

ERASMUS UNIVERSITY ROTTERDAM

ERASMUS SCHOOL OF ECONOMICS

BSc INTERNATIONAL ECONOMICS AND BUSINESS ECONOMICS

MAJOR MARKETING

---

# Flash Delivery Services and Their Influence on The Consumer Behavior of Students in Rotterdam

---

Student Name: Stefana Nevinglovschi

Student Number: 523158

Supervisor: Fleur Prins

Second Assessor: Marco Gregori

August 11, 2022



## Executive Summary

This paper investigates the influence of flash delivery services, such as Gorillas, Zapp, and Getir, inflicted on consumer behavior of students in Rotterdam when buying groceries. In terms of scientific relevance, this research fills a gap in the existing literature, as flash delivery services have not been addressed in academia, as a relevant sector of online retailing nowadays. In terms of managerial relevance, this research may benefit both online retailers and offline retailers, with insights regarding the consumer behavior of students, which could be strategically used afterwards for better marketing and advertising. The rise in online shopping may imply a reduction in offline shopping, which can lead to losses for traditional venues. Then, in terms of social relevance, the results of this research may serve consumers themselves by making them more aware of their own behavior. The central research question of this paper is "What is the influence of flash delivery services on consumer behavior of students in Rotterdam when buying groceries?".

As the first steps, the existing academic literature is reviewed, thus laying the background for this research. First, what drives consumers to buy online is the convenience aspect and the fact that they save a lot of time, as compared to buying in-store. Then, addressing flash delivery services, in particular, the key characteristics are the convenience of ordering groceries from the comfort of one's home and having them delivered to their door in a short period of time, as well as the accessibility to a wide range of grocery products just like in a supermarket. However, some downsides of using these services are the fixed delivery fee, as well as the surcharge for orders smaller than a certain amount, which makes small orders look expensive. Furthermore, looking at the relationship between online shopping and in-store shopping, some researchers have found the two to be complementary, while some authors have found a substitution relationship. As regards the current market for flash delivery services in Rotterdam, the startups have seen their peak in growth during the last lockdown imposed by the Dutch government because of the Covid-19 pandemic. Spending on these services was booming in the second half of 2021 and culminated from January until March 2022. Also, the most famous of all four services in the Netherlands appears to be Gorillas. With regard to the influence of accessibility to shops on online shopping, studies have shown that low accessibility to shops tends to increase the likelihood of buying online. Further studying the academic literature, it appears that online shopping increases the frequency of overall shopping among consumers. Last but not least, online shopping seems to be associated with a monotonous behavior of rebuying the same grocery items. Further, some research has been conducted regarding the use of flash delivery services by consumers in the Netherlands. The main findings are that a large proportion of consumers uses this convenient service as an alternative for when they forgot to buy certain items at

the grocery store, and many young people appear to be ordering largely snacks and drinks through flash delivery services.

As methodology, quantitative research was conducted, where primary data was collected through the means of a questionnaire and then, regression analysis was conducted to test relationships between variables. The key findings from this research are, first, that using flash delivery services tends to decrease the duration of shopping activity by 11.9 minutes, on average, for a student in Rotterdam. Second, students who use flash delivery services appear to be making fewer trips to the supermarket, as compared to students who do not use the services. This may imply that online grocery shopping is likely to substitute part of the in-store shopping trips. Then, using flash delivery services is associated with a higher frequency of overall grocery shopping. Furthermore, results show that students who use flash delivery services are more likely to purchase the same grocery items, possibly from different brands, than students who do not use the services. Also, the apps are designed in such a way that consumers often see their frequently bought products by default, which makes them more likely to rebuy the same products, rather than search for new items. This may lead to a monotonous purchasing behavior by default, and less brand exploration, as discovered in the literature. Last but not least, it seems that students who use flash delivery services in addition to supermarket shopping tend to purchase more snacks, as compared to students who do not use flash delivery services.

Concluding all these findings, the rise in flash delivery services in the Netherlands has impacted the consumer behavior of students in many ways, when it comes to grocery shopping. Consumers are more flexible now in the way they do their groceries. However, flash delivery services may influence consumers in spending more than actually needed. Especially students may easily fall into the trap of excessively using these services, without keeping track of the costs they incur in total. Nevertheless, it does not seem very likely that these services would be enough for consumers to stop going to the supermarket for groceries.

Lastly, some recommendations are provided for the flash delivery services. First, as concerns the uniformity of grocery shopping among online consumers, these startups could work on improving the customer experience in the online environment. Moreover, to encourage consumers to try new products, the online retailer could give recommendations on new products that could be bought together with the current selection. Further, in an attempt to aid the customer keep track of the total cost of their basket, the online retailers could build an algorithm that would keep the cumulative cost of the basket on the page at all times, with modifications as they add more products. One last suggestion would be to tailor the online shopping experience to each individual customer, based on their age and interests.

# Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Introduction</b>   | <b>6</b>  |
| 1.1      | Introduction of the topic . . . . .   | 6         |
| 1.2      | Problem Statement . . . . .   | 7         |
| 1.3      | Relevance . . . . .   | 7         |
| 1.3.1    | Scientific Relevance . . . . .  | 7         |
| 1.3.2    | Managerial Relevance . . . . .  | 8         |
| 1.3.3    | Social Relevance . . . . .  | 8         |
| 1.4      | Central Research Question . . . . .   | 8         |
| 1.5      | Theoretical Sub-questions . . . . .   | 8         |
| 1.6      | Empirical Sub-Questions . . . . .   | 8         |
| 1.7      | Limitations . . . . .   | 9         |
| 1.8      | Possible Ethical Research Issues . . . . .  | 9         |
| 1.9      | Chapter Descriptions . . . . .  | 9         |
| <b>2</b> | <b>Literature Review</b>  | <b>11</b> |
| 2.1      | Why do consumers buy products online? . . . . .   | 11        |
| 2.2      | What are the key characteristics of flash delivery services? . . . . .                                      | 13        |
| 2.3      | What is the relationship between online shopping and in-store shopping? . . . . .                           | 14        |
| 2.4      | What is the current market for flash delivery services in Rotterdam? . . . . .                              | 15        |
| 2.5      | How does the accessibility to shops influence consumer’s choice of using flash delivery services? . . . . . | 18        |
| 2.6      | What is the effect of flash delivery services on the frequency of shopping? . . . . .                       | 18        |
| 2.7      | How does using flash delivery services influence spending on groceries? . . . . .                           | 19        |
| 2.8      | Conceptual Model . . . . .  | 22        |
| <b>3</b> | <b>Methodology</b>  | <b>24</b> |
| 3.1      | Quantitative vs Qualitative Research . . . . .  | 24        |
| 3.2      | Research Design . . . . .   | 24        |
| 3.3      | Data Collection Method . . . . .  | 25        |
| 3.4      | Analytical Techniques . . . . .   | 26        |
| <b>4</b> | <b>Results</b>  | <b>28</b> |
| 4.1      | Descriptive Statistics of the Survey Respondents . . . . .  | 28        |

|          |   |           |
|----------|---|-----------|
| 4.2      | Hypothesis Testing . . . . .  | 29        |
| 4.2.1    | $H_{10}$ : Using flash delivery services does not decrease the duration of shopping activity  | 30        |
| 4.2.2    | $H_{20}$ : Flash delivery services are likely to substitute supermarket shopping trips . .  | 31        |
| 4.2.3    | $H_{30}$ : The distance between home and supermarket is not positively associated<br>with the tendency of using flash delivery services . . . . .                             | 31        |
| 4.2.4    | $H_{40}$ : Using flash delivery services does not increase the frequency of grocery shop-<br>ping among consumers . . . . .   | 32        |
| 4.2.5    | $H_{50}$ : Using flash delivery services is not associated with uniformity of grocery<br>products bought . . . . .  | 33        |
| 4.2.6    | $H_{60}$ : Consumers who use flash delivery services in addition to supermarket grocery<br>shopping do not purchase more unnecessary products, such as snacks and drinks .    | 35        |
| <b>5</b> | <b>Conclusion and Recommendations</b>   | <b>37</b> |
| 5.1      | Key findings from the literature review . . . . .   | 37        |
| 5.2      | Key findings from the quantitative research . . . . .   | 39        |
| 5.3      | Answering the central research question: "What is the influence of flash delivery services<br>on consumer behavior of students in Rotterdam when buying groceries?" . . . . . | 40        |
| 5.4      | Recommendations for flash delivery services . . . . .   | 42        |
| 5.5      | Limitations . . . . .   | 43        |
| 5.6      | Recommendations for future research . . . . .   | 44        |
| <b>6</b> | <b>Appendix</b>   | <b>48</b> |

# 1 Introduction

## 1.1 Introduction of the topic

Over the past years, there has been a tremendous shift to a digitalized world, where almost everything can be accomplished remotely from the press of a button. Perhaps coming from the desire to simplify their lives, to make everything effortless, time-efficient, and enjoyable, people continuously come up with new ideas. Back in the day, when the Internet emerged, very few people had access to it, and those who did were using it mainly to search for information. Today, slowly but steadily, the Internet has taken over our lives. People rarely do something without using the Internet, which shows how big of a role the Internet has in our lives. Addressing the central topic of this paper, with the new developments of the internet, there's been a global revolution in retailing ([Munson et al., 2017](#)). Innovations in technology over the last years have led to major changes in consumer shopping activities ([Schüler et al., 2020](#)). As [Rajan \(2019\)](#) noticed, manufacturers are switching from a B2B to a B2C business since consumers are switching to online shopping now. So, we notice how service providers are adapting to the changing needs and desires of customers. To be able to keep up, they have to embrace innovation. Those who do not eventually become obsolete. The e-commerce industry in the Netherlands was estimated at 26.6 billion euros in 2020, which showed a seven percent growth from 2019. Then, online sales in 2021 accounted for 10.3 percent of the country's total retail industry. Furthermore, online grocery shopping has been estimated that it would grow so much by 2025 when 75 percent of consumers will be buying 25 percent of groceries online ([Sarkovská and Chytková, 2019](#)).

With regard to online grocery shopping, the shopping rate among Dutch consumers is higher than in any other European country ([Coppola, 2021](#)). The 2019 year has recorded one-third of the Dutch households admitting to having ordered groceries online at least once in the past year ([Coppola, 2021](#)). This rate was higher than in Belgium, Germany, Italy, and the United Kingdom. There has been a considerable surge in online shopping in the past years, particularly since the Covid-19 pandemic started, which changed the behaviour of people. Ever since April 2020 Dutch consumers have become increasingly open to online grocery shopping ([Chevalier, 2022](#)).

Further, there has been a rising trend in grocery shopping online, particularly using flash delivery services, such as Gorillas, Zapp, Getir, and Flink, which are present not only in the Netherlands but in countries such as Germany, UK, Belgium, as well. According to [Pleuni \(2022\)](#), flash delivery startups in the Netherlands have experienced considerable growth in their turnover. Over the last six months, the percentage of people in the Netherlands who claimed using flash delivery services has doubled ([Ruetir, 2022](#)). With these major advancements, some changes in consumer behavior are bound to happen. From

a marketing perspective, it is interesting to explore these possible changes in consumer behavior inflicted by the transition from traditional retailing to e-tailing.

## **1.2 Problem Statement**

This paper will investigate the influence of flash delivery services, such as Gorillas, Zapp, and Getir, inflicted on the consumer behavior of students in Rotterdam when buying groceries. To begin with, the focus will be on the Netherlands specifically, because of their highest online grocery shopping rate, in Europe, which was mentioned above. Also, the Netherlands, as a country, is a perfect hub spot for innovation, due to their progressive culture ([InvestInHolland, 2021](#)). They've always been open-minded, adopting and setting new trends. Many entrepreneurs find the Netherlands an ideal place to launch their business idea. Hence, a lot of innovative ideas have started here. Particularly, as Rotterdam is one of the two largest cities in the Netherlands, very diverse and business-oriented, it represents a high interest in the study. Furthermore, the population sub-group selected for this study is that of students, as young people are usually more likely to adopt new technologies, must have Internet access, and use the Internet excessively ([Maat and Konings, 2018](#)). Also, the profile of the average online shopper is dominated by young people ([Maat and Konings, 2018](#)). In fact, according to a market researcher, GfK, particularly young people between the ages of 18 and 34 frequently use flash delivery services ([Ruetir, 2022](#)).

The interest in consumer behavior has arisen from personal experience of using flash delivery services and the observation that consumers behave differently in an online environment. For instance, some aspects that may be considered are the time spent on grocery shopping, the spending, the frequency of buying, as well as the type of products bought. Although in theory, buying online and in-store may reflect a similar activity, serving the same purpose, the process and experience are quite different. The phenomenon is not explored enough in academia; thus, this research may bring some contributions to the existing literature by shedding some light on the recent developments in the retailing industry and the implications on consumer behavior.

## **1.3 Relevance**

### **1.3.1 Scientific Relevance**

In terms of scientific relevance, this research will fill a gap in the existing literature by tackling the behavioral differences aspect in students as consumers, who buy groceries both online and in-store. In particular, flash delivery services have not been addressed in academia, as a relevant sector of online retailing nowadays. There has been quite some research into online shopping, the reasons why consumers

shop online, the relationship with shopping travel, as well as the transition from traditional shopping to e-shopping, and others. However, there's no academic research about flash delivery services in the Netherlands and the impact on consumer behavior of students.

### **1.3.2 Managerial Relevance**

Then, in terms of managerial relevance, this research may benefit both online retailers and offline retailers, with insights regarding the consumer behavior of students, which could be strategically used afterwards for better marketing and advertising. Offline retailers may find understanding the changes inflicted on students' consumer behavior by flash delivery services, such as Gorillas, Zapp, and Getir, quite important, since it may be the case that online retailers are capturing too much of the market, competing for the same clients. They must pay attention to these behavioral changes and be quick in their actions. The rise in online shopping may imply a reduction in offline shopping, which can lead to losses for traditional venues.

### **1.3.3 Social Relevance**

Last but not least, in terms of social relevance, the results of this research may serve consumers themselves by making them more aware of their own behavior. After a few conversations with some consumers, it may be stated that there is an interest in this research from the consumer side, as not many have attempted to look into this phenomenon.

## **1.4 Central Research Question**

*What is the influence of flash delivery services on consumer behavior of students in Rotterdam when buying groceries?*

## **1.5 Theoretical Sub-questions**

- Why do consumers buy products online?
- What are the key characteristics of flash delivery services?
- What is the relationship between online shopping and in-store shopping?

## **1.6 Empirical Sub-Questions**

- What is the current market for flash delivery services in Rotterdam?
- How does the accessibility to shops influence consumer's choice of using flash delivery services?



- What is the effect of flash delivery services on the frequency of shopping among consumers?
- How does using flash delivery services influence the spendings on groceries?

## **1.7 Limitations**

As it is expected for a Bachelor's thesis paper, there are certain limitations that should be considered, which may affect the research results. First, due to time constraints and resource limitations, a relatively small sample size is expected to be drawn from the population of interest, which may affect the accuracy of the results. Then, as regards the data collection method, given that this research will be based on results from a survey, the responses thus gathered may not truly reflect the consumer behavior of students when doing groceries. Furthermore, a certain bias may exist, due to possibly omitting some external factors, which may impact the validity of the results. Lastly, the reader should take into consideration that this is a small study conducted by a Bachelor's student, thus, the scope and depth of the discussions are bounded by the knowledge and experience of the author.

## **1.8 Possible Ethical Research Issues**

When conducting research, one should take into consideration possible ethical issues that may arise. Especially in the study of consumer behavior, ethical issues could appear in the way the data is collected and used afterwards. As this research is intended to shed some light on the influence of flash delivery services on the consumer behavior of students, the findings could be strategically used by marketers for better marketing and advertising. Although the survey will not ask for sensitive information from the consumers, which could pose a major issue in research, the insights into the consumer decision-making process while shopping may prove to be extremely valuable for online and offline retailers. Thus, they could adopt different strategies tailored to different types of customers.

## **1.9 Chapter Descriptions**

Chapter 1 has introduced the topic, as well as the problem that requires investigation. Then, the relevance of the study was discussed, followed by the central research question. In order to answer this question, seven sub-questions were defined, out of which three theoretical ones and four empirical ones. Lastly, some research limitations were discussed, as well as possible ethical research issues.

Chapter 2 entails a review of the existing academic literature, which aids in answering the sub-questions from chapter 1. Based on the findings from the literature, six hypotheses are formulated, assuming certain effects and relationships apply to the study population. This chapter ends with a con-

ceptual model which summarizes the six hypotheses, thus helping the reader have a better understanding of the expected results.

Chapter 3 entails an explanation of the methodology used in this paper, such as research design, data collection method, and analytical techniques. It also provides reasoning for why certain techniques were preferred.

Chapter 4 entails the results section, which starts with presenting the descriptive statistics of the survey respondents, and then a separate discussion of each of the hypotheses tested, with its results.

Chapter 5 entails the conclusion of this research and recommendations provided based on the findings. It starts with a summary of the key findings from the literature review, then a discussion of the key findings from the quantitative research, followed by a section where the central research question is largely discussed. Further, some recommendations for flash delivery services are provided, as well as limitations that impacted the research findings. Lastly, some recommendations for future research are offered.

## 2 Literature Review

### 2.1 Why do consumers buy products online?

First, when talking about online shopping, we can use multiple synonyms such as electronic shopping, virtual shopping, digital shopping, electronic commerce, home shopping, and more (Bhagyasree and Venugopal, 2021). More and more consumers prefer online stores over brick-and-mortar stores nowadays, and this is part of the globalization trend that has been accelerated by the Covid-19 pandemic (Vasudevan et al., 2022). During the Covid-19 pandemic, consumers have started reconsidering the way they do their groceries, and for some, it even became a necessity (Alaimo et al., 2020). It is estimated that in the Netherlands alone, the number of e-commerce users will amount to 13.4 million by 2025 (Statista, 2022). Below is a graph illustrating an increasing trend of buying online among consumers over the last ten years.

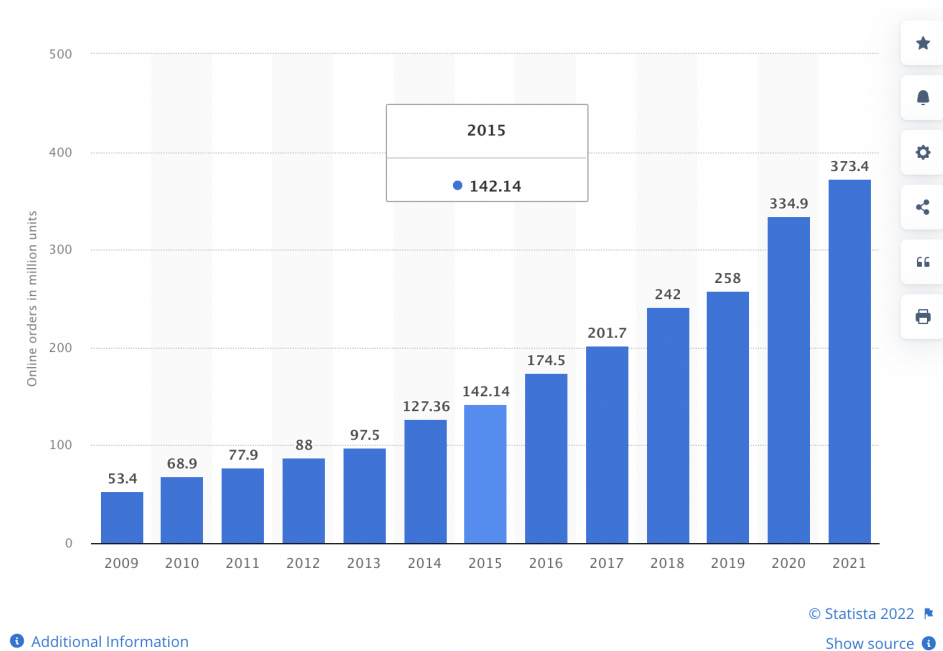


Figure 1: Increasing trend of online buying over the last ten years

*Note.* The Y-axis represents the online orders in million units, and the X-axis shows the years when the online orders were recorded.

This rising trend prompted authors such as Bhagyasree and Venugopal (2021) to investigate the reasons why consumers choose to shop online. According to their findings, the primary reasons for which consumers shop online are convenience, saving time, effort, and money. Online shopping is more convenient than traditional shopping because time is not a barrier (Bhagyasree and Venugopal, 2021). Furthermore, buying online allows you to compare different products by checking product specifications

and product reviews, as well as compare the prices offered by different resellers, and choose the most affordable one. All in all, as indicated by the respondents, the most important aspect of online shopping is the possibility of making a purchase at any time of the day from anywhere, since online store websites are available 24/7. Studies regarding online grocery shopping were conducted even 22 years ago, and it seems that consumers were driven by the same motivators, namely convenience and saving time, as depicted by [Morganosky and Cude \(2000\)](#).

Further, [Kumar and Kashyap \(2018\)](#) found convenience as one of the primary motivators to shop online. They studied the behavior of grocery shoppers and concluded that they act as utilitarian consumers, which means that they look for the most efficient way to achieve their goals. Although utilitarian shoppers behave in the same way in an offline store, the convenience of online grocery shopping makes the shopping process more efficient as they can minimize both financial and non-financial costs. Then, worth mentioning is also the study of [Anesbury et al. \(2015\)](#) which showed that consumers buy more efficiently online than in a store, mostly due to the search function they can use online to look up the products desired, instead of walking through each aisle in a supermarket to find all the correct products. Another study, by [Sarkovská and Chytková \(2019\)](#), reported that consumers usually switched from traditional shopping to online shopping either because of an external force driving them, such as an injury or giving birth, or due to an internal motivation to save time or energy. Lastly, [Brand et al. \(2020\)](#) also concluded that convenience is what mainly drives consumers to shop for groceries online.

To conclude this section and answer the first sub-question, it seems quite clear that consumers prefer shopping online over in-store, more and more nowadays because it proved to be more convenient and less time-consuming. Also, some find online shopping less costly, as they take into consideration both financial costs and non-financial costs, the latter being the cost incurred to travel to a physical store. People nowadays are always in a rush and they cannot afford to waste time, so they always look for the most efficient way of doing things. So, even when it comes to shopping, which used to be viewed as a leisure activity, people prefer buying online because it saves them a lot of time and trouble. The study of [Anesbury et al. \(2015\)](#) showed that the average duration of completing a grocery basket online is smaller than the average in-store time duration, not including the travel time. All in all, as it seems that time-saving is a major advantage brought by online shopping, which could imply that people take less time to shop online than in a supermarket, this paper will assume that using flash delivery services decreases the duration of shopping activity. So, the following hypothesis is formulated:

*H1<sub>0</sub>: Using flash delivery services does not decrease the duration of shopping activity.*

*H1<sub>a</sub>: Using flash delivery services decreases the duration of shopping activity.*

## 2.2 What are the key characteristics of flash delivery services?

Next, to investigate the impact of flash delivery services, this paper should discuss what these services entail for consumers in general. Since flash delivery services have gained in popularity only recently when the Covid-19 crisis began, there is not much academic literature investigating this service yet. Various studies have been published exploring the concept of online grocery shopping and the effects on consumer behaviour, but flash delivery services, in particular, have not been addressed. However, since flash delivery services represent a form of online buying, this phenomenon provides an opportunity for new research to be conducted, regarding significant trends from past literature.

Flash delivery services are defined as shopping service that delivers your groceries to your door within ten minutes ([Flitsbezorgd.nl](https://www.flitsbezorgd.nl), 2021). The advantages brought by these services are that you get your groceries very fast, from the comfort of your home, anytime from the morning until midnight, with the possibility of tracking your order live within the app. Also, you have access to a wide range of products, from food to non-food items, for almost the same prices as they are in a supermarket. Plus, not only do they offer supermarket groceries, but many other products from bakeries, coffee shops, or restaurants. Usually, there is a very low to no minimum order amount. However, if you spend less than a certain amount, say 20 euros, a surcharge is added to compensate for the small order. Hence, this tactic may be perceived as a minimum order amount for which you are not charged extra. One key characteristic of flash delivery services which may be considered a disadvantage compared to buying from a supermarket by some consumers, is the delivery cost incurred every time they order. There are different delivery costs depending on the online retailer. Usually, there is a flat rate combined with threshold-based free shipping, where the retailer absorbs the cost of the delivery for orders larger or equal to a predefined amount ([Flitsbezorgd.nl](https://www.flitsbezorgd.nl), 2021).

Furthermore, these shopping services are constantly looking to attract new customers, as well as retain their existing customers. Therefore, they have adopted a technique where they offer promotional codes offsetting the total order price. For instance, new customers receive a 20 percent discount or 10 euros discount on their first order, a method which works quite well. Then, there is the referral code, which you can share with your friends; when they make their first order, they get a discount, and you get shopping credit in your account. You can pay through almost any payment platform, such as iDeal, PayPal, Apple Pay, or Credit Card ([Flitsbezorgd.nl](https://www.flitsbezorgd.nl), 2021).

To summarize this section and answer the second sub-question, the key characteristics of flash delivery services are the convenience of ordering groceries from the comfort of one's home and having them delivered to their door in a short period of time, as well as the accessibility to a wide range of grocery

products just like in a supermarket. Some downsides of ordering groceries through these services compared to buying them from a physical store is that consumers incur a fixed delivery fee, as well as a surcharge for orders smaller than a certain amount, which makes small orders look expensive. However, setting a minimum order amount for which the surcharge is not applied, as well as a threshold-based free shipping may incentivize consumers to order more, just to offset these extra costs.

### 2.3 What is the relationship between online shopping and in-store shopping?

This section focuses on the relationship between e-shopping and in-store shopping. As stated by [Cao et al. \(2013\)](#) in 2013, there was little research into the relationship between e-shopping and traditional in-store shopping at the time. They looked at several studies about the effects of online buying on individuals' shopping travel, and some of these found substitution effects across many countries. For instance, one study conducted in the Netherlands in 2007 showed that more than 20 percent of online Dutch shoppers made fewer trips to the store in the centre ([Weltevreden and Rietbergen, 2007](#)). However, one year before that, [Farag et al. \(2006a\)](#) discovered a complementarity relationship between online shopping and offline shopping for consumers in the US and the Netherlands. With regard to Dutch consumers, they concluded that those who frequently buy online were more likely to shop more overall than those who only shop in-store. Therefore, this implied that e-shopping was not likely to substitute offline shopping, but rather complement it. Then, one year later, [Farag et al. \(2007\)](#) developed a structural equation model of the relationship between e-shopping and in-store shopping, concluding that e-shopping and in-store shopping tended to complement or generate each other, with regard to shopping trip frequency.

Furthermore, [Etminani-Ghasrodashti and Hamidi \(2020\)](#) later in 2020 discovered a complementary relationship between in-store shopping and online shopping, and the latter may even motivate consumers to do more in-store shopping in Iran. Then, some other authors have explored the effect of online shopping on the trip frequency and found that online shopping is associated with more frequent in-store shopping trips, such as [Lachapelle and Jean-Germain \(2019\)](#) in Canada and [Xi et al. \(2018\)](#) in China.

Nevertheless, several studies have shown the opposite effect, namely that online shoppers make fewer in-store shopping trips. Some of the authors that came to this conclusion are [Bjerkan et al. \(2020\)](#) in Norway, [Shi et al. \(2019\)](#), and [Xi et al. \(2020\)](#) in China.

To conclude this section and answer the sub-question, there are contradictory findings about the effect of online shopping on the frequency of in-store shopping trips. There is no clear conclusion about the relationship between online shopping and in-store shopping. However, these findings refer to shopping

in general, including different categories of products, such as books, clothing, groceries, and more. Most substitution of in-store shopping with online shopping was found for people with low access to a car (Shi et al., 2019). When talking about the Netherlands, people in general travel by bike to supermarkets or even walk, so not having a car is not an inconvenience. In general, in the Netherlands, residents can't complain about inaccessibility to stores due to a high density of grocery shops (Maat and Konings, 2018). So, the relationship is thought to be complementary rather than substitutionary in the Netherlands. To test previous results of Farag et al. (2007) according to the current time, this research will assume that shopping groceries online through flash delivery services is not likely to substitute supermarket shopping trips. The following hypothesis is formulated:

*H<sub>20</sub>: Flash delivery services are likely to substitute supermarket shopping trips.*

*H<sub>2a</sub>: Flash delivery services are not likely to substitute supermarket shopping trips.*

## 2.4 What is the current market for flash delivery services in Rotterdam?

Since this research paper is investigating the impact of flash delivery services on the consumer behavior of students in the Netherlands, it seems logical to first present what this market looks like in the Netherlands, based on recent reviews and website publications.

According to Pleuni (2022), flash delivery startups in the Netherlands have experienced considerable growth in their turnover. In 2021, it was estimated that by the end of the year, Dutch consumers were spending around 40 million euros per month on flash deliveries. Moreover, November of that same year found 700.000 Dutch consumers using flash delivery services (Pleuni, 2022). Over the last six months, the percentage of people in the Netherlands who claimed using flash delivery services has doubled (Ruetir, 2022). While it was about 200,000 in the first half of 2021, the number became around 700,000 in January 2022 (Kantar, 2022).

The growth is not stopping in 2022 when the turnover is expected to reach one billion euros. Also, it is not only in the Netherlands, but flash delivery startups have been growing across Europe; Getir is a Turkey-based company that has been revolutionizing delivery services since 2015. It currently operates in 30 cities in Turkey. Then, Getir was launched in the UK in January 2021, followed by Amsterdam in May 2021 (InvestInHolland, 2021). Next, Gorillas is a German startup founded in May 2020. It was successfully launched in Amsterdam in March 2021, before Getir. Gorillas is one of the most famous flash delivery services in the Netherlands, or "market leader in flash delivery", as claimed by the Jumbo CFO, Ton Van Veen (Seveno, 2022). Founded in the early stages of the Covid-19 pandemic, Gorillas

has become now one of the fastest growing companies in Europe, by making investments of hundreds of millions of dollars (Ruetir, 2022).

Regarding demand, Gorillas is followed by Flink, Zapp, and lastly Getir (Pleuni, 2022). Flink is another German delivery service that came to the Netherlands at the beginning of 2021. It is said to have the largest delivery area from all these services (snellesupers, 2021). Then, the last one to come to the Netherlands is Zapp, a British company that delivers 24 hours a day, seven days per week. Below is a table comparing the four main flash delivery services existent in the Netherlands, in terms of the estimated time of delivery, minimum order amount, and delivery costs - which are actually the same in all four cases, namely one euro and 80 cents. Zapp is the only service available 24/7.

Table 1: Flash Delivery Services Comparison

| Name     | Estimated delivery time (minutes) | Minimum order amount (EUR) | Delivery cost (EUR) |
|----------|-----------------------------------|----------------------------|---------------------|
| Gorillas | 10                                | 0                          | 1.80                |
| Getir    | 10                                | 10                         | 1.80                |
| Zapp     | 20                                | 0                          | 1.80                |
| Flink    | 10                                | 5                          | 1.80                |

Currently, all these services operate in Rotterdam, as well as many other cities in the Netherlands, as their delivery areas are expanding rapidly (Kantar, 2022). Also, 13 percent of the Dutch population lives in an area where one of these companies delivers (Kantar, 2022). Moreover, approximately half of the population in the Netherlands is familiar with the concept of flash delivery services, but it became a trend mostly among young people. However, the large majority of the Netherlands does not use these services and the reason seems to be that flash delivery services are mostly available in major cities in the Netherlands, such as Rotterdam, Amsterdam, The Hague (Markteffect.nl, 2022). The table below illustrates all the cities where flash delivery companies operate.

Table 2: Delivery areas of flash delivery services in the Netherlands

| Service Name | Delivery areas in the NL   |
|--------------|--|
| Gorillas     | Amsterdam, Arnhem, The Hague, Groningen, Haarlem, Leiden, Nijmegen, Rotterdam, Tilburg and Utrecht   |
| Getir        | Amsterdam, Amstelveen, The Hague, Leiden and Rotterdam   |
| Zapp         | Amsterdam and Rotterdam  |
| Flink        | Almere, Amsterdam, Arnhem, Apeldoorn, Breda, Delft, Deventer, The Hague, Eindhoven, Enschede, Groningen, Haarlem, Hengelo, Hilversum, Nijmegen, Rotterdam, Tilburg, Utrecht, Zeist, Zoetermeer |



One may wonder how these companies manage to deliver your groceries so fast. The answer is through the so-called "dark stores", which are nothing more than some warehouses around the city, located very conveniently for delivery people to pick up the groceries at lightning speed and deliver them to your door in no time. Recently there has been some controversy with respect to these dark stores, which are often located in the middle of residential areas. Locals from Amsterdam and Rotterdam have been complaining about noise, blocked sidewalks, and reckless bicycle or scooter delivery drivers ([NLTimes, 2022](#)). As reported by [Shamaa \(2022\)](#), many residents order at the end of the day, which means that delivery drivers wait outside these dark stores at late hours. Also, as the drivers have to deliver the groceries in no time, their bikes and scooters often make a lot of noise around the neighbourhoods, which causes frustration for residents. Therefore, the two cities have banned the reopening of any new dark stores for at least one year, while they will decide under what conditions they could open ([NLTimes, 2022](#)). In response, Gorillas was "disappointed and surprised" by the decision of Amsterdam and Rotterdam municipalities, but the company adopted a constructive position, where they are willing to consult with the municipalities to make things better ([NLTimes, 2022](#)). Getir also made a statement where they mentioned they regretted the measures taken, but they are also willing to consult with the municipalities ([NLTimes, 2022](#)). Nevertheless, Gorillas has found a solution for new distribution centers, set up in already existing supermarket chains, such as Jumbo. The collaboration is a smart strategy, since Gorillas does not need to find new warehouses, but can get their supplies from supermarkets, which also benefits the supermarket chain to a large extent. Furthermore, the company Getir has initiated a pilot project where they change the aspect of the so-called dark stores by displaying art in the shop windows, thus making it look like an art store. This both supports small local artists as well as improves the streetscape of the neighbourhoods, which could be a solution for the residents who complained not only about the nuisance of these stores but also their inappropriate plastered windows ([Mildred, 2022](#)).

Nevertheless, one interesting fact is that ever since the lockdown has ceased to exist in the Netherlands, the growth of flash delivery services has been stagnating. This is reported by ABN AMRO, on the basis of debit card transactions ([Mildred, 2022](#)). This could lead to some losses for these companies.

To conclude this section and answer the sub-question, flash delivery services have seen their peak in growth during the last lockdown imposed by the Dutch government because of the Covid-19 pandemic. Spending on these services was booming in the second half of 2021 and culminated from January until March 2022. Gorillas is the most famous of all four services available in the Netherlands. It is not certain how the success of these flash delivery services will continue this year, given that things almost returned to normal from the lockdown period, and the initial excitement of consumers has diminished.

Also, the future looks uncertain for these flash delivery companies because of the latest decision to ban the establishment of new distribution centers in cities. It is a matter of time to see how these companies manage to survive and what ideas they implement to keep their customers engaged.

## **2.5 How does the accessibility to shops influence consumer's choice of using flash delivery services?**

Since the concept of flash delivery services implies buying groceries from the comfort of one's home, and a few studies have shown a relationship of complementarity between online shopping and in-store shopping, it seems relevant to ask whether the distance one travels from their home to a supermarket influences their likelihood of buying online.

[Frag et al. \(2005\)](#) have tested the influence of one's residential environment and the accessibility to shops on e-shopping in the Netherlands. Their findings suggest that residents of highly urbanized areas are more likely to buy online, but also that low accessibility to shops increases the likelihood of buying online. Another study has found that good shop accessibility negatively impacts the frequency of online shopping ([Frag et al., 2006b](#)). Moreover, the authors also argue that people living in urbanized areas in the Netherlands are more inclined to adopt e-shopping, compared to people who live in non-urbanized areas, which may be explained by differences in lifestyle.

To conclude, based on the findings from the studies above, it seems that low accessibility to shops tends to increase the likelihood of buying online. Hence, this research paper intends to further look into this association between the distance from one's home to a supermarket and their likelihood of shopping online. So, the following hypothesis is formulated:

*H3<sub>0</sub>: The distance between home and supermarket is not positively associated with the tendency of using flash delivery services.*

*H3<sub>a</sub>: The distance between home and supermarket is positively associated with the tendency of using flash delivery services.*

## **2.6 What is the effect of flash delivery services on the frequency of shopping?**

Nevertheless, a major effect that has been studied in academia is that of online shopping on the frequency of shopping. In their paper, [Shi et al. \(2019\)](#) look at how e-shopping affects shopping travel in China. They examine e-shopping behavior for four types of goods: clothes and shoes, electronics, food

and drink, and cosmetics. One of their findings is that e-shopping and shopping travel behaviors are significantly influenced by factors, such as socio-demographics, internet experience, car ownership, and location. They have reached the conclusion that e-shopping has a substitution effect on the frequency of shopping trips in China. Therefore, they suggest that e-shopping could be a solution to urban congestion. However, they also found that e-shopping leads to an increase in the frequency of total shopping, which could imply that their shopping demands are induced by e-shopping.

While the study of [Shi et al. \(2019\)](#) showed that people in China who frequently buy online are less inclined to shop in-store, [Farag et al. \(2006a\)](#) showed that people in the Netherlands who frequently buy online, also tend to shop in-store more often. So, the frequency of shopping trips increases with the frequency of online buying. However, frequent online shoppers in China appeared to be shopping more overall, compared to people who do not shop online.

All in all, to conclude this section and answer the sub-question, existing studies suggest that online shoppers have a higher frequency of overall shopping than offline shoppers. So, e-shopping does not seem to replace in-store shopping, but rather complements it, which in the end results in more shopping. Nevertheless, these studies looked at shopping on a broad scale, not necessarily focusing on groceries. Thus, this research paper will shed some light on this specific category of shopping by investigating the overall frequency of grocery shopping among consumers and see if there is a difference between online shoppers and supermarket shoppers. So, the following hypothesis is formulated:

*H<sub>40</sub>: Using flash delivery services does not increase the frequency of grocery shopping among consumers.*

*H<sub>4a</sub>: Using flash delivery services increases the frequency of grocery shopping among consumers.*

## **2.7 How does using flash delivery services influence spending on groceries?**

[Sarkovská and Chytková \(2019\)](#) have tried to understand how switching from traditional grocery shopping to online grocery shopping has changed consumer behavior. They conducted a qualitative study of online grocery supermarket customers in the Czech Republic, which is one of the top European countries when it comes to sales of groceries online ([Sarkovská and Chytková, 2019](#)). They have found substantial changes in their consumer behavior when shopping online, compared to in-store. First, as one of the benefits of online shopping, consumers have reported more efficient shopping planning and higher perceived efficiency of shopping trips. By buying more efficiently, consumers claim to buy fewer unnecessary products than they usually do in a supermarket ([Sarkovská and Chytková, 2019](#)). However,

one pitfall of online grocery shopping perceived by consumers is the increased shopping uniformity (Sarkovská and Chytková, 2019). To elaborate on that, shopping uniformity means that consumers buy more or less the same products every time they shop which does not require much effort or time, so this contributes to time-saving on grocery shopping. However, consumers claim that shopping more uniformly leads to monotony in their diet (Sarkovská and Chytková, 2019).

Anesbury et al. (2015) have analysed the behaviour of 40 shoppers from Australia, throughout the grocery shopping process. The first conclusion is that when shopping online consumers want to see their favourite brands quickly. However, retailers may choose to display on the first page brands that are currently on deals or brands which can bring them higher margins. The results of Anesbury et al. (2015) suggest that these strategies of retailers may not be wise as they could increase shopping navigation time. The first-page position on an online grocery store seems to be highly valuable for brands. Their findings also suggest that some product categories take longer to buy than others, for instance, shampoo which is bought less frequently than food, thus it has lower brand familiarity (Anesbury et al., 2015). This study also shows that consumers do not look at many options when shopping online, so if they only see familiar brands and products, they will likely buy them. Moreover, they readily satisfy their shopping needs and make a selection from a range of known and approved brands (Anesbury et al., 2015). These findings are to some extent in line with the findings of Sarkovská and Chytková (2019) about shopping uniformity.

To summarize these findings, shopping in an online supermarket seems to be associated with default behavior, where consumers rebuy the same grocery items, often using the default page or favorites list. This proves to be more time-efficient and cost-efficient than shopping in a supermarket, where consumers are more tempted by the point-of-purchase marketing (Sarkovská and Chytková, 2019). This may also imply that online consumers engage in less brand exploration. Flash delivery services are a different type of online supermarket, so it is worth investigating whether using flash delivery services also makes consumers shop more uniformly than in a supermarket. So, the following hypothesis is formulated:

*H5<sub>0</sub>: Using flash delivery services is not associated with uniformity of grocery products bought.*

*H5<sub>a</sub>: Using flash delivery services is associated with uniformity of grocery products bought.*

Then, to address the topic of spending, it is important to look at the most common categories of products ordered online with these flash delivery services. According to research by Markteffect.nl (2022), approximately 49 percent of Dutch consumers place online orders with flash delivery services for forgotten groceries. This suggests that people often use flash delivery services in unplanned situations

when they need an item that is missing from their home. Then, around 44 percent uses the services to buy groceries for dinner. This is in line with a statement from the Dutch Review about a lot of people ordering late at night (Shamaa, 2022). Further, particularly for young people, it has been found that 43 percent of them place orders for lunch, 41 percent for snacks, and 32 percent for drinks (Markteffect.nl, 2022).

To conclude and answer the sub-question, there is no clear report regarding the exact spendings of consumers in the Netherlands when it comes to flash delivery services, but an assumption may be drawn from the research conducted by Markteffect.nl (2022). The statistics show that people in the Netherlands do not generally use flash delivery services as an alternative to doing their regular groceries. Instead, they show that a large proportion of consumers uses this convenient service as an alternative for when they forgot to buy certain items at the grocery store, and flash delivery services can immediately save them the trouble. Then, in the case of young people, they seem to be ordering food for lunch, which could be explained by the fact that they are busy during the day so they do not have time to cook a proper meal, and they can find ready meals available to order with flash delivery services. Also, many young people appear to be ordering snacks and drinks, probably to satisfy some cravings late at night or when they spontaneously gather with their friends. These findings may further imply that they use flash delivery services in addition to their regular grocery shopping, which may increase their spending overall, compared to people who only shop in supermarkets. Thus, this paper will further investigate this phenomenon, namely whether consumers who use flash delivery services in addition to supermarket grocery shopping, tend to buy extra unnecessary products, such as snacks and drinks. So, the following hypothesis is formulated:

*H<sub>60</sub>: Consumers who use flash delivery services in addition to supermarket grocery shopping do not purchase more unnecessary products, such as snacks and drinks.*

*H<sub>6a</sub>: Consumers who use flash delivery services in addition to supermarket grocery shopping purchase more unnecessary products, such as snacks and drinks.*

## 2.8 Conceptual Model

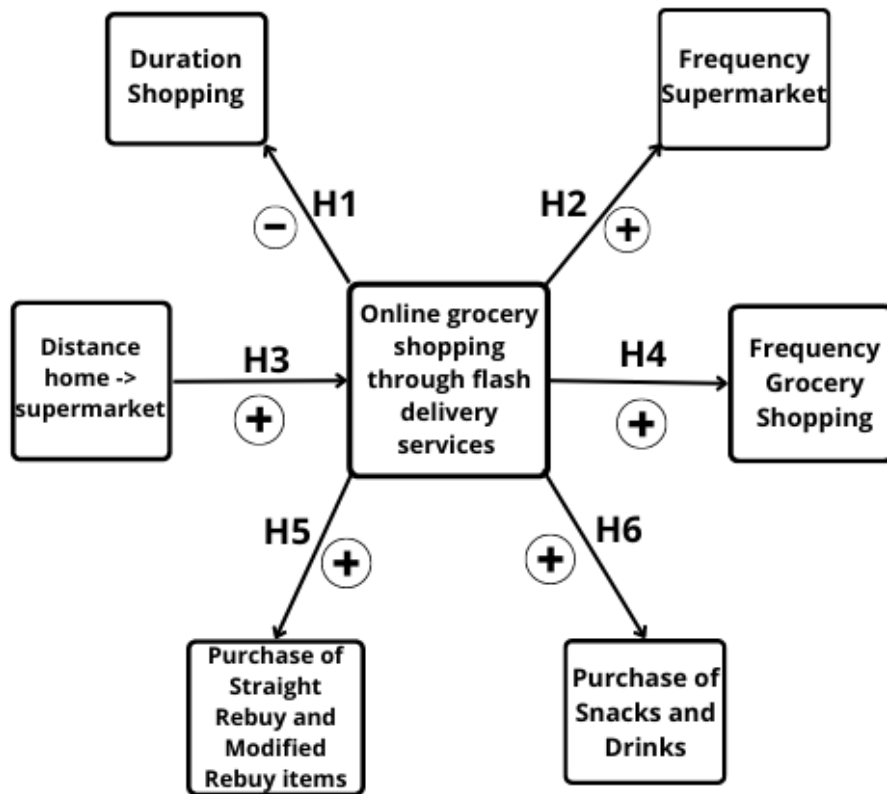


Figure 2: Conceptual Model

The figure above illustrates the conceptual model summarizing the hypotheses formulated above. The middle square shape represents the centre of the research, which is online grocery shopping through the use of flash delivery services. The model starts from the upper left square shape illustrating the first hypothesis which says that using flash delivery services decreases the duration of shopping activity. This negative relationship is illustrated through the minus sign along a continuous arrow to the variable Duration Shopping. The second hypothesis saying that flash delivery services are not likely to substitute supermarket shopping trips is illustrated through a plus sign along a continuous arrow connecting the centre to the variable for frequency of supermarket. The third hypothesis is represented by a plus sign along a continuous arrow indicating that the distance from home to a supermarket is positively associated with using flash delivery services. The fourth hypothesis is illustrated through a plus sign along a continuous arrow to the right, suggesting that using flash delivery services increases the frequency of grocery shopping. Then, the fifth hypothesis is illustrated through a plus sign along a continuous arrow

to the left bottom square, which shows a positive relationship between the use of flash delivery services and the purchase of straight rebuy and modified rebuy items. Last but not least, the sixth hypothesis is represented by a plus sign along a continuous arrow to the right bottom square, suggesting a positive relationship between the use of flash delivery services and the purchase of snacks and drinks.

## 3 Methodology

### 3.1 Quantitative vs Qualitative Research

When writing a research paper, there are two types of research to be conducted: quantitative and qualitative. Both of them provide an analysis of data, but they differ in the type of data collected, methods of data collection, and analysis techniques. The core difference is that quantitative research generates numerical data, while qualitative research produces textual or non-numerical data (Farnsworth, 2021). To elaborate on that, quantitative research deals with numbers and statistics and it is used to quantify opinions, behaviours, attitudes, and other defined variables in order to test hypotheses about a phenomenon and then contextualize the results from a study sample in a wider population. On the contrary, qualitative research deals with words and meanings and it is used in exploratory research, to gain an in-depth understanding of concepts, thoughts, and experiences (Farnsworth, 2021).

In quantitative research, quantitative data is collected through quantitative techniques, such as surveys, experiments, and observations. Further, to analyze quantitative data, mathematical and statistical methods are used, and the results are often reported in graphs and tables. Common statistical applications that can be used are Excel, Stata, SPSS, R. However, in qualitative research, qualitative data is collected through qualitative techniques, such as in-depth interviews, focus groups, and literature reviews. Also, analyzing qualitative data is more difficult than quantitative data, because it consists of images, videos, and text, instead of numbers. Some common techniques are qualitative content analysis, thematic analysis, and discourse analysis (Streefkerk, 2022).

### 3.2 Research Design

Given the scope of this research paper, namely to test the impact of flash delivery services on consumer buying behavior, quantitative research was the most suitable. With regard to the type of quantitative design, a descriptive design was preferred, which is used to measure variables and describe relationships between them (McCombes, 2022). The research focused on a narrow population, namely students from Rotterdam, which is quite a small and accessible population. Then, to select a representative sample for this population, probability sampling was used because it is the most statistically valid option (McCombes, 2022).



### 3.3 Data Collection Method

As a data collection method, there are two main survey techniques frequently used, questionnaire and interview, and both allow researchers to collect data about opinions, behaviours, experiences, and characteristics by asking people directly (McCombes, 2022). However, a questionnaire is more common in quantitative research, while interviews are more common in qualitative research. Given the quantitative nature of this research, a questionnaire was conducted, which entails a list of closed or multiple choice questions distributed online, by phone, by email, or in person. In this case, the questionnaire was distributed online, through common social media platforms such as LinkedIn, Facebook, and Instagram. The reason for this method of distribution is that students nowadays spend a lot of time on social media platforms, which increases the chances of a questionnaire reaching a big audience. In fact, it is a common practice nowadays to share questionnaires on social media platforms, either by making a post or a story. Furthermore, the questionnaire was also handed out personally to friends and peers studying in Rotterdam, and they were also asked to further distribute it to their contacts. Lastly, the questionnaire was also posted on SurveySwap, a platform where one can earn free survey respondents by filling out other people's questionnaires.

The questionnaire started with a socio-demographical part, where the respondents were asked questions about their age and level of education, as well as the distance between their home and the nearest supermarket. The question used a scale starting from 100 meters to 1000 meters (one kilometer), as a result of some conversations with students who were asked about their view on "close" and "far" when it comes to the distance from their homes to a supermarket. This particular question was used to test whether there is an association between the proximity of someone's house to a supermarket and their likelihood of using flash delivery services. Then the students were asked about how they do their groceries, with multiple choices, namely supermarket, online with flash delivery services, both, or other. For the respondents who chose online, the following question was formulated "What is the main reason for doing your groceries online?", with multiple choice options, namely convenience, saves time, saves effort, saves money, promotional codes, and other. The scope was to investigate what drives students in Rotterdam to buy groceries online.

Next, the following question categorized the respondents into two groups, either FDS users or non-users: "Do you use flash delivery services such as Gorillas, Zapp, Getir, Flink?". The next section differs depending on the answer to the former question. The respondents who answered yes were asked a set of questions about their online buying behavior, while the respondents who answered no were asked a similar set of questions, only about their in-store buying behavior. Nevertheless, the respondents from

the former group who chose "both" for how they do their groceries, were also asked to specify how often they shop in a supermarket. The frequency of shopping was measured in the number of times per week. Each question was carefully designed for one variable and the responses represented the values of that specific variable. Table 14 in the Appendix illustrates all the questions in the questionnaire with the respective variables created. In total, there were 19 variables which can be observed in the table below: Age - discrete variable, Gender - categorical variable, Status - categorical variable, Distance - continuous variable, Groceries - categorical variable, Reason Eshopping - categorical variable, FDS - binary variable, Frequency - count variable, Frequency Supermarket - count variable, Duration Shopping - continuous variable, Straight Rebuy - ordinal variable, Modified Rebuy - ordinal variable, Essential - ordinal variable, Snacks - ordinal variable, Drinks - ordinal variable, Forgotten - ordinal variable, Home Supplies - ordinal variable. To test the validity and reliability of the questionnaire, a pilot study was run by asking a couple of friends to fill out the questionnaire.

All in all, the questionnaire generated 185 responses, which were thoroughly filtered, thus removing "bad" answers, such as people who were not students, who were not in the target age group, or who did not complete the questionnaire properly. In the end, a sample of 155 students within the age group 18-25 was collected.

### **3.4 Analytical Techniques**

Regression analysis is the most common statistical tool used to describe relationships between dependent variables and independent variables. There are many different types of regressions to be performed, and choosing the right type depends on the data and the nature of the relationship. Therefore, it is essential to first figure out what type of data you are working with and then decide what type of regression you can apply. For instance, for a linear regression model, the data must follow a normal distribution, which is a probability distribution that is symmetrical, showing that data around the mean occur more frequently than data far from the mean (Chen, 2022). Also called the Gaussian distribution, it takes the shape of a bell curve, and it can be tested with the Shapiro-Wilk test which is believed to be the most powerful test for checking the normality of data (Korstanje, 2020). Furthermore, for a linear regression model, there needs to exist a linear relationship between the dependent and independent variables. This condition can be tested with scatter plots. Next, if the data follows a normal distribution and the linearity assumption is checked, a linear regression model can be built. Otherwise, if the relationship is non-linear, a non-linear regression can be built, such as binomial logistic regression, which is used to predict a binary dependent variable, such as FDS, based on one or more independent variables. In

the case of binary variables, such as FDS, they cannot follow a normal distribution, but they follow a Bernoulli distribution, which is defined as a discrete probability distribution, where the random variable can only have two possible outcomes (Cuemath, 2022).

For most of the hypotheses, a regression model was built, where the outcome variable was regressed on the explanatory variable, and two control variables were added, Gender and Status. The Gender variable was chosen as a control variable because gender has been found in multiple papers as a differentiator in the shopping behaviour of consumers. Status was also chosen as a control variable because having a job or not can play a big role in the shopping decisions of a student. Also, various authors, such as Farag et al. (2007) or Bhagyasree and Venugopal (2021), have considered Gender and Status as differentiators. Furthermore, in the recent research published by Markteffect.nl (2022), results for men and women are also considered separately.

The standard model used for a simple linear regression is:

*Model 1:  $Y = Constant + b1 * X$* , where Y is the dependent variable, X is the independent variable, and b1 is its coefficient

The standard model used for a logistic regression is:

*Model 2:  $\log(p/(p-1)) = Constant + b1 * X$* , where p is the probability of the outcome variable to take value 1, based on the independent variable X

For the fifth hypothesis, the uniformity of groceries bought is measured through the ordinal variables Straight Rebuy and Modified Rebuy. This hypothesis assumes that the dummy variable Both affects the odds of choosing a higher level of Straight Rebuy and Modified Rebuy. Therefore, the most suitable statistical method, in this case, is an ordinal logistic regression, which is a sub-type of logistic regression, but used when the outcome variable is categorical and ordered.

Lastly, for the sixth hypothesis, purchasing snacks and drinks is measured through the ordinal variables Snacks and Drinks, and using flash delivery services in addition to supermarket grocery shopping is measured through the dummy variable Both. The hypothesis assumes that the dummy variable Both affects the odds of choosing a higher level of Snacks and Drinks. This can be tested as well through an ordinal logistic regression.

Additionally, before performing logistic regressions, a chi-square test of independence was conducted, which is a statistical method to determine if there is an association between two categorical variables.

## 4 Results

### 4.1 Descriptive Statistics of the Survey Respondents

Table 3 below illustrates the descriptive statistics of 16 variables, such as the number of observations, mean, standard deviation, minimum and maximum. In order to work with these variables, some changes were required, such as transforming variables into dummy variables or creating new variables. For instance, for the gender variable, the female gender was coded with 1, while the male gender was coded with 0. Second, for the status variable, being a student was coded with 1, while being a self-employed/employed student was coded with 0. Then, for the binary variable FDS showing whether one uses flash delivery services or not, the yes answer was coded with 1, while the no answer was coded with 0. Lastly, for the categorical variable Groceries, a dummy variable named Both was created, which takes the value 1 in the cases where respondents use flash delivery services additionally to the supermarket visits, and 0 in the cases where respondents only buy from a supermarket.

Table 3: Descriptive statistics for the variables resulting from the questionnaire

| Variable              | Obs | Mean   | Std. Dev. | Min | Max  |
|-----------------------|-----|--------|-----------|-----|------|
| Age                   | 155 | 21.41  | 1.73      | 17  | 27   |
| Gender                | 155 | 0.52   | 0.50      | 0   | 1    |
| Status                | 155 | 0.66   | 0.47      | 0   | 1    |
| Distance              | 155 | 335.71 | 257.97    | 50  | 1000 |
| FDS                   | 155 | 0.55   | 0.49      | 0   | 1    |
| Frequency             | 155 | 3.23   | 1.49      | 1   | 7    |
| Frequency Supermarket | 155 | 2.68   | 1.39      | 0   | 7    |
| Duration Shopping     | 155 | 17.83  | 11.55     | 1   | 60   |
| Straight Rebuy        | 155 | 6.90   | 1.86      | 2   | 10   |
| Modified Rebuy        | 155 | 5.28   | 2.35      | 1   | 10   |
| Essentials            | 85  | 6.32   | 2.98      | 1   | 10   |
| Snacks                | 85  | 6.58   | 2.93      | 1   | 10   |
| Drinks                | 85  | 6.52   | 3.05      | 1   | 10   |
| Forgotten             | 85  | 6.14   | 2.94      | 1   | 10   |

Table 4 below represents a frequency table for the nominal variable Groceries. As can be noticed, the majority of respondents chose the supermarket as the main way of doing groceries, and a considerable number of 58 chose both supermarket and online. Then, only 3 respondents appear to be using flash delivery services exclusively as a way of doing groceries. The rest of the individual answers come from the Other option of the question.

Table 4: Frequency table for the nominal variable Groceries

| <b>Groceries</b>  | <b>Freq.</b> | <b>Percent</b> | <b>Cum.</b> |
|---|--------------|----------------|-------------|
| Both  | 58           | 37.42          | 37.42       |
| Market  | 1            | 0.65           | 38.06       |
| Market, supermarket<br>and speciality stores<br>(butchers, bakers, fromageries) | 1            | 0.65           | 38.71       |
| Online with Flash Delivery Services<br>(Gorillas, Zapp, Getir, Flink)           | 3            | 1.94           | 40.65       |
| Picnic  | 1            | 0.65           | 41.29       |
| Supermarket   | 89           | 57.42          | 98.71       |
| Supermarket and Market  | 1            | 0.65           | 99.35       |
| Supermarket and really really rare<br>with a delivery service                   | 1            | 0.65           | 100.00      |
| <b>Total</b>  | 155          | 100.00         |             |

*Note.* The second column illustrates the frequency of each value of the variable Groceries, meaning how many times each value was selected; the third column illustrates the proportion of each respective value out of the total values; the last column illustrates the cumulative proportions for all the values.

Table 5 below represents the frequency table for the nominal variable Reason Eshopping. As it can be observed, "Convenience" is the most frequent answer for the reason for shopping online, and the second most voted answer is "Saves time", results which are in line with the findings from the literature about motivators of online shopping. A few respondents also voted for the "Saves effort" answer, and the rest represented individual answers for the "Other" option.

Table 5: Frequency table for the nominal variable Reason Eshopping

| <b>Reason Eshopping</b>                                      | <b>Freq.</b> | <b>Percent</b> | <b>Cum.</b> |
|--|--------------|----------------|-------------|
| Convenience  | 34           | 55.74          | 55.74       |
| Promotional codes  | 1            | 1.64           | 57.38       |
| Saves effort   | 9            | 14.75          | 72.13       |
| Saves money  | 1            | 1.64           | 73.77       |
| Saves time   | 15           | 24.59          | 98.36       |
| Sometimes the supermarket is<br>closed when I need groceries | 1            | 1.64           | 100.00      |
| <b>Total</b>   | 61           | 100.00         |             |

*Note.* The second column illustrates the frequency of each value of the variable Reason Eshopping, meaning how many times each value was selected; the third column illustrates the proportion of each respective value out of the total values; the last column illustrates the cumulative proportions for all the values.

## 4.2 Hypothesis Testing

First of all, the Shapiro Wilk test was run for the following variables: Duration Shopping, Frequency Supermarket, Distance, and Frequency. The p-values for all the tests were higher than 0.05, which means that the null hypothesis stating that the data follow a normal distribution cannot be rejected. Therefore,

it can be stated that all these variables follow a normal distribution, criteria which allow for a linear regression to be conducted. Then, each set of variables for H1, H2, and H4 was described as a scatter plot diagram, to check for linear relationships, which is the second assumption of a linear regression analysis. As expected, linear relationships were found between the following pairs: Duration Shopping and FDS, Frequency Supermarket and FDS, Frequency and FDS (see Figures 3,4, and 5 in the Appendix). Next, for each one of the six hypotheses, a regression analysis was conducted, and the results are presented below in separate sections.

#### 4.2.1 $H_{10}$ : Using flash delivery services does not decrease the duration of shopping activity

As it can be noticed in Table 6 below, a negative relationship between Duration Shopping and FDS was depicted. As the p-value of the FDS's coefficient was smaller than 0.05, this effect seems to be statistically significant. So, to provide an interpretation of these results, the negative coefficient of 11.19 implies that when FDS takes a value of 1, Duration Shopping is expected to decrease by 11.19 units, compared to the case when FDS takes value 0. What this means is that using flash delivery services is associated with a lower duration of shopping activity by 11.19 minutes, as compared to not using flash delivery services. The regression equation is illustrated below:

$$\text{Duration Shopping} = 22.85 - 11.19 * \text{FDS} + 1.14 * \text{Gender} + 0.78 * \text{Status}$$

Table 6: Linear regression results for the relationship between Duration Shopping and FDS

| Variable     | Coefficient         |
|--------------|---------------------|
| FDS          | -11.19***<br>(1.65) |
| Gender       | 1.14<br>(1.65)      |
| Status       | 0.78<br>(1.74)      |
| Constant     | 22.85<br>(1.93)     |
| Observations | 155                 |
| R-squared    | 0.24                |

*Note.* Standard errors are reported in parantheses; R-squared shows the proportion of variance in the dependent variable explained by the independent variable; \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01.

Based on these results, the first null hypothesis stating that using flash delivery services does not decrease the duration of shopping activity is rejected, and thus, the alternative hypothesis is accepted as true.

#### 4.2.2 $H_{2_0}$ : Flash delivery services are likely to substitute supermarket shopping trips

The same type of regression model as for the first hypothesis was also applied for the second hypothesis. The regression equation is displayed below in italics, and the results are illustrated in Table 7.

$$\textit{Frequency Supermarket} = 3.23 - 0.55*\textit{FDS} - 0.56*\textit{Gender} + 0.057*\textit{Status}$$

As it can be grasped from the table below, the effect was not positive as expected. Based on the p-value which was smaller than 0.05, the results can be considered statistically significant. However, the coefficient is quite small (-0.55), which means the effect produced by FDS on Frequency Supermarket is not so high. The equation suggests that using flash delivery services is likely to decrease the frequency of a student buying from a supermarket by 0.55 units. This further implies that flash delivery services may substitute supermarket shopping trips to some extent. Therefore, the second null hypothesis stating that flash delivery services are likely to substitute supermarket shopping trips cannot be rejected.

Table 7: Linear regression results for the relationship between Frequency Supermarket and FDS

| Variable     | Coefficient       |
|--------------|-------------------|
| FDS          | -0.55**<br>(0.22) |
| Gender       | -0.56**<br>(0.22) |
| Status       | 0.06<br>(0.23)    |
| Constant     | 3.23<br>(0.26)    |
| Observations | 155               |
| R-squared    | 0.04              |

*Note.* Standard errors are reported in parantheses; R-squared shows the proportion of variance in the dependent variable explained by the independent variable; \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01.

#### 4.2.3 $H_{3_0}$ : The distance between home and supermarket is not positively associated with the tendency of using flash delivery services

In this case, logistic regression was conducted to test the relationship between FDS, as a binary outcome variable, and Distance, as a continuous independent variable, while controlling for gender and status. This resulted in the following equation:

$$\log(p/(p-1)) = 1.18 + 1.00*Distance + 1.23*Gender + 0.86*Status, \text{ where } p \text{ is the probability of FDS to take the outcome 1, based on Distance}$$

The results of the logistic regression are reported in Table 8 below. As it can be observed, the results are not statistically significant, and the LR chi-square test is also not significant, suggesting that the model does not fit the data well. Therefore, there is not enough evidence to reject the third null

hypothesis.

Table 8: Logistic regression results for the relationship between FDS and Distance

| Variable         | Coefficient    |
|------------------|----------------|
| Distance         | 1.00<br>(0.00) |
| Gender           | 1.23<br>(0.40) |
| Status           | 0.85<br>(0.30) |
| Constant         | 1.18<br>(0.47) |
| Observations     | 155            |
| LR chi2          | 0.69           |
| p-value          | 0.87           |
| Pseudo R-squared | 0.00           |

*Note.* Standard errors are reported in parantheses; LR chi2 test shows how well the model fits the data compared to the null; \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01.

#### 4.2.4 $H_{40}$ : Using flash delivery services does not increase the frequency of grocery shopping among consumers

Once again, a linear regression analysis was conducted between FDS and Frequency, with Frequency Supermarket, Gender, and Status as control variables. Frequency Supermarket was added as a control variable in this regression model because the frequency a student goes to the supermarket may affect both the overall frequency of buying and the probability of using flash delivery services. So, to avoid any bias caused by omitted variables, the right choice was to control for this variable. The regression equation and the results are displayed below.

$$Frequency = 0.78 + 0.82 * FDS + 0.85 * Frequency\ Supermarket - 0.04 * Gender - 0.38 * Status$$



Table 9: Linear regression results for the relationship between Frequency and FDS

| Variable              | Coefficient       |
|-----------------------|-------------------|
| FDS                   | 0.82***<br>(0.16) |
| Frequency Supermarket | 0.85***<br>(0.06) |
| Gender                | -0.04<br>(0.16)   |
| Status                | -0.38**<br>(0.16) |
| Constant              | 0.78<br>(0.26)    |
| Observations          | 155               |
| R-squared             | 0.62              |

*Note.* Standard errors are reported in parantheses; R-squared shows the proportion of variance in the dependent variable explained by the independent variable; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

As it can be observed in the Table above, based on the p-value of the FDS's coefficient, which was smaller than 0.05, the results can be considered statistically significant. To further interpret these results, the relationship depicted suggests that when FDS takes value 1, Frequency increases by 0.82 units. Moreover, two of the control variables also produce significant effects on Frequency. To be more precise, the frequency of going to the supermarket is added 0.85 times to the total frequency. Then, as concerns Status, when this variable takes a value of 1, Frequency decreases by 0.38 units. To conclude, based on these results, the fourth null hypothesis stating that using flash delivery services does not increase the frequency of grocery shopping among consumers is rejected, and thus, the alternative hypothesis is accepted as true.

#### 4.2.5 $H_{50}$ : Using flash delivery services is not associated with uniformity of grocery products bought

First, a chi-square test of independence was run to test for associations of the variable Straight Rebuy with FDS, as well as with the control variables Gender and Status. The p-value for the first test was smaller than 0.05, suggesting that there is a statistically significant association between Straight Rebuy and FDS. However, the association tests with Gender and Status were not statistically significant, meaning that these two variables are not likely to be significant in the ordered logistic regression model.

Further, an ordinal logistic regression was run between Straight Rebuy and FDS variables. In the end, Gender and Status were not added as control variables, because the regression model without them seemed to be better, according to the Likelihood ratio chi-square test, which was significant for the simple model, but not significant for the extended model. This is also in line with the results of the chi-square

tests of association with Gender and Status. The ordinal logistic regression results are displayed in Table 10 below. As it can be noticed, the likelihood ratio chi-square test is quite small, 5.20, meaning that there is little association between the variables, but the p-value is less than 0.05, which means that the model as a whole is statistically significant, compared to the null. The explanatory variable FDS seems to be statistically significant, based on the p-value which is smaller than 0.05. However, the effect produced on the Straight Rebuy variable is quite small (-0.66), and not positive as expected. To give an interpretation of these statistical results, when FDS goes from value 0 to value 1, one should expect a 0.66 decrease in the log odds of being in a higher level of Straight Rebuy. So, what this means is that using flash delivery services is associated with a lower level of rebuying the same grocery items.

Table 10: Ordinal logistic regression results for the relationship between Straight Rebuy and FDS

| Variable         | Coefficient       |
|------------------|-------------------|
| 1.FDS            | -0.66**<br>(0.29) |
| Observations     | 155               |
| LR chi2          | 5.20              |
| p-value          | 0.02              |
| Pseudo R-squared | 0.01              |

*Note.* Standard errors are reported in parantheses; LR chi2 test shows how well the model fits the data compared to the null; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Second, a chi-square test of independence was also run to test for associations of the variable Modified Rebuy with FDS, as well as Gender and Status. This time, the p-value of the first test was higher than 0.05, which is not statistically significant, implying that no association may be found between Modified Rebuy and FDS. Then, the other two chi-square tests were also not significant, meaning that no association is expected between Modified Rebuy and Gender or Status.

Nevertheless, a second ordinal logistic regression was conducted between Modified Rebuy and FDS variables. Similar to before, Gender and Status were not added as control variables because they did not improve the model, according to the LR chi-square test. The ordinal logistic regression results are displayed in Table 11 below. The likelihood ratio chi-square test is quite small, 4.51, meaning that there is little association between the variables, but the p-value is less than 0.05, which means that the model as a whole is statistically significant, compared to the null. The effect of FDS was also statistically significant at a p-value less than 0.05. However, the coefficient is positive this time, which means that going from value 0 to value 1 for the FDS variable, a 0.6 increase in the log odds of being in a higher level of Modified Rebuy is expected. This may be interpreted as students who use flash delivery services are 0.6 more likely to rebuy modified grocery items.

Table 11: Ordinal logistic regression results for the relationship between Modified Rebuy and FDS

| Variable         | Coefficient      |
|------------------|------------------|
| 1.FDS            | 0.60**<br>(0.28) |
| Observations     | 155              |
| LR chi2          | 4.51             |
| p-value          | 0.03             |
| Pseudo R-squared | 0.01             |

*Note.* Standard errors are reported in parantheses; LR chi2 test shows how well the model fits the data compared to the null; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

To conclude, based on the results of the two regressions, there is not enough evidence to reject the fifth null hypothesis, so neither the alternative hypothesis can be accepted.

#### 4.2.6 $H_{60}$ : Consumers who use flash delivery services in addition to supermarket grocery shopping do not purchase more unnecessary products, such as snacks and drinks

First, the chi-square tests were conducted again to check for associations between Snacks and Both, as well as associations with Gender and Status. The p-value for the first test is smaller than 0.05, implying that there is an association between Snacks and Both. However, based on the p-values of the other two association tests, there is no association expected between Snacks and Gender, or Snacks and Status.

Similar steps to the previous case were taken here, by conducting an ordinal regression analysis between Snacks and Both. Again, Gender and Status were not added as control variables because the simple model without them proved to be better, based on the LR chi-square test. The results of the ordinal logistic regression are displayed in Table 12 below. The likelihood ratio chi-square test is quite small (6.44), but with a p-value less than 0.05, which means that the model is statistically significant compared to the null. The variable Both is statistically significant at a p-value smaller than 0.05, and its coefficient is quite high at a value of 3.26. This implies that when going from value 0 to value 1 for the Both variable, one should expect a 3.26 increase in the odds of being in a higher level of Snacks. So, to further interpret the results, it is suggested that using flash delivery services in addition to the supermarket is associated with higher levels of buying snacks.

Table 12: Ordinal logistic regression results for the relationship between Snacks and Both

| Variable         | Coefficient      |
|------------------|------------------|
| 1.Both           | 3.26**<br>(1.37) |
| Observations     | 85               |
| LR chi2          | 6.44             |
| p-value          | 0.01             |
| Pseudo R-squared | 0.02             |

*Note.* Standard errors are reported in parantheses; LR chi2 test shows how well the model fits the data compared to the null; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Second, chi-square tests were also conducted for Drinks, to test if there is an association expected with Both, as well as with Gender and Status. This time, the p-value of the first test was higher than 0.05, which is not statistically significant, implying that no association may be found between Drinks and Both. Similar results were found for the association tests with Gender and Status.

Similarly, as before, an ordinal logistic regression was conducted between Drinks and Both, but the results do not look satisfactory in this case, as it can be seen in Table 13 below. The effect is not statistically significant, based on the p-value which is higher than 0.05. Furthermore, the model also does not seem to be statistically significant, according to the LR chi-square test.

Table 13: Ordinal logistic regression results for the relationship between Drinks and Both

| Variable         | Coefficient    |
|------------------|----------------|
| 1.Both           | 0.67<br>(1.05) |
| Observations     | 85             |
| LR chi2          | 0.43           |
| p-value          | 0.51           |
| Pseudo R-squared | 0.00           |

*Note.* Standard errors are reported in parantheses; LR chi2 test shows how well the model fits the data compared to the null; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

To conclude, based on the results of both the regression equations, there is not enough evidence to reject the sixth null hypothesis, hence neither the alternative hypothesis can be accepted.

## 5 Conclusion and Recommendations

To answer the central research question of this paper, "What is the influence of flash delivery services on consumer behavior of students in Rotterdam when buying groceries?", seven sub-questions were answered through an extensive literature study consisting of both theoretical and empirical findings. Based on the literature review, six hypotheses were formulated and tested through statistical analysis methods, namely regressions. Based on the results, the hypotheses were either accepted or rejected, which further led to answering the central research question.

### 5.1 Key findings from the literature review

Consumers have been shopping online for many years now, and they have always been driven by the convenience of buying anything they needed or desired, only through the click of a button, all from the comfort of their home. Also, people value their time and always seek efficiency, so they engage in online shopping if it saves them valuable time and effort. Further, shoppers have been found to act as utilitarian consumers, meaning that they try to maximize the utility they derive from their day-to-day activities, as this utility equals happiness (Kumar and Kashyap, 2018). Therefore, from the perspective of a busy consumer with a hectic job, when comparing going to the store which requires physical effort and time, with making a purchase from the internet which is quicker and does not entail much effort, the latter seems like a better alternative. Additionally, in the last two years, during the Covid-19 pandemic which forced people to stay at home, online shopping has proved to be a necessity for some people. As physical stores were closed, the only alternative to shopping was through the internet.

Then, particularly one sector of e-commerce has unexpectedly caught up, namely grocery retailing. During the lockdowns that were repeatedly enforced, people embraced grocery shopping online, through different forms, be it online supermarkets, or grocery delivery services. Particularly the Netherlands has quite rapidly adopted a new trend, that of ordering groceries through flash delivery services, which are defined as a shopping service delivering groceries to your door within ten minutes. What is so distinctive about these services is that people can easily do their groceries from the comfort of their own home, and have them delivered to their door the same day, within minutes. However, this service comes with a small delivery fee charged for every order made, as well as a surcharge for orders smaller than a predefined amount. This may either be an obstacle to completing an order in some cases, or a nudge to ordering more than one needs just to offset the extra costs.

Carrying on with online shopping versus traditional in-store shopping, some researchers have found the two activities to be complementary to each other, while other researchers have stated they may

substitute each other. The complementarity relationships would imply that online shopping does not reduce the number of trips to the store, but it may even generate some more, in cases where people particularly enjoy shopping as a leisure activity. However, the substitution relationship would imply that online shopping reduces the number of trips to the store, and this effect has been found for people with low access to a car (Shi et al., 2019).

Shifting the attention to the Netherlands, flash delivery services have soared in the last two years. Driven by the restrictions imposed on their liberty of going out, consumers in the Netherlands have become quite fond of these services. However, since not everything can go right, the flash delivery startups have been stirring up controversy, particularly in Rotterdam and Amsterdam, because of their so-called "dark stores" that are located in the middle of residential neighborhoods. These dark stores represent warehouses where groceries are stored and picked up by drivers. Residents have been complaining about the nuisance around these stores, caused by delivery people late at night. Consequently, the municipalities of the two cities have banned the reopening of any other dark store for at least one year. It is not yet clear how this decision will affect the startups, but they need to come up with new solutions, such as the partnership initiated by Gorillas with Jumbo.

Additionally, studies have been conducted about one's residential environment and the tendency of buying online. Some findings suggest that people who live closer to stores are less likely to shop online, while people who live farther away from stores are more prone to engage in online shopping (Farag et al., 2006b). Further, some findings showed a positive association between online shopping and the overall frequency of shopping. This entails that people who engage in e-shopping tend to shop more overall than people who only buy from physical stores.

Last but not least, studies have shown that online grocery shopping may be associated with some level of uniformity in the groceries purchased. To further explain, some consumers have claimed to engage in less brand exploration when shopping online, compared to shopping in-store, which seems to lead to diet monotony (Sarkovská and Chytková, 2019). Furthermore, shifting the focus to the Netherlands again, flash delivery services seem to be complementary to supermarket grocery shopping. Based on market research conducted in the Netherlands, a lot of consumers tend to be using flash delivery services as a backup option when they forgot to buy something at the grocery store. In addition, young people seem to be ordering food through flash delivery services around lunch time, and snacks and drinks are also a big part of their orders.

## 5.2 Key findings from the quantitative research

Most of the regression equations depicted statistically significant relationships between the dependent variable and the independent variable. The first regression model suggests that using flash delivery services tends to decrease the duration of shopping activity by 11.19 minutes, on average, for a student in Rotterdam. This effect is in line with the empirical findings from the literature about time-saving. For instance, [Anesbury et al. \(2015\)](#) has also proved that the average duration of completing a grocery basket is shorter in an online environment, as compared to in-store. Then, the second regression equation suggests an opposite effect to what was expected based on some findings from the literature. Using flash delivery services seems to be associated with a small decrease in the frequency of going to the supermarket for a student from Rotterdam. As frequency was measured in the number of times per week, the negative coefficient of 0.55 means that students who use flash delivery services for their groceries make, on average, 0.55 fewer trips to the supermarket, as compared to students who do not use flash delivery services. This may imply that online grocery shopping is likely to substitute part of the in-store shopping trips, as shown in the literature by [Shi et al. \(2019\)](#).

Then, the third regression equation did not result in a reliable effect, which suggests the model was not appropriate for the data, or there was some omitted variable bias. Either way, no conclusion can be drawn from the regression results, which leaves a lot of room for interpretation. However, two studies discussed in the literature review have shown that accessibility to shops can influence one's likelihood of engaging in online shopping. As regards the fourth regression, the results suggest that using flash delivery services increases the overall frequency of grocery shopping for a student in Rotterdam by 0.82 times per week, as compared to not using flash delivery services. These findings are also supported by the literature, as [Farag et al. \(2006a\)](#) have also shown that people in the Netherlands who shop online tend to shop more often overall, as compared to people who do not shop online. Interesting to notice is the negative coefficient of Status, which says that a student without a job is likely to buy groceries, on average, 0.38 times less per week than a student who is employed/ self-employed. Considering the money aspect, a student who has a job will probably have a higher budget per week than a student without a job, thus they may also be inclined to shop more often, be it essential groceries, or just snacks and drinks.

As regards the fifth regression equation, the effect of using flash delivery services on the level of straight rebuy purchasing was not positive as expected, but negative. To provide an interpretation of the mathematical relationship, it seems that for students who use flash delivery services, the odds of purchasing more straight rebuy items are 0.66 times those of students who do not use flash delivery

services. As concerns the interpretation of the sixth regression equation, it seems that for students who do not use flash delivery services, the odds of purchasing more modified rebuy items are 0.60 times those of students who use flash delivery services. These results may imply that when doing grocery shopping through flash delivery services, students tend to frequently repurchase grocery items that they are used to, called Straight Rebuy and Modified Rebuy, which could be associated with less brand exploration, as suggested by [Sarkovská and Chytková \(2019\)](#). The latter study has found consumers engaging in online grocery shopping complain about monotony in their diets, explained by their tendency of purchasing the same items, which normally does not happen in a supermarket, where they feel more tempted by the point-of-purchase marketing ([Sarkovská and Chytková, 2019](#)).

Last but not least, based on the results of the seventh regression equation, it seems that for students who use flash delivery services in addition to their usual groceries at the supermarket, the odds of purchasing more snacks are 3.26 times those of students who do not use flash delivery services. This relationship is also supported by the market research conducted in the Netherlands, regarding flash delivery services, which shows that a substantial part of the groceries purchased by young people with flash delivery services in the Netherlands is comprised of snacks. The research also suggests that flash delivery services are not used as a replacement for supermarket shopping, but additionally. Nevertheless, the results of the eight regression equation did not prove to be significant, suggesting that the model was not appropriate for the data, or that there was some omitted variable bias. Either way, no conclusion can be drawn about the effect of using flash delivery services in addition to supermarket shopping on the level of purchasing drinks.

### **5.3 Answering the central research question: "What is the influence of flash delivery services on consumer behavior of students in Rotterdam when buying groceries?"**

First, flash delivery services have become a trendy alternative for going to the supermarket in last-minute situations, such as when one is cooking dinner and they forgot an essential ingredient, or perhaps they are too busy with work and school and do not have the time to pass by the supermarket to do grocery shopping. So, it has been proved that online grocery shopping can save a lot of trouble and time. In fact, it was both found in the literature as well as through the research conducted in this paper, that people spend less time when making an online purchase as compared to purchasing in-store. Some have claimed that this is because of the point-of-purchase marketing one encounters in a physical store, while this research shows that the average duration of completing a grocery basket is shorter in an online



environment, as compared to offline. However, spending less time on shopping may be perceived as a downside for retailers, if that implies that consumers are less interested in exploring new products and brands, and they get used to rebuying the same items they are used to and already have validation for. The research also shows that online grocery baskets of students who order through flash delivery services are mostly comprised of straight rebuy and modified rebuy items, and not a lot of new items. From the perspective of marketing, this aspect entails that online retailers may need to think about new strategies to tempt customers to try new products or even make it harder to find the same products that they always buy. This can also depend on the interface of the online store, as consumers care about having a smooth experience while buying.

Second, as regards the impact of using flash delivery services on the supermarket shopping frequency, the research conducted supports the view that online shopping may substitute in-store shopping trips. Complete substitution is not likely to happen, at least not in the near future, as the results show that quite a lot of people still buy from a supermarket, but those who use flash delivery services tend to make fewer supermarket trips. As [Shi et al. \(2019\)](#) suggested, online shopping could be a solution for urban congestion, however, that is an issue in bigger and more crowded cities, not Rotterdam. Also, worth mentioning is that using flash delivery services for groceries instead of the supermarket, among young people, implies that supermarkets would be more populated by older people, who are less likely to shop online. However, older people are less likely to buy groceries in big quantities, or even visit the supermarket as often as the younger generation, hence, this could cause losses in the supermarket stores.

Furthermore, the findings regarding the increased frequency of overall grocery shopping among students, have two implications. First, flash delivery services are mostly used in addition to the usual grocery shopping activity, which could mean that people do not rely on these services to do their essential groceries, but rather use them on certain occasions. Second, the convenience of flash delivery services may drive people to excessive use, which could increase their spending and consumption overall. For instance, especially those services which are available 24/7 may incentivize people to order unnecessary things, such as snacks and drinks, late at night, or pre-made meals throughout the day which eliminates the need for cooking, and is even a cheaper alternative than ordering food from a restaurant. As the research illustrates, the orders of young people via flash delivery services consist of snacks and drinks more than actual food or essential grocery items.

All in all, the rise in flash delivery services in the Netherlands has impacted the consumer behavior of students in many ways when it comes to grocery shopping. To some extent, ordering groceries online is complementary to the usual grocery shopping in a supermarket, and to some extent, it replaces some of

the supermarket shopping trips which would otherwise be essential. The convenient option of ordering groceries online from home while sitting comfortably on the couch, and receiving them at the door within minutes makes supermarket shopping not essential anymore. Today, when a person forgets to buy certain grocery items at the store, or simply wants to eat something quick, Gorillas, Zapp, or any of these services saves them the trouble. Hence, consumers are more flexible now in the way they do their groceries. For instance, being busy or tired, or just unable to commute to a store, is not a problem anymore, as there is an alternative to that. However, it all comes with a cost, otherwise, the service would be too good to be true. In other words, the delivery fee incurred for every order and the surcharge applied for orders smaller than a predefined amount make a small order look expensive. Thus, no customer will place an order just for a carton of milk or some toilet paper, because they will pay an equal amount as an extra cost. This implies that customers will try to order as much as possible in one go, to pass the threshold of a minimum order without the surcharge. Furthermore, as the delivery cost is offset for large orders, sometimes consumers may even add extra things to their order, just to avoid the delivery fee. To draw the conclusion from these points, flash delivery services may influence consumers in spending more than actually needed. Especially students may easily fall into the trap of excessively using these services, without keeping track of the costs they incur in total. Then, some consumers may even get too used to using flash delivery services, that they would no longer visit the supermarket unless it comes in their way. Nevertheless, as much variety as these flash delivery services offer, they still have limited options, as compared to the variety offered in a supermarket. Also, the apps are designed in such a way that consumers often see their frequently bought products by default, which makes them more likely to rebuy the same products, rather than explore new items. This may lead to monotonous purchasing behavior by default, as proved in the literature.

#### **5.4 Recommendations for flash delivery services**

Based on the findings presented above, some recommendations may be provided for the flash delivery startups. First, given the controversy around the so-called "dark stores" where flash delivery services store their goods, a suggestion would be to improve the aspect of these warehouses, to make them look more like some little stores. This could make them integrate better into the scenery of the neighborhoods, thus making the residents happier. Also, as regards the one-year ban for opening any new such locations, a solution for these startups could be to form partnerships with local supermarkets, thus following the example of Gorillas with Jumbo.

Then, with regard to the uniformity of buying among online customers, a suggestion for the apps

offered by the startups is to work on improving the consumer experience in the online store environment. For instance, instead of displaying the frequently bought products by default on the main page, an idea could be to implement an algorithm which would recommend similar products that could be bought by a consumer, based on their purchasing history. Moreover, to encourage consumers to try new products, the online retailer could give recommendations on new products that could be bought together with the current selection.

Further, in an attempt to aid the customer keep track of the total cost of their basket, the online retailers could build an algorithm that would keep the cumulative cost of the basket on the page at all times, with modifications as they add more products. Perhaps this could be helpful for consumers who are price conscious and spend a lot of time on making an order. Then, another suggestion would be to tailor the online shopping experience to each individual customer, based on their age and interests. For instance, since young people are more likely to buy a lot of snacks and drinks, the online retailer could offer more deals and promotions on these product categories, which would incentivize the young consumer to purchase more. Then, with regard to the more mature customers, such as parents, the online retailer could offer discounts on bulk buying for families.

## 5.5 Limitations

As this is a Bachelor's thesis paper, there are certain limitations that impact the research findings. First, the primary limitation of this paper is regarding the sample size. Due to limited time and resources, the analysis was carried out on a relatively low number of survey respondents. Although most of the results proved to be statistically significant, perhaps a larger data sample could generate more accurate results. Then, a second limitation is the research environment of this study. Once more, due to limited time available, as well as limited knowledge in constructing an extensive survey, the answers provided by the respondents may not provide sufficient insight into the topic researched. Also, this survey could not control for the authenticity of the responses, thus a certain bias could exist in this research. Furthermore, online grocery shopping in the Netherlands consists not only of flash delivery services, but there are many supermarkets which have an online store alternative, such as Albert Heijn, or Jumbo. Then, there is one exclusively online supermarket, named Picnic, which was not considered in this paper. With that being said, as a suggestion for future research, it would be worth making a distinction between these types of online grocery stores and flash delivery services, as the effects could be quite different. Last but not least, due to a lack of experience in conducting research and writing academic papers of such a large scale, the scope and depth of the discussion in this paper are quite limited, as compared to academic

studies of experienced scholars.

## **5.6 Recommendations for future research**

Based on the aforementioned limitations of this paper, there are a few suggestions for future research to be conducted, which could provide a more profound understanding of the topic in question. First, this study should be conducted on a larger scale, collecting a bigger sample from the Netherlands, while also accounting for differences per city. The results thus generated would be more accurate and conclusions could be drawn about the whole population. Second, regarding the research environment, some extensive field research would allow for a deeper understanding of the actual behavior of consumers while shopping. For instance, observations could be carried out at the grocery store, and the method of eye tracking may be applied to the online environment, to see things from the perspective of consumers. This eye tracking method is used in marketing for studies about consumer behavior. Lastly, another suggestion for future researchers is to investigate how consumer behavior has changed from the time when online shopping was not a trend among consumers, up until today.

## References

- Alaimo, L. S., Fiore, M., and Galati, A. (2020). How the covid-19 pandemic is changing online food shopping human behaviour in italy. *Sustainability*, 12(22):9594.
- Anesbury, Z., Nenyecz-Thiel, M., Dawes, J., and Kennedy, R. (2015). How do shoppers behave online? an observational study of online grocery shopping. *Journal of Consumer Behaviour*, 15(3):261–270.
- Bhagyasree, J. and Venugopal, J. (2021). A study on the impact of online shopping on consumer’s buying behavior. *Turkish Journal of Computer and Mathematics Education*, 12(12):2843–2851.
- Bjerkan, K. Y., Bjørgen, A., and Hjelkrem, O. A. (2020). E-commerce and prevalence of last mile practices. *Transportation Research Procedia*, 46:293–300.
- Brand, C., Schwanen, T., and Anable, J. (2020). ‘online omnivores’ or ‘willing but struggling’? identifying online grocery shopping behavior segments using attitude theory. *Journal of Retailing and Consumer Services*, 57:102195.
- Cao, X., Chen, Q., and Choo, S. (2013). Geographic distribution of e-shopping. *Transportation Research Record*, 2383:18 – 26.
- Chen, J. (2022). Normal distribution definition.
- Chevalier, S. (2022). Netherlands: Coronavirus e-commerce change groceries.
- Coppola, D. (2021). Topic: Online grocery shopping in the netherlands.
- Cuemath (2022). Bernoulli distribution - definition, formula, graph, examples.
- Etminani-Ghasrodashti, R. and Hamidi, S. (2020). Online shopping as a substitute or complement to in-store shopping trips in iran? *Cities*, 103.
- Farag, S., Krizek, K. J., and Dijst, M. (2006a). E-shopping and its relationship with in-store shopping: Empirical evidence from the netherlands and the usa. *Transport Reviews*, 26(1):43–61.
- Farag, S., Schwanen, T., and Dijst, M. (2005). Empirical investigation of online searching and buying and their relationship to shopping trips. *Transportation Research Record: Journal of the Transportation Research Board*, 1926(1):242–251.
- Farag, S., Schwanen, T., Dijst, M., and Faber, J. (2007). Shopping online and/or in-store? a structural equation model of the relationships between e-shopping and in-store shopping. *Transportation Research Part A: Policy and Practice*, 41(2):125–141.

Farag, S., Weltevreden, J., van Rietbergen, T., Dijst, M., and van Oort, F. (2006b). E-shopping in the netherlands: Does geography matter? *Environment and Planning B: Planning and Design*, 33(1):59–74.

Farnsworth, B. (2021). Qualitative vs quantitative research – what is the difference?

Flitsbezorgd.nl (2021). Alles over flitsbezorgers in nederland.

InvestInHolland (2021). Getir, pioneer in flash delivery of groceries, locates in the netherlands.

Kantar (2022). Markt van flitsbezorging groeit onstuimig in nederland.

Korstanje, J. (2020). 6 ways to test for a normal distribution-which one to use?

Kumar, A. and Kashyap, A. K. (2018). Leveraging utilitarian perspective of online shopping to motivate online shoppers. *International Journal of Retail amp; Distribution Management*, 46(3):247–263.

Lachapelle, U. and Jean-Germain, F. (2019). Personal use of the internet and travel: Evidence from the canadian general social survey’s 2010 time use module. *Travel Behaviour and Society*, 14:81–91.

Maat, K. and Konings, R. (2018). Accessibility or innovation? store shopping trips versus online shopping. *Transportation Research Record: Journal of the Transportation Research Board*, 2672(50):1–10.

Markteffect.nl (2022). Monitor flitsbezorging.

McCombes, S. (2022). What is a research design: Types, guide amp; examples.

Mildred (2022). Flash deliverer getir opens first ‘art store’ in the netherlands.

Morganosky, M. A. and Cude, B. J. (2000). Consumer response to online grocery shopping. *International Journal of Retail amp; Distribution Management*, 28(1):17–26.

Munson, J., Tiropanis, T., and Lowe, M. (2017). Online grocery shopping: Identifying change in consumption practices. *Internet Science*, page 192–211.

NLTimes (2022). Rapid delivery use skyrocketing in netherlands.

Pleuni (2022). The dutch spend €40 million on flash delivery.

Ruetir (2022). Gorillas adjusts company: German flash deliverer now dutch.

Seveno, V. (2022). Jumbo to join forces with on-demand delivery company gorillas.

Shamaa, L. (2022). Enough! dutch residents want flash delivery services off their streets.

- Shi, K., De Vos, J., Yang, Y., and Witlox, F. (2019). Does e-shopping replace shopping trips? empirical evidence from chengdu, china. *Transportation Research Part A: Policy and Practice*, 122:21–33.
- snellesupers (2021). Snelle boodschappenservices vergelijken: Vergelijk alle flitsbezorgers.
- Statista (2022). Ecommerce - netherlands: Statista market forecast.
- Streefkerk, R. (2022). Qualitative vs. quantitative research: Differences, examples amp; methods.
- Sarkovská, K. and Chytková, Z. (2019). Benefits and pitfalls of online grocery shopping as perceived by the consumers: Evidence from the czech republic. *Economic Trends and Economic Policy*.
- Vasudevan, A., Ping, T. P., and Wider, W. (2022). Online grocery shopping behavior among consumers in singapore. *International Journal of Management and Sustainability*.
- Weltevreden, J. W. and Rietbergen, T. V. (2007). E-shopping versus city centre shopping: The role of perceived city centre attractiveness. *Tijdschrift voor Economische en Sociale Geografie*, 98(1):68–85.
- Xi, G., Cao, X., and Zhen, F. (2020). The impacts of same day delivery online shopping on local store shopping in nanjing, china. *Transportation Research Part A: Policy and Practice*, 136:35–47.
- Xi, G., Zhen, F., Cao, X. J., and Xu, F. (2018). The interaction between e-shopping and store shopping: Empirical evidence from nanjing, china. *Transportation Letters*, 12(3):157–165.

## 6 Appendix

Table 14: Survey questions with the resulting variables

| Question  | Variable                                    |
|---|---|
| 1. What is your age?  | Age   |
| 2. What gender do you identify with?  | Gender                                      |
| Male  |   |
| Female  | Status                                      |
| 3. What is your status?   |   |
| Student   | Distance                                    |
| Employed/Self-employed student  |   |
| 4. How far is the nearest supermarket to your house?  | Groceries                                   |
| 5. How do you do your groceries?  |   |
| Supermarket   |   |
| Online with flash delivery services   | Reason Eshopping                            |
| Both  |   |
| 6. What is the main reason for doing your groceries online?   |   |
| Convenience   |   |
| Saves time  |   |
| Saves effort  |   |
| Saves money   | FDS   |
| Promotional codes   |   |
| Other   | Frequency                                   |
| 7. Do you use flash delivery services?  |   |
| Yes   | Frequency Supermarket                       |
| No  |   |
| 8. How often do you buy groceries in general (times per week)?  | Duration Shopping                           |
| 9. How often do you buy groceries from a supermarket (times per week)?  |   |
| 10. How much time do you usually spend on making a grocery order with flash delivery services? (in minutes) / How much time do you usually spend in the supermarket for groceries? (in minutes)   | Straight Rebuy<br>Modified Rebuy            |
| 11. To what extent is your typical online grocery basket (from Gorillas/Zapp/Getir/Flink) made of the following product categories? / To what extent is your typical supermarket grocery basket made of the following product categories? (Rate from 1 to 10) |   |
| Straight Rebuy (The same products from the same supplier)   |   |
| Modified Rebuy (Generally the same products, but from different suppliers)  | Essentials<br>Snacks<br>Drinks<br>Forgotten |
| 12. How likely are you to use flash delivery services in the following cases? (Rate from 1 - being extremely unlikely to 10 - being extremely likely)   |   |
| (Rate from 1 - being extremely unlikely to 10 - being extremely likely)   |   |
| For essential food items/ Essential food items  |   |
| For snacks  |   |
| For drinks on special occasions   |   |
| Forgotten grocery items   |   |

*Note.* The survey was built in such a way that some questions were asked differently, depending on their response to Question 7.



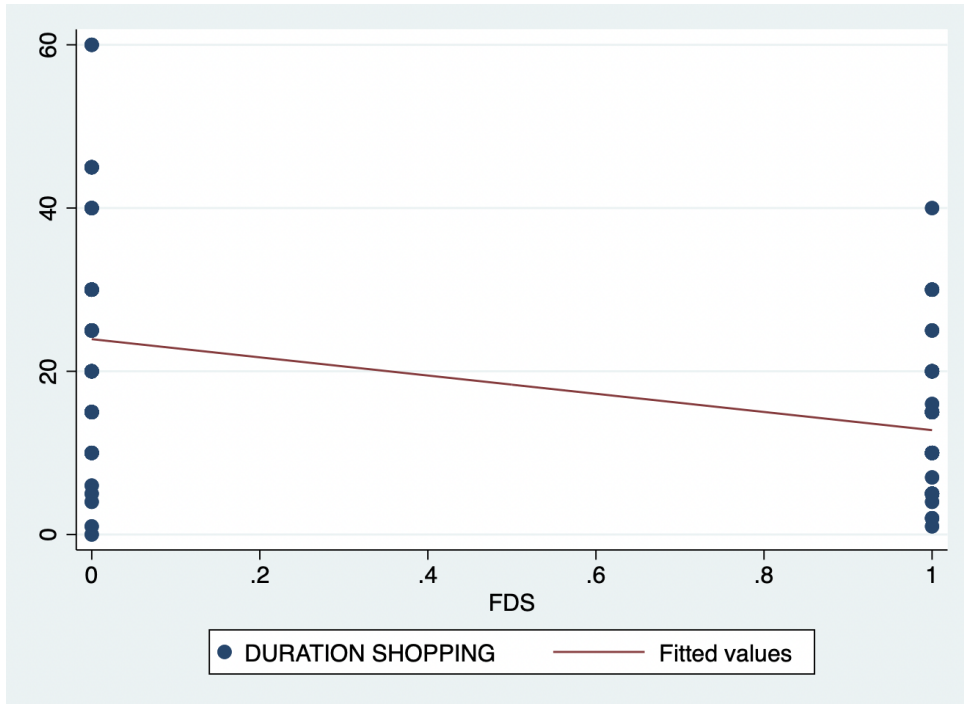


Figure 3: Scatter plot diagram illustrating a linear relationship between Duration Shopping and FDS

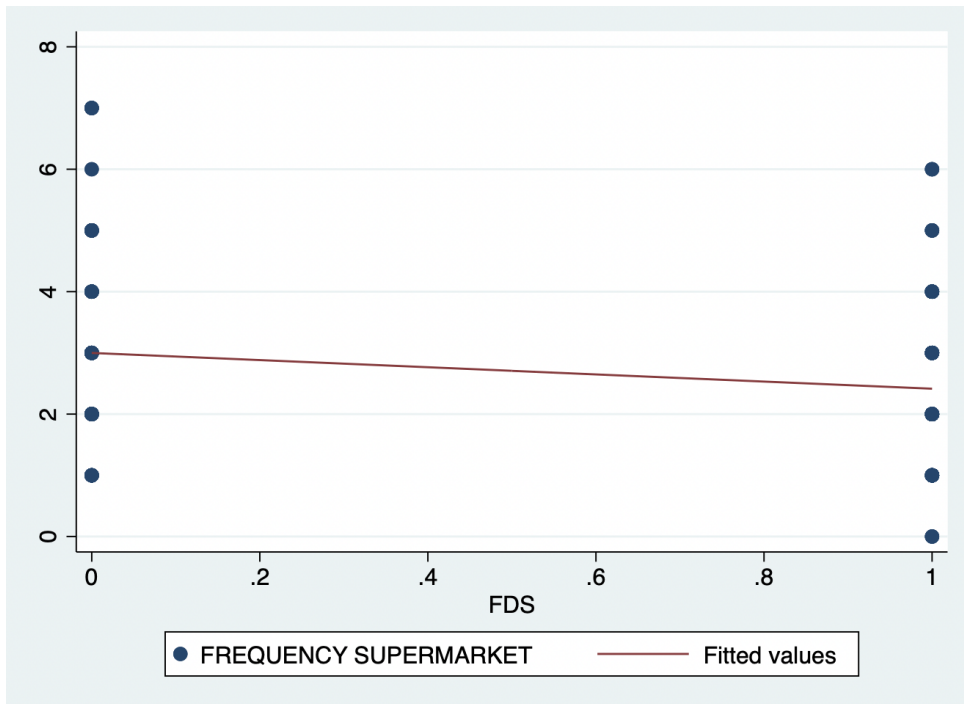


Figure 4: Scatter plot diagram illustrating a linear relationship between Frequency Supermarket and FDS

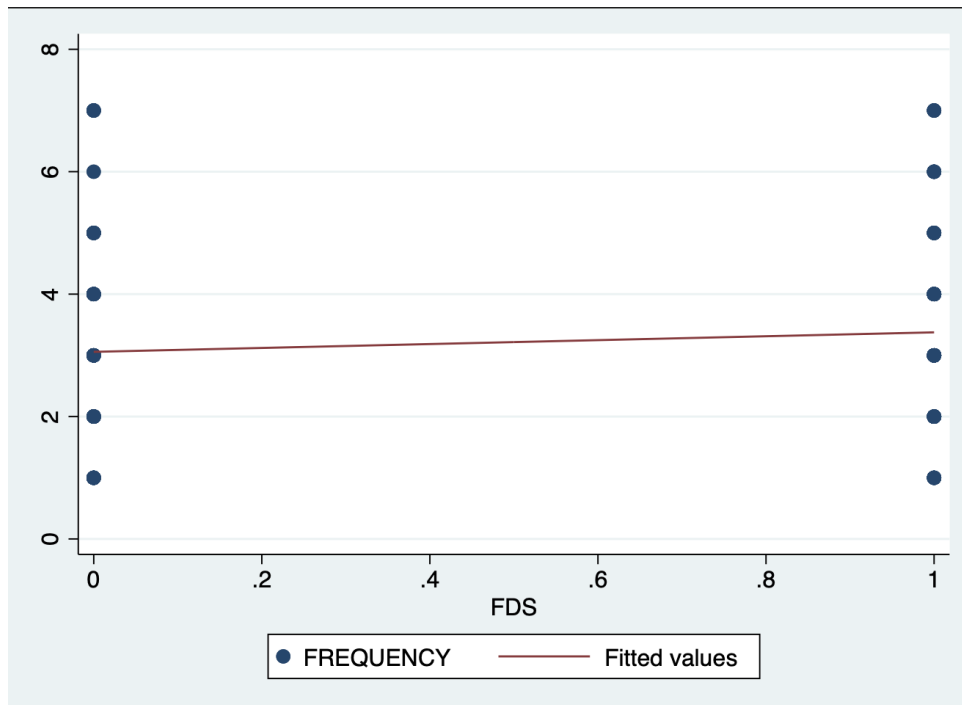


Figure 5: Scatter plot diagram illustrating a linear relationship between Frequency and FDS