On-demand grocery delivery in Germany

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An empirical analysis of determinants affecting customers' purchase intentions

Maria Katharina Groß

The dissertation is written under the supervision of Prof. Miguel Fontes Rita

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Abstract (English)

On-demand grocery delivery services (ODGDS) are proposed as a new way of last-mile experience and a step towards the next level of (e-)commerce. Even though the topic has gained a great interest among researchers and practitioners, empirical research on consumer behavior in quick commerce is scarce. Thus, the purpose of this study conducted is to enrich existing findings on purchase behavior by providing an overview of drivers and barriers to adopting to ultra-fast grocery delivery of German consumers. A twofold analysis is performed; qualitative data were collected through semi-structured expert interviews and quantitative data was gathered through an online survey with 186 participants. Evidently, the intention of consumers to use ODGDS is mainly driven by convenience and peer group behavior, followed by general perception, good assortment, and curiosity. Meanwhile, the main barriers are found among on-site factors, personal value motives, and missing use instances. Demographic characteristics that identify users are gender and place of residence; however, income and age are not determinative factors when it comes to the usage of ODGDS. This research has practical implications as it attempts to use a constructed model to make predictions for imaginary personas and predict their purchase intention based on distinct demographic and personal characteristics. Managerial implications are assured as learnings can serve as guidance for ultra-fast delivery start-ups to develop targeted customer acquisition strategies.

Keywords: on-demand grocery, ultra-fast delivery, customer adoption, quick-commerce, consumer behavior

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Author: Maria Katharina Groß

Abstract (Português)

Os serviços de mercearia a pedido (ODGDS) são propostos como uma nova forma de experiência de última milha e um passo para o próximo nível de (e-)comércio. Embora o tema tenha ganho grande interesse entre os investigadores, a investigação empírica sobre o comportamento dos consumidores no comércio rápido é escassa. Assim, o objectivo deste estudo é enriquecer as descobertas existentes sobre o comportamento de compra, fornecendo uma visão geral dos condutores e das barreiras à adopção de entregas ultra-rápidas de mercearias aos consumidores alemães. É realizada uma dupla análise; os dados qualitativos foram recolhidos através de entrevistas de peritos semi-estruturados e os dados quantitativos foram recolhidos através de um inquérito online. Evidentemente, a intenção dos consumidores de utilizar ODGDS é principalmente motivada pela conveniência e comportamento do grupo de pares, seguida pela percepção geral, boa variedade e curiosidade. Entretanto, as principais barreiras encontram-se entre os factores no local, motivos de valor pessoal, e casos de uso em falta. As características demográficas que identificam os utilizadores são o sexo e o local de residência; contudo, o rendimento e a idade não são factores determinantes quando se trata da utilização de ODGDS. Esta investigação tem implicações práticas, uma vez que tenta utilizar um modelo construído para fazer previsões para pessoas imaginárias e prever a sua intenção de compra com base em características distintas. As implicações gerenciais são asseguradas, uma vez que os ensinamentos podem servir de orientação para que os ODGDS desenvolvam estratégias específicas de aquisição de clientes.

Palavras-chave: mercearia a pedido, entrega ultra-rápida, adopção pelo cliente, comércio rápido, comportamento do consumidor

Título: "Entrega de mercearia a pedido na Alemanha - Uma análise empírica dos factores determinantes que afectam as intenções de compra dos clientes"
Autor: Maria Katharina Groß

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Glossary

Buyer = Adopters	*Customers who have bought groceries at least one time at ultra-fast delivery services*
E-commerce	*Electronic commerce*
E-grocery	*Electronic grocery*
Non-buyer = Non-adopters	*Customers who have never bought groceries at ultra-fast delivery services*
ODGDS	*On-demand grocery delivery services*
Ultra-fast delivery = on-demand grocery = quick commerce (grocery) = ODGDS	*These terms are used similarly.*

1 Introduction

For several years running, the online sales channel of groceries has been experiencing enormous future relevance worldwide of which groceries are the online segment with the highest growth rates (Herbert et al., 2021). While the online grocery market continues to develop at a tremendous pace, the landscape is shifting. For a long time, the supply was rather small and the market was dominated by big players that could map a week's shopping online - making delivery within days the benchmark. However, things are changing now.

Pushed by the Covid-19 pandemic, "ultra-fast" grocery shopping has become the latest trend among online grocery delivery. A new generation of online grocers is invading major urban centers and is thereby redefining convenience. As a result, dark-store-based startups are gaining significant funding and are aggressively expanding around the world. Their big customer promise entails grocery delivery within 10 to 15 minutes - or "faster than you can", in the words of Berlin-based startup Gorillas' catchphrase. No other segment is currently attracting as many investors as ODGDS, with companies such as Gorillas, Getir, Flink, Wolt, and Deliveroo. In the first quarter of 2021 by itself, the amount of capital flowing into such companies was $14 billion, more than in full-year 2020 (Hofmann, 2021).

At the same time, an important question one might ask is what motivates German consumers to adopt these services? Are there any obstacles preventing customers from using them? And how do users distinguish themselves from non-users? For example, can they be identified through specific characteristics?

With the goal of identifying the drivers and barriers to customer adoption of on-demand grocery delivery services (ODGDS), this thesis is structured and presented following the guidelines of (Saunders, Lewis, & Thornhill, 2019): Firstly, an in-depth industry analysis on the current state of e-grocery and on-demand grocery services are given. Subsequently, the thesis will provide an academic literature review (Adolphus, 2015) regarding drivers and barriers of customer adoption on this new business model. In the main body, the methodology of the evaluation is explained, and the results are presented and discussed. Finally, based on theory and knowledge obtained by a customer survey, its results will be discussed and put into perspective whilst providing an outlook for the future.

2 Literature Review

2.1 Research documentation

The methodology and structure of this dissertation have been developed according to Saunders (Saunders et al., 2019). The literature review in particular follows the guidance of Adolphus and has two purposes: firstly to show awareness of the present state of knowledge of a particular field and secondly to provide a foundation for the author's research (Adolphus, 2015).

2.2 Industry analysis: overview and development of e-grocery

2.2.1 Global e-grocery market

The global online grocery business was predicted to be worth US$198.5 billion in 2020. This market is estimated to grow at a 15.7% CAGR from 2020 to 2027, reaching a projected volume of US$550.7 billion by 2027. The United States will hold the highest share (28.77%) of the online food business in 2020, with a market value of $57.1 billion. The largest single market besides the United States is China with an expected market size of US$110 billion by 2027, with a CAGR of 20.5% (Research and Markets, 2021). Furthermore, in the global market, Japan and Canada are worth mentioning, with CAGRs of 11.4% and 14%, respectively, expected for the years 2020 to 2027 (Research and Markets, 2021).

Even though the growth rates may sound enormous, online groceries will only account for a percentage of the total market in 2020. Whilst it is unlikely that online retail will come to dominate the entire grocery market within a short period, yet its share will increase significantly (Mkansi et al., 2018). According to a Postnord study, already 45% of the population in the UK, almost one in three Spanish (36%), Swedes (35%), and French (27%) have bought groceries online in 2020 (Postnord, 2020).

2.2.2 The German e-grocery market

Given the focus of this paper on the German market, it is analyzed in more detail below.

The German online grocery market is forecast to grow at a CAGR of around 12.5% by 2027 (Research and Markets, 2021). The online food market in Germany has been experiencing tremendous momentum in the wake of the Covid-19 pandemic. The number of consumers ordering their groceries online has almost doubled during the pandemic. While around 16% of consumers used to order their groceries online before the pandemic, around 30% stated that they did it in April 2020 (Bitkom research, 2020). In a representative study conducted on behalf of Mastercard even 43% of the 25 to 34-year-old claimed to have ordered groceries online for the first time during the lockdowns (Mastercard, 2021).

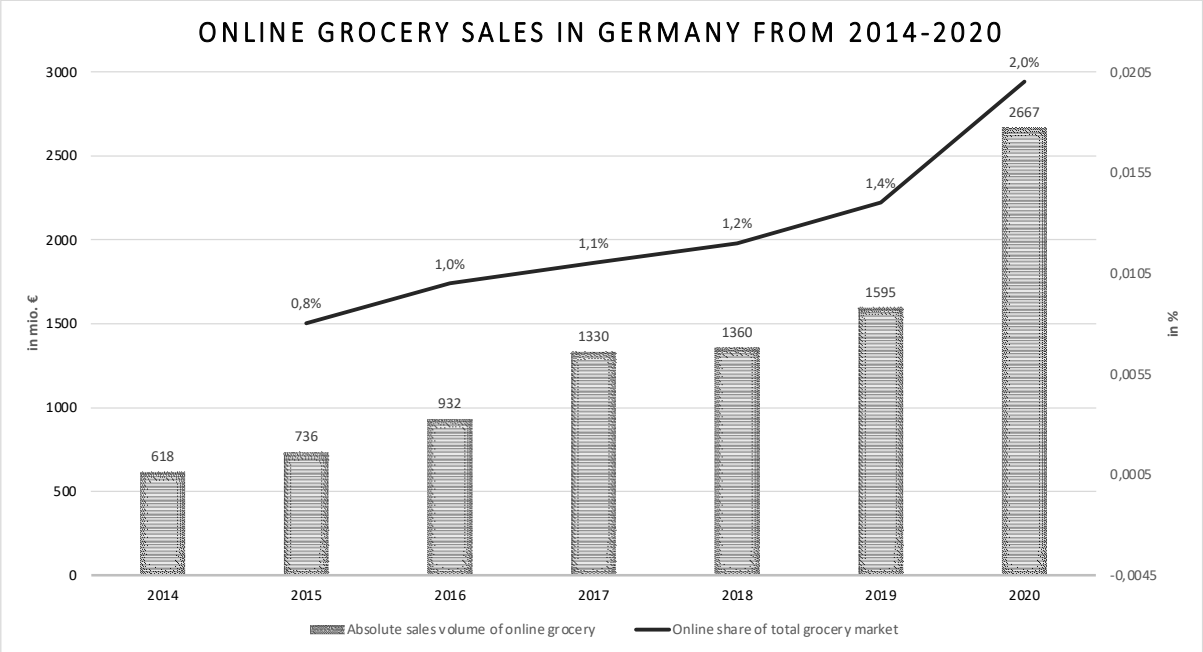


Figure 1: Online grocery sales in Germany from 2014-2020

Source: (HDE Handelsverband Deutschland, 2020)

Figure 1 shows the absolute size of the online food market and the value-based market share of online food retailing in Germany from 2014 to 2020. In 2020, the total volume of online food sales amounted to 2667 million Euros with a market share of around 2%.

The aggregate volume of online grocery grew significantly at a CAGR of 23,8% from 2012 to 2020. With a growth rate of around 60% between 2019 and 2020, groceries represent the fastest-growing segment in German e-commerce. In that timeframe, it grew almost three times as fast as the non-food segment (HDE Handelsverband Deutschland, 2020).

2.3 Landscape shift in online grocery: the rise of on-demand grocery

2.3.1 Characteristics of the business model

While the existing landscape of online grocery channels has seen little innovation and diversification regarding business models during the recent years, and a week's shopping was basically covered by the online channel through major multichannel retailers offering next day deliveries at best, the immediate needs of consumers were not reflected in the market at all before the pandemic (Frank & Pechel, 2020). This gap has closed since then and is being fiercely contested. Similar to physical offline grocery, with multiple channels coexisting, including supermarkets, discounters, convenience stores, organic specialists, the same is likely to be reflected in online grocery concepts (Research Farm ltd., 2021).

A true hype has formed over the past year around a special form of delivery players. Pushed by the Covid-19 pandemic, technological developments and changing consumer expectations of immediacy (Delgosha & Hajiheydari, 2020), ODGDS, which allows consumers to access services immediately when experiencing a need, anywhere and anytime' (Burg et al., 2019) is considered among the most promising means of goods distribution (El Houda Hammami et al., 2020) and enjoys tremendous popularity among grocery shoppers replacing in-store shopping for groceries (Altay et al., 2021).

No other segment is currently attracting as many investors as ODGDS. Investment in ultra-fast food delivery services has multiplied in the first six months of 2021 (see figure 2). According to recent data published by Pitchbook in late July, $8.1 billion worth of venture capital funding has been invested in this kind of last-mile start-ups, which is more than ever before.

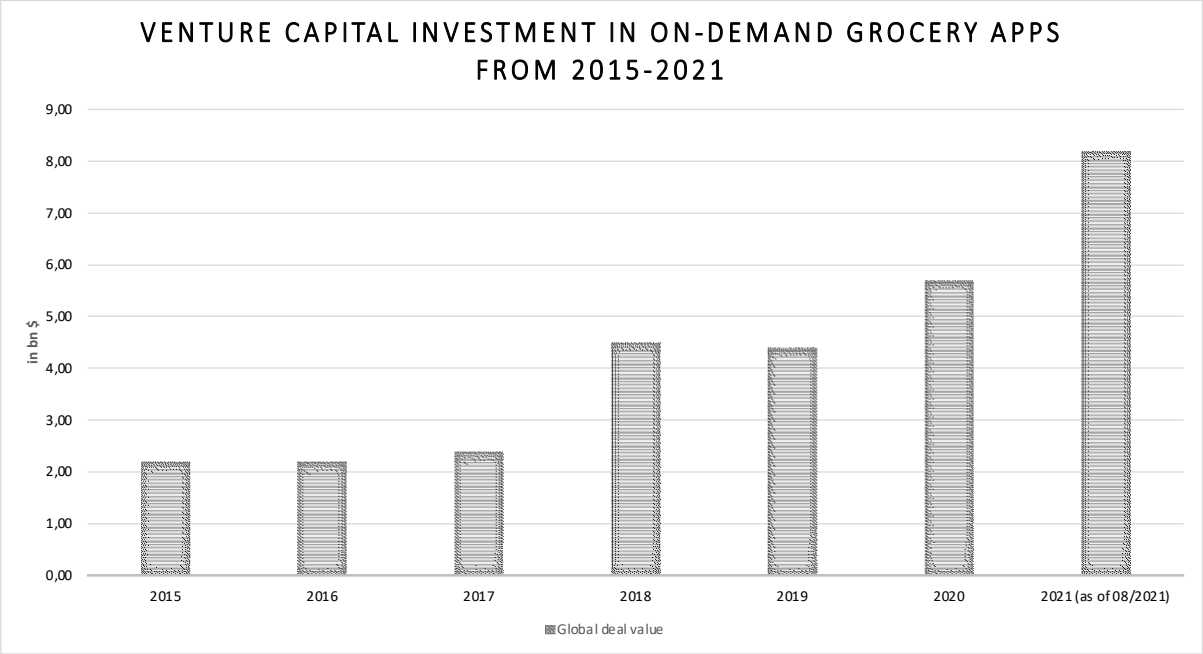


Figure 2 Venture capital investment in on-demand grocery companies from 2015-2021

Source: own illustration based on (PitchBook, 2021)

Yet, further focusing on the latest developments, according to PitchBook Data, investors have poured nearly $14 billion globally into ODGD start-ups such as the Turkish pioneer Getir, the UK-based Weezy, or the German startups Gorillas and Flink since the onset of the pandemic, with more funding coming in during the first three months of 2021 than all of the previous quarters (PitchBook, 2021).

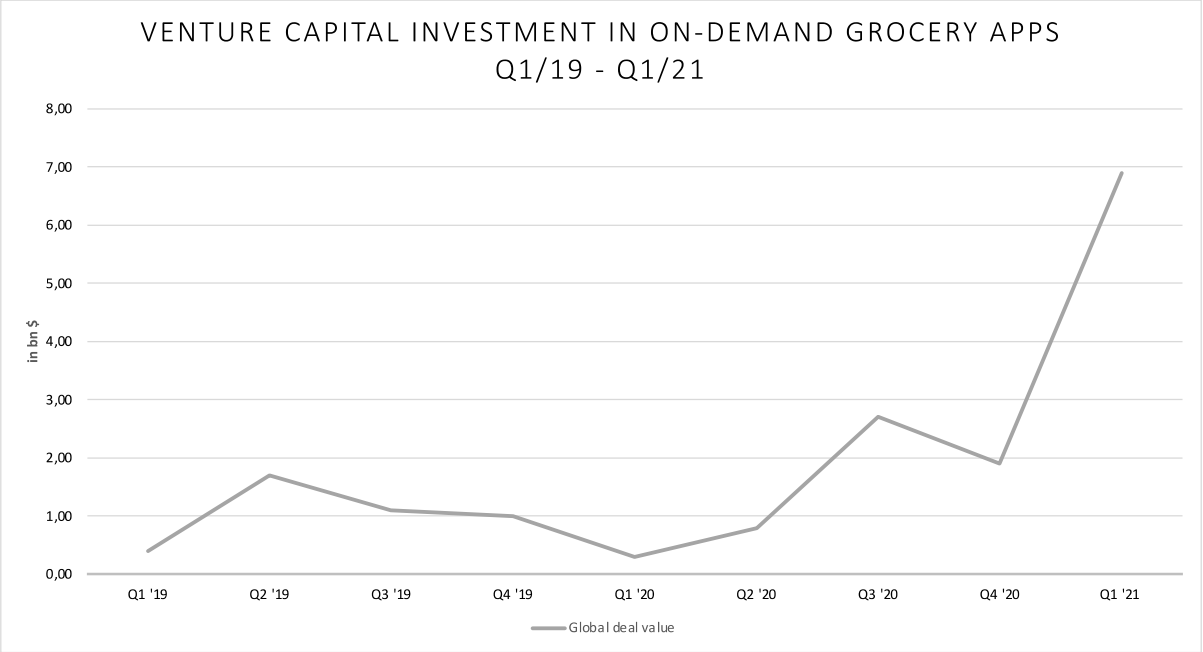


Figure 3 Venture capital investment in on-demand grocery apps Q1'19 - Q1'21

Source: own illustration based on (PitchBook, 2021)

Combining mobile technology and city logistics, on-demand grocery is a novel business concept that involves providing its customers with instant delivery of groceries along with other products through a mobile application that allows users to order and pay for products at their convenience from home using secure payment methods (Altay et al., 2021). These startups operate small dark stores in urban areas and are thus bypassing retailers along the supply chain when sourcing their products. Due to the hyper-local nature of their business model, they can commission and deliver to customers' homes within 10 to 15 minutes, which for many instances is faster than the customer making a trip to the local brick-and-mortar store themselves (Research Farm ltd., 2021).

The speed is also relevant for marketing purposes. Due to Alberto Menolascina (co-founder of London-based delivery app Dija), ultra-fast delivery services "produce that 'wow' moment that [makes] people start talking about you. It is the disruption you create when you do something shocking. You don't create electricity by incrementally improving the candle."

Yet, this business model comes with a fair share of challenges. Super-fast delivery means high operating costs in a competitive sector with many established suppliers in need fulfillment at an acceptable margin without raising prices excessively (Burg et al., 2019). Some business analysts are even skeptical about making a profit with this business model (Wall Street Journal, 2021). Last-mile delivery services result in unnecessary inefficiencies such as low asset utilization and multiple journeys to surrounding communities, resulting in increased vehicle emissions, traffic, and operational expenses (Aktas et al., 2020). The main cost drivers are labor, inventory, spoilage, and commissioning, which make unit economics work at a very low margin of about 13% on average according to a study conducted by research platform Sacra. (see Appendix I (Asplund, 2021))

2.3.2 The competitive environment in Europe & Germany

ODGDS offering ten to fifteen minutes grocery delivery are expanding quickly across Europe (Appendix I). Launched back in 2015, Turkish start-up Getir was the first player in the European market and is still pioneering with a current market valuation of 7.5bn$ (Bradshaw, 2021). There are a few more early adopters worth mentioning: French Frichti (2015),

Barcelona-based Glovo (2018), and German Delivery Hero (2019) which is mainly operating in Turkey. The pandemic and the related lockdowns in most European countries then caused demand to explode in such a way that a veritable wave of new players showed up on the market: German Gorillas, London-based Weezy, UK-based Fancy, and Finnish Wolt were all launched in 2020, Swiss Stash**,** Italian Macai, Stockholm-based Kavall, Brussels-based Ding Dong, and Berlin-based Wuplo are just a few names that followed (Lewin & Bussy, 2021).

As of November 2021, there were already six ultra-fast delivery services in Germany (Gorillas, Flink, Getir, Bring, Wuplo and Getfaster), which distinguish themselves only marginally in delivery costs, minimum order values, depth and breadth of assortment, and locations. In essence, all apps are similar and convey the same mission - spontaneous groceries in less than 15 minutes (Neuhetzki, 2021).

In the following Gorillas, one of the most successful players in the German market, is described in more detail. Founded in 2020, Gorillas reacheda unicorn status in March 2021, faster than any German start-up in history (Hüsing, 2021). Gorillas was worth €3bn in September 2021 (Kluge, 2021). Solely within the first half of 2021, it has raised $16.2bn in venture capital (PitchBook, 2021), and can record 950.000 app downloads only in 2021, as of September 2021 (Pratty, 2021).

Already in the year of its foundation, 2020, more than 100 warehouses were opened in major European cities. By the end of 2021, this figure is set to rise to 500, due to the business journal Capital (Schwär & Schlenk, 2021), with each warehouse containing 1,000 to 3,000 items personalized to the neighborhood (PitchBook, 2021). According to CEO Sumer, "One warehouse can make €1m a month [in revenues]" (Bradshaw & Lee, 2021).

On the other hand, critical voices in the German press claim that Gorillas is making losses per each order. German Manager Magazin reported that an average shopping cart with a value of €21.50, allegedly resulted in a loss of €1.50 after cost deductions (Rest, 2021). Capital Magazin calculates a contribution margin of 25 cents for an order of €23.80 (Schwär & Schlenk, 2021). Meanwhile, the increasing pressure on unit economics is also being noticed by the customers themselves, as Gorillas started charging higher delivery fees for small orders (Wehmann, 2021), presumably a reaction to the profitability challenges they are facing.

In addition to the profitability debate, Gorillas is also doing very poorly in social aspects after laying off hundreds of employees in Berlin for striking over pay and working conditions (Rainer, 2021).

2.3.3 Drivers of the business model for the customer

After having carefully analyzed the market, the following section aims to understand the underlying rationales for customers to buy groceries online from on-demand services. To date, literature is very limited for this specific sector. Most studies have rather focused on e-grocery in general with no focus on the aspect of ultra-fast delivery or on on-demand economy in general with no focus on groceries.

I. **Lockdown habits:** A major lever of online grocery has been, and is expected to remain, the impact of the lockdowns caused by the Covid-19 pandemic. As a result of the pandemic, more people are turning to e-commerce to meet their grocery demand (Altay et al., 2021). This is confirmed by a recent study by Abou-Zeid, which also shows that COVID-19-related characteristics (including individual as well as household experiences related to employment, income, remote work, and others) serve to be drivers of e-grocery adoption (Abou-Zeid, 2021).

H1: The pandemic and its resulting change in customer behavior is the major driver for the adoption of on-demand grocery. (variable=lockdown)

II. **Convenience factors:** Independently of the pandemic, most of the driving factors identified by the literature are related to pure convenience. (Kang et al., 2016)(Frank & Pechel, 2020)(Pan et al., 2017).

a) **Service: speed, time savings & flexibility:** First and foremost, the aspect of time savings whilst using the service of home delivery instead of having to go to the supermarket is driving customer adoption (Güsken et al., 2019) (bvdw, 2018) (Pan et al., 2017) (Frank & Pechel, 2020) (Delgosha & Hajiheydari, 2020). In this regard, customers also name the flexibility of being able to order from any location (Bitkom research, 2020) (Delgosha & Hajiheydari, 2020) at any time (bvdw, 2018) whilst getting access to multiple retailers (Pan et al., 2017). Interestingly, the time required to access bricks and mortar grocery stores did not affect e-grocery adoption, yet it did affect the online grocery purchase

amount in a positive way (Kang et al., 2016). It can be also seen that speed in delivery is another important attribute in consumers' decision-making (Vakulenko et al., 2019). However, it was shown that more than half of customers (54.8 %) are unconcerned with the delivery timings of online grocery if the delivery period exceeds 24 hours (Bauerová, 2018).

H2.1: The possibility to order groceries when and wherever you like is the major driver for the adoption of on-demand groceries. (v=flexibility)

H2.2: Time savings through super fast delivery is the major driver for the adoption of on-demand grocery. (v=time savings)

H2.3: Time savings by eliminating planning time is the major driver for the adoption of on-demand grocery. (v=time savings_no planning)

b) **Mental & physical relief:** Another aspect driving customer adoption to e-grocery relates to the physical relief in terms of carrying the groceries (bvdw, 2018) and also the mental relief in terms of time and financial aspects (Güsken et al., 2019).

H2.4: The physical relief of not having to carry heavy bags is the main driver for the adoption of on-demand groceries. (v= physical relief)

III. **Social & individual influences:** Further, studies show that social influences, facilitating conditions, perceived trust and hedonic motivations are also playing a vital role in driving customers to buy groceries online (Pauzi et al., 2017).

a) **Attitude and influence of peer group & household:** Different studies found out that the relevance of the subjective norms and attitudes of peer groups, especially that of the households is very high regarding the attitude to adopting ODGDS (Piroth et al., 2020) (Abou-Zeid, 2021) If another person in a potential customer's household already shop groceries online or has already made some experiences in this regard, the potential customer is much more likely to adopt in the long-term (Abou-Zeid, 2021) (Güsken et al., 2019). The influence of personality traits as such is controversial. While a study by Piroth et al. found them to have no significant influence on attitudes toward on-demand grocery shopping (Piroth et al., 2020), a different, earlier study examined this effect in more detail. In particular, it showed that personal-level variables influence online channel adoption as such, while it is at the household level that consumers are motivated to adopt, with age

having a disappearing or less pronounced effect when combined with household characteristics (Van Droogenbroeck & Van Hove, 2017).

H3.1: Having friends or a household using on-demand grocery services is the main driver for the adoption of on-demand grocery. (v=friends)

b) **Perception:** Other factors driving the online grocery purchase intention of customers are perceived trust (Pauzi et al., 2017) (Güsken et al., 2019), perceived ease of use (Wei et al., 2018), and expectations regarding performance and effort (Yuuiarty & Hartiwi Prabowo, 2021).

H3.2: Having a good perception towards ultra-fast delivery services is the main driver for the adoption of on-demand grocery. (v=perception)

c) **Demographic and situational factors:** Various studies have also examined the importance of demographic and situational factors (e.g. birth of a child or health problems) as triggers for starting to shop for groceries online (Hand et al., 2009) (Güsken et al., 2019).

H3.1: Specific changes in the life situation are the major driver for on-demand grocery. (v=life situation)

IV. **Assortment and price:** The final factor driving customers to use e-grocery services lies in the wide selection of products, including specialty grocery offerings (Frank & Pechel, 2020) (Bitkom research, 2020) (Pan, Giannikas, Han, Grover-Silva, & Qiao, 2017), as well as in competitive pricing. Respondents in various studies perceive products to be cheaper online (Pan, Giannikas, Han, Grover-Silva, & Qiao, 2017) and cite financial benefits (Delgosha & Hajiheydari, 2020) (Güsken et al., 2019) as important drivers.

H4: Competitive product pricing is the major driver for the adoption of on-demand grocery. (v=product price)

H5: The wide assortment is the major driver for the adoption of on-demand grocery. (v=assortment)

2.3.4 Obstacles of the business model

To understand the obstacles related to ODGDS, it is required to study the underlying barriers and perceptions of non-buyers.

I. **No on-site check:** One of the main reasons that keep non-buyers from buying groceries online is their distrust of online retailers when it comes to selecting fresh, high-quality foods and their preference for seeing and choosing groceries in person. (Klepek & Bauerová, 2020) (bvdw, 2018) (Bitkom research, 2020)

H6: No on-site check is the major barrier in adopting on-demand grocery. (v=on-site check)

II. **Hedonic reasons:** Also, non-buyers prefer personal contact with the seller. They miss the pleasure arising from the shopping experience (Klepek & Bauerová, 2020).

H7: Missing the shopping experience is the major barrier in adopting on-demand grocery.(v=experience)

III. **Lack of awareness:** A survey of German shoppers, which shows that only 4% already use same-hour, and a mere 12% use same-day delivery, and the aspect that the survey participants cite the barrier of preferring to receive products immediately rather than waiting for delivery (Bitkom research, 2020), while being bothered by having to adjust to the timing of delivery (bvdw, 2018), suggests a lack in awareness of on-demand delivery services.

H8: No awareness is the major barrier in adopting on-demand grocery. (v=Gorillas, Flink, Wuplo, Getfaster, Getir)

IV. **Perceived complexity, no acceptance of unfamiliar technology:** The last barrier, which is increasingly highlighted in the literature, is based on perceived complexity and risk. (Pauzi et al., 2017) Accordingly, consumers often experience a psychological barrier in terms of refusal of innovation (Joachim et al., 2018), as well as safety concerns with the platform application, lack of clarity about the service provider's performance, and problems with the trustworthiness of the service provider, which have a significant negative impact on attitudes and intentions to adopt online grocery shopping (Delgosha & Hajiheydari, 2020).

H9: Perceived complexity of unfamiliar technology is the major barrier in adopting on-demand grocery. (v=complexity)

V. **Financial concerns:** Another barrier that prevents potential customers from buying food online involves financial concerns like high shipping costs (Delgosha & Hajiheydari, 2020)(Bitkom research, 2020) and a reluctance to pay for the delivery services as such

(Klepek & Bauerová, 2020). A study by PWC reveals that most consumers expect free delivery in online retailing and that 23% of European consumers are not willing to pay for shipping (PricewaterhouseCoopers, 2020).

H10.1: High product prices are the major barrier to adopting on-demand grocery. (v=product price)

H10.2: Delivery fees are the major barrier to adopting on-demand grocery. (v=delivery cost)

2.3.5 German consumer characteristics

In the following, the characteristics and the shopping behaviour of German online grocery buyers will be described, in particular connections between the adoption of of online food suppliers andthe consumer's place of residence, income structure, and age.

According to a representative study by Bitkom research in 2019, only 21% of consumers in rural regions have ever bought groceries online, compared to more than one in three (37 %) in cities (Dr. Bernhard Rohleder, 2019).

H11: People living in major cities tend to adapt to the service faster. (v=location)

Income also plays a role in online grocery orders. According to the Digital Market Outlook 2020 from the Statista Research department, 40.7 % of online grocery shoppers in Germany had a high income, while 30.5 % were on a mid-level and the remaining 28.8 % on a low-income level (Statista Research Department, 2020).

H12: People of high income tend to adapt to the service faster. (v=income)

The distribution of the ages of online grocery shoppers shows that they are rather young. Almost half of the shoppers in 2020 were aged between 25 and 44, compared to 35% between 45 and 64, and 13% between 18 and 24. (Statista Research Department, 2020) Looking at 25-34-year-olds, almost half of the respondents (47%) stated thata they will continue to buy groceries online even after the Covid-19 lockdowns; this compares to no more than 24% across all age groups. 15% of all people surveyed now even prefer online supermarkets to physical supermarkets – among the young 18-24 age group even one-third (33%). However, the Mastercard study also shows that the vast majority of Germans (82%) still prefer shopping at the supermarket rather than ordering online (Mastercard, 2021).

H13: Younger people (<44years) are more likely to adapt to the service. (v=age)

2.4 Problem statement & research objective

This overview of previous research reveals that, despite an increasing amount of research in the field of online grocery shopping, existing literature within this field is still scarce. This is, in particular, true for Germany, an area which is nearly untouched by researchers. Furthermore, there are discrepancies in terms of drivers and barriers, as well as in terms of perceived weightings.

The main question I will elaborate on throughout the course of this thesis is what drives German consumers to use on-demand grocery services and what keeps them from using them. Therefore, through the research questions, the attempt is made to generate specific and comprehensive answers to understand the drivers and the barriers to adopting this new online grocery channel. Further, the user profiles of adopters and non-adopters are carefully analyzed to understand their role in the context of using on-demand grocery services. Based on the quantitative and qualitative results of this research, seeking to understand (non)customer profiles, management implications, and recommendations for on-demand grocery startups are provided.

Research questions:

RQ1*: What are the drivers that make people use on-demand grocery services in Germany?*

RQ2: *What are the obstacles and barriers that keep German consumers from adopting on-demand grocery services?*

RQ3: *What are the demographic user profiles of people using or not using on-demand grocery services in Germany?*

A brief overview of all hypotheses can be found in Appendix V.

3 Methodology

3.1 Quantitative & qualitative research design

The objective of this thesis is the identification of drivers and barriers of on-demand grocery adoption by the example of Gorillas in Germany. The scope of the study and the related research questions determine the choice of the research design and the data collection methodology. For this study, the methodology of this dissertation is twofold. The first part is based on a quantitative research approach consisting of an online survey, and the second part is covered by a qualitative research approach built on 7 (non-)customer interviews.

Qualitative: Although critics regard qualitative research as subjective, difficult to replicate, and generalizing (Bryman, 2016), it has several advantages that make it suitable for this study. One important advantage is its ability to develop hypotheses and theories. Secondly, qualitative research is used to expand on topics that are not yet clear (Mayring, 2016). Therefore, the qualitative approach seems suitable for this study, as the relevant literature already provides insights into many relevant aspects, while the exact objective of the study, a comprehensive overview of barriers and drivers of customer adoption of on-demand grocery, is missing, especially with respect of Gorillas in Germany.

Quantitative: The main part of the research for the sake of this dissertation is done quantitatively. In general, quantitative research methods can be used to reach large, representative groups. The way this approach is performed in this paper is by creating a standardized survey with both closed and open-ended questions using an online questionnaire. This quantitative approach is useful for several reasons, but of particular importance are aspects of reliability, objectivity, and comparability of the data collected (Yilmaz, 2013). However, the ability to collect data relatively quickly and easily to locate the drivers and barriers of on-demand food acceptance in Germany also makes this approach useful for concluding the research question. Disadvantages of this methodology, such as the acquisition of rather general knowledge as well as difficulties in capturing complex problem structures, will be tried to be compensated by further conducting qualitative interviews in the second part (Qualtrics, 2020).

3.2 Research Method

3.2.1 Semi-structured (non-)customer interviews

Next to the online survey, semi-structured customer interviews, as described by Pole and Lampard, seemed to be the most suitable method for gaining additional indeterminate, in-depth insights and answers to the research questions (Pole & Lampard, 2002). Semi-structured interviews mostly focus on the respondent's opinion and experience and aim to obtain rich and detailed data (Bryman, 2016). One major advantage is the opportunity to obtain both hands-on experience and theory-driven insights of interest. At the same time, the semi-structured interview provides the potential to capture the complexity of the research topic (Galletta, 2013). The use of an interview guide to structuring the interview helps to ensure that important questions are discussed and later on simplify the process of category analysis. This list of questions should be answered during the interviews, although neither the order nor the wording of the questions is binding (Galletta, 2013). It is also possible to include additional questions throughout the interview to ensure a natural interview flow and to enable the interviewee to develop new ideas. Usually, a full answer also requires certain additional or follow-up questions to dig deeper into a topic (Galletta, 2013).

Identification of interviewees: Given the limited scope of a master's thesis and the desire to delve deeper into this subject than possible through a quantitative survey, the number of experts was frequently limited to a sample. For the sample of customers, a set of criteria was defined. Accordingly, the (potential) customers had to be diverse in demographic characteristics (age, gender, and location) as well as in income levels. Because the goal of this study is to identify the drivers and barriers to on-demand grocery adoption in Germany, it made sense to interview both existing Gorillas customers and non-buyers. A brief introduction and description of the interviewees can be found in Appendix IV.

The conception of the questionnaire: The findings gained in literature were used as inspiration and guidelines for open questions to obtain new findings related to the drivers and barriers as well as consumer characteristics in on-demand grocery shopping in Germany. Based on these questions, an interview guideline was developed, which can be found in Appendix III. The developed question guideline is of a semi-structured and therefore explorative nature. Thus, it consists of open-ended and structured questions and allows the

interviewees to rethink the core contents and the general topic, to think about it and relate their experiences and perceptions as well as to include new perspectives. Moreover, they allow respondents to answer according to their preferences without being limited to pre-defined detailed questions (Pole & Lampard, 2002). The number of questions varies depending on the interviewee because some questions have been textually adapted or reformulated to the expert's profile and individual experience.

Interview conduction: Ten interviews were carried out with 3 adapters and 3 non-adopters, each one with a duration varying between five and ten minutes. All interviews were conducted via phone calls. All interviewees were interviewed in their mother tongue to make them feel at ease and to make it as easy as possible for them to express whatever they wanted while avoidin any language barrier. With the explicit permission of the interviewees, the interviews were recorded with the application "voice memo" by Apple. During the interview conduction, a certain improvisation was imminent. It seemed to make more sense to let the interviewees answer the questions in an unconstrained way, mentioning everything that came into their minds. The interview guide was utilized as a tool to aid orienting throughout the interview and ensure that all aspects of the study were covered (Patton, 2002). Not least, the expertise and preparation of the interviewers regarding probing and moderation is a crucial element for a successful semi-structured interview (Bogner, Littig, & Menz, 2009). In this way, the interview guideline had been sent to the interviewees by e-mail one week before the actual interview date.

3.2.2 Online survey

Surveys are one way to collect data for this research and test the hypotheses. Especially online surveys are very suitable because they are easy to access and can be filled out from anywhere. Furthermore, the participants are given time to answer and are free from the possible influence of the interviewer (Formplus, 2020). In addition, the online survey allows the collection of primary data that is directly related to our research question and reflects a high degree of actuality (WPGS, 2020).

Sample: The sample of people taking part in the questionnaire aims to represent a very broad part of the German population rather than a specific target group as Gorillas and Co. are assumed to be services well known among most people of the population. Yet, it is often

impractical or even impossible to observe all the members of a population at a given point in time. Therefore, it is to admit, that the sample of our survey is underlying a selection bias, which occurs when the sampling procedure is not at random, and thus the sample is not representative of the population (Heckman, 2005). Further, some members of the population, which in this case are Master's students from Católica Lisbon and a principally young sample of participants, are more likely to be included in the sample because of the limited network and the limited scope of this research paper.

The conception of the survey: With the help of Qualtrics, a professional and easy-to-use electronic questionnaire was developed. As people tend to get tired by the end of surveys the questionnaire is kept as short as possible. The questions are mostly closed-response in nature, with a five-point Likert rating scale, and they probe the drivers and barriers of on-demand grocery, as well as characteristics of adopters identified in the literature. This type of question is used to show respondent feedback in a comparative form. The rating scale is ordinal, which means the answer options are in an ordered manner, but not continuous. Per definition, a Likert scale is a type of survey question that presents a set of possible answers from one extreme to the other. Questions on the Likert Scale provide more detailed feedback on drivers and barriers. In this research, a five-point Likert scale was chosen to allow the respondent to indicate the extent to which he or she agrees or disagrees with a particular statement (Mcleod, 2008). Moreover, a quantity scale is included in the questionnaire, which shows the participant the status of the process. This may have a positive effect on the participant's motivation to finish the questionnaire. To avoid an "agreement bias", statements are formulated both positive and negative. Demographic information is put at the end of the questionnaire as it particularly matters for the analysis of on-demand grocery adopting personas. To avoid any problems that can occur to the respondents while answering the questions, a short pretest was run to test all aspects of the questionnaire with a sample of four participants.

3.3 Analysis method

3.3.1 Qualitative content analysis

Mayring's qualitative content analysis is an approach designed to systematically analyze communication material. It strives to use the strengths of quantitative analysis, such as its

direction through rules and the adherence to the concepts of verified reliability and validity. The procedure then adapts these strengths meaningfully for the analysis of qualitative data (Mayring, 2016). The analysis includes the following steps by Mayring (2016): 1. Definition of the analysis material, 2. Definition of appropriate analysis techniques, 3. Definition of a system of categories, 4. Definition of analysis units, 5. Review of the category system, 6. Repetition of the analysis process if necessary, 7. Interpretation of the findings and 8. Application of quality criteria.

These steps make the analysis comprehensible for others, verifiable, and conferrable to other objects. This analysis method allows the identification of emerging ideas, patterns, and themes, and provides a useful way to summarize key aspects within a large body of data (Mayring, 2016). For this qualitative content analysis, it seemed that extracting and structuring the relevant content from the overall material and then analyzing it against predefined categories is the most appropriate method. The definition of the categories served to sort the interviews according to statements that fit into the categories. The main categories were developed deductively (Mayring, 2016) and therefore defined in advance, guided by the research questions and with the help of literature. Each category was subdivided into many subcategories, with subcategory-specific variables produced. The subcategories were mostly deductively developed and partly inductively developed. And all sub-subcategories (variables) were defined inductively, led by the collected data. To ensure a consistent and meaningful analysis, the categories were explained according to Mayring and supported by several quotes from all experts (Mayring, 2016).

3.3.2 Statistical Analysis in R

The generated “CSV” output of the Qualtrics survey is being analyzed in the statistical software R. The full R script can be found in the Appendix VII. The dataset consists of 186 observations with “buyer” as binary response variable (buyer = 1, non-buyer = 0) and 30 potentially important covariates. Throughout this chapter, meaningful covariates will be selected and an appropriate regression model will be set up. Firstly, an exploratory data analysis is performed in the form of summary tables, stargazer plots, correlation matrices, influence plots, and pivot tables

Given the binary character of the dependent variable, linear regression models are not applicable. That is why we resort to binary regression as a special case of binomial regression to capture the non-linear relationship between the estimators and the response. Probit and Logit models are the most commonly used models among binary regression. They both share similar characteristics and differ only in their link function in the generalized linear model framework. The probit function uses a cumulative distribution function as link function, i.e. $G(X\beta) = \Phi(X\beta)$, whereas Logit models assume a logistic link function, i.e. $G(X\beta) = \log\left(\frac{X\beta}{1-X\beta}\right)$. Furthermore, many researchers prefer the Probit/Logit models, because they constrain predicted probabilities [0;1] and they, therefore, imply sensible marginal effects across the entire range of explanatory variables. Based on the more complicated (non-linear) nature of the Probit and the Logit models, the betas cannot be interpreted directly. The average partial effect (APE), also known as the average marginal effect (AME), is a method that results from averaging the various partial effects throughout the sample to trace the partial effect of discrete factors on the likelihood of being a buyer (Wooldridge, 2012).

The Akaike Information Criterion (AIC) is a mathematical measure for determining how well a model fits the data it was built from. In statistics, the AIC is used to compare different possible models and determine which model fits the data best. It is derived from the number of independent variables used in the model's construction and the model's maximum likelihood estimate, which represents how effectively the model reproduces the data. The best-fitting model, according to AIC, is one that explains the most variation with the fewest independent variables while avoiding the risk of overfitting. (Bevans, 2020).

Then, through computation of the forward selection function, which in each forward step, automatically adds the one variable that gives the single best improvement to your model, the model with the lowest AIC is found.

4 Results

4.1 Qualitative research

The detailed and anonymized description of the interview participants as well as their online grocery shopping behavior can be found in the Appendix IV. In addition, the comprehensive content analysis, including codification, is also included in the Appendix IV. Thus, every quotation that supports or invalidates the hypotheses is cited, and inductive and deductive codes are developed. In general, each of the respondents knew Gorillas or Flink through advertisements or friends, except for one in ten respondents, and thus the oldest respondent, who did not know any quick delivery service at all.

The main drivers among the buyers are consistent convenience reasons and spontaneous purchases. In the words of customer 2 (C2), ultra-fast delivery services are just “very easy, very convenient, and you save time”. An inductive code and driver not developed in the literature, but mentioned by four out of five buyers, is related to curiosity. In this case, for example, C4 can be cited who found it "really exciting to see if they (Gorillas) can deliver on their promise." Another inductive driver that can be inferred from the interviews is laziness. For example, C1 stated, "not feeling like (going) to the supermarket and putting on pants."
H14: Curiosity is the major driver in adopting on-demand grocery. (v=curiosity)
H15: Laziness is the major driver in adopting on-demand grocery. (v=lazy)

The main barriers among non-buyers are, most notably, a lack of need. Especially C7 and C8 simply like to go shopping and are also very happy to get inspiration on site. C8 easily resolves spontaneous bottlenecks via neighbors, while C7 and C8 head off to the supermarket, which is also not far away. Interestingly, C7 and C8 both commented that they do not see the point of having a driver bring them two eggs. That is simply too much of a luxury that they don't want to indulge in while also feeling bad for the riders. In the case of the oldest non-buyer, the biggest barrier is technology.
H16: Lacking a use-case is the major barrier in adopting on-demand grocery. (v= no use case)
H17: A mismatch of personal values is the major barrier in adopting on-demand grocery. (v=values)

Two factors which are both driver and barrier are inspiration and speed. The participants interpret the inspiration and cross-selling factors in different ways. Two buyers see the apps as inspiring and often buy more than they need (see C9 “then one thing leads to another, and the shopping cart is full again”) whereas two non-buyers consider the app rather uninspiring and feel more inspired offline. The unique selling point of on-demand grocery services, speed, is similarly perceived as both a driver and an obstacle. While endorsers identify a clear advantage in speed for spontaneous purchases, non-shoppers fail to see a specific need or benefit.

Also of interest is the fact that price and assortment are never the main reasons for neither buying nor not buying, regardless of the level of income. Although price tends to become less relevant as income rises, it is never used as the first argument. When tested directly, the assortment is consistently rated positively among buyers, although the main reasons for shopping via the quick-delivery apps are others. The distance to the supermarket is also irrelevant for the purchasing intention. Both buyers and non-buyers indicated that they live near to the next supermarkets. Likewise, the lockdowns were largely irrelevant factors, nor does perception play a significant role in this context.

Regarding the (non)consumer characteristics, there is evidence that only people who live in cities (can) use on-demand grocery. There is also a tendency for customers to buy more if their salary is higher, but the salary is never the decisive factor in their intention to buy or not to buy. Accordingly, there are also reasons for customers with high salaries to not order. Regarding the age of the respondents, it turns out that age plays a role. The older respondents tend not to buy, whereas the younger people (under 37) are correspondingly more averse to these offers.

4.2 Quantitative analysis

4.2.1 Descriptives of the data set

After 13 days and a total number of 186 respondents, the survey has been closed. Subsequent to adjusting the dataset for missing data and unrealistic ages, a thorough analysis of the 165 responses. In the following, the term “buyer” is representatively used for all respondents who already used on-demand grocery services at least once, whereas “non-buyers” stand for all

respondents who have never used and/or heard of quick-commerce services like this. All variables with the respective coding can be found in Appendix VI. Somewhat surprisingly, the data set was then composed of almost half buyers (49.7%) and non-buyers (51.3%), providing an excellent basis for validating the drivers and barriers. Gender was also equally represented, with men making up 47% of respondents and women 53% of respondents. First, a look at the correlation metrics for all variables is done, though keeping in mind that these are not good dependency metrics for discrete or binary variables. Additionally, the correlation between all variables does not work either, as some variables were only asked one way (for adopters or non-adopters), leading to strong negative correlations with buyers). Three different correlation matrices are attached in Appendix VII.

4.2.2 Drivers for buyers

In general, buyers are on average 28 years old. Looking at the buyers' correlation metrics, there is a low correlation among the individual variables, which is good for the model, as high correlation leads to multicollinearity and thus misinterpretation of the regression model or even overfitting. The only covariates that show a stronger correlation are income and age, which makes sense since older people already work longer.

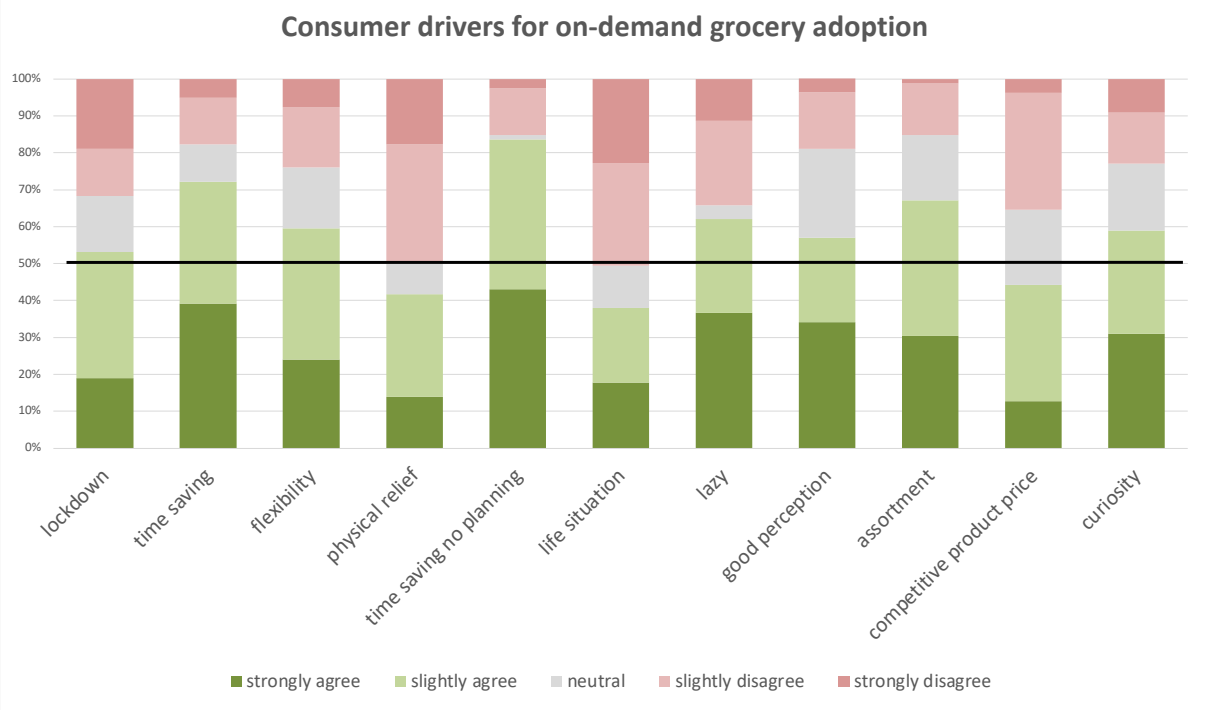


Figure 4: Drivers for on-demand grocery adoption

Figure 4 shows all the drivers derived from the literature and the qualitative interviews. The black line indicates a fixed threshold of 50% agreement. Thus, if more than the majority of respondents indicate an assumption (driver) as true (or slightly true), this is an indication that this driver is legitimate and the underlying hypothesis can be supported. One immediately noticeable thing is that two convenience variables (saving time and saving time without planning (which refers to spontaneous buying) are the strongest drivers among buyers, applying to more than 70% and more than 80% of buyers respectively. According to the 50% threshold, other convenience variables are also legitimate drivers, such as laziness and flexibility, along with good assortment, lockdown habits, curiosity, and good perception. Therefore, it can be said that the hypotheses H1 (lockdown), H2.1 (flexibility), H2.2 (time-savings), H2.3 (time-saving_no planning), H3.2 (perception), H5 (assortment), H14 (curiosity), H15 (lazy) are supported and these variables have a strong tendency to be legitimate drivers.

With less than 50% agreement among buyers, physical relief, living situation, as well as competitive product prices are to be considered as no key drivers. Therefore, H2.4 (physical relief), H3.1 (friends), H4 (product price) are not accepted. Strikingly, 30% of respondents feel that product prices are too high, but purchase anyway. Indeed, this also explains why income (anticipated from 4.2.4) does not play such a major role in the buying decision; whilst convenience is more dominant. However, drivers do not differ between women and men. Although flexibility is also more important to women (women mean: 2.3 vs. men mean: 2.7), the sample is too small to make more profound distinctions. Further drivers worth mentioning stated by buyers which were not included in the survey statements are the event of hosting guests and for self-treatment (see all additional drivers mentioned throughout the survey by buyers in Appendix V).

4.2.3 Barriers for non-buyers

Non-buyers are on average 33.4 years old. As with the buyers, there are almost no significant correlations between the covariates, except between income and age (as explained above), and between assortment and complexity, which I assume to be random. Among non-buyers, 62% are familiar with ultra-fast delivery services. The remaining 38% were introduced to Gorillas representative for all ultra-fast delivery services. However, only 10% of those non-buyers

unaware of Gorillas and Co. stated that they would consider trying out such service at some point in the future.

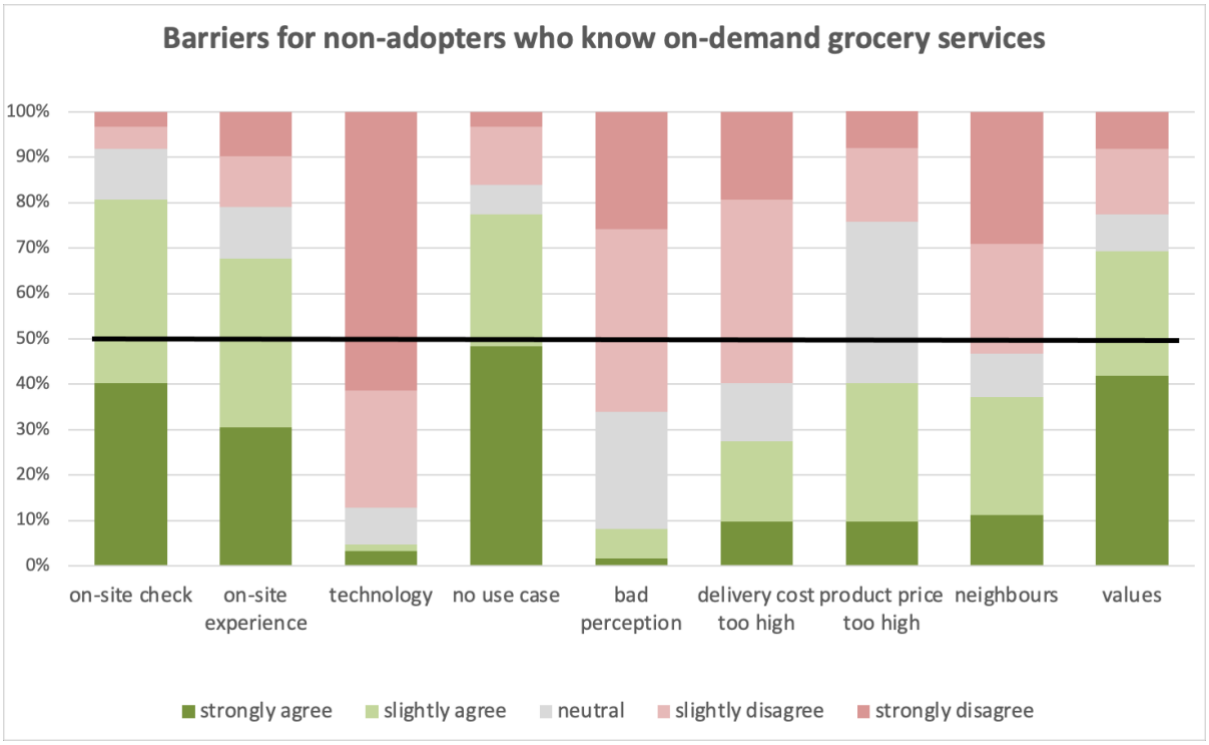


Figure 5: Barriers for non-buyers knowing on-demand grocery services

Figures 5 and 6 illustrate all of the barrier variables derived from both the literature and the qualitative interviews for non-adopters. While Figure 5 shows the results for non-adopters who are already familiar with on-demand grocery services, thus making their results more meaningful, Figure 6, in turn, shows the results for non-buyers who have never heard of an on-demand grocery service and can only specify their answers based on a one-pager from Gorillas and some immediate perceptions. Applying the 50% threshold, major blockers for non-buyers to whom on-demand groceries are common knowledge are missing on-site check, and on-site experience, lacking a use-case, and a misfit in personal values. Thus, these motives are regarded as legitimate blockers and H6 (no on-site check), H7 (experience), H16 (no use case), and H17 (values) are being accepted. A technological barrier and poor perception, on the other hand, are not relevant blockers for the non-buyers surveyed, nor are delivery fees and product prices. Furthermore, the argument put forward in the qualitative interviews that neighbors could replace on-demand grocery services by helping in spontaneous needs did not apply to the majority of non-buyers. Thus, H9 (complexity), H10.1 (product price), and H10.2 (delivery cost) are being rejected.

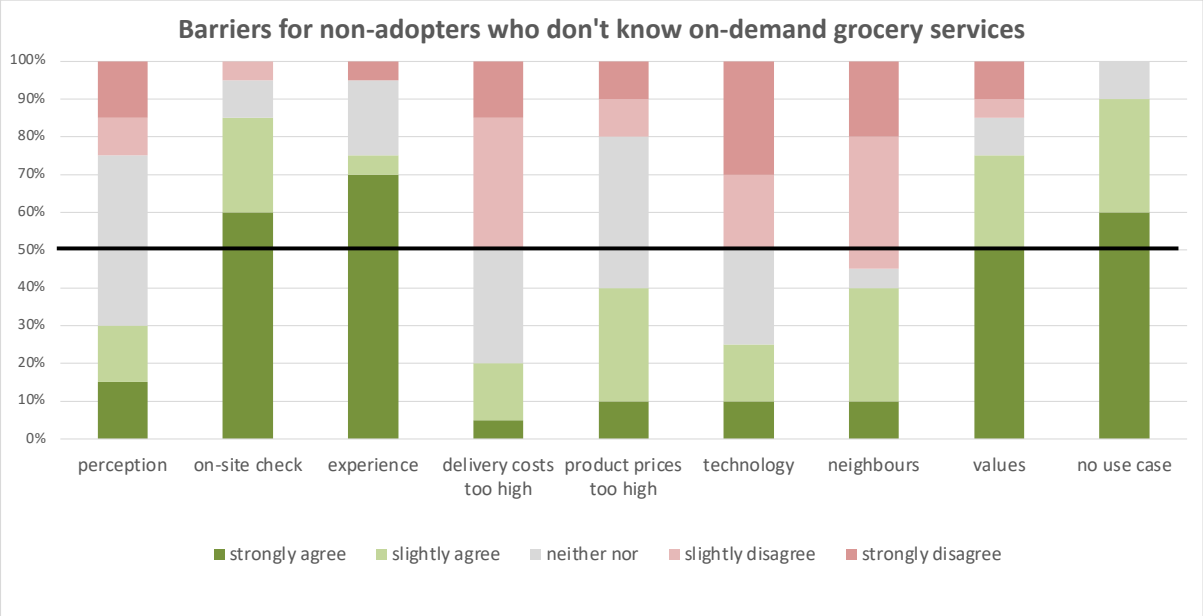


Figure 6: Barriers for non-buyers who do not know on-demand grocery services

As described above, the data derived from Figure 6 shows perceptions rather than actual blockers, yet it is interesting to see whether these perceptions of non-buyers who are unaware of on-demand grocery services differ from non-buyers who are already aware of Gorillas and Co. That said, eventually one can see very similar trends in responses to those of respondents who are aware of on-demand grocery services. The perceived complexity of unfamiliar technology, a lack of use-case, and especially the perceived advantages of on-site experience and on-site check are somewhat more important. And in principle, much more of the responses are neutral (gray), showing a legitimate uncertainty among this group of respondents. Remarkably, 9.5% of all non-buyers additionally and on one's initiative stated that the poor working conditions at ultra-fast delivery companies discouraged them from using and trying on-demand grocery services (see all additional barriers mentioned by non-buyers in Appendix V).

Concerning the last identified blocker of lacking awareness, it can be claimed that Gorillas is by far the best known among the five on-demand players in Germany. Among buyers, 96% are aware of this player, and even among non-buyers, the number is still at 73%. This is followed by Flink, with brand awareness among buyers of 87%, and among non-buyers of 39%. It is interesting to note that even in rural areas, Gorillas is known by almost two out of three respondents (59%), while almost every fourth respondent knows Flink (23%)). Wuplo, Getfaster, and Getir are rather unknown players, with Wuplo reaching only 5% awareness among buyers, Getfaster getting 6%, and Getir making 17%. Overall, 85% of all respondents

know at least one of the 5 delivery services surveyed, compared to 96% of buyers and 75% of non-buyers. Altogether 63% of the respondents know at least 2 out of the 5 players (87% of the buyers and 40% of the non-buyers) as well as 15% of all respondents are familiar with at least 3 out of 5 players (24% among buyers and 5% among non-buyers). This strong tendency at least for the dominant players Gorillas and Flink allows rejecting H8 (awareness).

4.2.4 Demographic characteristics

Exploratorily analyzing the impact of gender on the status of buyer or non-buyer, the results show that among buyers, 37% are men, while 63% are women, compared with 43% men and 57% women among non-buyers. This indicates that women are more likely to be buyers in aggregate (59% of women are buyers, while only 39% of men are buyers).

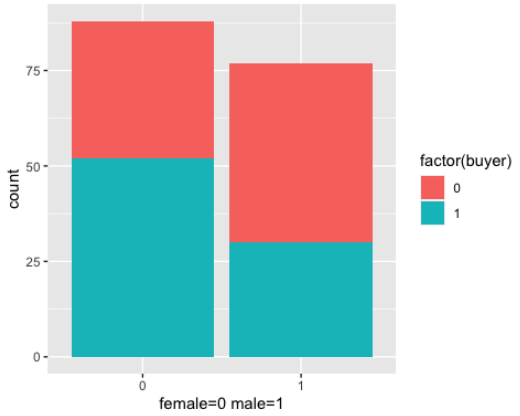


Figure 7: Impact of Gender (Bar)

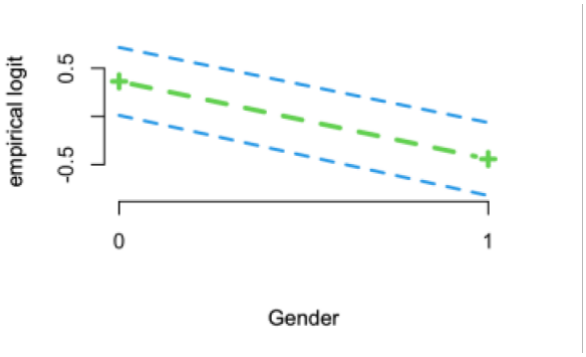


Figure 8: Impact of Gender (Function)

Concerning age, younger respondents (<40 years) tend to be more likely buyers than those over 40. Thus, in the 17-24 age group, 52% are buyers, in the 25-29 group the number is as high as 59%, just as in the 30-39 group. However, among respondents who are over 40 years old, this number drops to 20%. Admittedly, the data set is subject to a coverage and sampling bias as it does not show a representative age distribution for the German population, with the sample including dominantly younger respondents (81% of respondents are younger than 30 years vs 30% of Germans are younger than 30 years (bpb, 2020)) whilst also lacking those over 40 who live in large German cities (35% of those older than 40 years living in rural areas). However, it is striking that half of the young respondents are both aware that a grocery delivery service exists and have already purchased products via such a service.

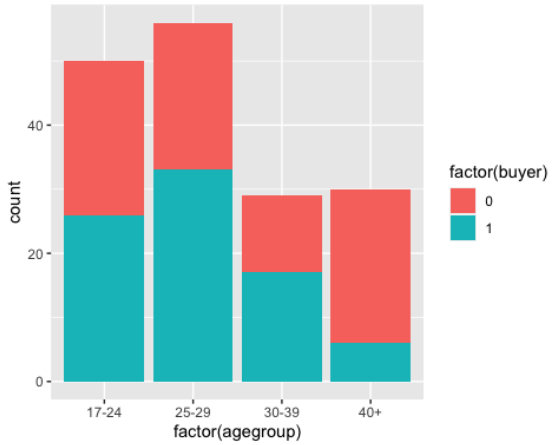


Figure 10: Impact of Age (Bar)

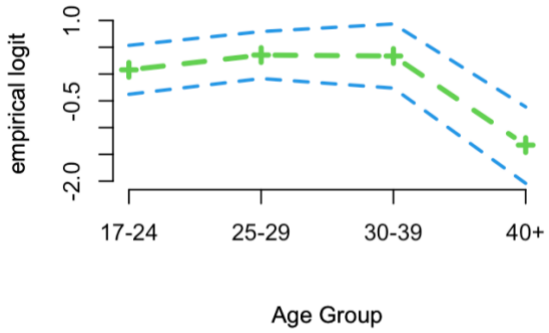


Figure 9: Impact of Age (Function)

As can be seen in Figure 9, there is a slight tendency that higher income leads to a higher probability of being a buyer. Specifically, 40% of people with low incomes (<€2,000 gross income per month) are buyers, 60% of people with middle incomes (€2,000-5,000 gross income per month) are buyers and 48% of people with high monthly incomes (>€5,000 gross income per month) are buyers. Despite the small sample, I would venture to say that income does not make a significant difference in the adoption or non-adoption of on-demand groceries. In addition, the social desirability bias is important to consider with this very sensitive variable, as respondents tend to answer questions like this in a way that makes them feel unashamed and supposedly better about themselves.

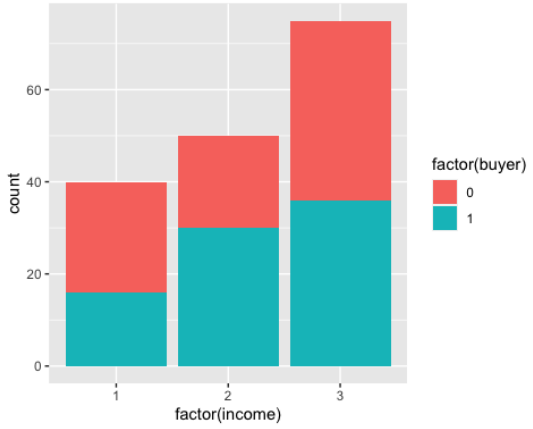


Figure 11: Impact of Income level (Bar)

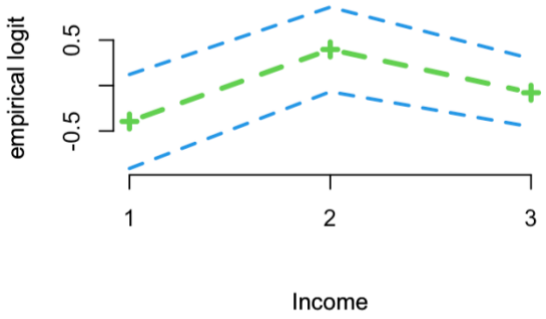


Figure 12: Impact of Income level (Function)

Since only respondents living in large cities and some medium-sized cities can order groceries on-demand, given that the services are only delivered to these areas, the variable location is a strongly significant covariate. Despite a coverage bias of the sample (61% of respondents live in major German cities), it can be noted a reasonable number of respondents who indicate that they have already ordered, although residing in small cities. It can be assumed that those respondents have ordered while they were on vacation or traveling. In general, 64% of

respondents in large cities (>250.000 inhabitants), 60% of people living in medium-sized cities (<250.000 inhabitants), and 18% of people living in rural areas have already made a purchase.

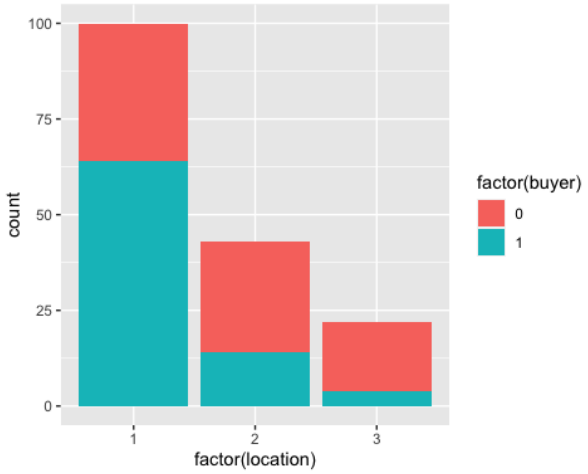


Figure 13: Impact of location (Bar)

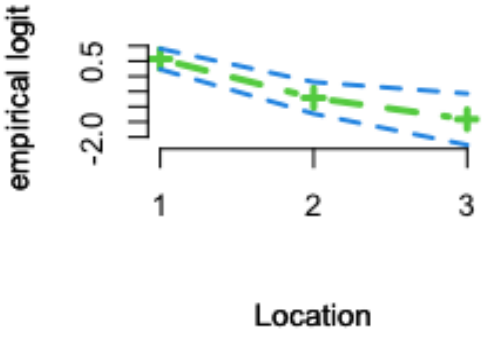


Figure 14: Impact of location (Function)

4.2.5 Regression and prediction

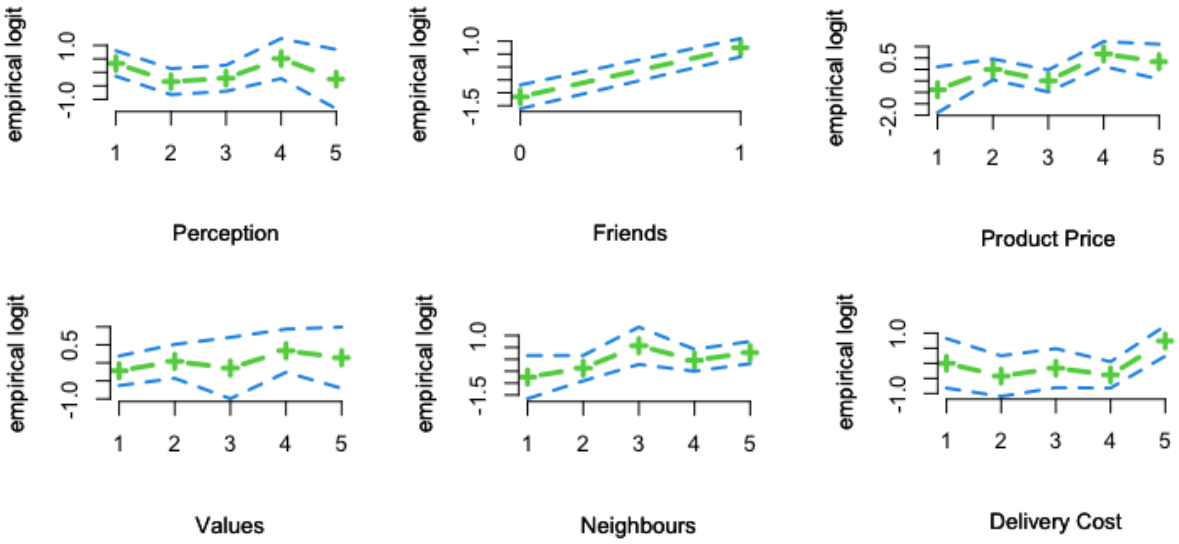


Figure 15: Function of both-sided asked motives

Both buyers and non-buyers were asked about their motivations. This inquiry reveals if motives previously thought to be merely drivers or obstacles have a statistically significant impact on individual purchasing behavior. The six driver variables sampled on both sides are plotted against the empirical logit function of the binary response variable buyer (in green) and the 95% confidence intervals in figure 16. (in blue). The influence of the respective variable can be shown in this way. The Friends variable is the one that stands out the most

while looking for linear graphs. So, if someone already does have acquaintances who have used the fast delivery service, the chances of being a buyer are greatly increased. Furthermore, the variable product price, which is both a driver and a blocker, demonstrates that a person who finds the products not too expensive (5) or rather not too expensive (4) is much more likely to purchase them. Likewise, the variable delivery cost indicates that consumers who do not regard delivery charges to be excessive are more likely to buy. Perception indicates that a person with a favorable perception (4) of ODGDS is more inclined to purchase, but no obvious linear relationship has been identified thus far. The same may be said for the variable neighbors, thus it's unclear whether being able to easily ask one's neighbors for little items makes one more likely to be a non-buyer. And whether a person has a high misfit in personal values towards ODGDS has a somewhat beneficial effect, if any, on the response variable buyer, but no statistically significant conclusion can be drawn.

	Dependent variable:					
	buyer					
	logistic			probit		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.035		-0.033	-0.020		
	(0.026)		(0.023)	(0.015)		
Perception	0.557***	0.370**	0.528**	0.329***	0.215**	0.309***
	(0.210)	(0.188)	(0.206)	(0.120)	(0.108)	(0.117)
Product_price	0.321*	0.405**	0.334*	0.194*	0.251**	0.178
	(0.192)	(0.177)	(0.191)	(0.111)	(0.103)	(0.109)
Values	0.235		0.237	0.149		0.151*
	(0.157)		(0.156)	(0.091)		(0.090)
Neighbours	0.130			0.069		
	(0.154)			(0.090)		
Friends	1.710***	1.799***	1.717***	1.027***	1.083***	1.060***
	(0.424)	(0.413)	(0.423)	(0.247)	(0.241)	(0.245)
DeliveryCost	0.266		0.292*	0.156		0.165*
	(0.170)		(0.166)	(0.100)		(0.096)
Income	-0.101			-0.062		
	(0.282)			(0.166)		
Location	-0.979***	-0.996***	-0.993***	-0.581***	-0.595***	-0.656***
	(0.311)	(0.289)	(0.311)	(0.182)	(0.168)	(0.175)
Gender	-1.029**	-0.867**	-1.021**	-0.616***	-0.521**	-0.624***
	(0.405)	(0.378)	(0.399)	(0.235)	(0.222)	(0.230)
Constant	-2.028	-1.267	-1.905	-1.216	-0.779	-1.563**
	(1.757)	(0.886)	(1.174)	(1.033)	(0.522)	(0.635)
Observations	165	165	165	165	165	165
Log Likelihood	-82.133	-86.164	-82.560	-81.970	-85.963	-83.321
Akaike Inf. Crit.	186.267	184.328	183.121	185.941	183.926	182.642
Note:				*p<0.1; **p<0.05; ***p<0.01		

Figure 16: Logit and Probit regression models

As described in the methodology chapter (see chapter 2.3.1), Logit and Probit regressions are computed for all variables asked on both sides for buyers and non-buyers (see Figure 14)). Following backward selection, the analysis is being started with all predictors included in the Logit model (Model 1) and Probit model (Model 4) and then gradually removing the least contributive covariates (Models 2 and 5) to reduce the AIC. Finally, the stepwise forward algorithm is computed that determines the models (Model 3 and 6) with the least possible AIC given the defined variables.

$$\mathrm{P}(\mathrm{buyer} = 1) = \phi(-1.563 + 0.309 \times \mathrm{Perception} + 0.178 \times \mathrm{Productprice} + 0.151 \times \mathrm{Values} + 1.060 \times \mathrm{Friends} + 0.165 \times \mathrm{Deliverycost} - 0.656 \times \mathrm{Location} - 0.624 \times \mathrm{Gender})$$

Formula 1: Probit model 6

Probit Model 6 (see regression equation above) is the model which fits the data best with an AIC of 182,6. When interpreting the regression formula, it should be noted that the sign of each coefficient has a corresponding influence on the outcome of the dependent variable. According to the best model (Probit Model 6, see equation above), it can be noticed that the general perception towards on-demand grocery services, the fact of having friends and households already using on-demand grocery services and the place of residence of the individuals are significant at a 99% (***) level for the difference of being a buyer or a non-buyer (indicated by the three stars next to the coefficients). Gender and price sensitivity to delivery costs are significant at a 90% (*) level, indicated by the one-star next to the coefficients. Age, price sensitivity to products offered, personal values, having neighbors to meet spontaneous needs, as well as income level are all not significantly different from zero, (hence the absence of stars next to the coefficients) for the likelihood of a person being a buyer or non-buyer. H3.1 (friends), H11 (location) are thus being supported, whilst H12 (income) and H13 (age) are being rejected.

With the help of average partial effects (APE), one can come to the following derivations. Holding all variables constant, on average not having friends (instead of having friends) using on-demand grocery services will decrease the probability of being a buyer by 34%. On the other side, holding all variables constant, on average being a woman (instead of men) will increase the probability of being a buyer by 18%.

Prediction: Based on the best model (Model 6), predictions are made for different imaginary personas of interest. For instance, a female persona living in a major German city, who has friends who already use on-demand groceries, who is not price-sensitive towards product and delivery fee, who generally has a good perception towards on-demand groceries, and whose value perception is neutral, has a striking 99,5% probability of being a buyer. If this very persona described were a male, holding all other characters constant, the probability of being a buyer drops to only 97%. And if the original persona (female) were very price sensitive to product costs and delivery fees, there is even a 88% chance that this persona would be a buyer. Another imagined masculine persona, living in a German major city, not price sensitive towards delivery fee and products prices, generally good perception towards on-demand grocery services, who is neutral in personal values against quick commerce services yet has no friends or household already adopting has an 81% chance to be a buyer. If the same person is being very price-sensitive holding all other characteristics constant, the likeliness of him being a buyer drops to 31%. Again, holding all characteristics of the price-sensitive male persona constant yet assuming that he has friends or a household using on-demand grocery, his probability of being a buyer increases to 71%. A third imaginary female persona living in a major German city, who has friends using quick commerce services, for whom prices are neither a driver nor a precise blocker, yet whose personal values do not match with on-demand grocery services and therefore her perceptions towards these start-ups is quite bad, anyway is likely at 63% to be a buyer. Holding all characteristics constant only changing gender to male, the likeliness for this persona to be buyer would drop to 39%.

After all, it is worth noting that three out of four inductive motives (codes) derived from the qualitative interviews proved to be legitimate as being strongly supported by the responses of the survey, whereas it was only accepted less than half (8/18) of the deductive motives derived from exiting literature. This again proves a huge gap in the existing literature within the context of German consumer behavior in quick-commerce.

4.3 Limitations

This analysis is subject to several biases. First and foremost, selection bias is there as the sample is failing to ensure being representative of the German population in terms of age and residents location. Also, there is potentially measurement error for all of the independent variables that are asked on a Likert scale that is not able to precisely measure feelings and

motivations, whereby some individuals may not answer honestly for a variety of reasons (e.g. social desirability bias). In addition, reverse causality between buyer and location may occur. Omitted bias may also be present in general, as there is a possibility that some variables have been omitted that may explain a significant portion of being a buyer or non-buyer that are simply not identified in the literature and qualitative interviews. However, especially in the regression, omitted variable bias is strongly present as the regression only includes variables that were asked for both buyers and non-buyers and not those that were asked unilaterally. This also leads to the suggestion for further analysis which would be to create a survey querying all variables from all respondents, followed by running the regression with all variables to further detect and predict all drivers and blockers.

5 Managerial Implications

The following section aims to validate the results and derive practical insights and learnings for ODGD start-ups. These specific recommendations are primarily intended to gain a deeper understanding of the business's customers to improve customer acquisition efforts by eliminating analyzed blockers, while also driving more targeted marketing activities for existing customers with the help of identified key drivers.

In principle, the literature, the qualitative data collected in the interviews, as well as the quantitative results obtained from the survey complement each other in terms of content without significant contradictions, which increases the credibility and significance of the results. Nevertheless, it is crucial to note that half of the rationales derived from the literature were not supported by the majority of the survey participants while deductive rationales derived from the interviews were most likely to resonate with the survey respondents. This does not imply that the statements in the literature are wrong in themselves, it rather confirms that the literature lacks the latest developments with gaps left for new qualitative research to be conducted. This also supports that the factors and barriers mainly studied for online grocery in general (see literature review) cannot be applied to ultra-fast grocery delivery services, but new studies are needed to investigate solely the consumer behavior within the on-demand grocery delivery sector.

RQ1: drivers that make people use on-demand grocery services in Germany

About the driving factors of buyers, it is remarkable how important the role of convenience as a driver (time-saving, time-saving no planning, lazy, flexibility) is across all the data gathered and literature. This is not surprising, as these elements define the unique selling points (USP) of ultra-fast delivery start-ups, though it provides evidence for the relevance and recognition of this USP by the target group. What underlines the importance of convenience once again is that these points outweigh presumed blockers in the purchase intention, such as negative value perceptions, poor general perception, and price perception, admittedly not as an aggregate combination, but as individual blockers. Therefore, advertising that focuses on convenience elements is essential to drive buyers' buying intentions. Besides convenience parameters, one further relevant driver is curiosity. Although the latter is certainly positive

and excitement is particularly helpful and decisive for the initial use and installation of the app, caution must be taken not to rest on the laurels of this driver, since the curiosity created will diminish considerably or even completely after the first use and may not lead to subsequent purchases by itself.

Beyond convenience and curiosity, another very important driver that turned out to be highly significant is having friends or households using on-demand grocery. The fact of having friends who are already users of ultra-fast delivery services makes individuals significantly more likely to be buyers themselves. It is also interesting to note that respondents who have friends using on-demand grocery are on average twice as likely to have a good to very good perception towards the service (from 44% to 84% agreement, no friends vs. having friends). This again demonstrates the urgency and effectiveness of word of mouth as one of the most important marketing channels.

Regarding the driver lockdown, it is clear that the lockdowns were relevant as an enabler and that ODGDS made good use of the momentum, as confirmed by slightly more than half of the respondents. Nonetheless, the decisive factor in the future will be that consumers continue to buy, irrespective of the lockdowns.

As far as the assortment is concerned, it can be said that the absolute majority of buyers consider the assortment to be sufficient (only 15% of buyers regard it as insufficient). This suggests that ODGDS have done a great job with the current selection available in the apps and that it does not make sense to significantly expand the assortment for productivity reasons.

But not only the drivers that have turned out to be relevant are of interest to managers of ODGDS. Consideration should also be given to what is not important to consumers in their decision to use the services. The motives that emerge from the literature such as the physical relief of not having to carry bags, and the motive that ODGDS are mainly used by customers undergoing a major change in their lives (see Covid-19 illness or taking on a new stressful job) are irrelevant for the majority of customers. This does not mean that these motivations do not have merit, however, marketing leaders should not spend large amounts of time developing marketing messages along these lines because they are simply not relevant to the majority of consumers. One explanation why carrying bags is of minor importance for the

buyers surveyed is that it is mostly crates of drinks or large purchases that are associated with a heavy load. Yet, these purchases are not mapped through ODGDS in the first place by most of the respondents.

RQ2: obstacles and barriers that keep German consumers from adopting on-demand grocery services

In terms of marketing to non-buyers, it is important to understand and validate the identified blockers to subsequently remove all of them. The first learning for managing non-buyers is to understand that missing on-site experience, missing on-site checks, and negative press coverage in the German press are currently major blockers. Regarding the negative press, it is imperative to work on the underlying causes (mainly allegedly poor working conditions among couriers). Even though this issue is mainly represented among non-buyers, it is also prevalent among buyers. This implies that by counteracting the negative headlines through an improvement in working conditions, former persuaded non-buyers (9,5% of non-buyers directly name bad working conditions a direct blocker) could turn into buyers, and current buyers, who are plagued by a guilty conscience, would tend to buy more if they had a better feeling about their purchase.

One finding worth mentioning and also linked to values is perception. It is significant that if consumers in principle have a good perception of ODGDS, they are more likely to be buyers. While this is plausible, what is interesting is that values and perception are not correlated, because both buyers and non-buyers consistently disagree with values, while the majority of buyers still report good perceptions. Hence, the question remains as to what is predominant here. For buyers, convenience factors outweigh values whilst the opposite is true for non-buyers?

In terms of convenience, one question remains: How is spontaneous and fast delivery a significant driver for buyers while being a significant blocker (no use case) for non-buyers? Given that two interview partners also used the argument of neighbors to justify the lack of a use case for spontaneous purchases, this aspect was asked about in the survey but did not turn out to be a significant answer and contributor, meaning there has to be more to it than simply that. Do people differ so much in their perception or planning ability? Why do some people

need products straight away and some never do? Or is spontaneous need for a product simply a created problem that non-buyers don't even notice since there has never been a solution for this problem and they, therefore, do not pay attention to it? Perhaps it is necessary to have tried the service once to first develop the problem of spontaneous needs and to become more attentive to it? Gorillas and Co. could market themselves as problem-solvers for this issue by advertising with "You also don't have neighbors who will spontaneously lend you an egg when the pancake batter is almost ready - no problem, we will help you out on this."

Furthermore, the cost determinants of the product price and the delivery cost are interesting to analyze. Product price has been described as both a driver and a barrier in the literature and has been tested accordingly. In the end, it turned out to be more of a barrier (among non-buyers, the majority of respondents (over 40%) perceive the price to be excessive), while another large proportion (over 35%) perceive it to be neutral, which suggests that they are probably unable to assess the prices. What is interesting, however, is that one out of three buyers also consider the prices to be too high while only 10% strongly agree with the product price levels. This suggests that the price is more of a blocker and that buyers also have to overcome the obstacle of accepting the higher prices (compared to discounters). Going further, one could even argue that it is probably convenience reasons that convince even the 40% of buyers to pay a price that they would normally consider too expensive. For managers, this means that on the one hand, they would still have a lever to pick up even more customers by offering lower prices, presuming that this is still profitable, or to focus even more on convenience and measure the effects of how much customers are willing to pay out for convenience (e.g. laziness and time savings). With delivery costs, the game is similar: in principle, the majority is willing to pay delivery fees, but in the end, it is significantly more often the buyers who are naturally even more price-elastic. For managers of ODGDS, this means that delivery costs are not a significant blocker in principle, but there would probably still be some short-term leverage if they were to advertise free delivery for limited periods to pick up some of the current non-buyers and convince them of the benefits of convenience.

As with drivers, it is important to understand which blockers were suspected but did not prove to be true. In this case, that is true for perceived complexity and potential awareness issues. It is pleasing for ODGDS to see that there is no issue on the part of non-buyers regarding app usage and that companies can continue to work with applications without worrying about having to develop additional channels. However, it is important to note that the technology

barrier mainly affects older people, who are not adequately represented in this survey. Accordingly, ODGDS should presumably consider whether and how to address older people who are not able to use apps. There is also evidence that the hypothesis of a lack of brand awareness among non-buyers is unfounded (at least for the two major suppliers Gorillas and Flink. The same applies to consumers older than 40 and those living in rural areas).

One last open question after evaluating the survey is the reason why only three nonbuyers who do not know Gorillas chose not even considering to try it out, after getting pitched the service. Unfortunately, the sample size is too small to draw meaningful conclusions, but the blockers showed comparable results to those already familiar with the service.

Finally, it can be concluded that the blockers "no use case" and "values" can be overcome through the positive press and targeted marketing. The perception of the necessity of checking out all products locally can likewise be addressed through the development of trust in this area. However, it is impossible to solve the lack of an on-site experience. Although the app can be designed for a maximum of inspiration (a lack of inspiration was also a blocker revealed by the qualitative interviews), it will never be possible to compensate for the social dimension, which is more important in this case.

RQ3: demographic user profiles of people using or not using on-demand grocery services in Germany

In terms of targeting, it should be noted that income and age have no significant influence on purchase intentions, but gender does. Concerning income, there are small yet insignificant tendencies for people with higher incomes to be less price-sensitive, but even for those with lower incomes, product prices and delivery charges are no decisive blockers. Consequently, it can be concluded that ultra-fast delivery start-ups must pay attention to price sensitivity when targeting potential customers, rather than to income level (i.e. everyone from students to high-income individuals should be addressed). Indeed, both product price and delivery fee, the two factors that target the consumer's perception of price, are represented in the best model. Nevertheless, this has to be assessed carefully and without overestimating the importance of the two factors. The two factors are distinct from each other. On the one hand, there is no correlation between the price-elasticity variables, which means that for one customer the

delivery cost may be a blocker, and for another customer, it is merely the high price, though in principle he would consider it worth paying for delivery. Statistically, only the price perception of delivery cost has a significant (*) negative effect on the purchase intention. However, the marginal effects are no longer significant for both, which means that although it is confirmed that delivery cost affects buyers, the absolute effect is relatively small.

Regarding the insignificance of age, it can also be concluded that ODGDS may tend to pick up young consumers (under 40 years of age) (which might also be due to sampling error), but should increasingly adapt their targeting to people over 40 years of age as well. One result was not based on a specific hypothesis derived from literature or qualitative interviews but found to be significant in targeting throughout the survey concerns gender. Since women are significantly more likely to be buyers than men, a sign for this could be explained by the fact that even today men are generally less likely to buy groceries, making them more likely to be non-buyers. Nevertheless, ODGDS should pay more attention to the target group of men, as there is still acquisition potential to be exploited among this group.

The location of residents could almost be regarded as a confirmatory or test variable since the variable is based on the fact that the delivery services are only located in large and some medium-sized German cities. Since the variable is significant and therefore corresponds to the truth, it can be concluded that the respondents replied genuinely, thereby making the dataset generally more credible.

6 Conclusion

6.1 Summary

This paper provides a comprehensive overview of the motives influencing consumers to participate or not participate in ODGDS. A major impact on consumer adoption of quick-commerce in the e-grocery context can be attributed to factors found in existing literature, such as the motives of convenience (including laziness, flexibility, spontaneity), peer group behavior, the general perception of ODGS, and assortment as well as within the newly found factors such as curiosity. In addition, influential barriers are found within several factors including the lack of personal values which are associated with poor working conditions, the lack of on-site experience and on-site inspection, and lastly the lack of having a use case for ordering at ODGDS. Moreover, the paper elaborates on the non-confirmed drivers which include physical relief, competitive prices, and adoption due to changed life situations, the barriers of generally poor perception, excessive costs, lack of awareness, the technology barrier as well as neighbors covering spontaneous needs. Regarding the demographic attributes, the impact of gender is striking as women are significantly more likely to make use of ultra-fast grocery delivery services than men do, as are people in large cities, although this is due to the current supply by ODGS start-ups. Income and age are irrelevant for the purchase intention.

Based on the findings and analysis, a prediction model, which can forecast the probability of an imagined persona being a buyer or non-buyer has been developed. This research contributes to existing consumer research by providing a comprehensive set of barriers and drivers of consumers to use ultra-fast delivery services for groceries, which is conceptualized based on primary qualitative and quantitative data collection. The research further extends the existing consumer research by comprising all drivers and barriers into the field of investigation. In addition, it mines demographic attributes against drivers and barriers, adding yet another unexplored dimension needed to elevate the findings to the next level of profundity. This research identifies several managerial implications that can be useful tools for managers of ODGDS operating in Germany. In doing so, it could help to firstly create a better understanding of their consumers, secondly, to respond more effectively to their needs, and thirdly, to resolve current customer constraints. By addressing the consumer needs which arise from barriers and drivers, managers can attract new groups of customers. Conclusively,

the prediction model can serve as a guide to sensitive managers on the influences of different characteristics of personas on their purchase decisions.

6.2 Outlook

This study has several limitations that may need further inquiry which will be elaborated upon in this outlook. Firstly, the findings are based on a small sample of 10 qualitative interview participants and 186 survey participants, this study is limited in its representativeness and hence does not allow generalization to the whole German quick-commerce industry. Future research should be conducted primarily in a qualitative way due to the lack of existing literature. This becomes strikingly evident as the survey mostly confirmed inductive motives whilst rejecting almost half of the deductive motives from literature. Generally, more research could be done in various fields since the market and consumer behavior within the quick commerce sector is rarely studied in scientific research papers. Merely the replication of this present paper in 2-3 years would be an exciting endeavor, because the sector is so fast-paced and young that consumer behavior will quite likely have already fundamentally changed by then. Furthermore, it might be advisable for future researchers to query all variables and drivers for buyers and non-buyers to improve the predictions.

Lastly, additional variables could be tested and queried beyond the scope of this paper. For example, one could examine the role of purchase frequency, and the impact of further demographic data points, such as education level or marital status. It would also be interesting to conduct a study of this kind in other countries and compare the results with those from Germany. A driver which came up in qualitative interviews and yet was not further researched is the influence of discount codes on purchase frequency, and the role of distance to the nearest supermarket. These influences could also be tested in further studies.

VI. Appendix

I. Illustrations

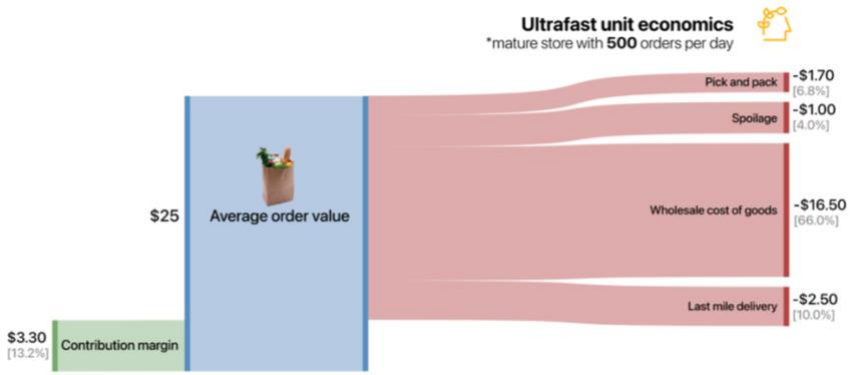


Figure 17 Cost structure of a on-demand grocery service; (Asplund, 2021)

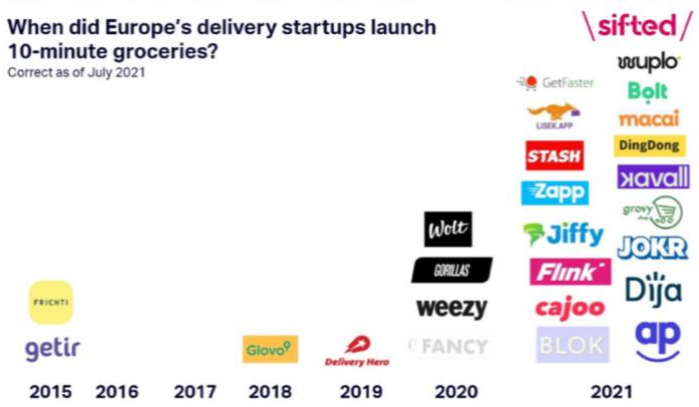


Figure 19 Timeline of on-demand grocery start-ups launch dates, (Lewin & Bussy, 2021)

Figure 18 On-demand grocery market in Europe, (Lewin & Bussy, 2021)

II. Literature review: drivers and barriers

Table 1 Drivers

Source	Area of study	Described drivers
(Yuuiarty & Hartiwi Prabowo, 2021)	shoppers' intention towards grocery shopping applications	Performance Expectancy, Effort Expectancy, Innovativeness of grocery mobile apps
(Wei et al., 2018)	online purchase intention of Fruits	perceived usefulness, perceived ease of use
(Delgosha & Hajiheydari, 2020)	attitude and intention towards adopting On-demand service platforms	Financial benefits, flexibility, ODSP application superior functionality, ODSP special services
(Abou-Zeid, 2021)	drivers of e-grocery adoption, use, and stickiness	Attitudes (peergroup and household adoption), COVID-19 related characteristics (incl. individual and household experiences related to employment, income, remote work, etc.)
(Van Droogenbroeck & Van Hove, 2017)	Adoption of online channel	variables at the personal level do affect adoption of the online channel, consumers' motivations to adopt lie on the household level. In particular, the effect of age disappears or becomes less strong when it is combined with household characteristics. age does not only capture a person's ability to use the technology but also its usefulness for that person's household, in that age is correlated with the presence of young children and the working situation in the household.
(Pan, Giannikas, Han, et al 2017)		convenience, time savings, home delivery and access to multiple retailers, economic value, wide assortments of products
(bvdw, 2018)	Adoption drivers	time independence for shopping, relief in terms of carrying the groceries, time savings.

(Bitkom research, 2020)	Adoption drivers	Offer of special foods, respondents perceive products to be cheaper online and appreciate the fact of not having to go to the supermarket while being able to order from any location.
(Hand et al., 2009)	triggers for starting to buy groceries online	importance of situational factors (e.g. having a baby or developing health problems)
(Frank & Pechel, 2020)		price and assortment, the mere convenience, service
(Piroth et al., 2020)	Attitude towards online grocery shopping	subjective norm and attitude, prior experience, high relevance of peer groups - personality traits had no significant influence on the attitude toward OGS
(Kang et al., 2016)	Adoption of online grocery	the time requirement (convenience variables) to access offline grocery markets, had no effect, yet it did affect the online grocery purchase amount. the effect of convenience variables and food related lifestyle variables varies across the context (adoption vs. post-adoption) and product categories.
(Pauzi et al., 2017)	Online grocery purchase intention	social influences, facilitating conditions, hedonic motivations, perceived risk, perceived trust
(Güsken et al., 2019)	Online grocery retail acceptance factors in literature	Service (product, delivery, service), use (envoronmental physical and mental relief, financial and time savings), effort (financial, mental, time), individual and customer focused (demographic and situational factors, trust and experience)

Table 2 Barriers

Source	Area of study	Described drivers
(Kimes, 2011a)	major reasons that prevent consumers	perceived need for interaction, perceived technology anxiety

	from ordering food online	
(Klepek & Bauerová, 2020)	Reasons of non buyers	see grocery in person before buying, distrust in e-tailers to choose the best and freshest grocery, preference of personal contact with seller, hedonic reasons and pleasure from the shopping experience, perceived online shopping slow regarding order-delivery time gap, reluctance to pay for the delivery service
(bvdw, 2018)	Reasons for non-buying	not being able to view and check the groceries on site, bothered by having to adjust to the time of delivery.
(Bitkom research, 2020)	Reasons for non-buying	high shipping costs, greater trust in stationary retail when buying food, doubts about quality and freshness, people like to buy food spontaneously and prefer to get the products immediately rather than waiting for delivery
(Delgosha & Hajiheydari, 2020)		perceived complexity, platform application security concerns, service provider performance ambiguity, service provider trustworthiness issues, and financial concerns have substantial negative impacts on attitude and intention

III. Interview guideline

Have you ever shopped for groceries online? If yes – have you ever used on-demand grocery services? Why did you try it? When did you try it the first time?

1. What are the drivers that make people use on-demand grocery service Gorillas in Germany?	
H1: The pandemic and its resulting change in customer behaviour is the major driver for the adoption of on-demand grocery.	What are the reasons for you to shop on Gorillas? Why did you adapt on on-demand grocery shopping?
H2: Convenience factors are the major driver for the adoption of on-demand grocery.	How did your grocery shopping behavior change during the pandamic? Does someone in your household or peer group already shops groceries via on-

H3: Social influences and peer group behaviour are the major drivers for the adoption of on-demand grocery.	demand apps? Since when have you adapt to on-demand grocery platforms?
H4: The price is the major driver for the adoption of on-demand grocery.	
H5: The assortment is the major driver for the adoption of on-demand grocery.	
2. What are the obstacles and barriers of German consumers not adopting to on-demand grocery service Gorillas?	
H6: No on-site check is the major barrier in adopting on-demand grocery.	What are the reasons for you to not shop groceries via on-demand service platforms like Gorillas? What needs to be happening to you to change your shopping behavior towards on-demand grocery? Would you ever consider purchasing groceries online? Does someone in your household or peer group already shops groceries via on-demand apps?
H7: Missing experience is the major barrier in adopting on-demand grocery.	
H8: No awareness is the major barrier in adopting on-demand grocery.	
H9: Perceived complexity of unfamiliar technology is the major barrier in adopting on-demand grocery.	
H10: Financial concern is the major barrier in adopting on-demand grocery.	
3. What does the user profile of someone using / not using Gorillas in Germany look like?	
H11: Younger people tend to adopt to the service.	How old are you?
H12: People living in cities tend to adopt to the service.	Where do you live?
H13: People of high income tend to adopt to the service.	Would you consider yourself to have a low, middle or high income?

IV. Interview analysis

Table 3: Interviewees characteristics

Purchasing behavior towards on-demand grocery	Customer	Age	Income level	Location	Online grocery delivery services used	First time using online grocery	Attentive through	Shopping cart
Frequent buyer	C1	24	Medium income	Munich	Flink, Gorillas, Amazon, Knuspr	Jan 2021	Marketing	Spontaneous purchases via gorillas, weekly shopping at Knuspr, as better plannable
Frequent buyer	C3	25	Medium income	Berlin	Gorillas, Flink	Sep 2021	Friends, colleagues	Average shopping cart with 20€, because of coupon codes. In principle, I buy across all product categories.
Frequent buyer	C9	26	Medium income	Hamburg	Gorillas, Flink	Apr 2021	Marketing, friends	"mainly supplementary purchases. If something is missing, you order it quickly."
Once a month buyer	C4	24	Low income	Cologne	Gorillas	Jul 2021	friends	
Once a month buyer	C5	37	High income	Munich	Rewe, Gorillas	Jun 2021	Marketing	No weekly shopping, rather spontaneous
Rare buyer	C6	27	Low	Stuttgart	Gorillas	Apr 2021	Marketing,	"on average 2-3 products

			income				friends	and spontaneous, small things that were still missing"
Non-buyer, but would like to use it as soon as Gorillas delivers to her district	C2	25	Low income	Stuttgart	Gorillas	Sep 2020	Friends	"small things, impulse buys, potato chips, or tomatoes while preparing food"
Non-buyer	C7	25	Low income	Munich	non	never	Friends	-
Non-buyer	C8	51	High income	Rural area near Stuttgart	Local delivery services	2005	Press	-
Non-buyer	C10	83	Medium income	Rural area near Stuttgart	Local delivery service	2018	Does not know Gorillas or Flink	"would like to map weekly shopping"

Table 4: Content analysis interviews

Category	Code	Reference
Drivers	Curiosity	C1: „ I wanted to test whether this delivery promise of 10min is truly happening."
		C5: "I thought the advertising was super exciting...I really wanted to try it out."
		C9: "I was super excited to try out how it works...the first time especially - late at night - no mood to go out. I then ordered 7x in the first month alone."

		C6: “found it really exciting whether they can keep their promise... I was really interested to see how it all works.”
	Lockdown	C2: “yes there was a trend, this has led to many more people using it, through the lockdown many did not want to get out or could not get out.”
		C3,C4,C6: lockdowns had nothing to do with their online grocery shopping behavior
		C9: “..had something to do with lockdown. Somehow it has suited well, and you also did not want to supermarket and there were many queues. But would also order apart from that.“
	Convenience (laziness)	C1: "…Purchases that I would make anyway but no desire to go to the supermarket, no regularity..flour missing - no desire to put on pants..”
		C2: “Speed but also convenience, you no longer have to move and it is as soon as possible with me…Because of laziness I don't want to go shopping anymore because of one thing”, “I love to go shopping, and before that I don't want to stand in line at Rewe…very easy, very convenient, and you save time”, “Convenient..we were sitting in the park with friends and then it arrived”
		C3: The fact that I had no more oat milk in the morning, no motivation and no time…Super convenient and also inspiring” “The 6 weeks I live in Berlin I was not even once in the supermarket, although the nearest supermarket is not far away.. I love rewe and that is further away”
		C9: “…the first time especially, late at night, no desire to go out, try out how that works. I then ordered 7x in the first month alone.”
	Convenience flexibility and spontaneous	C5: “…Bought several times when it took longer at work, you can order after work after 8pm or even if my wife has not managed to go shopping when everything else has closed, and you spontaneously still need something, like a red wine for dinner… It is just the convenience of not even really leaving the house.”
		C6: “spontaneous, little things that were missing”
		C10: “For old people this is great in itself. And also without a car or in winter.”
		C4: **“**ingredients were missing for cooking, needed urgently, faster than going to store, supermarket 10 minutes away by car..

		spontaneous and fast...with my girlfriend, the time factor is defined differently again, she is on the road from morning until late evening, stores are then already closed, she has no more energy and joy to go shopping"
	Assortment	C1: "new products (dirtea by Shirin David at flink first)"
		C3: "if something is out of stock, i switch between the two flink and gorillas, also large and wide and healthy offer, which i find great and local berlin stores for example fresh bread - you get everything bundled and don't have to go separately"
		C2: "wide assortment is important, fancy things don't necessarily have to be covered, but standard products do"
		C4: "product variety not too big, but for me this is not a blocker, however, sometimes products are not available for a long period of time."
		C5: "Typical things you get actually always"
		C9: "Assortment is great, especially vegan offer, I do not get everywhere else."
	Price	C2: "Prices are ok, the fact that I save time and that it is delivered to the door…10-20% mark up for it okay"
		C3: "Prices do not matter, average purchases are somewhat more expensive than when I go to Rewe, but coupons are good for that...or when I order sweets in the office, the price does not stop me"
		C4: "prices are rather blocker, it feels cheaper in the supermarket from the product price level, but delivery fees in itself are fine to me…if i really need something urgently to finish my cake - then 20 cents more is totally ok."
		C5: "Price does not really matter, similarity to Rewe, delivery costs also oke, do not matter"
		C6: "Delivery costs of 1.80 are fully all right"
		C8: "I don't care about the price.If I'm in the situation that I can not run itself, it is just lockdown is or I'm old, then I find this a great thing."
		C9: "mostly the delivery fee blocks me, otherwise prices are the same as usual. But coupon codes are a great driver, especially at flink."
		C10: „delivery fees are fine"
	Social drivers	C6: "In my group of friends, only a few people use it regularly. But if my girlfriend would enforce that, I would be using it

		more often as well.”
		C4: “My girlfriend already orders super regularly. I am also excited by this.”
Barriers	Price	C1: “…not the product prices per se, but delivery fee is a blocker for me, especially for orders under 10Eur.”
		C4: “product prices rather blocker, perceived cheaper in supermarket”
		C6: „prices are the main blocker to me”
		C7: “Price is also more of a blocker. I can accept paying a higher price for better products or more sustainable products, but not for someone to deliver the food to me.”
	Routine	C6: “I know what I'm getting and where it is. Carrying things is also no problem.”
	On-site check	C7: “I buy a lot of vegetables and I like to see them on the spot and choose them myself. The app has only representative picture of product.”
	Perception	C7: “I do trust that they will deliver what they promise.”
	Too luxurious	C7: “I don't see anyone bringing my food by bike. I don't see myself in a situation where I have so little time that I can't go shopping. And out of laziness I would think that it is too much of a luxury.”
		C8: “I am also uncomfortable when someone cycles to me in 10 minutes completely out of breath, then arrives in the 4th Stpck and brings me two eggs.”
	Speed irrelevant	C8: „I have time to shop and I like to go shopping. I've never been in a situation where I needed a 10-minute delivery. Then I just go to the neighbor.“
		C7: Ich sehe mich nicht in der situation dass ich so wenig zeit hätte um nicht mehr shooppen könnte
		C6: “But it's not a permanent solution for me, as long as there's a supermarket nearby. Delivery time does not matter. The time saving is not so relevant for me. The supermarket is super close.“
		C10: Speed ist egal. Ich brauche das nicht so schnell.
		C7: “the nearest store is a 5 minute walk away, it is easier, more flexible and faster for me to shop there.“
	missing	C7: “I also just like shopping and don't want to miss it. I wonder what I want to cook when I' m in the store. You could also do

	inspiration, shopping experience	it on the app, but that's less inspiring.”
		C8: “I like shopping, also for business. My supermarket is 5 minutes away...The shopping experience... I like to go shopping. I like to look around. I like to be inspired by new things. Plants or tchibo. Then I meet people there, it's just fun.“
	No service in rural areas	C8: “and there is no delivery service at our place.”
		C10: “Here, unfortunately, no one delivers. No delivery service. Also no Rewe.”
	Technological barrier	C10: “I can see so badly. That would take so much effort. My son would have to do that for me. If my son would do that, then that would work and would be great. But like this, it is rather difficult for me.“
	Physical relief	C8: “I don't have to carry my bags far either… Just from the car into the house for a few meters.”
		C9: „Carrying bags is not a reason.”

V. Survey

Table 5: Hypotheses

RQ1: What are the drivers that make people use on-demand grocery services in Germany?
H1: The pandemic and its resulting change in customer behavior is the major driver for the adoption of on-demand grocery. (variable=lockdown)
H2.1: The possibility to order groceries when and wherever you like is the major driver for the adoption of on-demand groceries. (v=flexibility)
H2.2: Time savings through super fast delivery is the major driver for the adoption of on-demand grocery. (v=time savings)
H2.3: Time savings by eliminating planning time is the major driver for the adoption of on-demand grocery. (v=time savings_no planning)
H2.4: The physical relief of not having to carry heavy bags is the main driver for the adoption of on-demand groceries. (v= physical relief)
H3.1: Having friends or a household using on-demand grocery services is the main driver for the adoption of on-demand grocery. (v=friends)
H3.2: Having a good perception towards ultra-fast delivery services is the main driver for the adoption of on-demand grocery. (v=perception)
H3.1: Specific changes in the life situation are the major driver for on-demand grocery. (v=life situation)
H4: Competitive product pricing is the major driver for the adoption of on-demand grocery. (v=product price)
H5: The wide assortment is the major driver for the adoption of on-demand grocery. (v=assortment)
H14: Curiosity is the major driver in adopting on-demand grocery. (v=curiosity)
H15: Laziness is the major driver in adopting on-demand grocery. (v=lazy)
RQ2: What are the obstacles and barriers that keep German consumers from adopting on-demand grocery services?
H6: No on-site check is the major barrier in adopting on-demand grocery. (v=on-site check)
H7: Missing the shopping experience is the major barrier in adopting on-demand grocery.(v=experience)
H8: No awareness is the major barrier in adopting on-demand grocery. (v=Gorillas, Flink, Wuplo, Getfaster, Getir)
H9: Perceived complexity of unfamiliar technology is the major barrier in adopting on-demand grocery. (v=complexity)
H10: Financial concern is the major barrier in adopting on-demand grocery.

H10.1: High product prices are the major barrier in adopting on-demand grocery. (v=product price) H10.2: Delivery fees are the major barrier in adopting on-demand grocery. (v=delivery cost) H16: Lacking a use-case is the major barrier in adopting on-demand grocery. (v= no use case) H17: A mismatch of personal values is the major barrier in adopting on-demand grocery. (v=values)
RQ3: What are the demographic user profiles of people using or not using on-demand grocery services in Germany?
H11: People living in major cities tend to adopt to the service. (v=location) H12: People of high income tend to adopt to the service. (v=income) H13: Younger people tend to adopt to the service. (v=age)

Table 6: Drivers and Barriers derived from open questions from the survey

Drivers for adopters not included in the survey	If you have guests	Guests are there and don't want to leave them alone or go shopping for something that is empty or forgotten. (e.g. drinks become scarce; replenishment via " Flaschenpost ").
		When guests are already there and it is missing or is finished.
	Assortment	Products that my city supermarket does not stock
	Presents	I can send something to my sick friends in Cologne although I live in Munich
	Convenience	No or hardly any delay, therefore almost no waiting time
		Gigantic appetite
		It takes 10 minutes to the nearest supermarket and another 10 minutes to walk back
		No shopping list, you order in front of your own empty fridge
	All drivers in	No (5x)

	survey	
	Treating moments	Treating moments. Situations that occur "more rarely", but trigger joy and you want to treat yourself to something as a result (wine, beer, sweets, etc.).
	Curiosity	Out of curiosity try the new service (when it was new)
Barriers for non-adopters not mentioned in the survey	Lockdown sport	Especially in lockdowns and in times of much home office, the way to the supermarket is my reason for leaving the house at all
	Poor working conditions	Poor working conditions 5x
		No control over organic products, Fairtrade goods....
		I've heard of pretty poor working conditions, so that puts me off and I don't want to support it.
		the working conditions and social security of the courier service employees is not guaranteed.
		I am unsure about the working conditions of bicycle couriers and about effects on the smaller supermarkets near me (e.g. CAP Markt)
	Age	Attitudes may change with age in favor of delivery services due to poor mobility and convenience.
	Blockers in survey are sufficient	No 3x
	Registration process	If at all, that it may seem time-consuming to register there first. The registration thus represents a certain inhibition threshold. But even that I have now exceeded - they just do not deliver to me, the silly.
	No use case	Unnecessary, I can also go shopping myself
		I never need products within 10 minutes
		I have many shopping opportunities near me

VI. Variables

Perception	I don't feel good about ordering from fast delivery services, as they seem unreliable and untrustworthy.	1= strongly agree 5=strongly disagree
On-site check	I prefer to shop locally and see and check the freshness and quality of the products.	
Experience	I just enjoy to go shopping at the local supermarket.	
Delivery cost	For me, the delivery costs (average 1,80€) of fast delivery services are too high.	
Perceived compexity	I find ordering groceries via app monstrous and am overwhelmed with the technology.	
Neighbors	If I spontaneously still need products, I just briefly ask my neighbors.	
No use case	I rarely need food super fast and spontaneously, so I don't see Gorillas and Co. adding any value for me.	
Values	It is not in line with my values to have a bike courier deliver small orders to me.	
Curiosity	I was just curious about whether they can keep their delivery promise.	
Lockdown	I buy more groceries online since/cause of the lockdowns.	
Non-buyers_interest	Could you imagine using on-demand grocery services in the future?	
Product cost	For me, the product prices (to compare with Rewe prices) are too high.	
Time saving	For me, the time saved by ordering from fast delivery services is the decisive argument.	
Flexibility	The ability to order from anywhere is very important to me.	
Phyiscal relief	For me it is a huge relief not to have to carry bags.	
Time_saving no planning	For me, it's a huge relief not to have to schedule extra time for shopping.	
Assortment	The product selection on Flink, Gorillas and Co. meets my requirements.	

Lazy	I am often too lazy to go shopping on the spur of the moment.	
Life situation	I have only discovered the advantages of fast delivery services through a certain situation in my life (e.g. through an illness or a new stressful job).	
Age	How old are you?	Open text field
Location	Where do you live?	1=major city, 2=medium size city, 3=rural area
Gender	What is your gender?	1=male, 0=female
Income	What is your monthly income?	1=low income, 2=medium income, 3=high income
Friends	Do you have friends or household that purchases groceries already via quick-commerce services?	1=yes, 0=no
Buyer	Have you ever bought groceries via quick-commerce services?	1=yes, 0=no
Wuplo, Getir, Gorillas, Flink, Getfaster	Are you familiar with the following quick commerce players?	Individual (1=yes, 0=no)

Figure 20: Variables

VII. R script

#convert data.frame

```
d <- read_excel("Thesis_V5.xlsx")
d <- as.data.frame(sapply(d, as.numeric)) #<- sapply is here
d[is.na(d)]=0
attach(d)
```

#split into buyer and nonbuyer

```
dbuyer=d[d$buyer==1,]
dnonbuyer=d[d$buyer==0,]
```

#specific vars to delete

```
buyerdel=c(1:6,9:11,13,16,30)
nonbuyerdel=c(1:6,17,18,20:23,25,30)
```

#age group

```
dagegroup <- d %>% mutate(agegroup = case_when(age >= 40 ~ '40+',
                                  age >= 30  & age <= 39 ~ '30-39',
                                  age >= 25  & age <= 29 ~ '25-29',
                                  age >= 25  & age <= 29 ~ '25-29',
                                  age >= 17  & age <= 24 ~ '17-24'))
```

#datasets for individual variables

```
dlocation=d[d$location!=0,]
dage=d[d$age!=0,]
dassort=d[d$Assortment!=0,]
dinc=d[d$income!=0,]
```

#DESCRIPTIVES / INTRODUCTION
#Summary

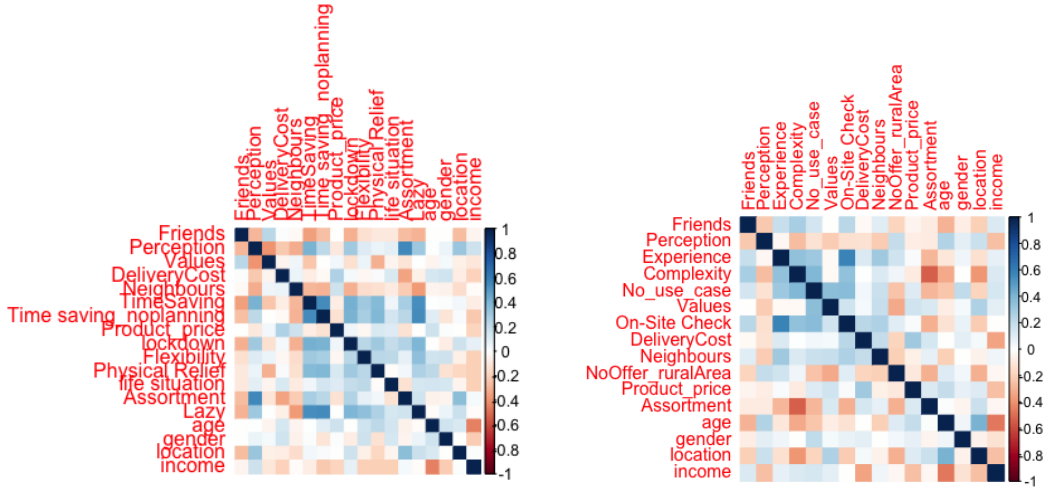
```
stargazer(d, type = "text",
          nobs = TRUE, mean.sd = TRUE, median = TRUE, iqr = TRUE, no.space = TRUE)
```

#Overview

```
stargazer(dbuyer[dbuyer$gender==1,], type = "text",
          nobs = TRUE, mean.sd = TRUE, median = TRUE, iqr = TRUE, no.space = TRUE)
stargazer(dbuyer[dbuyer$gender==0,], type = "text",
          nobs = TRUE, mean.sd = TRUE, median = TRUE, iqr = TRUE, no.space = TRUE)
```

#Correlation Matrix

```
#limitedcor= c(d$Wuplo, d$Flink, d$Getir, d$GetFaster, d$`non buyers_interest`,
d$NoOffer_ruralArea)
limitedcor=c(2:6,16,30)
corrplot(cor(d[,-limitedcor]), method = 'color')
corrplot(cor(dbuyer[,-buyerdel]), method='color')
corrplot(cor(dnonbuyer[,-nonbuyerdel]),method='color')
```



#hist plots

```
ggplot(d, aes(factor(gender), fill = factor(buyer))) + geom_bar() + xlab("female=0 male=1")
ggplot(dagegroup, aes(factor(agegroup), fill = factor(buyer))) + geom_bar()
ggplot(d, aes(factor(income), fill = factor(buyer))) + geom_bar()
ggplot(d, aes(factor(location), fill = factor(buyer))) + geom_bar()
```

#Compute Absolutes

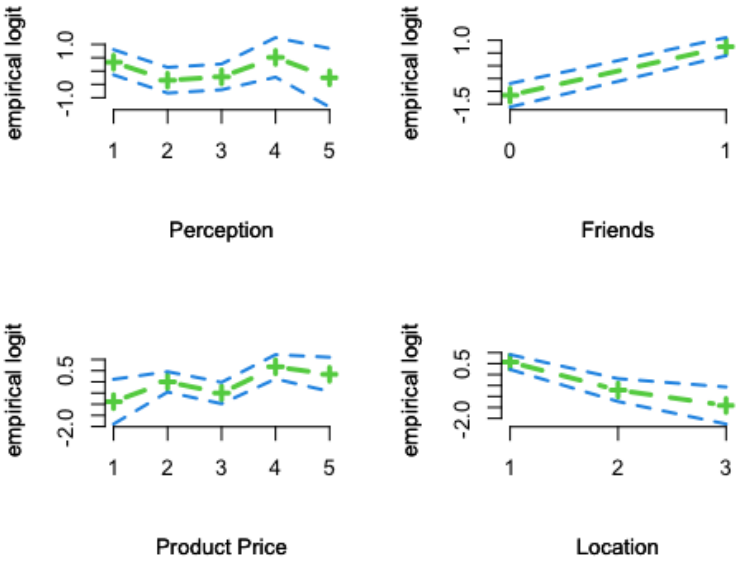
```
table(d$buyer,d$location)
table(d$buyer,d$income)
table(d$buyer,d$gender)
table(dagegroup$buyer,dagegroup$agegroup)
table(dagegroup$location,dagegroup$agegroup)
```

#Compute Percentages

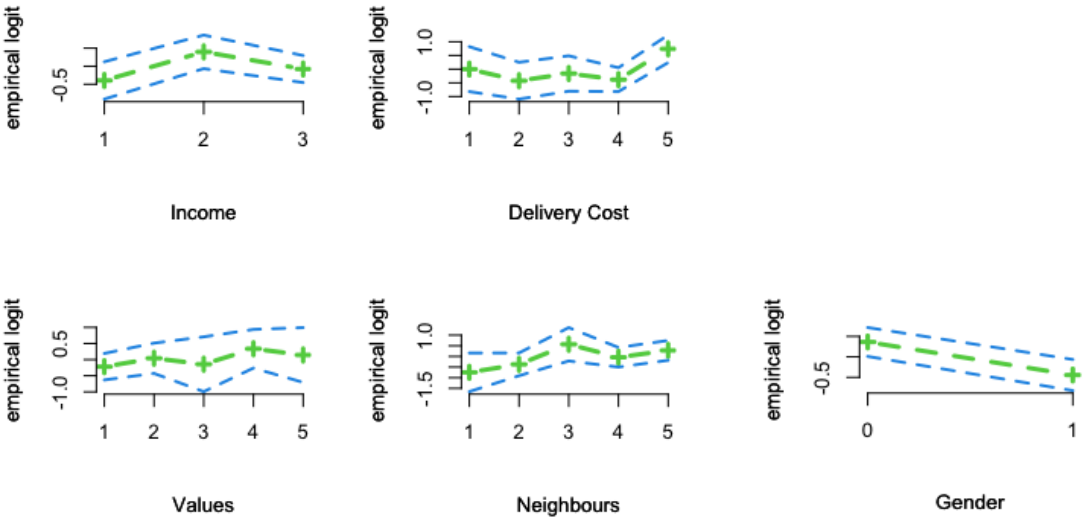
```
summaryBy(buyer ~ location, data=d, FUN = c(mean), na.rm=TRUE)
summaryBy(buyer ~ income, data=d, FUN = c(mean), na.rm=TRUE)
summaryBy(buyer ~ gender, data=d, FUN = c(mean), na.rm=TRUE)
summaryBy(buyer ~ agegroup, data=dagegroup, FUN = c(mean), na.rm=TRUE)
```

#exploratory analysis for categorical covariates

```
source("eda.main.bin.plot.r")
par(mfrow=c(2,2))
eda.main.bin.plot(y=buyer,covar=Perception,label="Perception",cont=F,data=d)
eda.main.bin.plot(y=buyer,covar=Friends,label="Friends",cont=F,data=d)
eda.main.bin.plot(y=buyer,covar=Product_price,label="Product Price",cont=F,data = d)
eda.main.bin.plot(y=buyer,covar=location,label="Location",cont=F,data=dlocation)
```




```
eda.main.bin.plot(y=buyer,covar=income,label="Income",cont=F,data=dinc)
eda.main.bin.plot(y=buyer,covar=DeliveryCost,label="Delivery Cost",cont=F,data=d)
eda.main.bin.plot(y=buyer,covar=Values,label="Values",cont=F,data=d)
eda.main.bin.plot(y=buyer,covar=Neighbours,label="Neighbours",cont=F,data=d)
eda.main.bin.plot(y=buyer,covar=gender,label="Gender",cont=F,data=d)
par(mfrow=c(1,1))
```



#awareness of delivery start-ups - buyers vs non buyers

```
summs=(d[,2]+d[,3]+d[,4]+d[,5]+d[,6])
sum(summs>2)/dim(d)[1]

summsbuyer=(dbuyer[,2]+dbuyer[,3]+dbuyer[,4]+dbuyer[,5]+dbuyer[,6])
sum(summsbuyer>2)/dim(dbuyer)[1]
```

```
summsnonbuyer=(dnonbuyer[,2]+dnonbuyer[,3]+dnonbuyer[,4]+dnonbuyer[,5]+dnonbuyer[,6])
sum(summsnonbuyer>2)/dim(dnonbuyer)[1]

table(d$buyer,d$Gorillas)
table(d$buyer,d$Wuplo)
table(d$buyer,d$GetFaster)
table(d$buyer,d$Flink)
table(d$buyer,d$Getir)
table(d$location,d$Gorillas)
table(dbuyer$Friends,dbuyer$Values)
table(d$Friends,d$Perception)
table(dbuyer$Friends,dbuyer$Perception)
table(dnonbuyer$Friends, dnonbuyer$Perception)
table(d$Values,d$Perception)
```

#summary of buyer vs nonbuyer

```
stargazer(dbuyer[,-buyerdel], type = "text",
        nobs = TRUE, mean.sd = TRUE, median = TRUE, iqr = TRUE, no.space = TRUE)

stargazer(dnonbuyer[,-nonbuyerdel], type = "text",
        nobs = TRUE, mean.sd = TRUE, median = TRUE, iqr = TRUE, no.space = TRUE)
```

#Converting to factor variables

```
Friends <- as.factor(Friends)
buyer <- as.factor(buyer)
```

#REGRESSION #Algorithm to find best model according to AIC (lowest AIC)

```
forward = glm(buyer~1,family=binomial(link = "logit"), data=d)
forw =step(forward,direction="forward",scope~age + Perception +Product_price + Values +
Neighbours + Friends +DeliveryCost + income + location +gender)
```

#Probit forward selection

```
forward_p = glm(buyer~1,family=binomial(link = "probit"), data=d)
forw_p =step(forward_p,direction="forward",scope~age + Perception +Product_price + Values +
Neighbours + Friends +DeliveryCost + income + location +gender)
```

#regression with all variables

```
fullglmlog=glm(buyer~age + Perception +Product_price + Values + Neighbours + Friends
        +DeliveryCost + income + location +gender,family=binomial(link = "logit"), data = d)
fullglmprob=glm(buyer~age + Perception +Product_price + Values + Neighbours + Friends
        +DeliveryCost + income + location +gender,family=binomial(link = "probit"), data = d)
```

#Second reduce some insignificant variables in model my.glm1 & my.glm2

```
my.glm1=glm(buyer~ Perception +Product_price+ Neighbours + Friends +DeliveryCost+ location
+gender,family=binomial(link = "logit"), data = d)
my.glm2=glm(buyer~ Perception +Product_price+ Friends + location +gender,family=binomial(link
= "logit"), data = d)
my.probit=glm(buyer~ Perception +Product_price+ Friends + location +gender,family=binomial(link
= "probit"), data = d)
```

#Finally use the stepwise Forward Algorithm from above and select the model with lowest AIC

```
my.logit_Forward=glm(buyer ~ Friends + location + gender + Product_price + Perception +
   DeliveryCost + Values + age,family=binomial(link = "logit"), data = d)
my.probit_Forward=glm(buyer ~ Friends + location + gender + Product_price + Perception +
   DeliveryCost + Values,family=binomial(link = "probit"), data = d)
```

#Compare the models

```
stargazer(fullglmlog,my.glm2,my.logit_Forward,fullglmprob,my.probit, my.probit_Forward, type =
'text', no.space = TRUE)

newdata=data.frame(Friends=c(1,1), location=c(1,1), gender=c(0,1), Product_price=c(1,3),
Perception=c(1,5), DeliveryCost=c(1,3), Values=c(5,1))
predictbuyer <- predict(my.probit_Forward,newdata, type = "response")
predictbuyer
```

#APE - Average partial effect

```
library(mfx)
probitmfx(my.probit_Forward, data = d, atmean = FALSE)
logitmfx(my.logit_Forward , data = d, atmean = FALSE)
```

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