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Online Grocery Shopping in Germany: Assessing the Impact of COVID-19

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Abstract: Online grocery shopping in Germany has shown a strong growth in the past years and is expected to further develop in the future, especially through the influence of COVID-19. The main purpose of this study was to examine six theoretical customer-oriented factors and their influence on consumer online grocery purchase intentions. Additionally, this study compares consumer perceptions before and since the COVID-19 outbreak. Since the health crisis is very recent, the research on its impact on online grocery purchasing behavior is limited. A total of 402 valid questionnaires were collected in Germany. The data were analyzed using the software SPSS IBM 28. The results indicate that perceived risk still has a negative influence on purchase intentions, thus remaining relevant in online grocery shopping. However, the consumers' perceived risk is considered lower compared to the pre-COVID-19 scenario. Moreover, perceived usefulness, perceived ease of use, perceived trust, convenience, as well as situational factors were found to have a positive relationship with purchase intention, both before the COVID-19 crisis and since then. The COVID-19 pandemic shows a strong reduction in perceived risk, while the remaining characteristics increase at moderate levels. Online grocery businesses could use the insights of this study to reduce perceived risks as well as successfully communicate the benefits of online shopping to consumers.

Keywords: consumer behavior; e-commerce; online grocery shopping; perceived risk; situational factors; COVID-19; Germany

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1. Introduction and Objectives

1.1. The COVID-19 Outbreak and Its Impact on Online Grocery Shopping in Germany

The COVID-19 disease refers to an infection (SARS-CoV-2) which was first detected in Wuhan (China) in December 2019 [1]. Since then, the number of infections has been rising globally each day. In March 2020, the World Health Organization (WHO) announced the COVID-19 outbreak as a global pandemic [2]. The COVID-19 disease can be seen as one of the greatest health crises in modern history and has influenced consumer behavior [3].

The pandemic has changed the grocery market in Germany in unprecedented ways [4,5]. In March 2020, the German federal government decided to close 'non-essential' shops in order to contain the pandemic. Grocery stores were allowed to remain open under strict hygiene conditions. The food shopping behavior of consumers has undergone remarkable changes since the outbreak of COVID-19 [4,6]. The imminent threat of COVID-19 that overwhelmed Germany animated panicked shopping behavior, which resulted in stock-outs and purchasing limits on many food items [7]. As a result of food businesses closing, grocery retailers have largely benefited from the crisis, especially during periods of lock-downs [8]. Consumers attempted to avoid shopping in stores and used grocery delivery and pick-up services more intensively during the beginning of the crisis. Therefore, the pandemic has brought a boom to online grocery shopping (henceforth OGS) even though food retailers remained open [4]. Customers are increasingly willing to order groceries online [4,9]. According to a study of PwC, 22% of the German participants use the internet

as a primary channel for shopping groceries. A total of 52% have started to purchase more groceries online during the COVID-19 pandemic, and more than 82% of consumers are planning to continue to do so [10]. The main reasons for buyers are the convenience of fast delivery, time saved and health concerns [3]. Nevertheless, in comparison to product categories such as fashion, consumer electronics and books, OGS is still a niche [11]. Although many consumers have adopted purchasing groceries through online channels, there is still a large group of customers refusing this way of buying [11,12]. Even though grocery purchases account for a large proportion of consumer spending [13], the online sector has been unable to gain traction. This is especially the case for the German market, where the share of food purchased online is about 1% of the total 125.3 billion euros [3]. According to a study of Deloitte [3], only 31% of German participants have purchased groceries online before the crisis.

As e-commerce is becoming an increasingly important marketing and sales channel worldwide, also reinforced by the COVID-19 pandemic [14], it is of high priority for the German market to better understand the factors influencing consumers' online purchasing behavior concerning groceries. The insights gained from this study can help grocery retailers to respond appropriately to consumers' expectations and reservations. The adoption reasons of online grocery consumers are also of high interest for established companies as well as start-ups to successfully increase their online sales and remain/become competitive on the market.

This study aims to address two research gaps in the existing literature on OGS. First, the most prominent factors in the literature [13,15–17], namely, risk, ease of use, usefulness, trust, as well as convenience and situational factors, were selected in order to analyze their influence on purchase intention since the outbreak of COVID-19. However, the influence of situational factors such as the COVID-19 pandemic [12] has not been thoroughly investigated in research on OGS and requires further research [18]. Second, the study makes a significant contribution to the literature by comparing consumer perceptions before and since the outbreak of COVID-19. Since the health crisis is very recent, the literature on its impact on online grocery purchasing behavior is limited.

The next section starts with a brief insight into the existing literature on OGS, followed by an explanation of purchase intention and a description of the employed constructs.

1.2. General Overview: Online Grocery Shopping

Over the past decade, the development of the internet had profoundly changed consumers' habits [6,12,19]. The internet has become a major distribution channel, where customers have the possibility to browse through e-shops at any time and from any place; there are no limitations regarding localization and opening hours [20,21]. OGS has enjoyed strong growth the last several years, and it is predicted that this channel will continue to grow rapidly in the upcoming years [6,22–24]. According to research by Nielsen, it is likely that by 2024, up to 70% of customers will buy groceries online [24]. Depending on the development of individual purchases in the online environment, OGS can be seen as one of the most dynamically developing categories [12,13]. The experience of buying groceries online is different from other forms of online shopping due to product perishability and variability [22]. Consumers select grocery items on a web page instead of choosing items from a supermarket shelf [18]. The online environment is missing elementary parts of the offline experience, such as the touching and smelling of products as well as the personal contact with employees to get assistance [18]. According to [25], the process of ordering groceries can be seen as a discontinuous innovation as it contains technological advances as well as changes in consumer behavior. This implies that the adoption process of buying groceries online might take longer and is possibly more difficult for consumers than in cases of continuous innovations [18].

Although OGS has already been identified as a dynamic category of the online market in recent years, the COVID-19 pandemic has further intensified this trend [12,14,26–28]. Consequently, a presence in the digital marketplace as well as addressing new customer expectations

are essential for retailers in order to retain existing customers and attract new ones in an extremely competitive environment [19]. Understanding consumer behavior when purchasing groceries online is essential for businesses, even more so during the pandemic, and is therefore at the forefront of companies and researchers' efforts [21,26,29]. However, while online shopping in general has attracted an abundance of research interest [30], investigations of OGS are limited [29]. Previous research has focused on consumer's expectations [13,31], advantages and disadvantages [32], several factors influencing online shopping behavior [33–35], technology acceptance as a determining factor of OGS adoption [36,37], benefits and challenges of OGS [34,38], as well as the influence of demographics [12,25].

2. Literature Review

2.1. Intention to Shop Groceries Online

Several research perspectives have been proposed to understand consumer online shopping behavior, including the theory of planned behavior, the technology acceptance model, the theory of the adoption of innovations, as well as the influence of variables such as perceived risk and convenience [11,39,40]. One of the most known social psychology theories about the way perceptions influence actions is Ajzen's theory of planned behavior (TPB) [41], which is an extension of the previously widely used theory of reasoned action [13,42]. A central element in the theory of TPB is the intention of an individual to perform a given behavior [41]. The consumer purchase intention is essential for consumer behavior and the decision-making process. According to the TPB model, the intention to perform an action is influenced by three factors: attitude, subjective norm, and perceived behavioral control [41]. According to this theory, the intention of an individual is the best predictor of their actual behavior. The theory of TPB has been applied in several studies and seems suited for the purpose of investigating and predicting consumer online grocery purchase intentions [11,13,39,40]. Research shows that online consumers perceive difficulties while shopping online, and it has been suggested that shopping in an online environment does require skills, opportunities, and resources [11,39]. Moreover, consumers may perceive the process as too complex and risky when performing online shopping [11,39]. Consequently, consumers' purchase intentions are a vital factor in the context of this study and are treated as the dependent variable.

2.2. Perceived Risk

One major difference between OGS and offline (in-store) shopping is the higher perceived risk when shopping online [25,43–45]. Ref. [15] highlights in his construct of perceived internet grocery risk that perceived risk for inexperienced online shoppers acts as a barrier for future online purchases. It is defined as the extent to which an individual believes using the internet for grocery purchases is insecure or has negative consequences [15]. Therefore, specific types of risk regarding OGS are taken into account.

Perceived risk includes several factors such as personal data security, delivery issues, a lower quality of products than expected, and difficulties regarding the return and exchange process [25]. With regards to data security, research emphasized that consumers have transaction risks when purchasing online as well as privacy concerns [25,44,46]. These concerns contain the unauthorized acquisition of personal information during the online buying process [44]. However, this kind of risk decreases after customers gain confidence when buying online [25,34]. Regarding the delivery process, late deliveries can be seen as one of the main issues when ordering online [6,22]. If the delivery is delayed, consumers will be disappointed and may no longer want to buy groceries online in the future. [34,47]. Another reason for a low uptake might also be the delivery fee that retailers charge [34]. Furthermore, the packaging and transport of the products, especially for the more fragile items, is also a significant factor when purchasing online [13,47,48]. Moreover, the quality of the products is one of the main concerns of customers when purchasing groceries online. Additionally, an important factor in consumers' intentions to purchase groceries online relates to the fear about the selection of perishable groceries such as fruits, vegetables or

meat [13,21]. Customers cannot assess and select the products themselves and therefore have no possibility to see, smell and touch the products beforehand [34,49]. Purchasing fresh products is linked with knowing product expiry dates, which is impossible online [21]. Even though grocery retailers may guarantee to sell high quality products, preferences still vary among consumers, leading to the risk that the delivery may not fulfill one's expectations [22,34]. A last important factor is a concern regarding the return and exchange of products purchased online. Consumers do not buy groceries online if they think that the return and exchange of products will be complex [13,17,47].

In order to understand to what degree the perceived risk of online shopping influences the consumers' intention to purchase groceries online rather than offline, the following hypotheses were formulated:

Hypothesis 1a. *The perceived risk of online shopping negatively influences the consumer's intention to buy groceries online since the outbreak of COVID-19.*

Hypothesis 1b. *The perceived risk of online shopping has been lower since the outbreak of the COVID-19 pandemic compared to before COVID-19.*

2.3. Perceived Usefulness and Perceived Ease of Use

Behavioral intentions and attitudes toward e-shopping have been widely supported by the technology acceptance model (TAM) [15,33,50]. The model was developed in order to predict 'technology acceptance', which can be visualized as the psychological state of an individual with regard to the intended purpose of a particular technology [25]. In order to change the perception of online shopping, research addressed consumers' willingness to change behaviors and attitudes by concentrating on *perceived usefulness* and *perceived ease of use*, as these are the key variables in the TAM model [33,36]. Perceived usefulness is defined as the degree to which an individual believes that using a particular technology would improve his or her performance or productivity [15,33,50]. In addition, perceived usefulness could also be defined as the degree to which an individual feels the online website could add value and efficacy when performing online shopping [35,51]. The perceived usefulness of the website depends on the efficiency of technological features such as advanced search engines, personal services and detailed product information [16,35].

The second variable, perceived ease of use, is defined as the degree to which an individual believes using a new technology is free of effort [33,50]. Within the OGS context, it means that ordering groceries online for consumers is perceived as effortless and easy [36]. Perceived usefulness refers to consumers' perceptions of the experience's outcome, and perceived ease of use refers to their perceptions of the process leading to the final outcome [17,33]. In particular, perceived usefulness describes how effective online shopping is in supporting consumers in accomplishing their task, while perceived ease of use describes how easy the internet as a shopping medium is to use [17].

The TAM model has been tested and validated by extensive research and proven to be suitable as a theoretical foundation for the adoption of e-commerce [17,37,52,53]. Research shows that it is appropriate to draw analogies between online shopping and the variables of the TAM model, as it has been widely used in the study field of online user behavior [33,35,50].

The following hypotheses were formulated based on the literature review:

Hypothesis 2a. *Perceived usefulness of online shopping has positively influenced the consumer's intention to buy groceries online since the outbreak of COVID-19.*

Hypothesis 2b. *Perceived usefulness of online shopping is higher since the outbreak of the COVID-19 pandemic compared to before COVID-19.*

Hypothesis 3a. *Perceived ease of use of online shopping has positively influenced the consumer's intention to buy groceries online since the outbreak of COVID-19.*

Hypothesis 3b. *Perceived ease of use of online shopping has been higher since the outbreak of the COVID-19 pandemic compared to before COVID-19.*

2.4. Perceived Trust

One of the most frequently quoted reasons for consumers not shopping online is the lack of trust [17,54]. Trust can be defined as the willingness of an individual to depend on a partner's behavior in a relationship [55–57]. According to [58], individuals rely on their general disposition of trust when in novel situations. The most important source of trust in a retail setting is the salesperson, where consumer trust is dependent on the salesperson's expertise, likeability and similarity to the customer [17,59,60]. In the online shopping context, the role of the physical salesperson is replaced by help buttons and search features, thus removing the basis of trust in the shopping experience [33,60]. Moreover, trust is considered an essential construct in online shopping, as consumers face risks caused by the uncertain behavior of online retailers and an unknown environment [57,61]. For example, risks linked to payment, product, information and time impact consumers' intention to purchase online negatively [6,29,57]. Consumers cannot check the quality of a product physically or monitor the safety and security of sending personal and financial information while purchasing online [17,33,54]. Previous literature showed that trust has a positive effect on the intention to shop online [61–63]. Therefore, the following hypotheses are proposed:

Hypothesis 4a. *Perceived trust of online shopping has positively influenced the consumer's intention to shop for groceries online since the outbreak of COVID-19.*

Hypothesis 4b. *Perceived trust of online shopping is higher since the outbreak of the COVID-19 pandemic compared to before COVID-19.*

2.5. Online Shopping Convenience

According to different research, perceived online shopping convenience can be seen as one of the main benefits for consumers to purchase groceries online [28,47,64,65]. The key principles in shopping convenience are the reduction in the opportunity costs, effort and time involved in shopping activities [13,17,66]. The main factors for consumers to shop online are the possibility of shopping at any time from any place as well as the convenience of staying home [14,20,21,28,29,47]. Shopping online can be seen as less stressful than going to the grocery store during rush hours and having to experience long waiting times at the cashier [21,29]. Moreover, consumers do not need to carry their purchases home, as they get their groceries directly delivered to their home [13,17]. It is not that the shopping itself is more efficient, but there is time and energy saved when buying online [13,14]. Furthermore, avoiding crowded places (grocery stores) by switching to online purchasing can be seen as a benefit, as it has allowed for protecting oneself and others since the beginning of the COVID-19 pandemic [67]. The delivery option is especially highly valued by older consumers, families with children and consumers with physical disabilities [13,20,21]. Furthermore, online consumers can compare product costs online without physically visiting multiple stores [17,61]. However, one barrier that consumers face when purchasing online is the learning process of shopping on a specific webpage. The design and the use of the website needs to be simple and comprehensible, otherwise consumers will drop the purchasing process and prefer shopping in-store. Online grocery consumers demand user-friendly websites [68] since they often lack assistance from salespersons [47]. Furthermore, late deliveries, long delivery time windows, incorrect deliveries and time-consuming returns and exchanges reduce the convenience of online shopping [47,68,69].

The following hypotheses are presented in order to investigate to what degree online shopping convenience influences consumers' intention to purchase groceries online while also taking the pandemic into account:

Hypothesis 5a. *Online shopping convenience has positively influenced the consumer's intention to buy groceries online since the outbreak of COVID-19.*

Hypothesis 5b. *Online shopping convenience has been higher since the outbreak of the COVID-19 pandemic compared to before COVID-19.*

2.6. Situational Factors (COVID-19)

In recent years, studies have examined the influence of situational factors regarding online shopping [12,18,70]. Specific needs or circumstances, such as avoiding spending effort and time on an extra trip to buy a needed product, are often motives to use online shopping [18,70]. Furthermore, situational factors such as health problems or having children are triggers for beginning to purchase groceries online [18]. According to the research of [18], situational factors such as lifestyle changes (e.g., relocation) are key triggers to start online shopping. Currently, the most visible situational factor is the outbreak of the COVID-19 pandemic, which has affected consumer behavior and decision-making worldwide [12,14,67]. In Germany, Spain and Italy, grocery sales increased about 20% during the beginning of the first lockdown in March 2020 [71]. The rapidly spreading virus encouraged panicked shopping behaviors that resulted in stock-outs and purchasing limits on many food items, offline as well as online [4,12]. The restrictions (e.g., 'stay at home') imposed by the government during lockdown periods lead to an increase in both online and local grocery shopping. The shutdown of restaurants and cafés altered consumer food expenditures, leading to a shift from gastronomy to grocery retail [4,8]. These measures resulted in a rapid use of online shopping, including groceries [4,28]. Moreover, with increasing insight about infection risks and safety measures, consumers preferred to avoid crowded shops to protect themselves and therefore switched to buying groceries online [1,7,8,28]. The latest studies highlight, that the pandemic has a positive influence on buying groceries online [1,4,26]. According to a study by McKinsey & Company, 32% of the participants have started buying groceries online since the beginning of the pandemic in Germany [72]. Convenience, time savings, increased selection online, as well as health concerns are mentioned as the main benefits of having purchased goods online since the beginning of the pandemic [8].

To investigate to what degree the situational factors influence consumers' intention to shop for groceries online rather than offline, the next hypotheses were formulated:

Hypothesis 6a. *Situational factors have positively influenced the consumer's intention to buy groceries online since the outbreak of COVID-19.*

Hypothesis 6b. *Situational factors have had a higher influence since the outbreak of the COVID-19 pandemic compared to before COVID-19.*

3. Method

3.1. Procedure and Sample

Data were collected by using an online survey which was created with the Qualtrics survey software. The survey was conducted between 15 October and 15 November (third pandemic wave in Germany). During that period, the majority of the restrictive measures were directed towards non-vaccinated people. The survey link was shared via the authors' Facebook accounts, in relevant WhatsApp groups as well as via e-mail to reach as many potential respondents as possible. As an incentive, respondents were able to enroll in a lottery for one of five amazon gift cards. Furthermore, only people based in Germany were allowed to participate in the study, as it only refers to the German market. In total, 402 respondents (68.2% aged 20–25; 9.7% aged 36–49; 19.1% aged 50–65) completed the survey with valid answers. A total of 31 questionnaires had to be excluded from the analysis due to missing answers. From the 402 valid respondents, 37.7% are male, 62% are female and 0.3% chose "prefer not to say". A detailed overview of the sample's characterization can be taken from Table 1 below. The data were statistically analyzed with the software IBM SPSS, version 28.

Table 1. Distribution Sample Characteristics.

Characteristics		*n*	Percent
Gender	Male	151	37.6%
	Female	250	62.2%
	Diverse	0	0.0%
	Prefer not to say	1	0.2%
Age	<20	3	0.8%
	20–35	275	69.4%
	36–49	39	9.8%
	50–65	76	19.2%
	>65	3	0.8%
Current Employment Status	Student	127	31.6%
	Full-time employed	203	50.5%
	Part-time employed	41	10.2%
	Full-time homemaker	22	5.5%
	Unemployed	1	0.2%
	Retired	8	2.0%
Have you ever purchased groceries online?	No	113	28.1%
	Yes	289	71.9%
Have you purchased groceries via the internet for the first time during the outbreak of the COVID-19 pandemic (2020/2021)?	No	75	26.0%
	Yes	214	74.0%

3.2. Questionnaires and Measures

From a variety of factors, six were selected that potentially influence a consumer's intention to shop for groceries online. A self-administrated questionnaire was created referring to different measurement scales from the existing literature. The questionnaire was published in German. A standard translation and back-translation procedure was used to ensure the equality of the measurement instruments. The survey consisted of two main sections, corresponding to two different time periods—before and since the beginning of the COVID-19 outbreak. This procedure allowed for determining, for each respondent, both their actual behaviors before and since the pandemic as well as their behavioral intentions for the period onwards. All listed variables were measured on a 5-point Likert scale as the attitude measurement, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). An overview of the scales is presented in the Appendix A. It shows which literature was used as a basis for the measurement of each construct (Risk Pre/Post, Usefulness Pre/Post, Ease of Use Pre/Post, Trust Pre/Post, Convenience Pre/Post, Situational factors Pre/Post) and the full list of items.

The questionnaire started with a dichotomous variable, asking the respondent whether they had previously purchased groceries online. In the event of an affirmative answer, another dichotomous variable was implemented, asking the participant whether they had bought groceries online for the first time during the outbreak of the COVID-19 pandemic. In the following questions, two multiple choice questions on purchase frequency and the initial reasons to purchase groceries online were presented. The questionnaire continued with close-ended questions for all respondents, both derived from the literature and self-constructed. Therefore, a pre-test was required. The questionnaire was pre-tested on 20 test subjects beforehand to ensure comprehensibility. The close-ended questions were used to measure consumer perceptions before and after the outbreak of the COVID-19 pandemic as well as purchase intentions towards OGS. Moreover, two control questions were implemented to ensure whether the respondent has answered the other questions truthfully. Control questions are used to exclude respondents who do not answer the survey seriously from the data analysis. The final part of the survey contained an open-ended question to offer participants the possibility to add any comments or thoughts on OGS. Furthermore, demographic variables such as gender, age and current employment status

were queried. Finally, respondents had the chance to enter their email address so as to participate in the lottery.

4. Results

4.1. Descriptive Analysis

Out of all respondents, about 71.7% stated that they have purchased groceries online before and were forwarded to two more questions. More than half of the participants (53.1%) indicated that they purchased groceries for the first time during the outbreak of the COVID-19 pandemic. With regards to the frequency of purchasing groceries online, 24.3% indicated that they purchase groceries "2–3 times a month", while 10.2% stated "once a month", and 9.4% selected "once a week". 13.2% of the respondents stated that they purchase groceries "rarely". Those respondents who had purchased groceries online in the past were further asked to specify their personal reasons why they started or tried purchasing groceries online. A total of 21% of the previous online grocery shoppers stated: "Outbreak of the COVID-19 pandemic", while 18.2% chose "Grocery Shopping is too tiring", and 23.9% selected "Grocery shopping is too time-consuming". A detailed overview about the frequency of online purchases as well as the personal reasons given can be taken from Table 2.

Table 2. Distribution Sample Characteristics.

		n	Percent
Initial Reasons for OGS	Outbreak of the COVID-19 pandemic	162	21.9%
	Health problems	8	1.1%
	Mobility problems	6	0.8%
	Grocery shopping is too tiring	140	18.9%
	Grocery shopping is too time-consuming	184	24.8%
	Choice Had a baby	21	2.8%
	No car	49	6.6%
	Recommendation	85	11.5%
	Choice Curiosity	86	11.6%
How often do you buy groceries online?	Tried once	19	6.6%
	Rarely	53	18.3%
	once every 2–6 months	25	8.7%
	2–3 times a month	98	33.9%
	Once a month	41	14.2%
	2–3 times a week	13	4.5%
	Once a week	38	13.1%
	Daily	2	0.7%

4.2. Reliability Analysis

Reliability is a test quality criterion and indicates how reliably a test measures a certain characteristic, indicated by Cronbach's alpha. If the characteristics are stable, it is expected that the same results will be obtained with repeated measurements. For this reason, a high degree of reliability means that the follow up tests are independent of random fluctuations and environmental conditions. According to the literature, an alpha value higher than 0.70 indicates internal consistency at an acceptable level, an alpha value higher than 0.80 indicates consistency at a good level and an alpha value higher than 0.90 indicates internal consistency at an excellent level [73]. For instance, Perceived risk Pre (0.87) and Post (0.83) show an alpha on a good level, while Trust Post (0.94) and Convenience Post (0.91) demonstrate an alpha on an excellent level. The scales' reliability values are in a range between 0.69 and 0.94, showing that the reliability of the measurement can thus be rated from sufficient to excellent. All reliability measurements can be taken from Appendix A.

4.3. Hypothesis Testing

The hypotheses are tested in two steps. First, bivariate correlation analyses according to Pearson are calculated for Hypotheses 1a–6a in order to show correlations between

purchase intention and the predictor variables as well as possible correlations among the predictors (see Table 3 for details). Subsequently, purchase intention is placed in relation to the individual predictors and analyzed by means of simple linear regression. Second, for Hypotheses 1b–6b, the change in the predictors due to the outbreak of the COVID-19 pandemic is calculated using *t*-tests with dependent samples.

Table 3. Correlation Analysis.

Future Intention		1	2	3	4	5
1 Risk	−0.40 **					
2 Convenience	0.63 **	−0.27 **				
3 Trust	0.75 **	−0.53 **	0.67 **			
4 Usefulness	0.78 **	−0.41 **	0.82 **	0.81 **		
5 Ease of Use	0.69 **	−0.41 **	0.75 **	0.82 **	0.90 **	
6 Situational factors	0.58 **	−0.29 **	0.72 **	0.63 **	0.67 **	0.63 **

* $p < 0.05$, ** $p < 0.01$—two-sided.

The magnitude of the effect is interpreted using the recommendations of [74]. He suggests Pearson's correlation coefficients from a value of 0.10 as a small effect, from a value of 0.30 as a medium effect and from a value of 0.50 as a large effect. In the context of *t*-tests, reference is made to Cohen's effect measure *d*, the classification of which he proposes as follows: $d > 0.30$ small effect, $d > 0.50$ medium effect and $d > 0.80$ large effect.

Starting with Hypotheses 1a–6a, the following correlation table shows correlations between the predictors (at the second measurement time point) and purchase intention.

It is immediately apparent that perceived risk is negatively correlated with future intention to an intermediate degree. A higher perceived risk is therefore associated with a lower future intention. Furthermore, perceived risk is also negatively correlated with the remaining predictors from a weak to strong extent. Additionally, future intention can be positively related to all other predictors. The strength of the links can be rated as "large" according to Cohen's recommendation.

Thus, in the context of Hypothesis 1a, an expectancy-compliant relationship between perceived risk and future intention can be observed. If future intention is now subsequently made dependent on perceived risk by means of simple linear regression analysis, around 16% variance in future intention can be explained ($F(1, 400) = 77.81$, $p < 0.05$). With each additional unit in perceived risk, the value of future intention decreases by $b = -0.54$ units. Thus, the hypothesis stated can be supported by the present findings. In the course of testing Hypothesis 2a, future intention is made dependent on perceived usefulness. While Pearson's correlation analysis already suggests a positive relationship between the two characteristics, linear regression analysis shows that the value of future intention increases by $b = 1.12$ units for each additional unit in perceived usefulness. Overall, a variance resolution of about 62% is achieved ($F(1, 400) = 639.37$, $p < 0.05$). Accordingly, the hypothesis can also be supported by the results described. The next hypothesis (Hypothesis 3a) postulates that future intention is favored by perceived ease of use. While this presumed positive relationship could already be suggested by the correlation analysis, a simple linear regression analysis shows that with each additional unit in perceived ease of use, future intention increases by $b = 1.09$ units. The proportion of explained variance in future intention amounts to about 48% ($F(1, 400) = 367.51$, $p < 0.05$). Thus, the established hypothesis can be supported. Another character trait considered as a possible predictor of future intention is perceived trust (Hypothesis 4a). As before, this expectational relationship can already be observed on the basis of the correlation analyses. Based on this, a linear regression analysis shows that perceived trust increases future intention by $b = 1.03$ units with each additional unit. Moreover, the predictor can explain about 56% of the variance in future intention ($F(1, 400) = 505.22$, $p < 0.05$). Thus, the hypothesis can also be confirmed. Based on theoretical assumptions, perceived convenience will also have a positive effect on future intention, which could already be indicated by the correlation analysis (Hypothesis 5a). Using simple linear regression, it becomes clear that convenience can

explain about 40% of the variance in future intention F(1, 400) = 266.92, $p < 0.05$). In detail, the value of future intention increases by $b = 1.10$ units with each additional unit in convenience. Accordingly, the hypothesis can be supported once again. Lastly, hypothesis H6a relates situational factors to future intention in a positive way, which was proven in the correlation analyses already. In order to relate future intention to situational factors, the calculation of the linear regression analysis shows that future intention increases by $b = 0.83$ units with each additional unit in the situational factors. In total, a variance clarification of approximately 33% is achieved (F(1, 400) = 198.26, $p < 0.05$). Thus, the established hypothesis can be confirmed.

If one subsumes the proportions of explained variance in the individual linear regression models to a maximum possible 100%, it is noticeable that this value is exceeded. This suggests that there are redundancies in the prediction of future intention among the individual characteristics. In order to be able to control the mutual influences of the predictors, a multiple linear regression model is calculated. Based on this model, the characteristics together achieve a proportion of explained variance of about 66% (adj. R^2—F(6, 394) = 131.77, $p < 0.05$). Table 4 depicts the conditional effects of the characteristics on Future Intention.

Table 4. Multiple Regression Analysis.

Future Intention	*b*	*SE*	*β*	*t*	*p*
Risk	−0.02	0.05	−0.02	−0.52	0.60
Convenience	−0.03	0.06	−0.02	−0.29	0.77
Trust	0.50	0.08	0.36	6.22	<0.05
Usefulness	0.95	0.11	0.67	8.46	<0.05
Ease of use	−0.35	0.11	−0.22	−3.17	<0.05
Situational factors	0.07	0.06	0.05	1.19	0.23
R^2	0.66				
Adj. R^2	0.66				
$F_{(6, 394)}$	131.77				

Focusing on the observed effects of the individual predictors, it can be analyzed that perceived usefulness is most likely to predict future intention favoring. This is followed by the characteristic of perceived trust, which also has a favorable influence on future intention. Contrary to expectations and the previous results, perceived ease of use turns out to be an inhibiting factor with regards to future intention. The remaining characteristics prove to be non-significant predictors in this model.

Finally, it should be noted that the predictor perceived usefulness especially shows tendencies towards multicollinear structures in connection with the predictors ease of use and trust.

In order to confirm or reject Hypotheses 1b–6b, multiple *t*-tests were performed as well as effect size measurement using Cohen's d (see Table 5 for details). The effect measurement d uses the sample standard deviation of the mean difference adjusted by the correlation between measures.

Within the first hypothesis (Hypothesis 1b), it was subsequently hypothesized that the perceived risk will have been lower since the outbreak of the COVID-19 pandemic compared to before COVID. A comparison of the means indicates that the perceived risk Post is lower ($M = 2.50$, $SD = 0.92$) than for perceived risk Pre ($M = 3.37$, $SD = 1.15$). The relationship between these two constructs is found to be partially significant and positive (r(400) = 0.07, $p = 0.08$). Based on the *t*-test, the mean difference can be evaluated as statistically significant: $t(401) = 12.20$, $p < 0.05$ (one-sided). The magnitude of the effect can be evaluated as large ($d = 0.84$). Thus, the first hypothesis can be provisionally supported.

Table 5. *T*-tests analyses (Hypotheses 1b–6b).

Characteristics		*M*	*SD*	One-Sided *p*	Cohen's *d*
Pair 1	Risk_pre Risk_post	3.37 2.50	1.15 0.92	<0.05	0.83
Pair 2	Usefulness_pre Usefulness_post	3.66 4.27	0.78 0.86	<0.05	−0.73
Pair 3	EOU_pre EOU_post	3.85 4.36	0.63 0.78	<0.05	−0.72
Pair 4	Trust_pre Trust_post	3.64 4.16	0.62 0.89	<0.05	−0.63
Pair 5	Conv_pre Conv_post	4.05 4.48	0.57 0.70	<0.05	−0.66
Pair 6	SitFac_pre SitFact_post	3.70 4.28	0.68 0.86	<0.05	−0.73

H2b proposed that usefulness post ($M = 4.27$, $SD = 0.86$) will be higher than usefulness pre ($M = 3.66$, $SD = 0.78$), which is supported by the results. The relationship between these two constructs is found to be significant and positive ($r(400) = 0.47$, $p < 0.05$). The mean difference can be considered significant based on the *t*-test: $t(401) = -19.03$, $p < 0.05$. The magnitude of the difference can be considered moderate based on Cohen's recommendations.

Hypothesis 3b hypothesized that ease of use has been higher since the outbreak of COVID-19 compared to before COVID. This hypothesis is supported with ease of use post ($M = 4.36$, $SD = 0.78$) having significantly ($t(401) = -15.80$, $p < 0.05$) higher values than ease of use pre ($M = 3.85$, $SD = 0.63$). The magnitude of the difference can be considered moderate based on Cohen's recommendations.

Hypothesis 4b proposed that trust post ($M = 4.16$, $SD = 0.89$) is higher compared to trust pre ($M = 3.64$, $SD = 0.62$), which is supported by the results. The relationship between these two constructs is found to be significant and positive ($r(400) = 0.70$, $p < 0.001$). The mean difference can be called significant by *t*-testing, as the results show: $t(401) = -16.35$, $p < 0.05$. Beyond that, the effect can be evaluated as medium.

Regarding convenience, Hypothesis 5b proposed that convenience will have been higher since the outbreak of COVID-19 compared to before COVID. The results show that convenience post ($M = 4.48$, $SD = 0.70$) is higher than convenience pre ($M = 4.05$, $SD = 0.57$). The relationship between these two constructs is found to be significant and positive ($r(400) = 0.47$, $p < 0.001$). Hypothesis 5b is supported ($t(401) = -12.85$, $p < 0.05$, $d = -0.66$). Hypothesis 6b hypothesized that situational factors have had a higher influence on the intention to purchase groceries online since the COVID-19 outbreak compared to before COVID. The analysis shows that situational factors pre ($M = 3.70$, $SD = 0.68$) have significantly lower values than situational factors post ($M = 4.28$, $SD = 0.86$). Hypothesis 6b is supported ($t(401) = -20.32$, $p < 0.05$).

In summary, the COVID-19 pandemic shows a strong reduction in perceived risk, while the remaining characteristics increase in moderate levels.

In the following section, the results will be discussed by referring to the literature.

5. Discussion

The results show that almost 72% of the participants already have experience with OGS, and of those, more than half used the service for the first time since the outbreak of COVID-19. This increase could be explained, for instance, by the recent major investments of online grocers in advertising, as the COVID-19 crisis led to a rapid increase in online grocery shopping [4]. The 'stay at home' measures and the general reduction in activities (especially in terms of gastronomy) led consumers to use OGS. Based on the proposed OGS adoption reasons [18], the most striking reasons are "Outbreak of the COVID-19 pandemic", "Grocery Shopping is too tiring" and "Grocery Shopping is too time-consuming". The

results show clearly that German consumers are willing to buy groceries online, as the advantages of the online channel outweigh those of stationary shopping for them. However, grocery retailers can use even more targeted marketing to communicate and highlight the advantages of online purchasing, as it can also be seen from the frequency results (Table 2) that, so far, online purchasing has not yet replaced regular weekly stationary grocery purchasing.

In accordance with the literature review discussed in this study, the empirical findings support the validity of the conceptual constructs. The results demonstrate a significant negative effect of risk perceptions on consumers' intention to shop for groceries online. This is in line with previous research on OGS [13,15,22,25,34]. It is noticeable that the return and exchange options were perceived by almost half of respondents as being worse online, which are in line with findings by [47]. This shows that the ease of unwanted item returns are important to online shoppers when considering OGS. Moreover, the delivery of low-quality products or incorrect items was perceived as a fundamental risk, corresponding to findings by [13]. This risk indicates that consumers were particularly worried about the selection of perishable food such as vegetables, eggs or meat products.

A significant positive effect on perceived usefulness was found in this study, supporting previous studies [33,51]. The results indicate that OGS is perceived as useful and increases the shopping productivity of consumers. Furthermore, the findings of the multiple regression highlight that out of all variables, perceived usefulness has the highest influence on future intention. Therefore, online grocery stores should provide a simple and fast access to the online shop by providing various information and high-quality goods descriptions.

The revealed significant positive effect of perceived ease of use on OGS intention that was found in this study also supports the findings of previous studies [33,51]. More than half of the respondents appreciated the fact that buying groceries online is easy and effortless. However, a simultaneous examination of the effects on the characteristics shows a negative effect on ease of use (multiple regression). In conjunction with this theory, no plausible explanation for these results can be derived. This should be validated in future research.

The revealed significant positive effect of trust on OGS intention also supports the findings of previous studies [16,75]. The results show that secure payments by credit card are especially important for consumers. Moreover, the multiple regression results show that, next to usefulness, trust has the highest influence on OGS intention. This implies that online grocers should offer a secure service in terms of data and payment.

In line with previous studies [13,36,47] a significant positive effect of convenience on OGS intention was found. The results of this study show that saving time and the prevention of physical effort are especially appreciated by the respondents, corresponding to the findings of [13,28]. This indicates that consumers who perceive the convenience as simple and comfortable are more likely to display a positive intention to shop for groceries through the online channel.

In compliance with previous studies [12,18,26], a significant positive effect of situational factors on OGS was determined. Health problems as well as the time and physical effort to buy a needed item are especially triggers for starting OGS, supporting the findings of [18]. Situational factors seem to be relevant for German consumers. The findings suggest that the main motives for OGS are beyond a marketer's control and should be used as a basis for marketing communications content and targeted advertising. In line with previous findings [12,26,28], global events such the COVID-19 outbreak can also be seen as an important trigger to purchase groceries online. This indicates that there has been a significant acceleration as well as a faster acceptance of the online grocery business due to the health crisis. It is therefore likely that consumers have started to avoid physical stores due to fears of virus transmissions [12].

In general, the OGS intentions were quite high, as 57% agree to purchase groceries through an online channel, and 58% agree to continue buying groceries online once the COVID-19 situation has subsided. This can be attributed to respondents' curiosity and trying out this relatively new form of grocery shopping, as the pandemic, in particular,

has increased attention on grocery online shopping. In Germany, new providers such as 'Gorillas' as well as 'Rewe Online' have successfully established themselves on the market during the crisis [4]. The results suggest that the majority of the respondents are satisfied with the service of online grocers, as they plan to buy groceries online in the future, even once the pandemic has subsided. Nevertheless, online grocery retailers should not rest on their current success due to the pandemic; rather, they should make future investments and address critical issues such as risk perception in order to continue to operate successfully in the market and thus retain consumers so that they continue to purchase groceries online in the long term.

Moreover, Hypotheses 1b–6b were confirmed by the statistical results as well. The findings show that COVID-19 has a corresponding influence on the characteristics even in the passive imagination of the subjects. The perceived risk has decreased since the COVID-19 outbreak, and for all other characteristics, the pandemic has had a promoting influence. These results indicate that the pandemic and the policies of 'stay at home' opened a window of opportunity for online grocers to disseminate, which was driven by institutional restrictions and major shake ups of existing demand [4]. The results show that there has been a strong upswing in online grocery shopping, and it has therefore become more socially accepted in Germany since the outbreak of COVID-19.

6. Conclusions

6.1. Theoretical and Managerial Implications

These findings have important theoretical and practical implications for companies in the online grocery business. This study provides research findings in the field of OGS and the impact of the COVID-19 pandemic in Germany. The literature on the impact of COVID-19 on consumer buying behavior is so far very limited due to the actuality of the subject. Furthermore, the creation of the questionnaire, measurement instruments and their items have been both developed based on the literature as well as self-constructed. These can be used for future research regarding OGS.

Regarding practical implications, perceived risk can be reduced by constantly improving the quality of products and delivery, as well as implementing additional trust-building exercises. This leads to improvements in consumer trust and a higher repurchasing probability [36].The most frequently asked questions about ordering and delivering groceries are important attributes to positively influence consumer's ease of use [29]. Furthermore, online retailers can implement chatbots as well as "Frequently asked questions" to assist consumers during the ordering process.

Perceived usefulness plays a major role in awakening the interest in buying groceries through an online channel. Therefore, marketers should not focus purely on the technical interface but instead concentrate on people's thinking [29].

Additionally, the results of this study indicate that perceived trust plays a crucial role in consumers' formation of attitudes towards online shopping. Firms in the online grocery business can create a positive perception of trust by getting involved in trust building interventions, such as displaying privacy policies or, for instance, regularly communicating with consumers [60].

With respect to convenience, online grocery businesses should provide a user-friendly website for consumers to navigate, since they often lack assistance from salespersons [47]. Moreover, flexible payment methods as well a simple delivery and return process should be present. Online grocery retailers could implement a service of a third-party logistics company in order to pick up the return packages and make the process more convenient for consumers. Furthermore, pick up points for ordered groceries could offer consumers the opportunity to pick up their order quickly and easily at the store.

Situational factors, which are beyond a marketer's control, could be used as a basis for marketing communications content and targeted advertising. For instance, online grocery providers could use magazines directed at new parents [18]. Furthermore, the COVID-19 pandemic forced retailers to respond rapidly to new consumer trends and the shift of

grocery business to online channels. Health concerns, lower mobility and 'stay at home' measures have led to an increase in e-commerce. The benefits of purchasing groceries through an online channel should be marketed through various channels, especially in relation to the pandemic or other situational factors.

6.2. Limitations and Future Research

Naturally, this study has limitations that should be acknowledged. First, in the course of the development and creation of the questionnaire, the measurement instruments and their items have been realized according to purely theoretical templates and with their own development. Although the references from the literature do not necessarily lack uniqueness and the questionnaire has been checked for comprehensibility and understandability by means of a pretest, a validation of the characteristics should take place in future and further use. The good reliability values of the majority of the constructs should be emphasized positively, although these should not be seen as proof of existing validity. Second, future research can investigate the six customer-oriented factors as well as the impact of the COVID-19 crisis in other countries where online grocery retail is beginning to evolve. Third, future research could use qualitative methods or a mixed methods approach in order to get deeper insights of relevant perceptions and attitudes towards OGS in Germany. Fourth, a larger and more inclusive sample could potentially gain deeper knowledge of the subject. In this study, almost 70% of the participants are between 20–35 years old, which reduces its comparability to older age groups. Fifth, future studies could seek to relate online consumption trends in the aftermath of COVID-19 with the innovation aspects in biomaterial-based approaches and platforms—this could be considered a hot topic in the context of sustainable consumption habits [76]. Lastly, future research could examine differences among generational cohorts such as Millennials, Baby Boomers and Generation Z.

6.3. Summary of the Main Findings

The analysis of the impact of the COVID-19 pandemic on OGS in Germany contributes to the limited research in this field. The findings of this study display that PR decreased due to the influence of COVID-19 in the context of OGS, while the other constructs increased. Furthermore, the characteristics also had a favorable influence on future intentions due to COVID-19 conditions. To conclude, online grocery retailers are facing major challenges in the German market, especially due to the impact of the pandemic and the resulting changes in consumer shopping behavior. In order to remain competitive in the future, retailers are forced to offer additional and convincing added value for consumers in the online area, so that consumers continue to buy groceries online even after the pandemic has ended.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki. Ethical review and approval were waived for this study, as it involved no explicit manipulation of participants nor any type of deception (data collection consisted of a traditional survey with voluntary responses).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data will be provided upon request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Construct	Cronbach's α	Item	Reference
Perceived risk Pre	0.87	One risk of buying groceries online is receiving low quality products or incorrect items	adopted from [15]
		Security around payment and personal data on the internet is not good enough	
		Return and exchange opportunities are not as good on the internet as in the supermarket	
		One risk when buying groceries online is receiving products with an undesirable expiration date	
Perceived risk Post	0.83	One risk of buying groceries online is receiving low quality products or incorrect items	adopted from [15]
		Security around payment and personal data on the internet is not good enough	
		Return and exchange opportunities are not as good on the internet as in the supermarket	
		One risk when buying groceries online is receiving products with an undesirable expiration date	
Perceived usefulness Pre	0.85	Shopping for groceries online increases my shopping productivity (e.g., I can use the time gained for sth. else)	adopted from [77]
		Shopping for groceries online enhances my effectiveness	
		I perceive OGS as useful	
Perceived usefulness Post	0.91	Shopping for groceries online increases my shopping productivity (e.g., I can use the time gained for sth. else)	adopted from [77])
		Shopping for groceries online enhances my effectiveness	
		I perceive OGS as useful	
Perceived ease of use Pre	0.85	The online grocery website is clear and understandable	adopted from [78]
		Instructions for OGS are easy to follow	
		Buying groceries online is easy and effortless	
Perceived ease of use Post	0.91	The online grocery website is clear and understandable	adopted from [78]
		Instructions for OGS are easy to follow	
		Buying groceries online is easy and effortless	
Perceived trust Pre	0.82	Buying groceries online is a trustworthy experience	adopted from [79]
		I trust the information mentioned on the online website	
		Buying groceries online is reliable	
		I feel safe using my credit card making grocery purchases online	adopted from [80]
		I feel safe to share my personal details if requested	
Perceived trust Post	0.94	Buying groceries online is a trustworthy experience	adopted from [79]

Construct	Cronbach's α	Item	Reference
		I trust the information mentioned on the online website	
		Buying groceries online is reliable	
		I feel safe using my credit card making grocery purchases online	adopted from [80]
		I feel safe to share my personal details if requested	
Convenience Pre	0.79	Buying groceries online is time-saving	adopted from [81]
		Ordering groceries online is possible 24/7 which makes life comfortable	
		Delivery of the products to the door step saves time and physical exertion	
		Buying groceries online is less stressful	
		Buying groceries online is a benefit for disabled, less mobile people	
Convenience Post	0.90	Buying groceries online is time-saving	adopted from [81]
		Ordering groceries online is possible 24/7 which makes life comfortable	
		Delivery of the products to the door step saves time and physical exertion	
		Buying groceries online is less stressful	
		Buying groceries online is a benefit for disabled, less mobile people	
Situational factors Pre	0.69	Having a baby is a trigger to start buying groceries online	adopted from [18]
		Having health problems is a trigger to start buying groceries online	
		Spending time and effort in an extra trip to buy a needed item is a trigger to start buying groceries online	
		Global events are triggers to start buying groceries online	
Situational factors Post	0.85	Having a baby is a trigger to start buying groceries online	adopted from [18]
		Having health problems is a trigger to start buying groceries online	
		Spending time and effort in an extra trip to buy a needed item is a trigger to start buying groceries online	
		The COVID-19 pandemic is a trigger to start buying groceries online	
Intention to shop groceries online	0.95	For future purchases, I plan to search for grocery products online	adopted from [82]
		For future purchases, I plan to buy grocery products via the Internet	
		I will take more time to search for online grocery as an alternative	
		I plan to continue buying groceries online once the COVID-19 situation has subsided	

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