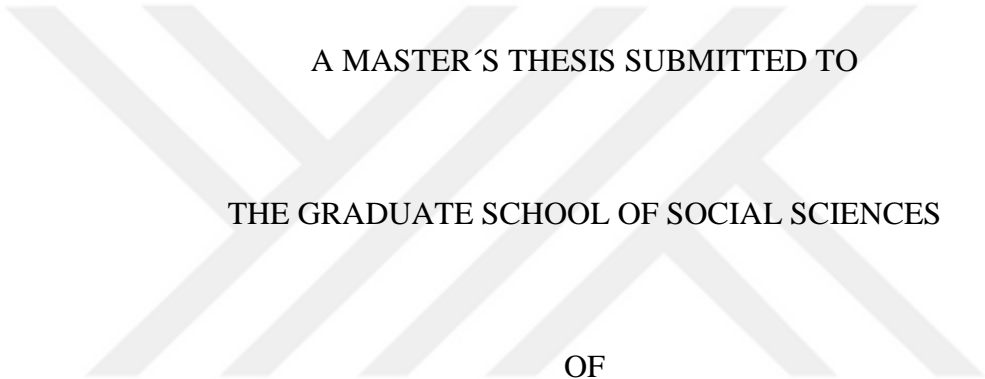


A RESEARCH ON THE COMPREHENSION OF CONSUMERS'
BEHAVIOURAL INTENTION TOWARDS GROCERY MOBILE SHOPPING
APPLICATIONS IN GERMANY



A MASTER'S THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES

OF

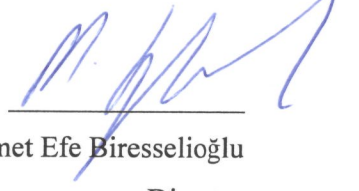
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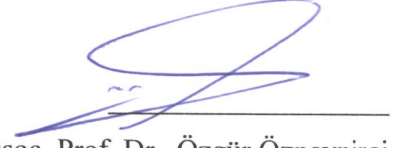
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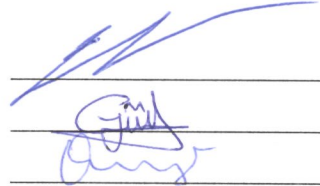
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ABSTRACT

A RESEARCH ON THE COMPREHENSION OF CONSUMERS' BEHAVIOURAL INTENTION TOWARDS GROCERY MOBILE SHOPPING APPLICATIONS IN GERMANY

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June 2018

This thesis analyses the perception of consumers concerning the pre-adoption process of mobile shopping applications with the focus on grocery retailers from Germany. The Technology Acceptance Model developed by Davis (1989) is used for measuring the influence of the independent variables such as perceived risk, personal innovativeness, perceived usefulness, perceived ease of use and subjective norm on consumers' behavioural intention to use grocery mobile shopping applications. The sample consists of 280 respondents from two German universities and social media. The structural equation modelling results show that perceived usefulness provides a mediator within the TAM and the variables of subjective norm and personal innovativeness provide two essential predictors for the pre-adoption process. Also, gender, age and education serve as factors aside from personal innovativeness and behavioural intention to use mobile applications, which provide an important piece of background information. Meanwhile, perceived risk does not have a negative influence upon consumers' intention to use mobile applications. Practical guidelines are provided to the grocery retail chains in Germany, which should focus strongly on the extension of the mobile shopping application as distribution channel. Especially, the marketing and advertisement approaches need to set the focus on the perception of consumers. Additionally, during the development stages of such mobile applications,

retailers need to exchange information with outsiders like students and others for gaining knowledge about consumers' requirements. Finally, the handling and design of the mobile applications should be user-friendly. The measurement approach with the Technology Acceptance Model specified on grocery retail mobile applications from German retail chains had not been taken into consideration before. Especially, the mediation of perceived usefulness within the model and the moderated mediation effects provide new insight into the pre-adoption of mobile shopping applications. The results provide valuable awareness and insights for theoretical and practical implications.

Keywords: Grocery retail mobile applications, Technology Acceptance Model, Perceived usefulness, Perceived Risk, Personal Innovativeness, Perceived Ease of Use, Subjective Norm, Retailing

ÖZET

TÜKETİCİLERİN GIDA PERAKENDECİSİ MOBİL ALIŞVERİŞ UYGULAMALARI KULLANMALARINA YÖNELİK DAVRANIŞSAL NİYETLERİNİN ANLAŞILMASI ÜZERİNE ALMANYA'DA BİR ARAŞTIRMA

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Bu tez, tüketicilerin Almanya'dan gelen market perakendecilerine odaklanarak mobil alışveriş uygulamalarının ön kabul süreciyle ilgili tüketicilerin algılarını analiz etmektedir. Davis (1989) tarafından geliştirilen Teknoloji Kabul Modeli, algılanan risk, kişisel yenilikçilik, algılanan kullanılabilirlik, algılanan kullanım kolaylığı ve tüketicinin davranışsal niyetini mobil alışveriş uygulamalarını kullanma konusundaki öznel norm gibi bağımsız değişkenlerin etkisini ölçmek için kullanılmıştır. Örnek, iki Alman üniversitesinden ve sosyal medyadan 280 katılımcıdan oluşmaktadır. Yapısal eşitlik modelleme sonuçları, algılanan yararlılığın TKM içinde bir arabulucu sağladığını ve öznel norm ve kişisel yenilikçilik değişkenlerinin, ön kabul süreci için iki temel belirleyici sağladığını göstermektedir. Ayrıca, cinsiyet, yaş ve eğitim, kişisel yenilikçilik ve mobil uygulamaların kullanılmasına yönelik niyetinin yanı sıra önemli bir arka plan bilgisi parçası sağlayan faktörler olarak da hizmet etmektedir. Bu arada, algılanan riskin, tüketicilerin mobil uygulamaları kullanma niyeti üzerinde olumsuz bir etkisi yoktur. Mobil alışveriş uygulamasının dağıtım kanalı olarak genişlemesine

yoğunlaşan Almanya'daki market zincirlerine pratik kılavuzlar sunulmaktadır. Özellikle pazarlama ve reklam yaklaşımları, tüketicilerin algısına odaklanmalıdır. Buna ek olarak, bu tür mobil uygulamaların gelişim aşamalarında, perakendecilerin, tüketicilerin ihtiyaçları hakkında bilgi sahibi olmak için öğrenciler ve diğerleri gibi yabancılarla bilgi alışverişinde bulunmaları gerekmektedir. Son olarak, mobil uygulamaların kullanımı ve tasarımı kullanıcı dostu olmalıdır. Alman perakende zincirlerinden market perakende mobil uygulamalarında belirtilen Teknoloji Kabul Modeli ile ölçüm yaklaşımı daha önce dikkate alınmamıştır. Özellikle modelde algılanan kullanılabilirliğin aracılık etmesi ve arabuluculuk yapılan arabuluculuk etkileri, mobil alışveriş uygulamalarının ön kabulüne yeni bir bakış açısı getirmektedir. Sonuçlar, teorik ve pratik çıkarımlar için değerli farkındalık ve anlayış sağlar.

Anahtar Kelimeler: Bakkal perakende mobil uygulamalar, Teknoloji Kabul Modeli, Algılanan fayda, Algılanan Risk, Kişisel Yenilikçilik, Algılanan Kullanım Kolaylığı, Öznel Norm, Perakendecilik



To My Parents

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TABLE OF CONTENTS

ABSTRACT.....	iii
ÖZET.....	v
DEDICATION.....	vii
ACKNOWLEDGMENTS.....	viii
TABLE OF CONTENT.....	ix
LIST OF TABLES.....	xii
LIST OF FIGURES.....	xiii
LIST OF ABBREVIATION.....	xvi
1. CHAPTER 1. INTRODUCTION.....	1
1.1. Problem discussion.....	1
1.2. Research aim and objectives.....	2
1.3. Research questions.....	3
1.4. Originality and significance of the study.....	4
1.5. Structure of the thesis.....	5
2. CHAPTER 2. LITERATURE REVIEW.....	6
2.1. Grocery retail.....	6
2.2. M-Commerce and E-commerce.....	8
2.3. Theoretical Background.....	10
2.4. Technology acceptance model.....	15
2.4.1. Unified theory of acceptance and use of technology.....	18
2.4.2. Theory of reasoned action.....	19
2.4.3. Theory of planned behaviour.....	20
2.4.4. Perceived usefulness.....	21
2.4.5. Perceived ease of use.....	22
2.4.6. Personal innovativeness.....	23
2.4.7. Subjective norm.....	24
2.4.8. Perceived risk.....	26
2.4.9. Behavioural intention to use.....	27

3. CHAPTER 3. RESEARCH DESIGN AND METHODOLOGY.....	29
3.1. Survey development.....	29
3.2. Pilot study.....	30
3.3. Proposed research model.....	31
3.4. Hypotheses development.....	32
3.5. Sampling.....	41
3.6. Data collection.....	41
4. CHAPTER 4. ANALYSIS AND RESULTS.....	45
4.1. Structural Equation Modelling (SEM).....	45
4.2. Data analysis.....	46
4.3. Validity and Reliability.....	50
4.4. Path analysis.....	52
4.5. Mediator role of perceived usefulness.....	57
4.6. Moderated mediation.....	59
4.6.1. Gender.....	60
4.6.2. Experience.....	61
4.6.3. Education.....	62
4.6.4. Age.....	62
5. CHAPTER 5. DISCUSSION AND IMPLICATIONS.....	66
5.1. Discussion.....	66
5.2. Theoretical implications.....	67
5.3. Practical implications.....	70
5.4. Conclusion.....	72
5.5. Limitations and future research.....	74
References.....	76
Appendix: Questionnaire for data collection in English.....	87
Appendix: Questionnaire for data collection in German.....	94

LIST OF TABLES

Table 1. Reliability for the Pilot Study.....	30
Table 2. Sources of the item-scales.....	39
Table 3. Demographic characteristics of the sample.....	42
Table 4. Model fit statistic of each variable	48
Table 5. Sources of the items and their CFA loadings	49
Table 6. Convergent validity and reliability of the measurement model.....	53
Table 7. Discriminant validity of the measurement model.....	54
Table 8. Fit index of the entire measurement model.....	55
Table 9. Path analysis results.....	56
Table 10. Mediation analysis results.....	58
Table 11. Summarized hypotheses results.....	64

LIST OF FIGURES

Figure 1. Standard Technology Acceptance Model by Davis (1989).....16

Figure 2. Technology Acceptance Model 2 (TAM 2) by Venkatesh and Davis (2000).....17

Figure 3. Unified Theory of Acceptance and Use of Technology by Venkatesh et al. (2003).....18

Figure 4. Technology Acceptance Model 3 (TAM 3)19

Figure 5. Theory of Reasoned Action.....20

Figure 6. Theory of Planned Behaviour20

Figure 7. Proposed Research Model 31

Figure 8. Proposed Research Model Including Hypotheses.....40

Figure 9. Final Research Model Including Estimates and R-square.....56

LIST OF ABBREVIATIONS

AGFI:	Adjusted Goodness of fit Index
AVE:	Average extracted variance
BI:	Behavioural intention
CFA:	Confirmatory factor analysis
CFI:	Comparative fit index
CR:	Composite reliability
DF:	Degree of freedom
GFI:	Goodness of fit index
GRMA:	Grocery retail mobile application
IFI:	Incremental fit index
NFI:	Normed fit index
PEU:	Perceived ease of use
PIIT:	Personal innovativeness of information technology
PR:	Perceived risk
PU:	Perceived usefulness
RMSEA:	Root Mean Square Error of Approximation
SN:	Subjective norm
TAM:	Technology acceptance model
UTAUT:	Unified technology acceptance and use of technology

1. CHAPTER 1. INTRODUCTION

1.1. Problem statement

In recent years, the m-commerce area has become a rapidly growing opportunity for customers and organizations. Especially, famous German retailers like Edeka, Real Kauf, Rewe, Lidl and Aldi have extended their distribution channels in accordance with the m-commerce area. Nowadays they offer several products on mobile applications. This provides the possibility for consumers to order products from their mobile devices. Retailers tend to give more priority to their mobile application channel, which represent a broader scope of their digital marketing approaches (Adobe Newsroom, 2017).

Mobile applications of such retail chains are already available, however the usage of such applications is still limited and comprises just 7 % of consumers, who purchase their groceries and cosmetics on mobile devices (Wiwo, 2015). An article by “Wirtschaftswoche” published in 2015 claimed that German retailers need to focus more on mobile applications, due to the rapid growth of the m-commerce (Wiwo, 2015). Generally, the m-commerce area and its unique attributes are offered by a large variety of companies from distinct fields, who are capitalizing on this opportunity as a new enterprise area and distribution channel (Faqih and Jaradat, 2015).

Previous literature focuses on the effect of pre-adoption processes of mobile applications in various contexts (Faqih and Jaradat, 2015; Agrebi and Jallais, 2015; Liébana-Cabanillas et al., 2017; Natarajan et al., 2017) and this thesis analyses the statements of those researchers within the literature review part. The Technology Acceptance Model developed by Davis (1989) based on the Theory of Reasoned Action developed by Ajzen and Fishbein (1980) was chosen for measuring the adoption process regarding mobile applications by researchers like Faqih and Jaradat, 2015; Agrebi and Jallais, 2015; Liébana-Cabanillas et al., 2017; Natarajan et al., 2017. However, the results of prior literature do not agree with each other to a large extent. Hence, this thesis aims to evaluate previous results and statements with the focus on grocery retail chains and mobile applications for purchasing grocery products. The

pre-adoption process is examined by using the Technology Acceptance Model developed by Davis (1989) and is changed in accordance with the measurement approach of this research.

1.2. Research aim and objectives

The purpose of this research is to reveal of consumers' perception regarding the pre-adoption of mobile applications for purchasing grocery products from German retail chains. Furthermore, this thesis aims to use the Technology Acceptance Model developed by Davis (1989) for measuring latent constructs like personal innovativeness, subjective norm, perceived risk, perceived ease of use and perceived usefulness and how they predict the behavioural intention pattern by consumers for mobile applications specified on grocery products. One main aspect evaluates the risk barrier in front of such mobile applications, which needs to identify how strongly it deters consumers from using such applications.

Additionally, perceived usefulness is measured regarding its effect within the Technology Acceptance Model, because it is reasonable to assume, based on previous literature, that this variable provides an important mediator within the measurement model (Ramayah et al., 2003; Henderson and Divett, 2003; Venkatash et al., 2003). Naturally, the further overview in accordance with the consumer behaviour patterns provides additional insights for the retail industry and for the academic area. This thesis aims to identify the main aspects of why consumers would prefer such mobile applications for purchasing their groceries instead of buying them in the physical store. The results of this thesis should be useful for creating further ideas during the development process of mobile shopping applications to the retail chains in Germany. One further essential aspect is to find out whether one of the latent constructs within the measurement model provides a major determinant or which factor mostly affects consumers' intention to use grocery retail mobile applications.

1.3. Research questions

In accordance with the aim of this thesis, the development of important research questions provides an essential guideline for the measurement and evaluation process. In an endeavour to measure the pre-adoption approach of consumers' behavioural intention to use regarding mobile shopping applications, certain research questions were developed for the evaluation process.

The research questions of this thesis are:

RQ1: Does risk have a negative impact on consumer's intention to use mobile shopping applications?

RQ2: Which factors affect consumer's intention to use grocery retail mobile applications?

RQ3: Does perceived usefulness mediate the linkage between personal innovativeness, perceived risk, subjective norm, perceived ease of use and behavioural intention?

RQ4: Do demographic characteristics moderate the mediation between personal innovativeness, perceived risk, subjective norm, perceived ease of use and behavioural intention?

1.4. Originality and significance of the study

The Technology Acceptance Model developed by Davis (1989) has previously been changed twice by Venkatesh and Davis, (2000) and Venkatesh and Bala, (2008), also other studies used the TAM and changed it in keeping with their research aim (Aldás-Manzano et al., 2009b; Faqih and Jaradat, 2015; Agrebi and Jallais, 2015; Natarajan et al., 2017). Hence, this thesis uses the TAM as well as the changed model in accordance with its research aim, which specifies on the pre-adoption of grocery mobile applications from German retailers.

Research concerning those retailers is insufficient and there are no findings in accordance with the combination of TAM and German retailers with the focus on grocery goods. Therefore, there is a lack of literature regarding the examination of perceived usefulness as only mediator within the TAM specified on mobile applications. The model of this thesis is built based on previous literature recommendations. For instance, Gupta et al. (2017) claimed that personal innovativeness and perceived risk need to be examined, because they emphasized that one of them could be one major determinant for mobile shopping adoption.

Natarajan et al. (2017) used the Technology Acceptance Model, which includes personal innovativeness, perceived risk, perceived usefulness, and perceived ease of use as independent variables for measuring the linkage towards intention to use mobile shopping applications. Therefore, Natarajan et al. (2017) measured the linkage regarding price sensitivity instead of grocery products. Therefore, Natarajan et al. (2017) proposed that the research model should be tested across other cultures. Gupta et al. (2017) mentioned that it is essential to consider various demographic areas for further research. In addition, Agrebi and Jallais (2015) confirmed that “innovativeness” positively and indirectly influences the “intention to use” and highlight the necessity of studying its effect on m-purchasing. Also, Liébana-Canabillas et al. (2017) underlined the need to measure the effect of perceived risk as an important security variable on mobile adoption. Finally, the originality and

significance of this thesis lie in its purpose of measuring the moderated mediation effect of gender, experience, age and education.

1.5. Structure of the thesis

The Chapter 1 of this thesis is introduction part and outlines the aims and objectives of this study. Chapter 2, on the other hand, is mainly comprised of the review of previous literature, which is used as basis for building the measurement model of this study. Besides, Chapter 2 emphasizes the distinction among m-commerce and e-commerce and deals with the grocery retail area in Germany. Chapter 3 explains the approach of the data collection process and the data analysis based on the structural equation modelling. Also, the entire sample aspects are included in this chapter, as well as the methodologies, which are used for this study. Chapter 4 summarizes the results of the data analysis approach including the explanations. Chapter 5 indicates theoretical and practical implications of this study. It also indicates the conclusions part and provides overview about further research necessities.

2. CHAPTER 2. LITERATURE REVIEW

The following section of the thesis aims to focus on previous literature from m-commerce area. The section compares the statements and results regarding mobile applications and explains the approach of online grocery specified on m-grocery. Besides, it focuses on various factors which could inspire consumers to use mobile applications for grocery shopping.

2.1. Grocery retail

The grocery retail area offers a wide and deep product portfolio of non-food and food products to its customers. In most countries, there are several grocery chains available, which often provide non-food and food articles within various channels like physical stores, online shops and mobile applications. For instance, Germany is one of these grocery retail markets, where retail stores and chains offer a huge product variety to its customers. The most famous German retailers are Edeka, Lidl, Aldi and Rewe. Those retail groups control approximately 67% of the German retail market in 2015; Edeka (25,3 %), Rewe (15%), Lidl (14,7 %) and Aldi (11,9%). The rest of the market share was subdivided by suppliers and other small retail groups (De Haas et al., 2017).

Edeka is the largest retailer group within the German market. Edeka and the Rewe Group were founded as a cooperation of independent retailers. Both groups are active in the super- and hypermarket area (De Haas et al., 2017; Cliquet, 2006). Additionally, Penny, which belongs to the Rewe group, is a discounter. Lidl and Aldi also operate in the discount market area. Kaufland, which belongs to the Schwarz group (Lidl), operates both in the discount market area and in the hypermarket area (De Haas et al., 2017). Consumers typically purchase their products in the physical stores of such retailers. However, in recent years retailers have also developed online shops, where their consumers can buy non-food and food articles on websites and mobile applications. In 2017, retailers set themselves the objectives to improve especially the mobile area. The optimization of mobile contents is a priority set by 23% of the

retailers and belongs to their digital marketing approaches. Around 79% of the retailers declared the preference of their customers to do product searches and purchases with mobile devices as a very significant competition factor (Adobe Newsroom, 2017). Under these circumstances, it is reasonable that retailers start to extend their m-commerce distribution channels given the growing importance of mobile devices.

These statistics are based on a global survey from Adobe in collaboration with E-consultancy. Thus, it is disputable whether German retailers also focus their approaches concerning mobile devices and applications in similar ways. In 2015, it was mentioned in an article by “Wirtschafts Woche” that the German retail industry needs to set trends, because the m-commerce strongly gains relevance (Wiwo, 2015). This provides challenges and opportunities to retailers like Rewe, Aldi and Edeka. Hence, it is important for them to convert these opportunities through appropriate strategies into revenue (Wiwo, 2015). One could argue that this potential provides an extension in accordance with the online dispersal area and creates benefits concerning the price struggle among retailers.

Edeka and Rewe have already developed mobile applications for younger and busier consumers. Also, discounters like Lidl have created mobile applications which focus on consumer service and promotions (Scott et al., 2017). At the moment, Lidl is investing several millions of dollars for warehouse data and IT system improvement (Scott et al., 2017). The reason for this is the rapidly growing online shopping. For instance, the online grocery in Germany which sells food and beverages grew by about 26% and achieved 1 billion USD in sales in 2016 (Scott et al., 2017). Accordingly, it is foreseeable that the online and m-grocery growth continues in the upcoming years, and thus retailers need to be prepared as far as their mobile applications are concerned. Regarding the previously mentioned statements, the online shopping area has become one of the most important distribution channels within multi-channels by grocery retailers. Additionally, retailers put themselves at a higher risk situation of losing customers to competitors, if they do not enter into the online grocery. The reason for this case is that providers like Amazon Fresh delivers food and beverages directly to the consumer’s home (Coca Cola and Mckinsey, 2015). Based on this awareness and

the rapid market growth, the measurement of the perception by consumers in accordance with the pre-adoption of mobile shopping applications of German retailers can provide important insights. Therefore, the existence of risk barriers need to be clearly identified for preparing solutions, thus encouraging consumers to use grocery retail mobile applications.

2.2. M-Commerce and E-Commerce

Mobile commerce and electronic commerce are two large areas for research and hence, it is essential to emphasize how strongly they differ from each other. M-Commerce, unlike e-commerce, includes new possibilities for companies and their customers regarding service and mobile devices possess the same attributes as e-commerce (Kim, 2006). E-Commerce is seen as a process which guides business approaches like purchasing, selling and exchanging information on the Internet (Mckay and Marshall, 2004; Zeng and Xu, 2010). Tarasewich et al. (2002) claimed that m-commerce encompasses all of the tasks pertaining to commercial transactions executed with communications network, which is made possible through the use of mobile devices. Based on the comparison of these definitions, it is understandable that e-commerce comprises the entire transactions and information seeking process within the Internet. However, m-commerce is restricted to the transactions and information seeking approaches on mobile devices. There are also studies available which mainly focus on the characteristics of e-commerce and m-commerce. Mobility and accessibility are typical characteristics, which determine the reason why consumers prefer to adopt m-commerce (Kim, 2006). These attributes could provide more flexibility to customers regarding their purchasing behaviour. Carrying a notebook or computer is much more difficult than carrying a mobile device. Hence, it would be convenient to purchase through the mobile device in places like trains or during an excursion. This is one of the most outstanding characteristics of m-commerce, which is called “on the move” (Parker et al., 2016). Thus, m-commerce allows for a more impulsive and faster purchasing process by consumers, due to the easy and quick shopping completion (Rodríguez-Torríco et al., 2017).

Especially, the mobile application which is seen as the major part of m-commerce, provides a new sizeable opportunity to consumers as well as to companies like retailers. The reason for this is that mobile applications are easy accessible because individuals can download the software from App-Store or Google Play Store (McLean et al., 2018). There is no doubt that m-commerce provides a growing opportunity for future business strategies within various market segments. In addition, there are further attributes available which distinguish m-commerce to be a distribution strategy for selling products and sharing information. For instance, ubiquity is one characteristics of m-commerce because of its ability to satisfy information and communication needs everywhere (Kenny and Marshall, 2000; Kannan et al. 2001; Vetter, 2001; Tarasewich and Warkentin, 2002). It is important to note that many retailers have already integrated m-commerce into their omnichannel processes. Thus, consumers who tend to purchase their products impulsively, would prefer to use mobile devices for the buying approach instead of other online devices (Rodríguez-Torríco et al. 2017). Regarding the ubiquity, consumers have the possibility to use their mobile devices within the physical store for analysing the products about information through mobile shopping application, thus ensuring that the desired product includes all relevant features before making the final purchase (Rapp et al., 2015).

As regards the previously mentioned results, there are several characteristics and features regarding m-commerce available, which confirm that e-commerce and m-commerce differ from each other. Firstly, there is a distinction regarding the devices between e-commerce and m-commerce. Secondly, it must be remembered that the preference by consumers could result from their behavioural patterns. Rodríguez-Torríco et al. (2017) focused on the difference between the behavioural patterns of impulsiveness and need for touch (NFT) among consumers in terms of mobile and online devices. Need for touch (NFT) is defined by prior studies as the contact by consumers with the product, to collect information for preparing a solution regarding their purchase issues (Peck and Childers, 2006; Peck and Wiggins, 2006). For this reason, m-commerce and e-commerce also need to be evaluated on the basis of consumers' behavioural pattern. In line with their behavioural pattern, consumers prefer to use certain devices for purchasing products. For instance, NFT consumers prefer to use computer for buying their products after they have gathered sufficient

information within the physical store (Rodríguez-Torríco et al., 2017). However, impulsive consumers mostly tend to use mobile devices instead of online devices due to the possibility to purchase the product online immediately at the point of sale (Rodríguez-Torríco et al., 2017). In light of these studies, there is evidence that e-commerce and m-commerce differ not only in the devices used, but also in consumers' behavioural pattern.

2.3. Theoretical background

The m-commerce is still a rapidly growing area, which is especially unsurprising given the willingness of people to use such mobile applications (McLean et al., 2018). It is assumable that factors like innovativeness, usefulness, ease of use or subjective norm mostly inspire people to use some technologies. On the other hand, the factor risk can put a barrier in front of peoples' intention to use any technologies. Menon and Kahn (1995) and Chau and Hui (1998) argued that studies which mostly try to find out the reason for consumers' acceptance regarding new products or technologies only point to consumer innovativeness, but they missed the point that products and technologies involve risks, too. Based on this study, it is essential to consider risk factors as well as positive factors for consumers' intention. The reason for this consideration is that consumers' online purchasing behaviour is decreasing while perceived risk is rising (Bhatnagar et al., 2000).

The main factor for this is probably due to the fact that consumers' trust is negatively influenced by perceived risk. Hence, perceived risk creates a barrier to consumers' intention to purchase. Thus, risk factors can pose a threat to consumers' actual purchase decision (Kim et al., 2008). Regarding these findings, one can assume that risk factor constitutes a huge problem for online purchasing processes. However, these researchers have focused their studies on electronic commerce, online shopping behaviour and consumers' acceptance regarding new products and technologies in general. According to this, it is safe to assume that risk factors can vary across areas.

The m-commerce area can differ compared to others. Wu and Wang (2005) found out that perceived risk surprisingly affects the behavioural intention to use m-commerce positively. They concluded that consumers use m-commerce for their transactions despite risks, because of several available benefits within m-commerce. They especially emphasized competitive price, diverse products, convenience and time savings as contributory factors for the use of m-commerce. Under these circumstances, consumers feel enticed to use m-commerce, although there are still some risks available (Wu and Wang, 2005).

Natarajan et al. (2017) argued that consumers just tend to use a mobile shopping application if it affords protection, otherwise factors like security and performance risks would deter consumers from using such mobile applications. In view of the mentioned statements, it is clearly comprehensible that perceived risk plays a certain role in technology adoption. However, there is still a lack of evidence as to whether perceived risk generates a barrier to consumers' intention to use mobile shopping applications. Besides, personal innovativeness has also been measured by several studies. Personal innovativeness as a factor prevails individuals' risk perception in accordance with the adoption of technologies (Lu et al., 2005b).

Aldás-Manzano et al. (2009a) studied the implications of personal innovativeness on perceived risk in online banking. According to their study, individuals with a high level of innovativeness have lower perceptions concerning risks associated with online banking. In addition, there is a similarity between mobile commerce and online banking because of the transaction processes (Aldás-Manzano et al., 2009a). It is therefore reasonable to assume that more innovative people intend to use modern technologies like mobile applications for certain approaches. However, it is disputable whether personal innovativeness really provides the entire inspiration to adopt technologies. As a matter of fact, the usefulness and ease of use of a web page, rather than personal innovativeness, are viewed as advantages for consumer (Agarwal et al., 1998). Based on this conclusion, it is likely that consumers adopt some technologies because of the utilities they offer. However, this adoption depends on the technology or innovation by itself. Goldsmith and Hacker (1991) considered the domain-specific

part of innovativeness and measured that this part provides a useful predictor for the adoption of innovations by consumers. Also, it is evidenced by Citrin et al. (2000) that domain-specific innovativeness directly affects consumers' behaviour to adopt Internet shopping. In recent years, some researchers have studied the general effect of innovativeness on consumers' intention to use technologies for online shopping.

For example, general innovativeness provides a strong predictor for the intention of online shopping and future online shopping intention as well (Goldsmith, 2000). Considering this, it is reasonable that personal innovativeness is the factor that mostly inspires consumers despite the possible risks associated with new technologies. Meanwhile, perceived usefulness and perceived ease of use are also defined as key determinants concerning intention to use technology (Davis, 1989). The reason for this is that the higher consumers' perception of usefulness and ease of use of a system, the more likely they are to use this system (Ramayah et al., 2014). Of all the conclusions reached by the studies, this is one of the strongest factor triggers consumers' intention to use technologies. The reason for this could be that previous studies used different criteria in their measurements.

Naturally, there are quite a few researchers who focused their study on m-commerce. They considered factors like personal innovativeness, perceived usefulness and perceived ease of use in the context of m-commerce. For instance, Agrebi and Jallais (2015) developed an extended TAM to improve the comprehension of non-purchaser and purchaser behavioural intention to shop by m-commerce. They considered perceived usefulness, perceived ease of use as well as perceived enjoyment within the model. Furthermore, satisfaction and intention to use were indicated within the model as dependent variables. Natarajan et al. (2017), on the other hand, developed an extended TAM which additionally includes perceived risk, personal innovativeness and satisfaction as well as price sensitivity. They also focused their study on the comprehension of consumers' intention to use mobile applications for shopping. The objectives of both studies are very similar. The main purpose lies in the measurement concerning attributes of consumers' behavioural intention to shop by mobile shopping applications. However, the results of both studies differ from one another. As far as

non-purchasers are concerned, perceived usefulness provides something like a key determinant that explains the intention to use mobile shopping applications (Agrebi and Jallais, 2015). Likewise, personal innovativeness is one factor that need to be considered because of its strong effect on the adoption of technologies not only between the innovators but also between others (Natarajan et al., 2017).

Despite their similarity, both studies have concluded distinct results. This distinction occurs because of different key aspects. On the one hand, the core area was to predict the shopping behaviour by mobile shopping applications among non-purchasers and purchasers. On the other, the focal point was price sensitivity, which probably led the study to come up with a different result. Therefore, it could be assumed that the reason for the variation in results is that Natarajan et al. (2017) additionally considered perceived risk and personal innovativeness, whereas Agrebi and Jallais (2015) did not consider personal innovativeness within their research model. In light of these factors, it is safe to assume that the different results between the studies were brought about by the inclusion of different criteria.

Based on previously mentioned studies, there is a further consideration of personal innovativeness and perceived usefulness essential in the context of m-commerce. Although both studies focused their research on factors that could explain consumers' intention to use mobile shopping apps, they did not measure the impact of external behaviour on individuals because individuals with less experience often search for information from people with higher experience regarding the technology to reduce uncertainties (Yang, 2012). One could assume that if individuals have more friends or family members using such technologies, there is a higher likelihood for that individual to use these technologies.

Additionally, through the information collection, they become more familiar with the technology. Hence, knowledge and experience are associated with comfort regarding mobile services and they reduce the perceived risk attributed to the service (Jiang, 2009). Based on these arguments, subjective norm is one factor which could play an

important role in consumers' intention to use mobile application for shopping. Besides, researchers like Zhang et al. (2012) and Yang (2012) found out that subjective norm has a significant relationship with mobile shopping adoption. Considering the effect of subjective norm within the research model, this thesis claims to find out whether this factor is stronger than personal innovativeness and perceived usefulness, and whether it reduces the risk perceived by individuals as regards mobile shopping applications.

Moreover, Faqih and Jaradat (2015) came to the conclusion that perceived usefulness, perceived ease of use and subjective norm affect individuals' intention to use m-commerce. They have argued that rather perceived usefulness and perceived ease of use predict consumers' intention than subjective norm towards the use of m-commerce. There are a few studies available, which examined the impact of perceived usefulness on behavioural intention and they found it to be significantly related (Kim et al., 2010; Wei et al., 2009; Wu and Wang, 2005; Zarpou et al., 2012). On the other hand, some studies, which also measured the relation between perceived usefulness and behavioural intention, refuted the connection (Chong et al., 2012; Wu and Wang, 2005; Zarpou et al., 2012 and Wei et al., 2009).

In accordance with these statements, it is to be expected that individuals tend to use a technology if it provides any utility apart from ease of use. But in this context, it is essential to consider that these prior studies did not measure the relationship of the variables within the context of mobile shopping applications. Thus, it must be reminded that m-commerce is a very recent technology, which is still unexplored by many potential users with all its aspects and characteristics (Liébana-Cabanillas et al., 2017). It could be possible that m-commerce with the focus on a certain product category provides more accurate results in the context of factors and barriers for consumers' intention to use mobile shopping applications. Prior studies focused just on cultures and the entire area of m-commerce in general. Studies by Moon and Domina (2015) and Ko et al. (2009) measured consumers' intention to use mobile applications for shopping related to fashion products. They also measured, through structural equation model, the relationship of distinct factors associated with

behavioural intention. Especially Moon and Domina (2015) additionally studied consumers' intention with the implications based on two distinct cultures. The study by Moon and Domina (2015) states that South Korea includes a more collectivistic culture, whereas the United States is influenced by a more individualistic culture. Moreover, they have found out that South Korean people are more affected than American people by their family members and friends concerning the intention to use mobile applications for purchasing fashion products.

The reason for this result can be accounted for mainly by the cultural background. Because of their collectivistic culture, Korean people tend to be less engaged in direct expression of their opinions and more engaged in indirect problem-solving behaviour (Liu and McClure, 2001). However, as far as the innovativeness aspect is concerned, the case is reversed, although accessibility concerning media, shopping and high fashion remains the same. In this case, it is important to note that American individuals had higher innovativeness than South Korean individuals (Moon and Domina, 2015).

2.4. Technology Acceptance Model

The Technology Acceptance Model (TAM) was developed by Davis (1989) in an endeavour to measure the acceptance and intention to use new technology or information systems. It is especially emphasized by prior studies that the model is commonly utilized for deciding innovation acknowledgment conduct because of its vigour, adaptability and illustrative quality (Natarajan et al., 2017; Arning and Ziefle, 2007; Djasasbi et al., 2010). According to the TAM, the use of technologies by individuals depends on the intention to use, which again depends on the attitude. The attitude is predicted by the variables of perceived ease of use and perceived usefulness. Perceived usefulness and perceived ease of use constitute two important variables within the TAM (Davis, 1989). It has been theoretically and empirically examined that attitude forms a vital determinant for intention to use and it has been emphasized that attitude serves as a key mediator between intention and perception (Agarwal et al., 1998).

Accordingly, it is essential that attitude must be considered within the TAM, otherwise the researcher is highly likely to come up with inappropriate results. However, in recent years, it was evidenced by prior literature that the TAM explains the intention to use mobile technology with and without “attitude” variable (Wu et al., 2011). In addition, studies by Teo et al. (2011), Nistor and Heymann (2010) and Teo (2009) studied the effect of attitude within the TAM as important variable.

The results of these researchers have shown that the TAM is usable with attitude and without attitude as variable due to the reason that the variance are equal in both cases. (Natarajan et al., 2017). Regarding the mediation effect by “Attitude”, the assumption was not supported by Davis (1985) and Davis et al. (1989) owing to the fact that perceived usefulness and perceived ease of use describe the subjective estimation rather than represent the objective reality by individuals. Hence, the TAM is also useful without “Attitude” as a variable and it is more essential for this thesis to involve further external variables within the research model.

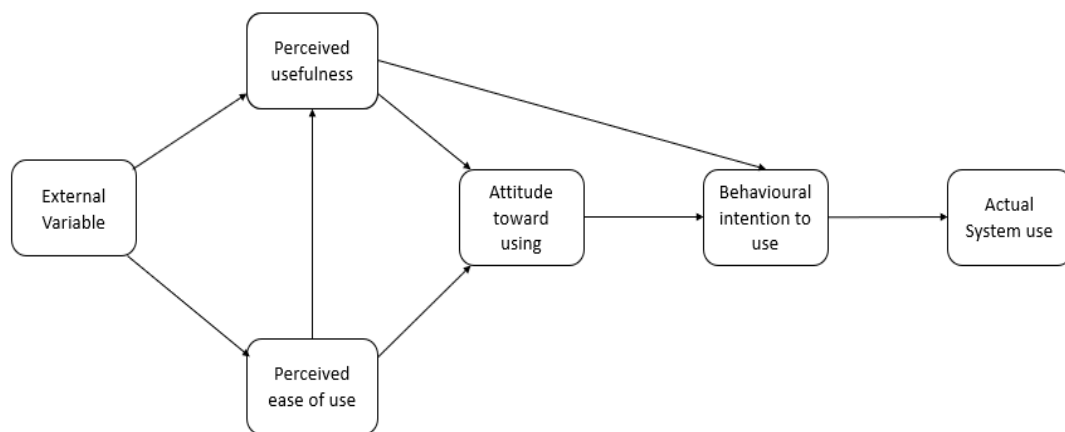


Figure 1. Technology Acceptance Model (Source: Davis, 1989)

2.4.1. Unified Theory Acceptance and Use of Technology

Moreover, unified theory of acceptance and use of technology UTAUT also provides a model that could explain determinants of intention to use in accordance with expected performance, expected effort, social influence, and facilitating conditions (Agrebi and Jallais, 2015). Both the TAM and UTAUT could provide adequate models for the measurement of consumers' intention to use mobile shopping applications for purchasing grocery products. However, on the one hand, the m-commerce area has become a very popular and important global research domain, which was measured by many studies on the theoretical basis of the TAM to develop the comprehension of its adoption (Faqih and Jaradat, 2015).

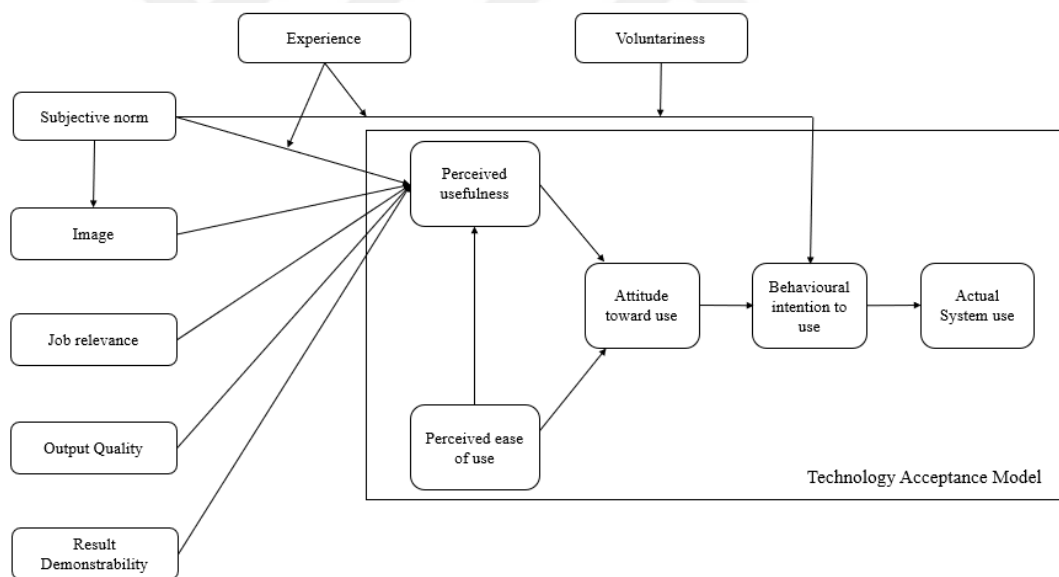


Figure 2. Technology Acceptance Model 2 (Source: Venkatesh and Davis, 2000)

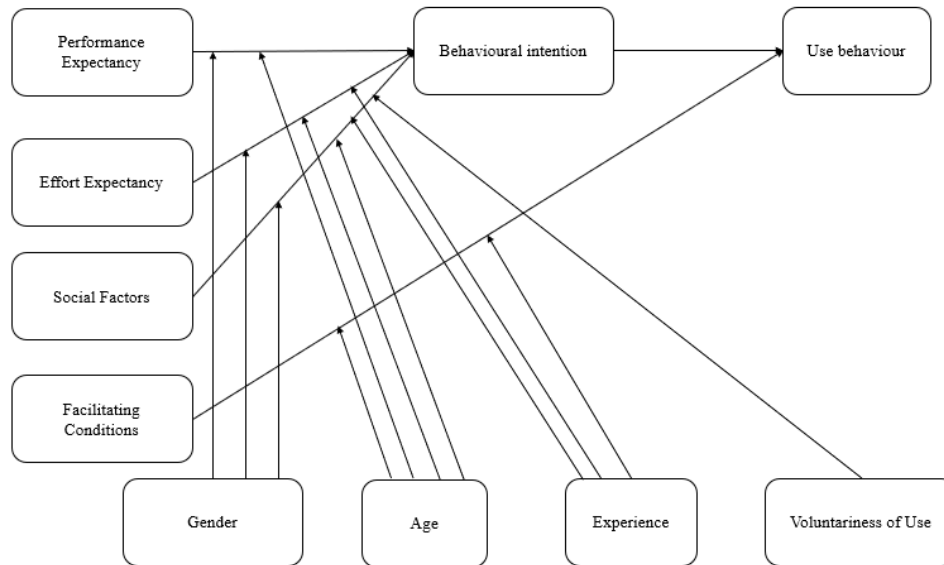


Figure 3. Unified Theory of Acceptance and Use of Technology (UTAUT)
 (Source: Venkatesh et al., 2003)

Then again, a further vital perspective by the TAM is the adaptability to include outside factors for estimating the aim to use, as indicated on innovation systems (Kim et al., 2010). Thus, the TAM includes the ability to be extended by variables like personal innovativeness, perceived risk and subjective norm, which is essential for this study. Some prior studies developed an extension of the TAM in accordance with their research criteria. For instance, Venkatesh and Davis (2000) developed the extension of the TAM, the TAM 2, and Venkatesh and Bala (2008) developed the TAM 3. Naturally, the UTAUT efficiently explains behavioural intention and the use of many technologies. However, the TAM is preferred due to the flexibility and explanation strength in this thesis.

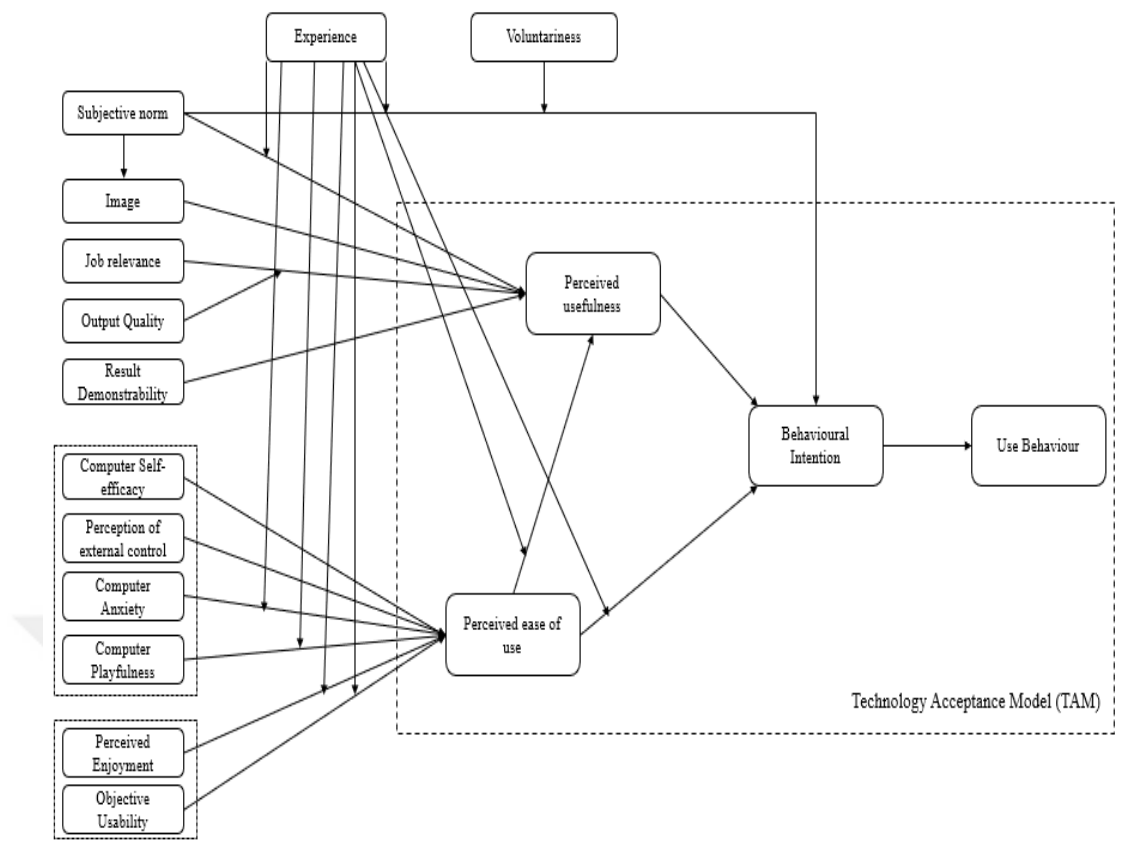


Figure 4. Technology Acceptance Model 3 (Source: Venkatesh and Bala, 2008)

2.4.2. Theory of Reasoned Action (TRA)

Besides, Davis (1989) built the TAM based on the “Theory of Reasoned action” (TRA) developed by Ajzen and Fishbein (1980). TRA is an expectancy value model which mainly focuses on the relationship between people’s attitude and their beliefs (Blue, 1995). By and large, the expectation to achieve a certain result brings about the idea that a certain kind of behaviour may or may not breed a certain reaction. On the other hand, the value of the result rests on the person's evaluation or the subjective value that stems from the reaction (Ajzen and Fishbein, 1980; Eagly and Chaiken, 1993). The aim of this study is to figure out whether consumers’ perception of usefulness regarding mobile applications for purchasing groceries leads to an adoption of this mobile application.

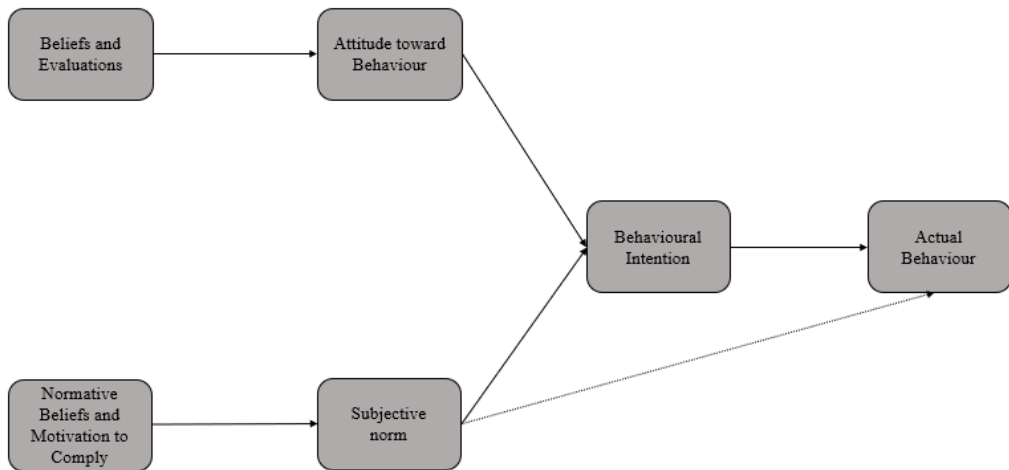


Figure 5. Theory of Reasoned Action (Source: Ajzen and Fishbein, 1980)

2.4.3. Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour provides an extension of the previously developed Theory of Reasoned Action (Ajzen et al., 1989). The distinction between TRA and TPB is that TPB additionally indicates perceived behavioural control, which has an indirect impact on behavioural intention and a direct impact on behaviour (Figure 6).

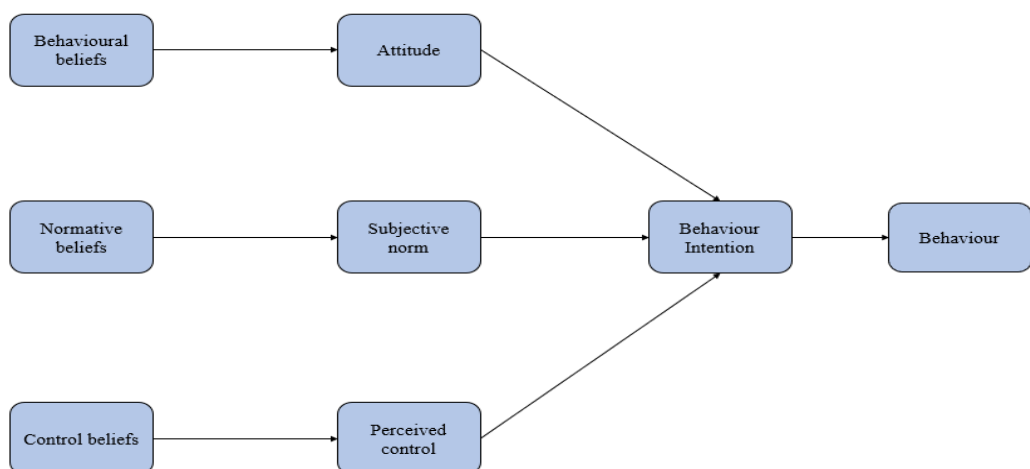


Figure 6. Theory of Planned Behaviour (Source: Ajzen, 1989)

Perceived behavioural control is clearly defined as the “people’s perception of the ease or difficulty of performing the behaviour of interest” (Zhang et al., 2012, p. 1903). TPB is used when the behaviour by an individual is additionally affected by external control factors, whereas TRA is used when the behaviour by individuals is only influenced by their own willingness (Blue, 1995). Besides, prior literature compared the effect between the TAM, TRA and TPB as preferable measurement model. The main criteria captured through the variance explained the entire theory. Davis et al. (1989) claimed that the TAM included $R^2 = 0,47$ and $R^2 = 0,51$ compared to TRA $R^2 = 0,32$ and $R^2 = 0,26$ for the prediction of software usage intention within two terms, and Mathieson (1991) provided measurement results concerning the intention to use spreadsheet package, where the TAM $R^2 = 0,69$ was better compared to TPB $R^2 = 0,60$ (Taylor and Todd, 1995). These results provide further insights that TAM as theory is more appropriate for measuring behavioural intention to use GRMA. Besides, it was empirically claimed that usage intentions and behaviour’s substantial proportion of the variance is explained usually at around 40 % by the TAM (Venkatesh and Davis, 2000). In light of prior findings, the TAM seems to be the appropriate theory and model in an effort to measure the pre-adoption of grocery retail mobile applications.

2.4.4. Perceived usefulness

Perceived usefulness provides an important variable within the TAM and is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320). In recent years, perceived usefulness has been measured in several studies with the coherence of mobile devices (Faqih and Jaradat, 2015; Kitchen et al., 2015; Arpaci, 2016; Natarajan et al., 2017). In terms of users’ satisfaction, it was claimed by Agrebi and Jallais (2015) that aspects of perceived usefulness need to be considered by companies regarding the smart phone purchase approaches for consumers. Therefore, perceived usefulness differs depending on the beliefs of consumers. Consumers’ beliefs linked with security directly affect the purchase approaches in online mobile stores, whereas perceived usefulness is indirectly related to information, aesthetic and technical quality when it comes to using mobile online stores for information seeking (Sohn, 2017).

Perceived usefulness in the context of this thesis is regarded as a possible factor, which could inspire potential consumers to use mobile applications by German retailers for grocery shopping. It is disputable whether utilities like the improvement of shopping performance, shopping productivity, shopping effectiveness, quicker purchases inspire individuals to use such mobile applications. However, it is known that perceived usefulness belongs to the most considered variables within the research area of technology adoption, including m-commerce (Liébana-Cabanillas et al., 2017). Accordingly, within this thesis, it is important to capture whether perceived usefulness has any impact on behavioural intention to use mobile application for grocery shopping.

2.4.5. Perceived ease of use

Perceived ease of use is the second variable within the TAM and was defined as “the degree to which a person believes that using a system would be free of effort” (Davis, 1989, p. 320). The relationship between perceived ease of use and perceived usefulness has been empirically proven by various studies by Wu and Wang (2005), Khalifa and Ning Shen (2008), Aldás-Manzano et al., (2009b) and Agrebi and Jallais (2015) Natarajan et al., (2017), Faqih and Jaradat, 2015, Zhang et al. 2012. Hence, it is extremely surprising that perceived ease of use provides implications regarding mobile application for grocery shopping. Moreover, it is important to note that easy handling of the mobile application could inspire individuals to use it for their grocery purchases.

However, it is highly questionable whether perceived ease of use is the predictor, which has the most noteworthy effect upon the goal to utilize portable shopping applications, when buying grocery products from German retailers. According to Wu and Wang (2005), there is an indirect impact of perceived usefulness on behavioural intention; however, perceived ease of use does not have a direct impact on behavioural intention. It means that consumers intend to use a certain technology owing to the fact that the ease of use provides a utility satisfying the consumers’ expectations and beliefs. It could be also assumed that this case occurs in the context of grocery retail

mobile applications as well. Therefore, the facility of using such an application could inspire consumers to use it and provides opportunities to retailers, as well as to the potential consumers. Despite the usefulness of mobile applications, individuals can perceive complexity due to the constraints like small screens or difficulty in keying in data (Wei et al., 2009). Hence, perceived ease of use is one important variable, which need to be considered within this thesis.

2.4.6. Personal innovativeness

Personal innovativeness was defined as “the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of social system” (Rogers, 2002, p. 990). Based on this definition, it could be generalized that individuals tend to accept a certain system in various paths and at different paces. According to this, individuals were categorized into different groups like innovators, early adopters, early majorities, late majorities, and laggards. Innovators and early adopters differ from each other in that innovators have a high interest in technology, so they can try new ideas which are outside of their local circle (Rogers, 2002).

On the other hand, early adopters would adopt new ideas within their local circle. Early majorities, late majorities, and laggards have been summarized in a group, who tend to adopt new ideas after people have become familiar with them and have already adopted this idea and were satisfied by the system (Rogers, 2002). Thereby, it is reasonable to assume that personal innovativeness encompasses three major groups of adopters, people who would be interested in ideas outside of their local network, people who would adopt an idea within their local network, and people who just would adopt an idea if it was previously adopted by peers of them (Rogers, 2002).

It is also mentioned that innovators and early adopters are defined as people with higher innovativeness and hence it is considered that they exhibit more resistance towards risks and uncertainties and they tend to use certain innovations compared to other people (Agarwal and Prasad, 1998). Because of this reason, potential consumers

of German retailers could intend to use mobile applications for grocery shopping, despite them having more possible risk barriers than others. Accordingly, it is essential to identify such groups, because they could share positive information regarding retailers' shopping applications with early majority, late majority and laggards. It was claimed by previous studies that personal innovativeness serves as a major predictor in the context of mobile shopping adoption (Natarajan et al., 2017). As such, personal innovativeness seems to be an interesting variable in the context of behavioural intention to use grocery retail mobile applications. Personal innovativeness exerts a strong influence on behavioural intention to use grocery retail mobile applications. Hence, it is treated within this thesis as an external variable in the proposed research model (Figure 3.). However, the personal innovativeness of consumers need to be categorized into domain-specific innovativeness and global innovativeness (Hirunyawipada and Paswan, 2006; Flynn and Goldsmith, 1993).

Global innovativeness was characterized as people who characteristically adapt while others characteristically innovate, however, global innovativeness is weaker concerning the prediction process of specified system innovations than domain-specific innovativeness (Agarwal and Prasad, 1998). Individuals, who possess a domain-specific innovativeness tend to adopt new technologies or products within a specific domain of interest (Goldsmith and Hofacker, 1991). It is also claimed that domain-specific innovativeness directly affects consumers' behavioural adoption in the context of Internet shopping (Citrin et al., 2000). Based on this evidence, this thesis focuses on the domain-specific context of personal innovativeness as a variable within the proposed research model.

2.4.7. Subjective norm

Subjective norm was defined as the social influence of important people, for instance friends, family or affinity to use a certain technology (Fishbein and Ajzen, 1977). It means that humans tend to be affected by people who are important for them to use, for example, mobile applications, e-commerce and many others. Over the years, many

researchers have been trying to find out how strongly subjective norm as a variable affects consumers' intention to use certain technologies. Lu et al. (2005a) measured the consumer's intention to adopt wireless Internet services via mobile technology. They also used the standard TAM and added personal innovativeness and subjective norm as external variables. In addition, Lu et al. (2005a) created the hypothesis "Social influences in the form of subjective norm and images have a direct positive impact on intention to adopt WIMT" (Lu et al., 2005a, p. 251). The hypothesis was subsequently rejected and Lu et al. (2005a) concluded that subjective norm has an impact only on perception and not on intention by itself. Besides, it confirmed the conclusion by Venkatesh et al. (2003) who also argued that subjective norm does not affect consumer's intention to use any technology, but instead of this, the perception is influenced by subjective norm. However, Yang et al. (2013) also examined the impact of subjective norm on behavioural intention to use mobile shopping and found out that social influence was positively related to behavioural intention to use mobile shopping.

Yang et al. (2013) argued that social influence positively impacts the consumers' intention, but it was not the strongest variable for consumers' intention to use mobile shopping. Probably the involvement of subjective norm as an external variable for measuring the influence on consumers' intention to use grocery retail mobile applications can provide new insights. Previous studies like Lu et al. (2005a) and Venkatesh et al. (2003) found out that subjective norm does not affect consumers' intention to use certain technologies. On the other hand, recent studies like Arpaci (2015), Faqih and Jaradat (2015) and Yang et al. (2013) refuted the statements of previous researchers and confirmed in their studies that subjective norm has a significant impact on consumers' intention to use mobile shopping. Based on these statements, subjective norm is added as an external variable since it could be assumed that subjective norm firmly impacts a purchaser's social goal to utilize portable shopping application for obtaining basic needs from retailers. Lu et al. (2005a) supported the hypothesis that subjective norm positively affects perceived usefulness, however the other sources Arpaci (2016), Faqih and Jaradat (2015), and Yang et al. (2013) rejected this hypothesis. They did not find any significant relation between subjective norm and perceived usefulness. Hence, subjective norm is regarded as a variable within the measurement model of this thesis.

2.4.8. Perceived risk

Perceived risk provides the negative results of an item or administration to the purchaser who utilizes this administration or item. Such outcomes give vulnerabilities and obstructions to utilizing a specific item or administration (Featherman and Pavlou, 2003; Kim et al., 2008). Besides, perceived risk can be subdivided into different kinds of risks, like security risk, social risk, time risk, financial risk and performance risk, which could impede the usage of certain products or services (Lee, 2009, p. 131).

- Performance risk: The possibility of the product malfunctioning and not performing as designed and advertised and therefore failing to deliver the desired benefits (Lee, 2009, p. 131).
- Social risk: Potential loss of status in one's social group as a result of adopting a product or service, looking foolish or untrendy (Lee, 2009, p. 131).
- Financial risk: The probability that a purchase results in loss of money as well as the subsequent maintenance cost of the product (Lee, 2009, p. 131).
- Privacy risk: Potential loss of control over personal information, such as when information about you is used without your knowledge or permission. The extreme case is where a consumer is "spoofed" meaning a criminal uses their identity to perform fraudulent transactions (Lee, 2009, p. 131).
- Time risk: Consumers may lose time when making a bad purchasing decision by wasting time researching and making the purchase, learning how to use a product or service only to have to replace it if it does not perform to expectations (Lee, 2009, p. 131).
- Physical risk: The probability that a purchased product results in a threat to human life (Lee, 2009, p. 131).

All these aspects provide evidence that consumers perceive various kinds of risks regarding their purchases and use of technology. Thus, it is essential to identify which of these risk factors need to be considered in this thesis. It is to be expected that risk factors like financial risk, product risk, security and privacy risk negatively influence the intention to use mobile shopping adoption, because these risk factors are regarded

as being predominant in web shopping (Bhatnagar et al., 2000). However, it is disputable whether there is a similarity concerning perceived risk between web shopping and m-commerce.

It was claimed by Yang et al. (2015) that m-commerce transactions are associated with more uncertainties and risks compared to e-commerce. Accordingly, one could argue that perceived risk plays an important role in m-commerce. It is also necessary to emphasize that mobile services provide information about the location of users in real time, which represent an intrusion into privacy (Yang et al., 2015). Thus, it is reasonable that perceived risk involves a privacy risk, which might affect the behavioural intention to use mobile shopping applications. Performance risk is another factor next to privacy risk, which puts a barrier to consumers' intention to use mobile shopping applications for grocery purchasing.

Performance risk is assessed by consumers in accordance with their requirements and cognitive abilities regarding a certain product domain (Aldás-Manzano et al., 2009a). Therefore, it is only normal that any processes in mobile shopping applications could not perform in accordance with consumers' requirements. For instance, there is a chance that the payment processes may not work in the right way and hence the anxiety of the consumer may increase to such an extent that he or she may abstain from using such a mobile application. If disconnection or server breakdown occurs during the payment process, the result can be an unexpected loss (Lee, 2009). Additionally, performance risk and security concerns keep consumers away from using mobile shopping applications (Natarajan et al., 2017).

2.4.9. Behavioural intention to use

Behavioural intention is utilized in understanding the innovation utilization, due to the fact that the estimation of the immediate and backhanded impact of different factors on social aim is critical for the use appreciation (Taylor and Todd, 1995). Taking this significance into consideration, it is safe to assume that behavioural intention as a

dependent variable within the research model could cast further light on the pre-adoption process of mobile shopping applications from grocery retailers. It was mentioned by Warshaw and Davis (1985) that behavioural intention predicts the probability of performing a certain behaviour (cited from Blue, 1995). Hence, it is chosen as a dependent variable for this thesis. This thesis mainly focuses on the likelihood whether potential consumers would use the mobile applications by German grocery retailers or not. Additionally, behavioural intention functions as a dependent variable for several predictors, which can be regarded as a possible attribute of consumers, when they use those mobile applications.



3. CHAPTER 3. RESEARCH DESIGN AND METHODOLOGY

The following section deals with the scientific approach of this study. It emphasizes how data was gathered through online questionnaires and it explains in which context the survey was developed. Additionally, it clarifies the prior literature review, which provides the vital background for the hypothesis development. In a final step, the section shows the approach of data analysis as well as the software, which are used for analysis.

3.1. Survey development

An online survey was developed in an effort to reach as many respondents as possible. The questions of the survey were adapted from prior articles, which studied the effect of m-commerce on distinct fields. The scale-items of the entire thesis were used from previous literature to ensure the availability of adequate items for the data analysis approach. Four items for measuring personal innovativeness were taken from Aldàs-Manzano et al. (2009b). Additionally, 14 items were taken from Faqih and Jaradat, (2015) for measuring subjective norm, perceived usefulness, perceived ease of use and behavioural intention to use (displayed in Table 1).

Finally, five items were selected from Natarajan et al. (2017) for measuring perceived risk. Afterwards, these questions were changed for grocery retail mobile applications, thus communicating the scope of this study to the respondents (Table 1). The screening question “Have you ever used any mobile application for any purpose before?” was developed for separating respondents without prior experience in using mobile applications from respondents including experience regarding mobile applications.

3.2. Pilot Study

Besides, the survey was developed as a five-scale questionnaire. The following answer possibilities were given within the survey: 1= strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. To ensure the comprehension of the questionnaire, a pilot study was conducted in a company in Bremen, Germany. A total of 30 respondents were chosen for attending the survey. The questionnaire was tested by distinct employees from various departments. After the pilot study was completed, it was observable that the survey provided sufficient comprehension concerning the questions and the answer opportunities. 26 respondents completely fulfilled the questionnaires and found it to be comprehensible in total. Improvement suggestions were just made by 4 respondents, who also did not fulfill the questionnaires entirely.

Table. 1. Reliability for the Pilot Study

Variable	Items	Cronbach's Alpha
Personal Innovativeness	PIIT 1 PIIT 2 PIIT 3 PIIT 4	0.605
Perceived Usefulness	PU 1 PU 2 PU 3 PU 4	0.872
Perceived Ease of Use	PEU 1 PEU 2 PEU 3 PEU 4	0.922
Perceived Risk	PR 1 PR 2 PR 3	0.343

	PR 4	
	PR 5	
Subjective Norm	SN 1	0.777
	SN 2	
	SN 3	
Behavioural Intention to Use	BI 1	0.897
	BI 2	
	BI 3	

Table 1. illustrates the reliability of each variable including its items measured by using SPSS 22.0. Regarding to Nunally et al. (1967) the required value provides 0.7 (Natarajan et al., 2017). It observable concerning the table that four out of six fulfill the criteria. However, it was continued with all items due to the reason that this thesis aims to achieve a larger sample size for the final analysis, which could change the values again.

3.3. Proposed research model

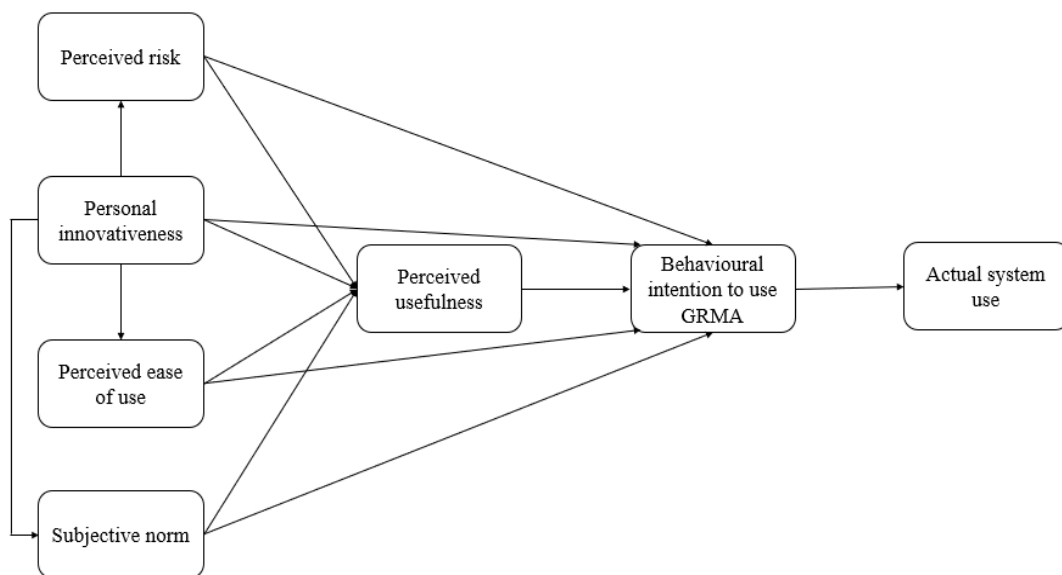


Figure 7. Proposed research model based on TAM (Davis, 1989)

The above proposed research model was conceptualized based on the TAM by Davis (1989). Prior studies were used for the preparation of the links between predictors, dependent variables, as well as the moderator variables. The next section provides further details about the hypothesis development regarding prior literature. Furthermore, the section engages with the development of the hypotheses of this thesis in accordance with the research model. The hypotheses were prepared based on the literature as well as the linkages among the variables.

3.4. Hypotheses development

Personal innovativeness provides an interesting factor in the research model. Prior studies measured personal innovativeness on the basis of various kinds of technologies. For instance, Citrin et al. (2000) measured the adoption of Internet shopping and claimed that personal innovativeness in the domain-specific context has a direct impact on consumers' behaviour to adopt Internet shopping. Furthermore, personal innovativeness was also studied regarding e-commerce.

It was established that users' innovativeness significantly affects initial acceptance of e-commerce owing to the fact that innovativeness implies a more positive perception of e-commerce in the case of innovative individuals (Crespo and Bosque, 2008). However, it is highly questionable whether personal innovativeness provides a significant effect on intention to use in the context of m-commerce. Naturally, several studies initiated their research with this question and studied the effect of personal innovativeness and intention to use smartphones for shopping applications (Hung et al., 2007; Zhang et al., 2012; Lu, 2014; Natarajan et al., 2017; Aldás-Manzano et al., 2009b). It was mentioned by Natarajan et al. (2017) that personal innovativeness has a direct impact on intention to use mobile shopping applications regarding the influence of price sensitivity. Hence, the link between personal innovativeness and behavioural intention to use grocery retail mobile applications could be possible and need to be tested in this thesis. Agarwal and Prasad (1998) studied the impact of

personal innovativeness on perceived ease of use specified on information technology in general and found it to be significantly related. Later, this result was supported by Lewis et al. (2003) who emphasized the significance of personal innovativeness on perceived usefulness and perceived ease of use as well. Moreover, the last link regarding personal innovativeness could be possible in accordance with perceived risk. This linkage was stated by Aldás Manzano et al. (2009a) who measured the relationship in the context of mobile payments, and they added that mobile payment is comparable to mobile shopping applications due to the transaction part (Aldás Manzano et al., 2009a). Despite the lack of literature regarding the impact by personal innovativeness on subjective norm, it was decided to test the effect of personal innovativeness on external influences like as subjective norm. Based on the above mentioned argumentations, the following hypotheses were proposed:

H1: Personal innovativeness has a negative impact on perceived risk.

H2: Personal innovativeness has a positive impact on perceived ease of use.

H3: Personal innovativeness has a positive impact on subjective norm.

H4: Personal innovativeness has a positive impact on perceived usefulness.

H5: Personal innovativeness has a positive impact on behavioural intention to use grocery retail mobile applications.

One could argue that perceived risk directly impacts perceived usefulness, which might affect behavioural intention to use any technology. Moreover, the direct link between perceived risk and behavioural intention to use is also significant. Wu and Wang (2005) focused their research on the m-commerce area and considered perceived risk within the TAM. It was concluded that perceived risk significantly impacts behavioural intention to use m-commerce (Wu and Wang, 2005). In the same year, similar research was done by Lu et al. (2005b). They focused on e-commerce; however, they specified on the association between perceived risk and intention to use in the context of online applications. The connection between perceived risk and perceived usefulness was also considered in their research. It was claimed that perceived risk has a direct impact on perceived usefulness, however the direct link

between perceived risk and intention to use was rejected (Lu et al., 2005b). But it needs to be noted that Lu et al. (2005b) studied the effects regarding e-commerce and Wu and Wang (2005) specified the research on m-commerce. In recent years, additional studies have generated results related to the mentioned links. Thakur (2014) and Ramayah et al. (2014) used perceived risk and perceived usefulness for measuring mobile payment systems. Ramayah et al. (2014) claimed that perceived risk negatively influences perceived usefulness towards intention to use mobile payment service. On the other hand, Thakur (2014) did not use the link between perceived risk and perceived usefulness like Wu and Wang (2005) before. Park and Jun (2003) and Kim et al. (2008) studied the relationship between perceived risk and intention to use in e-commerce adoption and found it to be statistically significant. Thus, one can suppose that the relation of perceived risk could be significant in the context of grocery retail mobile applications. Although prior studies measured the relations between perceived risk and perceived usefulness, as well as between perceived risk and behavioural intention to use in the context of e-commerce, the links should also be tested in the context of m-commerce. Based on the upon argumentations, the following hypotheses were proposed:

H6: Perceived risk has a negative impact on perceived usefulness.

H7: Perceived risk has a negative impact on behavioural intention to use GRMA.

It is already mentioned in this thesis that perceived usefulness belongs to the important variables within the Technology Acceptance Model. Hence, prior studies examined the impact of perceived usefulness on behavioural intention. For instance, Wu and Wang (2005) confirmed in their study that behavioural intention to use m-commerce is significantly influenced by perceived usefulness. Besides, it is important to emphasize that the necessity is stated by Davis (1989) to consider perceived usefulness within the implementation of technology systems. Hence, the consideration of perceived usefulness for measuring the behaviour of potential consumers can provide insights. For this reason, this consideration provides the opportunity that perception of utilities within the GRMA could encourage people to use these applications. Thus, it can be concluded that perceived usefulness can present a strong path towards

behavioural intention to use GRMA. Also, Aldás-Manzano et al. (2009b), that measured personality factors regarding to m-shopping acceptance, claimed that perceived usefulness functions as an indicator of conduct aim to utilize innovation. Based on this suggestion, the following hypothesis was proposed:

H8: Perceived usefulness has a positive impact on behavioural intention to use GRMA.

Associated with the research model in this thesis, perceived ease of use can be consistent as another variable that could have a certain impact upon these measurements. For example, within the proposed research model of this thesis, the links are highlighted between perceived ease of use and perceived usefulness, as well as between perceived ease of use and behavioural intention to use GRMA. Prior studies examined the effect of these relationships in the context of technology acceptance. It was claimed by Davis et al. (1989) that perceived ease of use functions as an antecedent in association with perceived usefulness. However, the research was not directly measured in the context of a certain technology. Thus, it could be possible that the link between those constructs is not as strong as the link stated in the research by Davis et al. (1989). The reason is that this thesis specifies its research on GRMA, which provides a particular technology. But a more recent study by Aldás-Manzano et al. (2009b) examined the influence of perceived usefulness on perceived ease of use in the context of m-shopping intention. Also, Agrebi and Jallais (2015) confirmed the significant relation between perceived ease of use and perceived usefulness regarding m-commerce. Hence, the connection in accordance with GRMA could be significant. Agrebi and Jallais (2015) studied the direct impact of perceived ease of use on the intention to use m-commerce and found it to be significantly related. This relationship was also studied by Wu and Wang (2005) in the same context, however the direct relation between perceived ease of use and behavioural intention to use was not supported in the study. Wu and Wang (2005) argued that perceived ease of use only affects behavioural intention to use, not perceived usefulness. Thus, both relationships were studied before with different results. Hence, these links could provide insights for consumers' pre-adoption of grocery retail mobile applications in Germany. Based on the above mentioned argumentations, the following hypotheses were proposed:

H9: Perceived ease of use has a positive impact on perceived usefulness.

H10: Perceived ease of use has a positive impact on behavioural intention to use grocery retail mobile applications.

Limayem et al. (2000) focused the study on purchasing behaviour through the Internet and subdivided the impact of subjective norm on intention to use into friends' influence, family influence and media influence. It was concluded that friends do not affect the intention to use Internet for shopping, whereas the impact of family and media was statistically significant as regards the intention to use the Internet for shopping (Limayem et al., 2000).

As a further important factor, subjective norm was considered in the research model of this study. Subjective norm directly impacts behavioural intention to use grocery retail mobile applications. Similar research was done by prior studies in the context of m-commerce and they found a positive relationship between subjective norm and behavioural intention to use (Kim et al., 2009; Wei et al., 2009; Yang et al., 2013; Faqih and Jaradat, 2015). The relationship between subjective norm and behavioural intention to use in the context of other technologies was also significant. Therefore, Arpaci (2016) studied the effect of subjective norm on students' intention to use mobile cloud services and found it to be significantly related.

Thus, the role of external influences could also be essential for the examination of pre-adoption towards GRMA. Lu et al. (2005a) studied the impact of subjective norm on perceived usefulness in the context of wireless Internet services through mobile devices and found it to be significantly related. Hence, the influence of subjective norm on perceived usefulness is also considered within the model of this thesis. The knowledge of this linkage can provide important insights into pre-adoption process of the GRMA. Based on the argumentations stated above, the following hypotheses were proposed:

H11: Subjective norm has a positive impact on perceived usefulness

H12: Subjective norm has a positive impact on behavioural intention to use GRMA.

Since the standard TAM developed by Davis (1989) defines actual system use as an additional dependent variable, the following hypothesis was created:

H13: Behavioural intention to use has a positive impact on actual system use.

It was mentioned by Davis (1989) that perceived usefulness and perceived ease of use are two important predictors within the TAM. The relationship was often measured in prior studies, thus helping us gain further insights into how these predictors correlate with one another. Many prior researchers claimed in their studies that perceived usefulness as well as perceived ease of use provide an essential predictor regarding the intention to use technologies (Davis, 1989; Aldás-Manzano et al., 2009b; Ramayah et al., 2014; Agrebi and Jallais, 2015). Hence, the necessity of these predictors in association with the TAM is generally known. Additionally, it was surprisingly announced by Venkatesh and Davis (2000) that external variables on intention to use are mediated by perceived usefulness and perceived ease of use. This conclusion could be associated with the strength of the prediction by those variables. Meanwhile, the TAM includes both predictors as variables, which could provide confirmation concerning the mediation effect. Furthermore, prior studies measured the mediator effect of perceived usefulness and perceived ease of use in various contexts. Ramayah et al. (2003) studied the mediator effect of perceived usefulness among perceived ease of use and the intention to use Internet banking and found it to be significantly related. However, it needs to be emphasized that Ramayah et al. (2003) defined perceived usefulness as partial mediation owing to the fact that the direct path between perceived ease of use and intention to use Internet banking was still stronger than the indirect path. Henderson and Divett (2003) also measured the mediation effect of perceived usefulness upon perceived ease of use in the context of electronic supermarket use.

They claimed that the prediction by perceived ease of use on behaviour was mediated by perceived usefulness. Additionally, the further research necessity was emphasized to find out how perceived usefulness mediates the relationship between perceived ease of use and behaviour regarding a certain technology system (Henderson and Divett, 2003). Given the possibility that perceived usefulness mediates perceived ease of use, it could provide empirical support as to whether perceived usefulness also mediates the relationship of external variables like subjective norm and personal innovativeness towards behavioural intention to use GRMA. Based on these statements, the following hypotheses were proposed:

H14: Perceived usefulness mediates the relationship between subjective norm and behavioural intention.

H15: Perceived usefulness mediates the relationship between personal innovativeness and behavioural intention.

H16: Perceived usefulness mediates the relationship between perceived ease of use and behavioural intention.

H17: Perceived usefulness mediates the relationship between perceived risk and behavioural intention.

Table 2. Sources of the items

Variable	Items	Source
PIIT	<p>PIIT1: I think I would be the first in my circle of friends to know where I can shop using mobile applications</p> <p>PIIT2: I think I would be the first in my circle of friends to shop using mobile applications</p> <p>PIIT3: I think I know more about mobile applications than my circle of friends</p> <p>PIIT4: I think I would shop using mobile applications even if I did not know anyone who had done it before</p>	Aldás-Manazano et al., 2009b
PU	<p>PU1: Using grocery retailer mobile application improves my shopping performance</p> <p>PU2: Using grocery retailer mobile application improves my shopping productivity</p> <p>PU3: Using grocery retailer mobile application enhances my effectiveness of my grocery shopping</p> <p>PU4: Using grocery retailer mobile application is useful to make my purchasing quickly</p>	Faqih and Jaradat, 2015
PEU	<p>PEU1: Grocery retailer mobile application are clear and understandable</p> <p>PEU2: Using grocery retailer mobile application does not require a lot of mental effort</p> <p>PEU3: It is easy to do shopping by grocery retailer mobile application</p> <p>PEU4: It is easy to use grocery retailer mobile application to do what I want to do</p>	Faqih and Jaradat, 2015

PR	<p>PR1: My decision using grocery retailer mobile application involves a higher risk</p> <p>PR2: The security systems built into the grocery retailer mobile application are not strong enough to protect my Account</p> <p>PR3: Grocery retailer mobile application may not perform well and process payments incorrectly</p> <p>PR4: Using grocery retailer mobile shopping is adding great uncertainty to payments</p> <p>PR5: Internet hackers (criminals) might take control of my account if I used a grocery retailer mobile application</p>	Natarajan et al., 2017
SN	<p>SN1: My family members (e.g. parents, spouse, children) think that I should make purchases through grocery retailer mobile application</p> <p>SN2: The media frequently suggest to us to make purchases through grocery retailer mobile application</p> <p>SN3: My friends think that I should make purchases through the grocery retailer mobile application</p>	Faqih and Jaradat, 2015
BI	<p>BI1: Assuming I had access to grocery mobile application, I intent to use it</p> <p>BI2: Given that I had access to grocery retailer mobile application; I predict that I would use it.</p> <p>BI3: I plan to use grocery retailer mobile application the next few months</p>	Faqih and Jaradat, 2015

Figure 8. illustrates the research model of this thesis including some hypothesis. The figure displays the linkages between the variables of this study. It also shows the complexity between the constructs and how the TAM can be change in accordance with external variables including perceived usefulness as possible mediator.

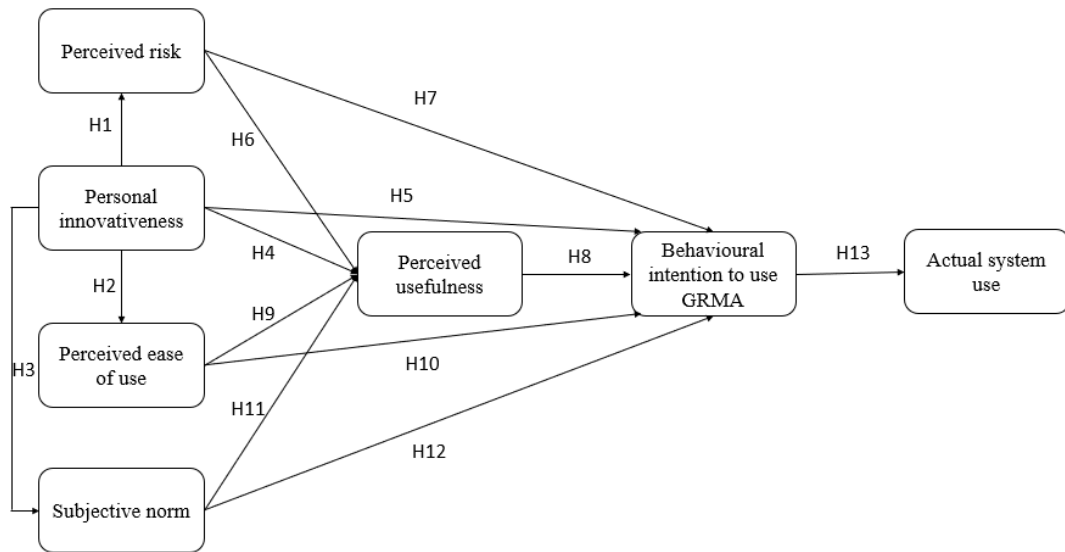


Figure 8. Proposed research model including hypotheses

3.5. Sampling

According to Smith and Albaum (2010) there are two distinct sampling techniques available. Firstly, there is the probability sampling method where the sampling units have a known non-zero probability of being part of the sample. Secondly, in the non-probability method, the probability is unknown (Smith and Albaum 2010). In this study, the non-probability sampling method was used, because it is less cost-intensive compared to the probability sampling method. In addition, non-probability sampling method was mainly used in m-shopping studies (Aldsmanzano et al. 2009b; Wu and Wang, 2005; Yang, 2005).

According to Smith and Albaum (2010), there are four categories of non-probability sampling; quota sampling, convenience sampling, judgment sampling and snowball sampling. Convenience sampling was used for this study. The reason for this decision is that convenience sampling provides the possibility to reach a larger number of respondents. Also, the target population was end consumers, random sampling could not be employed since it was not possible to identify and access all omni-channel shoppers (Kitchenham and Pfleeger, 2002). In addition, convenience sampling allows for accessibility to the sampling units as well as ease of measurement (Smith and

Albaum, 2010). Hence, convenience sampling was beneficial for gathering sufficient data over a short period of time. It was essential for the data collection due to time constraints. In this case, it provides the opportunity that each consumer could be a non-user. Convenience sampling was also used in recent studies like (Kitchen et al. 2015; Agrebi and Jallais, 2015; Faqih and Jaradat, 2015; and Arpaci, 2016) for pre-adoption perspectives.

3.5.1. Data collection

The final data collection was made within a term of one and a half month. The online survey was placed at Google Form. Google Form was used for the survey because of its various advantages regarding sharing and monitoring of the results, as well as the later summary in an Excel file. The online survey was placed at the blackboard of the Universities in Bremen and Oldenburg. Additionally, the link was also shared on Facebook to achieve a large number of respondents.

Furthermore, it was decided to raffle an online Amazon coupon to provide an additional stimulus to the respondents. In the end, a total of 310 online questionnaires were received, however just 280 of them were eligible for the final measurement approach. Four questionnaires were not completely filled and 26 respondents answered the screening question “Have you ever used any mobile application for any purpose before?” with “No”. Thus, these questionnaires were not considered during the data analysis approach. Despite some unusable questionnaires, the rate was still at 90.32 % of usable questionnaires, which can be assumed as a good result. Moreover, an evaluation in SPSS 22.0 was made to distinguish frequency of gender, age, annual income, marital status and education level of the respondents (Table 2.). This was made for reaching an overview about the distinct characteristics of respondents. The frequency between non-users and users of mobile applications from German retailers was clearly defined. The majority were non-users 95.4 % (N = 267), whereas just 4.6 % (n = 13) had used mobile applications by German retailers for groceries at least once.

Table 3. Demographic characteristics of the sample

Characteristics	Frequency	Percentage
Usage:		
Users:	13	4.60%
Non-Users:	267	95.40%
Total:	280	100.00%
Gender:		
Male	82	29.29%
Female	198	70.71%
Total	280	100.00%
Marital status:		
Married	28	10.00%
Single	252	90.00%
Total	280	100.00%
Education level:		
A-Level	145	51.79%
Bachelor's degree	78	27.86%
Master's degree	30	10.71%
PHD	3	1.07%
other	24	8.57%
Total	280	100.00%
Annual income:		
Under € 25000	230	82.14%
€ 25001 - € 34999	18	6.43%

€ 35000 - € 49999	17	6.07%
€ 50000 - € 74999	10	3.57%
€ 75000 - € 99999	2	0.71%
Over € 125000	3	1.07%
Total	280	100.00%
Age:		
18 - 25 years old	180	64.29%
26 - 30 years old	77	27.50%
31 - 35 years old	10	3.57%
36 - 40 years old	4	1.43%
41 - 45 years old	2	0.71%
Age 46 or older	7	2.50%
Total	280	100.00%

Furthermore, the education level of the respondents was considered and the result provided that 51.79% (n = 145) had an A-Level, 27.86% (n = 78) were respondents with a bachelor's degree and 10.71% (n = 30) with a Master's degree. Additionally, 1.07% (n = 3) of the respondents had PHD and 8.57% (n = 24) achieved other degrees. Concerning the marital status, 10% (n = 28) of the respondents were married, whereas 90% (n = 252) of the respondents were unmarried. Based on the sample demographics, 29.29% (n = 82) were male respondents and 70.71% (n = 198) were female respondents.

Moreover, the consideration of the annual income was also essential to categorize the respondents into certain income classes. 82.14% (n = 230) were respondents with an income under 25000€ annually. 6.43% (n = 18) had an annual income in the range of 25001 – 34999€ and 6.07% (n = 17) were in the range of 35000 – 49999€. Therefore, 3.57% (n = 10) of the respondents earn between 50000 – 74999€ and just 0.71% (n = 2) were in range of 75000 – 99999€. Lastly, the age of the respondents was also

considered in the survey. 64.29% (n = 180) of the respondents were between 18 – 25 years of age. 27.50% (n = 77) of the respondents were aged between 26 – 30. 3.57% (n = 10) were in the middle age group of 31 – 35 years of age. In addition, just 1.43 % (n = 4) were between 36 – 40 and 0.71% (n = 2) were between 41 – 45 years old. Finally, 2.50% (n = 7) of the respondents were aged 46 or over.



4. CHAPTER 4. ANALYSIS AND RESULTS

A number of studies examined the effect of distinct factors on the intention to use m-commerce and mobile shopping applications in various contexts (Faqih and Jaradat, 2015; Agrebi and Jallais, 2015; Liébana-Cabanillas et al., 2017; Natarajan et al., 2017). Consistent with these prior studies, this thesis provides a new overview about the pre-adoption process of mobile applications. As far as the field is concerned, which is chosen for this study, mobile applications for grocery goods by German retailers provide new insights into the German retail market. Mobile applications provide opportunities for the online and offline gain of consumers and they have a growing share within the market. (Brynjolfsson et al., 2013). These opportunities can provide further stimulus for German retailers to extend and develop their targets regarding the mobile technology. Especially, the implications of this thesis deliver results in accordance with consumers' perception of mobile shopping applications for grocery products. The following section explains the analysis results of the measurement model and the hypothesis testing of this study.

4.1. Structural Equation Modelling (SEM)

Structural equation modelling is one of the most commonly used methodologies within the field of psychology and social science for measuring the strength of research models (Browne, 1984; Bentler, 1983; Joreskog, 1978). Especially through the appropriate opportunity to measure and modify theoretical models, which is provided by the confirmatory factor analysis, SEM indicates a great potential for developing additional theories (Anderson and Gerbing, 1988). The application of SEM needs to be accurately chosen by researchers because the path analysis approach varies between covariance-based analysis (CB-SEM) and a variance-based approach partial-least-squares (PLS-SEM). CB-SEM provides an optimal methodology concerning a theory testing and confirmative study, whereas PLS-SEM is highly applicable for prediction and theory development. Additionally, PLS-SEM also provides the ability to measure very efficiently, especially at larger sample sizes and in accordance with complex

research models (Hair et al., 2011). For this thesis, PLS-SEM seems to be more applicable, owing to the fact that the research model requires a complex structure, especially regarding the consideration of mediator and moderator variables. Thus, the estimate loadings of PLS-SEM can contribute to the path coefficients (Hair et al., 2011). Besides, the sample size of this study comprises 280 respondents, which provides the next main reason for the usage of PLS-SEM as measurement approach. Therefore, some variables in the construct just include two or three items that do not fit the requirements of CB-SEM (Hair et al., 2011). Generally, PLS-SEM as a methodology is a widely established analytical approach within business and marketing research (Fornell and Bookstein, 1982; Henseler et al., 2010).

4.2.Data Analysis

After the data collection was completed, SPSS 22.0 and AMOS 23.0 were used for the evaluation of the collected data. Firstly, variables were determined through the mean of the associated items to build the final research model for the measurement approach. Thereupon a confirmatory factor analysis within AMOS 23.0 was conducted to assess the validity of the measurement model. The confirmatory factor analysis showed lower loadings for the items PIIT4, PEU1 and SN2 (below 0.5).

According to this, the items with the estimation values below 0.5 were removed from the construct and the remaining 20 items were considered for the SEM approach. The elimination was made because a variable should indicate at least five items or the loadings need to be 0.5 or above, because such a value provides a solid factor (Costello et al., 2005). Thereupon, the confirmatory factor analysis was done again for measuring the values of the remaining items. The second measurements without the item below 0.5 in AMOS 23.0 have provided acceptable values (Table 4.). Furthermore, the fit statistic was used for identifying the fitness of each variable regarding the model. Common aspects were Chi-square/degree of freedom, which need to be below 3.0 (Kline, 2005), Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), which need to be above 0.9 (Bentler, 1990; Hair et

al., 2006; Bollen, 1989), as well as the Root Mean Square Error of Approximation, which should be below 0.08 (Hair et al., 2006). Table 3 shows the values of each variable regarding the fit statistic:

Table 4. Model fit statistic of each variable

Variables	Chi-square/DF	CFI	NFI	IFI	RMSEA
Criteria	< 3.000	> 0.9	> 0.9	> 0.9	< 0.08
Personal innovativeness	1.067	1.000	0.997	1.000	0.015
Perceived usefulness	1.680	0.996	0.990	0.996	0.049
Perceived ease of use	0.071	1.000	1.000	1.000	0.000
Subjective norm	2.009	0.995	0.989	0.995	0.060
Perceived risk	1.578	0.997	0.991	0.997	0.045
Behavioural intention	0.080	1.000	1.000	1.001	0.000

Table 5. Sources of the items and CFA loadings

Variable	Items	CFA Loadings	Source
PIIT	PIIT1: I think I would be the first in my circle of friends to know where I can shop using mobile applications	0.859	Aldás-Manazano et al., 2009b
	PIIT2: I think I would be the first in my circle of friends to shop using mobile applications	0.815	
	PIIT3: I think I know more about mobile applications than my circle of friends	0.910	
PU	PU1: Using grocery retailer mobile application improves my shopping performance	0.671	Faqih and Jaradat, 2015
	PU2: Using grocery retailer mobile application improves my shopping productivity	0.751	
	PU3: Using grocery retailer mobile application enhances my effectiveness of my grocery shopping	0.806	
	PU4: Using grocery retailer mobile application is useful to make my purchasing quickly	0.636	
PEU	PEU2: Using grocery retailer mobile application does not require a lot of mental effort	0.771	Faqih and Jaradat, 2015
	PEU3: It is easy to do shopping by grocery retailer mobile application	0.763	
	PEU4: It is easy to use grocery retailer mobile application to do what I want to do	0.717	
PR	PR1: My decision using grocery retailer mobile application involves a higher risk	0.581	Natarajan et al., 2017

	<p>PR2: The security systems built into the grocery retailer mobile application are not strong enough to protect my Account</p> <p>PR3: Grocery retailer mobile application may not perform well and process payments incorrectly</p> <p>PR4: Using grocery retailer mobile shopping is adding great uncertainty to payments</p> <p>PR5: Internet hackers (criminals) might take control of my account if I used a grocery retailer mobile application</p>	<p>0.786</p> <p>0.630</p> <p>0.822</p> <p>0.615</p>	
SN	<p>SN1: My family members (e.g. parents, spouse, children) think that I should make purchases through grocery retailer mobile application</p> <p>SN3: My friends think that I should make purchases through the grocery retailer mobile application</p>	<p>0.864</p> <p>0.813</p>	Faqih and Jaradat, 2015
BI	<p>BI1: Assuming I had access to grocery mobile application, I intent to use it</p> <p>BI2: Given that I had access to grocery retailer mobile application; I predict that I would use it.</p> <p>BI3: I plan to use grocery retailer mobile application the next few months</p>	<p>0.951</p> <p>0.926</p> <p>0.734</p>	Faqih and Jaradat, 2015

Table.3 shows that each variable is adequate and fulfills the requirements for the construct regarding the fit statistic. Personal innovativeness indicates a Comparative Fit Index (CFI) = 1.000, a Normed Fit Index (NFI) = 0.997, Incremental Fit Index (IFI) = 1.000, Root Mean Square Error of Approximation (RMSEA) = 0.015 and χ^2/df = 1.067. Moreover, Perceived usefulness includes a Comparative Fit Index (CFI) = 0.996, a Normed Fit Index (NFI) = 0.990, Incremental Fit Index (IFI) = 0.990, Root Mean Square Error of Approximation (RMSEA) = 0.049 and χ^2/df = 1.680. Furthermore, Subjective norm also indicates good fit index with a Comparative Fit Index (CFI) = 0.995 a Normed Fit Index (NFI) = 0.989, Incremental Fit Index (IFI) = 0.995, Root Mean Square Error of Approximation (RMSEA) = 0.060 and χ^2/df = 2.009.

Likewise, perceived risk provides good values like a Comparative Fit Index (CFI) = 0.997, a Normed Fit Index (NFI) = 0.991, Incremental Fit Index (IFI) = 0.997, Root Mean Square Error of Approximation (RMSEA) = 0.045 and χ^2/df = 1.578. Therefore, perceived ease of use contains a Comparative Fit Index (CFI) = 1.000, a Normed Fit Index (NFI) = 1.000, Incremental Fit Index (IFI) = 1.000, Root Mean Square Error of Approximation (RMSEA) = 0.000 and χ^2/df = 0.071 and behavioural intention to use GRMA Comparative Fit Index (CFI) = 1.000, a Normed Fit Index (NFI) = 1.000, Incremental Fit Index (IFI) = 1.001, Root Mean Square Error of Approximation (RMSEA) = 0.000 and χ^2/df = 0.080.

4.3.Validity and Reliability

The validity and reliability of the measurements model were evaluated using AMOS 23.0 and SPSS 22.0. Cronbach's Alpha was measured using SPSS 22.0 to examine the internal consistency of the items. Regarding Cronbach's Alpha, the following scale was suggested by George and Mallery (2003): >0.9 = Excellent, >0.8 = Good, >0.7 = Acceptable, >0.6 = Questionable, >0.5 = Poor and below 0.5 unacceptable (cited from Gliem and Gliem, 2003). Personal innovativeness = 0.850, Subjective norm = 0.825, Perceived ease of use = 0.749, Perceived risk = 0.819, Perceived usefulness = 0.794

and Behavioural intention to use GRMA = 0.902. All items of this study provide a result at least above 0.7, thus the items are within the acceptable range. According to Nunnally et al. (1967) the reliability of a measurement construct is given, if the value by Cronbach's Alpha exceeds 0.7 (Natarajan et al., 2017). Moreover, the composite reliability provides values, which are also essential for proving the reliability of the measurement model.

Personal innovativeness = 0.898, Subjective norm = 0.822, Perceived ease of use = 0.794, Perceived risk = 0.821, Perceived usefulness = 0.811 and Behavioural intention to use GRMA = 0.960. It is worth noting that each value exceeds the required value of 0.6 (Bagozzi and Yi, 1988). In light of these results, it is verified that the requirements for the reliability of the constructs are fulfilled. The results for the reliability of each variable are also shown in Table 5. Further relevance provides the validity of the measurement model. The evaluation of validity varies between convergent validity and discriminant validity.

The average variance extracted needs to be at least 0.5. The value of 0.5 means that half of its indicators' variance is explained by the latent variable (Hair et al., 2012). The variables indicate the following average variance extracted results: Personal innovativeness = 0.747, Subjective norm = 0.698, Perceived ease of use = 0.563, Perceived risk = 0.483, Perceived usefulness = 0.519 and Behavioural intention = 0.890. Almost all variables exceed the desired value of 0.5 except Perceived risk. However, the value of Perceived risk is very close to 0.5, hence the variable is continuously used for the measurement. The values of the convergent validity are shown within the Table 5.

Table 6. Convergent validity and reliability of the measurement model

Variable	Average variance extracted (AVE)	Composite reliability (CR)	Cronbach's Alpha
Personal innovativeness	0.747	0.898	0.850
Subjective norm	0.698	0.822	0.830
Perceived ease of use	0.563	0.794	0.750
Perceived risk	0.483	0.821	0.820
Perceived usefulness	0.519	0.811	0.790
Behavioural intention	0.890	0.960	0.900

Discriminant validity provides the second essential path for measuring the validity of a measurement model. Firstly, the correlation of each pair was determined by using SPSS 22.0 and the results have shown that the correlations of the pairs do not exceed 0.7 (Anderson and Gerbing, 1988). Furthermore, the square roots of each average variance extracted were calculated for comparing these values with the correlations. It is shown in Table 6 that the square roots of AVE by each latent construct exceed the values of the correlations. It agrees with the constraints for the discriminant validity claimed by Fornell and Larcker (1981). According to this, the measurement model also provides satisfaction concerning the validity.

Table 7. Discriminant validity of the measurement model

	PIIT	SN	PEU	PR	PU	BI
PIIT	0.864					
SN	0.352	0.835				
PEU	0.098	0.082	0.750			
PR	-0.227	-0.133	-0.067	0.695		
PU	0.262	0.313	0.311	-0.158	0.720	
BI	0.427	0.510	0.223	-0.222	0.532	0.943

Note: Square roots of the AVE are the bolded diagonal values and the other values provide the correlations among the pair constructs.

Additionally, it needs to be emphasized that the results of the SEM show that all the links except the relationship between personal innovativeness and perceived ease of use and the negative relationship between perceived risk and perceived usefulness, as well as the correlation between perceived risk and behavioural intention to use GRMA, are significantly related with one another, with a minimum confidence interval of 95%.

4.4.Path analysis

The fit statistic of the entire measurement model was also examined to avoid the necessity of further paths among the latent constructs. The fit indices of the measurement model were found to be very good ($\chi^2/df = 0.739$; goodness of fit index (GFI) = 0.997; adjusted goodness of fit index (AGFI) = 0.981; normed fit index (NFI) = 0.992; comparative fit index (CFI) = 1.000; root mean square error of approximation (RMSEA) = 0.000).

However, many studies considered the chi-square p value to be a further essential value for the fit index of measurement models. It was claimed that studies with a higher sample size than 200 could ignore the absolute fit index of minimum discrepancy chi-

square p value (Joreskop and Sorbom, 1996). Hence, the chi-square p value was not considered for this thesis, for the simple reason that the sample size is comprised of 280 respondents in total. Those values prove that the structural equation model fulfills the requirements entirely and thus there is no need for additional paths within the model. The results compared with the criteria are shown in Table 7.

Table 8. Fit Index of the entire measurement model

Name of the index	Score	Criteria
Chi-square/DF	0.739	< 3
RMSEA	0.000	< 0.05
GFI	0.997	> 0.9
AGFI	0.981	> 0.9
CFI	1.000	> 0.9
NFI	0.992	> 0.9

Behavioural intention to use GRMA is significantly related to perceived usefulness ($\beta = 0.389$; C.R. = 7.105; $p < .05$), personal innovativeness ($\beta = 0.211$; C.R. = 4.157; $p < .05$), subjective norm ($\beta = 0.389$; C.R. = 6.525; $p < .05$), thus H5, H8 and H12 are supported. However, behavioural intention to use GRMA is neither positively related to perceived ease of use ($\beta = 0.095$; C.R. = 1.378; $p > .05$), nor negatively related to perceived risk ($\beta = -0.105$; C.R. = -1.644; $p > .05$), hence H7 and H10 are not supported. Additionally, perceived usefulness is significantly related to subjective norm ($\beta = 0.258$; C.R. = 4.070; $p < .05$), perceived ease of use ($\beta = 0.367$; C.R. = 5.104; $p < .05$) and personal innovativeness ($\beta = 0.127$; C.R. = 2.308; $p < .05$), thus H4, H9 and H12 are supported for this thesis. But perceived risk ($\beta = -0.100$; C.R. = -1.430; $p > .05$) does not negatively affect perceived usefulness. Thus, H7 is rejected.

Personal innovativeness has a positive impact on subjective norm ($\beta = 0.298$; C.R. = 6.287; $p < .05$) and has a negative impact on perceived risk ($\beta = -0.168$; C.R. = -3.898; $p < .05$), hence H3 and H1 are supported in this study. However, personal innovativeness does not positively impact perceived ease of use ($\beta = 0.069$; C.R. =

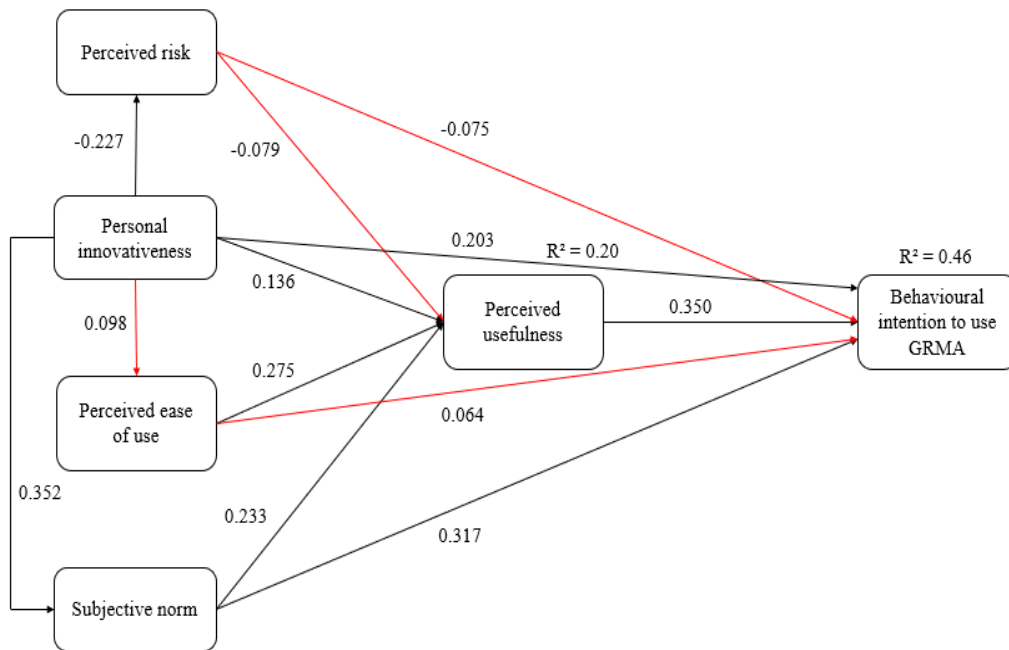
1.643; $p > .05$), hence H2 is rejected. It needs to be emphasized that the relationship between behavioural intention to use GRMA and actual usage was not measured owing to the fact that this thesis aims to focus on non-users rather than users. The dependent variable actual usage was considered within the measurement model, but it was not considered within the structure model anymore, due to the lack of users. Thus, H13 is not supported.

Table 9. Path analysis results

Relationship	Path coefficient	S.E.	C.R.	P-value
PR ← PIIT	-0.168	0.043	-3.898	***
PEU ← PIIT	0.069	0.042	1.643	0.100
SN ← PIIT	0.298	0.047	6.287	***
PU ← SN	0.258	0.063	4.070	***
PU ← PEU	0.367	0.072	5.104	***
PU ← PIIT	0.127	0.055	2.308	0.021
PU ← PR	-0.100	0.070	-1.430	0.153
BI ← PU	0.389	0.055	7.105	***
BI ← PIIT	0.211	0.051	4.157	***
BI ← PR	-0.105	0.064	-1.644	0.100
BI ← SN	0.389	0.060	6.525	***
BI ← PEU	0.095	0.069	1.378	0.168

Table 8 shows the results of the hypothesis testing by using structural equation modelling. An important value for the hypothesis testing provides the critical ratio. The critical ratio reports the information about the two-sided significance of the hypothesis at the customary 5% level. The critical ratio is formed by dividing the value of the estimation by its standard error. The value 1.96 or higher (and -1.96 and lower) provides the criterion for the two-sided 5% significance (Hox and Bechger, 1998).

Figure 9. Final research model including estimates and r-square:



The measurement model shown above indicates the output by AMOS 23.0 and it is apparent that four out of twelve hypotheses are not accepted. Furthermore, it demonstrates the r-square values of behavioural intention to use GRMA and perceived usefulness. Behavioural intention to use GRMA indicates a $R^2 = 0.46$, which means that 46% of the variance is explained by the predictors, whereas perceived usefulness contains a $R^2 = 0.20$, which means that the predictors explain the variance of this variable or mediator about 20%. In both cases, the remaining value is provided by the standard error of the model. The r-square result by behavioural intention to use GRMA agrees with the findings by Venkatesh and Davis (2000). Usage intentions and behavioural intention of the variance are explained usually at around 40% by the TAM (Venkatesh and Davis, 2000).

4.5. Mediator role of perceived usefulness

After the path analysis and hypothesis testing had been completed, the results showed that some paths indicate “indirect” links next to the “direct” relations. As for the intention to use mobile applications for grocery shopping, it is worth noting that consumers perceive a utility, which could be influenced by the handling, external factors or the character of consumers by themselves. It was previously mentioned by Ramayah et al. (2003) and Henderson and Divett (2003) that perceived usefulness provides a potential mediator within the TAM. Given the measurement approach of this thesis concerning the path analysis and hypothesis testing, especially perceived usefulness provides some indirect paths with external variables towards behavioural intention to use GRMA. For this reason, it was decided to add the measurement for the mediation effect of perceived usefulness.

For the estimation of the mediation effect, the SEM procedure was also considered by using AMOS 23.0. However, before the measurement approach was started, it was essential to emphasize the fact that the typology of complementary mediation differs in five distinct patterns (Zhao et al., 2011, p. 200):

1. Complementary mediation: Mediated effect ($a \times b$) and direct effect (c) both exist and point in the same direction
2. Competitive mediation: Mediated effect ($a \times b$) and direct effect (c) both exist and point in opposite directions.
3. Indirect-only mediation: Mediated effect ($a \times b$) exists, but no direct effect.
4. Direct-only non-mediation: Direct effect (c) exists, but no indirect effect.
5. No-effect non-mediation: Neither direct effect nor indirect effect exists.

These patterns provide accurate knowledge about the mediations evaluation procedure. Hence, the measurement was done based on these patterns. Table 9 shows the results of the mediating effect of perceived usefulness. All these results were determined in accordance with the calculation approaches mentioned by Zhao et al. (2011).

Table 10. Mediation analysis results

No	Path	Direct path coefficient			Indirect path coefficient	Mediation type
		a	b	c	a*b	
H14	BI ← PU ← SN	0.233	0.35	0.317	0.082***	Complementary
H15	BI ← PU ← PIIT	0.136	0.35	0.203	0.048***	Complementary
H16	BI ← PU ← PEU	0.275	0.35	0.064	0.096***	Indirect only

Paths indicated with * fulfill the 5% confidence interval**

Baron and Kenny described the complementary mediation as the partial mediation effect whereas competitive mediation, direct-only non-mediation and no-effect non-mediation point to no mediation (cited from Zhao et al., 2011). As already mentioned in the patterns above, complementary and competitive mediations differ from one another in terms of direction. The direction of the mediation effect can be computerized by using the following equation $a \times b \times c = c'$ (Zhao et al., 2011).

Determination approach:

1. **$0.233 \times 0.350 \times 0.317 = 0.026$**
2. **$0.136 \times 0.350 \times 0.203 = 0.0097$**

Both determinations show that the first two mediator effects can be defined as complementary mediation effects since they have the same directions. Besides, H14 and H15 are significant on a confidence interval of 95%. Hence, perceived usefulness partially mediates the relation between subjective norm and behavioural intention to use GRMA, as well as between personal innovativeness and behavioural intention to use GRMA. Thus, H14 and H15 are supported.

Perceived ease of use does not impact behavioural intention, whereby there is no direct path available in this case (Table. 8), whereas the indirect path including perceived usefulness provides a positive impact. For this reason, an indirect-only mediation exists, where perceived usefulness mediates the relationship between perceived ease of use and behavioural intention to use GRMA. Thus, H16 is supported. Furthermore,

mediation effect of perceived usefulness between perceived risk and behavioural intention to use GRMA were not tested anymore owing to the fact that perceived risk does not provide a significant direct path towards behavioural intention to use GRMA, nor with perceived usefulness (Table.8). Thus, it is not possible that there exists any mediation effect in this case. Hence, H17 does not provide any mediator role.

4.6.Moderated Mediation

Because gender and experience were previously examined as moderators within the context of m-commerce (Faqih and Jaradat, 2015; Natarajan et al., 2017), it would be valuable for this thesis to find out whether the mediation effect by perceived usefulness could be influenced by gender, experience, age or education of the consumers. The moderated mediation effect occurs, if one or more variables affect the indirect path. There are various constraints for the occurrence of moderated mediation effect (Preacher et al., 2007, p. 193):

1. The independent variable (X) functions as a moderator of the b1 path.
2. Some fourth variable (W) affects the a1 path.
3. W affects the b1 path.
4. W affects a1 whereas yet another variable (Z) affects b1.
5. W affects both a1 and b1.

Since gender, experience, age and education could impact the mediation effect within the measurement of this study, the following hypotheses were developed for testing the effect of moderated mediation within this research:

H18: Gender moderates the mediation between personal innovativeness and behavioural intention to use GRMA.

H19: Gender moderates the mediation between subjective norm and behavioural intention to use GRMA.

H20: Gender moderates the mediation between perceived ease of use and behavioural intention to use GRMA.

H21: Experience of mobile applications moderates the mediation between personal innovativeness and behavioural intention to use GRMA.

H22: Experience of mobile applications moderates the mediation between subjective norm and behavioural intention to use GRMA.

H23: Experience of mobile applications moderates the mediation between perceived ease of use and behavioural intention to use GRMA.

H24: Education moderates the mediation between personal innovativeness and behavioural intention to use GRMA.

H25: Education moderates the mediation between subjective norm and behavioural intention to use GRMA.

H26: Education moderates the mediation between perceived ease of use and behavioural intention to use GRMA.

H27: Age moderates the mediation between personal innovativeness and behavioural intention to use GRMA.

H28: Age moderates the mediation between subjective norm and behavioural intention to use GRMA.

H29: Age moderates the mediation between perceived ease of use and behavioural intention to use GRMA.

4.6.1. Gender

The moderator gender was used for measuring whether both groups provide difference regarding the mediator role of perceived usefulness. The measurement approach was also conducted by using AMOS 23.0 to compare the regression coefficients with each other through 5000 bootstrapping and a 95% confidence interval. The results show that the path between personal innovativeness and perceived usefulness differs in female and male groups. Concerning the male group, the indirect path was statistically significant ($\beta = 0.149$; $p < .05$) and the female group does not provide a significant relation concerning the indirect path between PIIT and behavioural intention to use ($\beta = 0.017$; $p > .05$). Thus, gender moderates the mediation between personal innovativeness and behavioural intention to use GRMA. Hence, the hypothesis H18 is supported. The indirect path between subjective norm and behavioural intention does not show any difference between females ($\beta = 0.079$; $p < .05$) and males ($\beta = 0.081$; $p < .05$). Besides, the mediation between perceived ease of use and behavioural intention to use does not vary between females ($\beta = 0.088$; $p < .05$) and males ($\beta = 0.105$; $p < .05$). Thus, the hypotheses H19 and H20 are not supported.

4.6.2. Experience

The experience regarding the usage of mobile applications in general was also considered for measuring whether there is a moderated mediation effect available within this study. The experience of the respondents was categorized between short and long experience. Short experience comprises a period between 0 and 24 month and long experience starts at 24 month. The mediation of perceived usefulness between personal innovativeness and behavioural intention to use was not statistically-significant for the respondents with low experience and high experience; both indirect paths do not provide a significant level of about $p > .05$, hence, H21 is not supported. Additionally, the indirect paths between subjective norm and behavioural intention to use GRMA are not different between respondents with high experience ($\beta = 0.099$; $p < .05$) and low experience ($\beta = 0.054$; $p < .05$). Also, the indirect path between

perceived ease of use and behavioural intention to use GRMA does not indicate any difference concerning low experience ($\beta = 0.054$; $p < .05$) and high experience ($\beta = 0.131$; $p < .05$). Thus, the hypotheses H22 and H23 are both rejected. These results show that experience does not work as a moderator within the context of this mobile applications study.

4.6.3. Education

The question of how the education influences the mediation as moderator was also examined. The education of the respondents was categorized into two groups as well: Individuals with an A-level and individuals with a B-level. Regarding the mediation between PIIT and behavioural intention to use GRMA, A-level respondents showed a significant influence on the indirect relationship ($\beta = 0.083$; $p < .05$), whereas the B-level respondents did not show any significant indirect path ($\beta = 0.019$; $p > .05$).

Thus, education moderates the mediation between PIIT and BI to use GRMA. Hence, the hypothesis H24 is supported. However, the indirect effect concerning the A-level of subjective norm ($\beta = 0.072$; $p < .05$) and Perceived ease of use ($\beta = 0.109$; $p < .05$) do not vary in the B-level of subjective norm ($\beta = 0.080$; $p < .05$) and perceived ease of use ($\beta = 0.082$; $p < .05$). Thus, the hypotheses H25 and H26 are not supported.

4.6.4. Age

Finally, the age was considered as a demographic aspect regarding the moderated mediation effect of this study. The age of the respondents was categorized into individuals between the ages of 18 and 25, whereas the other category was made up of respondents over the age of 25. The indirect path concerning the younger generation is significantly related between PIIT and behavioural intention to use GRMA ($\beta = 0.059$; $p < .05$), whereas the over 25 year olds were not shown to have any influence on the indirect path between PIIT and behavioural intention to use GRMA ($\beta = 0.030$;

$p > .05$). Regarding this mediation, age functions as a moderator and thus the hypothesis H27 is supported. As far as the younger generation is concerned, neither the indirect path of subjective norm ($\beta = 0.080$; $p < .05$) nor the indirect path of perceived ease of use ($\beta = 0.104$; $p < .05$) shows differences from the subjective norm ($\beta = 0.085$; $p < .05$) and PEU ($\beta = 0.083$; $p < .05$) of the over 25-year-old respondents. Hence, age functions like education when it comes to the relation between PIIT and BI to use GRMA as moderator.



Table 11. Summarized hypotheses results

No.	Hypothesis	Result
H1	Personal innovativeness has a negative impact on perceived risk	supported
H2	Personal innovativeness has a positive impact on perceived ease of use	not supported
H3	Personal innovativeness has a positive impact on subjective norm	supported
H4	Subjective norm has a positive impact on perceived usefulness	supported
H5	Perceived ease of use has a positive impact on perceived usefulness	supported
H6	Personal innovativeness has a positive impact on perceived usefulness	supported
H7	Perceived risk has a negative impact on perceived usefulness	not supported
H8	Perceived usefulness has a positive impact on behavioural intention to use GRMA	supported
H9	Personal innovativeness has a positive impact on behavioural intention to use GRMA	supported
H10	Perceived risk has a negative impact on behavioural intention to use GRMA	not supported
H11	Subjective norm has a positive impact on behavioural intention to use GRMA	supported
H12	Perceived ease of use has a positive impact on behavioural intention to use GRMA	not supported
H13	Behavioural intention to use GRMA has a positive impact on actual usage	not supported
H14	Perceived usefulness mediates the relationship among subjective norm and behavioural intention to use GRMA	supported

H15	Perceived usefulness mediates the relationship among personal innovativeness and behavioural intention to use GRMA	supported
H16	Perceived usefulness mediates the relationship among perceived ease of use and behavioural intention to use GRMA	supported
H17	Perceived usefulness mediates the relationship among perceived risk and behavioural intention to use GRMA	not supported
H18	Gender moderates the mediation among personal innovativeness and behavioural intention to use GRMA	supported
H19	Gender moderates the mediation among subjective norm and behavioural intention to use GRMA	not supported
H20	Gender moderates the mediation among perceived ease of use and behavioural intention to use GRMA	not supported
H21	Experience moderates the mediation among personal innovativeness and behavioural intention to use GRMA	not supported
H22	Experience moderates the mediation among subjective norm and behavioural intention to use GRMA	not supported
H23	Experience moderates the mediation among perceived ease of use and behavioural intention to use GRMA	not supported
H24	Education moderates the mediation among personal innovativeness and behavioural intention to use GRMA	supported
H25	Education moderates the mediation among subjective norm and behavioural intention to use GRMA	not supported
H26	Education moderates the mediation among perceived ease of use and behavioural intention to use GRMA	not supported
H27	Age moderates the mediation among personal innovativeness and behavioural intention to use GRMA	supported
H28	Age moderates the mediation among subjective norm and behavioural intention to use GRMA	not supported
H29	Age moderates the mediation among perceived ease of use and behavioural intention to use GRMA	not supported

5.CHAPTER 5. DISCUSSION AND IMPLICATIONS

5.1.Discussion

This thesis provides new insights regarding the influences that play a role in consumers' perception and pre-adoption of mobile shopping applications. The results were obtained by using structural equation modelling analysis, which provides the opportunity to compare the results of this thesis with findings of prior literature in the context of mobile shopping applications (Aldás-Manzano et al., 2009b; Natarajan et al., 2017; Faqih and Jaradat, 2015; Agrebi and Jallais, 2015; Liébana-Cabanillas et al., 2017; Natarajan et al., 2017).

This thesis shows further insights with its results within a commonly used shopping area, which calls grocery retailing. It is a fact that the grocery retailing forms an essential part of purchasing in general due to the fact that consumers always need to consume food and beverages. As already mentioned, the use of, interest in and demand for mobile applications for shopping and searching approaches are increasing both for consumers and retailers (Wiwo, 2015). Hence, the measurement of the perception by consumers regarding mobile applications also provides new insights into the grocery retail industry.

The upcoming sections indicate theoretical implications, which deal with the comparison of the results achieved by this thesis and previous literature. Therefore, the practical implications provide further insights, how the results of this thesis could be appropriately used by the large German retail chains, and how advertisement and further aspects play roles in the m-grocery. Finally, the conclusion discusses the general topic upon which this thesis is based, involving the findings and future research limitation, which should provide an overview about further research regarding this study.

5.2.Theoretical implications

These results provide new theoretical contributions to the literature of the TAM. It fills a significant gap in research conducted into pre-adoption of mobile shopping applications for grocery retailers in a modern country like Germany. Moreover, new insights into the TAM were offered within this thesis. The role of perceived usefulness as a mediator between PEU, PIIT, SN and BI within the TAM partial are in line with previous argumentation by Venkatesh and Davis (2000). This thesis claims perceived usefulness as the main mediator among other external variables, whereas perceived ease of use is mediated by perceived usefulness.

This achievement fills a gap within the literature dimension of the TAM. Furthermore, the variable “perceived risk” was considered within the theoretical model as an external variable, due to its importance in m-commerce mentioned by Natarajan et al. (2017) and there is a necessity for future research with perceived risk as an external variable within the TAM mentioned by Liébana-Cabanillas et al. (2017). It was firstly assumed that perceived risk could provide a barrier to consumers’ intention and keep them away from grocery retail mobile applications. However, the results showed that perceived risk does not have a significant negative impact either on perceived usefulness or on behavioural intention to use GRMA. Based on this, it has been established that perceived risk does not deter consumers from using grocery retail mobile applications.

For this reason, the mediation effect of perceived usefulness between perceived risk and behavioural intention to use GRMA does not exist, either. Hence, this finding does not support the proposition by Natarajan et al. (2017) that perceived risk plays an essential role in the pre-adoption of mobile applications because risks would deter potential users from using mobile applications. The findings concerning perceived risk also are not in accordance with results of prior studies. For instance, the downstream effect as regards online purchase decisions claimed by Kim et al. (2008) is not supported in this thesis. Additionally, it refutes the proposition that an increase in

perceived risk automatically reduces consumers' online shopping behaviour (Bhatnagar et al., 2000). This result agrees with the finding by Wu and Wang (2005), who claimed that consumers prefer to use m-commerce due to the advantages that outweigh risks. Besides, it does not support the statement by Natarajan et al. (2017) that security and performance risk keep consumers away from mobile shopping applications. Regarding the result of this thesis, perceived risk does not function as a factor which could deter consumers from m-shopping. Furthermore, the negative impact of personal innovativeness on perceived risk is significant within this thesis. It supports the previous finding by Aldás-Manzano et al. (2009a), who argued that individuals with high innovativeness do not perceive much risk within transactions of mobile payments. Thus, it can be argued that feelings of risk decrease due to high personal innovativeness. This agrees with previous statement by Aldás-Manzano et al. (2009a) and extends this research to another dimension.

This thesis does not support the argumentation by Agarwal et al. (1998), who focused on the definition of personal innovativeness regarding information technology. Agarwal et al. (1998) claimed that personal innovativeness does not have any relation with perceived ease of use, perceived usefulness and usage intention. In accordance with grocery retail mobile applications, a significant relation with behavioural intention and perceived usefulness is given, and the link between perceived ease of use and personal innovativeness is also not found in this study.

Thus, the findings by Agarwal et al. (1998) and Lewis et al. (2003) are both not supported, because both articles claimed that personal innovativeness has an impact on perceived ease of use. Furthermore, concerning personal innovativeness, the findings agree with the statement by Natarajan et al. (2017) who claimed that personal innovativeness plays an essential role in the pre-adoption within the m-commerce area. The result also agrees with the finding by Lu et al. (2005a) who found out that individuals with higher innovativeness exhibit strong positive intention to use new technologies. Based on the results of this thesis, the importance of personal innovativeness is also one vital aspect in the domain of grocery retail mobile applications. The findings mentioned above indicate that personal innovativeness

provide important insights, hence the importance of this variable in further technology domain studies is essential. The measurement of perceived usefulness shows a strong impact on behavioural intention to use. This finding agrees partially with Agrebi and Jallais (2015), that perceived usefulness serves as a main determinant within the TAM as far as non-purchasers and purchasers are concerned. In this thesis, perceived usefulness is described as a mediator between common independent variables and the behavioural intention to use the mobile application. This emphasizes the strength of perceived usefulness within the TAM.

The finding that individuals' intention to use grocery retail mobile applications is strongly influenced by external factors like media, family and friends is confirmed due to the impact between subjective norm and behavioural intention to use grocery retail mobile applications. This also confirms the findings by Yang et al. (2013), Arpaci (2015), Faqih and Jaradat (2015), who also found the relationship to be significant. It should be emphasized, for the research in the context of m-commerce and mobile shopping applications, that subjective norm plays an important role in the pre-adoption of mobile applications. Also, the partial mediation of perceived usefulness supports the idea that the influence of external people or other things is automatically associated with a utility within the domain of individuals' perception of mobile shopping applications.

The same impact can be observed in the complementary mediation of perceived usefulness between personal innovativeness and behavioural intention to use GRMA because of the fact that individuals with innovativeness perceives more utility regarding new technologies than less innovative individuals. Also, the mediation effect of this case highlights the importance of perceived usefulness as a mediator and personal innovativeness as an independent variable within the TAM and their collaboration with one another. Hence, the results of this thesis provide further insights both within the academic field and for the mobile commerce. Moreover, the impact of the demographics, gender, education, age and experience on mobile applications as moderators of the mediation effect. Although most of the hypotheses of the moderated mediation are not supported, the mediation of personal innovativeness and behavioural

intention to use GRMA is moderated by gender, education and age. These results provide interesting insights for the academic field and fill the gap in the literature regarding moderated mediation in m-commerce literature.

5.3. Practical implications

All these results provide new insights for the academic field, but at the same time the impact on practical use can create new awareness within the grocery retail sector. Large retail chains in Germany, especially Lidl, Aldi, Rewe, Real Kauf and Edeka can benefit from these results. Considering the effect of perceived usefulness, it is clear that the intention to use grocery retail mobile applications is associated with the perception of an advantage. Because perceived usefulness was already defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320), the indirect only mediation among perceived ease of use and behavioural intention through perceived usefulness emphasizes that the easiness of an application provides an advantage, which leads automatically to the use of such a mobile application.

For this reason, retailers need to set their focus on the handling and design of the mobile application during the development stages. Especially, the use of such an application can be modified through larger screens of the applications, an easy menu which guides the user across the application. In addition, an entire overview about prices including additional costs need to be clearly emphasized. Moreover, the access to the application itself as well as a structured categorization of the goods need to be considered within the development approach. Furthermore, a stimulus would be provided by offers of future products in the assortment. Thus, the consumer has the possibility to reserve a product maybe before it arrives in the physical store or in the warehouse of the retailer. Likewise, it provides the opportunity for retailers to plan their demand more accurately, which offers benefits to both parties. Additionally, greater emphasis should also be placed on advertising and marketing approaches, given the role of external factors like family, friends and media in general. These

common aspects have a profound impact on the behavioural intention of consumers regarding the pre-adoption of grocery retail mobile applications. Subjective norm describes the external influence of family, media and friends (Limayem et al., 2000). Because of the strong significant relationship between subjective norm and behavioural intention within this study, it is easy to foresee that grocery retail mobile applications can earn growing reputation through distinct advertising approaches. Especially, social media platforms like Linked in, Xing, Facebook, Twitter and others need to be used by retailers for awakening an interest in young people.

Besides, advertisement within television could help reach a larger number of potential users for such applications. Retailers need to focus on the accentuation of the easy handlings, design with optimal screens and smart usage of the mobile applications. The consideration of these aspects constitutes an essential success factor for each retailer's advertising and marketing approaches. The marketing approaches like the development of smart strategies by the large chains could increase the use of GRMA and extend the size of an entire distribution channel.

Since this thesis claims personal innovativeness as an important variable within the model, retailers need to set their focus on young adults who tend to exhibit high levels of personal innovativeness. Such individuals can become opinion leaders of the mobile shopping applications while others follow them. It was claimed by Natarajan et al. (2017) students display a high level of innovativeness. Thus, cooperation with universities can be an excellent solution to gain valuable information and improvement recommendations by students. The accessibility of those applications at universities could lead to opinion sharing between students and retailers. This approach would incorporate potential consumers with innovativeness into the development process. Thanks to this collaboration, the idea sharing between students and retailers could provide guidance for further improvement of the applications. Students would receive the opportunity to share these mobile applications with their friends, peers and family members. Thus, they can receive feedback, which accordingly leads to information sharing with the retailers, and thus they would gain further essential knowledge regarding the needs of consumers about their mobile applications.

Retailers have the chance to prepare mobile applications in accordance with the requirements of consumers. Furthermore, knowledge gained through the moderated mediation effect by gender, age and education on perceived usefulness towards the indirect path between personal innovativeness and behavioural intention to use GRMA, should also be considered by retailers. These results mainly claim that the personal innovativeness of humans varies according to gender, age and education, which provides essential insights concerning the requirements of potential consumers. Therefore, it needs to be emphasized that the mediation effect of perceived usefulness between personal innovativeness and behavioural intention to use is influenced by gender, age and education.

A solution for this issue could be the availability of two distinct mobile applications, which can attract the interest of certain groups. These practical implications should improve the mobile applications of organized retail chains in Germany. These recommendations can help them to increase their market share within the online and m-commerce fields. Moreover, the increase in the distribution size through mobile applications can become a trend in the upcoming years. The results of this thesis already help retailers to prepare themselves for such a trend. Hence, the rise of further economics of scale and annual revenue provides them with further possibilities to expand efficiently within the European and global market.

5.4. Conclusion

TAM by Davis (1989) has been used as a method of choice for measuring the effect of distinct external influences, and how they affect the pre-adoption process by potential consumers. Also, in this thesis, the TAM is proving both its flexibility and robustness. The result concerning of the variance explained by TAM agrees in accordance with previous studies done by (Taylor and Todd, 1995 and Venkatesh and Davis, 2000).

Due to the insignificant impact of perceived risk on consumers' behavioural intention, retailers do not need to pay that much attention to the avoidance of risk factors, which could occur during the daily handling. Probably, because of the fact that data was mainly gathered from young students, who can be categorized as modern and smart, especially concerning the usage and adoption of new technologies.

Also the mediator role of perceived usefulness as an important variable within the TAM and provides an essential construct for new technology acceptance measurement approaches. Through this awareness regarding perceived usefulness, the needs, which guide consumers to GRMA can be identified more easily. This result can help retailers from Germany to compete with a distribution channel like mobile applications against large online commerce providers like Amazon, that entered the market with its online grocery delivery service Amazon Fresh in Germany (Coca Cola and Mckinsey, 2015). Through the measurement of the behavioural intention pattern of potential consumers, this thesis leads to further perspectives and information as to whether certain attributes

lead to the adoption of m-commerce. Since personal innovativeness and perceived ease of use do not have a significant relationship, there is no need to put the emphasis on the ease of use for highly innovative individuals, whereas less innovative people need user friendly, smart screens and a guideline within the mobile application. Hence, the measurement model provides the opportunity to enable a retailer to adopt a development process of mobile applications so that they can reach different groups of potential consumers.

This thesis recommends improvements for increasing the use of mobile shopping applications of grocery retailers in Germany. Hence, it can be summarized that the results of this thesis provide valuable opportunities for the grocery retail area and the further approach of mobile application development. Generally, the theoretical contribution aims to show new results of the TAM, especially with perceived usefulness as a strong mediator and the moderated mediation of gender, education and

age. Finally, these insights can help retailers to extend their strategies regarding the Omni-Channel. Mobile shopping applications could provide an additional channel within the Omni-Channel, which achieve further and new groups of customers like busier and younger people, for instance. This could lead to positive implications regarding Omni-Channel strategies of organized retailers.

5.5.Limitations and future research

Despite the valuable insights that this thesis offers to GRMA, there are several limitations. The main limitation is that this thesis aims to evaluate the effect of consumers' intention to use GRMA only in German retail chains. Further research should be conducted with smaller grocery providers, which deliver grocery products directly to homes. The conduction of such research could lead to interesting results and provide insights of the entire market. Therefore, the thesis was just limited to German consumers and an intercultural comparison with other countries and foreign retail chains would provide interesting results, which could be used for the global market comparison.

Additionally, the comparison of GRMA with other product-specific categorized retail areas could be interesting, especially for wholesalers. Furthermore, the examination of whether perceived usefulness mediates the effect of other variables like perceived behavioural control or trust can provide further insights. Moreover, it could be tested whether the theory of planned behaviour is usable for similar studies like this, thus providing a further comparison of the results. Because the model of this thesis only comprises perceived risk, perceived usefulness, perceived ease of use, subjective norm and personal innovativeness as independent variables, there is still a chance to extend the model to further other latent constructs like perceived enjoyment, perceived security and anxiety. Finally, the consideration of another variable as a possible mediator instead of perceived usefulness can change the results, which could also be valuable for the advancement of mobile applications in other retail segments. A further aspect regarding this thesis can be the use of convenience sampling for achieving a

larger sample size. Last but not least, the focus on users of grocery mobile applications could reach other outcomes and provides results which can be used for a comparison among non-users and users.



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Appendix A: Questionnaire for data collection in English

In recent years the m-commerce area has become a rapidly growing opportunity for customers and organizations. Especially, famous retailers like Edeka, Real Kauf, Rewe, Lidl and Aldi have extended their distribution channel in accordance to the m-commerce area. Nowadays they offer several products on mobile applications. This provides the possibility for consumers to order products from their mobile devices.

However, despite the fast growing interest, m-commerce is still a very limited researched area who needs further research. The purpose of the research will be to find out how strong certain factors affect consumer's intention to use grocery retailer mobile application and is there are a major determinant available for the mobile shopping application adoption. Besides, the research aims to measure possible barriers because of cost or risks. You are just going to investigate 5 minutes of your time to response the entire questionnaire. But you have the opportunity to win a 50 € coupon by Amazon.

Screening:

Have you ever used any mobile application for any purpose before?

- Yes
- No

For which purpose do you use mobile applications?

(You can choose more than one answer)

- Social media
- Reading newspaper
- Buying tickets for travels

- Booking hotel
- Purchasing books or movies
- Purchasing groceries
- Purchasing fashion
- Purchasing shoes and accessoires
- Other, please state: _____

How long have you been using mobile applications for shopping?

(Just one answer possible)

- 0-12 months
- 13 months – 24 months
- 24 months – 36 months
- More than 36 months

Have you ever used mobile shopping applications for purchasing groceries from retailers like Real Kauf, Rewe, Edeka, Lidl or Aldi?

- Yes
- No

How long have you been using mobile applications from retailers?

(Please, just response this question, if you have respond the previous question with “YES”)

- 0-12 months
- 13 months – 24 months
- 24 months – 36 months

- o More than 36 months

In the following section please choose just one answer and if you have not used mobile apps from retailers like Real Kauf, Rewe, Edeka, Lidl or Aldi, then please select the answers based on your assumptions:

Use the following sign: X

Questions	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think I would be the first in my circle of friends to know where I can shop using mobile applications					
I think I would be the first in my circle of friends to shop using mobile applications					
I think I know more about Mobile applications than my circle of Friends					
I think I would shop using mobile applications even if I did not know anyone who had done it before					
Using grocery retailer mobile application improves my shopping performance					
Using grocery retailer mobile application improves my shopping productivity					
Using grocery retailer mobile application enhances my					

effectiveness of my grocery shopping					
Using grocery retailer mobile application is useful to make my purchasing quickly					
Grocery retailer mobile application are clear and understandable					
Using grocery retailer mobile application does not require a lot of mental effort					
It is easy to do shopping by grocery retailer mobile application					
It is easy to use grocery retailer mobile application to do what I want to do					
My decision using grocery retailer mobile application involves a higher risk					
The security systems built into the grocery retailer mobile application are not strong enough to protect my Account					
Grocery retailer mobile application may not perform well and process payments incorrectly					
Using grocery retailer mobile shopping is adding great uncertainty to payments					
Internet hackers (criminals) might take control of my account if I used a grocery retailer mobile application					

My family members (e.g. parents, spouse, children) think that I should make purchases through grocery retailer mobile application					
The media frequently suggest to us to make purchases through grocery retailer mobile application					
My friends think that I should make purchases through the grocery retailer mobile application					
Assuming I had access to grocery retailer mobile application, I intent to use it					
Given that I had access to grocery retailer mobile application, I predict that I would use it.					
I plan to use grocery retailer mobile application in the next few months					
Answer possibilities:	Not at all	About once a week	Two or three times a week	Four or five times a week	More than five times a week
How many times do you use grocery retailer mobile application in a week?					
Answer possibilities:	Non-use	1-3 h	3-5 h	5-7 h	>7 h
How many hours do you spend using grocery retailer mobile application every week?					

Demographics:

What is your gender?

- o Male

- Female

What is your age?

- 18-25 years old
- 26-30 years old
- 31-35 years old
- 36-40 years old
- 41-45 years old
- Age 46 or older

What is your marital status?

- Single
- Married

What is the highest level of education you have completed?

- A-Level
- Bachelor degree
- Master degree
- PHD
- other

Where lies your annual income?

- Under € 25,000
- €25,001-€34,999

- o €35,000-€49,999
- o €50,000-€74,999
- o €75,000-€99,999
- o €100,000-€124,999
- o Over €125,000

Thank you for the participation. If you are interesting in winning the Amazone coupon, please write your name, prename and e-mail address below. I will announce the winner in the end of April.

Name:

Prenome:

E-Mail address:

Appendix B: Questionnaire for data collection in German

In den letzten Jahren hat sich der M-Commerce-Bereich zu einer schnell wachsenden Möglichkeit für Kunden und Organisationen entwickelt. Namhafte Einzelhändler wie Edeka, Real Kauf, Rewe, Lidl und Aldi haben ihren Vertriebskanal nach dem M-Commerce-Bereich erweitert. Heutzutage bieten sie mehrere Produkte für mobile Anwendungen an. Dies bietet Verbrauchern die Möglichkeit, Produkte von ihren mobilen Geräten zu bestellen. Trotz des schnell wachsenden Interesses ist der M-Commerce immer noch ein sehr begrenztes Forschungsgebiet, das weitere Forschung benötigt. Der Zweck der Untersuchung wird darin bestehen, herauszufinden, wie stark bestimmte Faktoren die Absicht des Verbrauchers beeinflussen, die mobile Anwendung von Lebensmittelhändlern zu verwenden, und ob es eine wesentliche Determinante für die Anwendung von mobilen Einkaufsmöglichkeiten gibt. Die Forschung zielt außerdem darauf ab, mögliche Barrieren aufgrund von Risiken zu messen. Sie werden nur 5 Minuten Ihrer Zeit investieren, um den gesamten Fragebogen zu beantworten. Aber Sie haben die Möglichkeit einen 50 € Gutschein von Amazon zu gewinnen.

Screening:

Haben Sie jemals irgendeine Mobile App für ein Vorhaben verwendet?

- Ja
- Nein

Für welches Vorhaben, haben Sie Mobile Apps verwendet?

(Sie können nachfolgend mehrere Antworten abgeben)

- Benutzung von Sozialen Netzwerken
- Lesen von Zeitungen

- Kauf von Tickets für Reisen
- Hotelbuchungen
- Kauf von Büchern oder/und Filmen
- Kauf von Lebensmitteln
- Kauf von Bekleidung
- Kauf von Schuhen oder/und Accessoires
- Sonstige, bitte angeben: _____

Wie lange benutzen Sie Mobile Apps schon für den Kauf von diversen Produkten?

(Nur eine Antwortmöglichkeit)

- 0-12 Monate
- 13 Monate – 24 Monate
- 24 Monate – 36 Monate
- Länger als 36 Monate

Haben Sie jemals eine Mobile App dazu verwendet, um Produkte wie Lebensmittel bei Einzelhändlern wie Real Kauf, Rewe, Edeka, Lidl oder Aldi zu kaufen?

- Ja
- Nein

Wie lange nutzen Sie die Mobile App von Einzelhändlern schon?

(Diese Frage ist nur zu beantworten, sofern die vorherige Frage mit „JA“ beantwortet worden ist.)

- 0-12 Monate

- 13 Monate – 24 Monate
- 24 Monate – 36 Monate
- Länger als 36 Monate

Bitte kreuzen Sie innerhalb der nachfolgenden Kästen nur das an, was Ihnen am ehesten zusagt und beantworten Sie jede Frage. Sofern Sie noch nie eine Mobile App von Lebensmitteleinzelhändler genutzt haben, geben Sie Ihre Antwort basierend auf Ihrer Annahme ab.

Benutzen Sie das nachfolgende Zeichen für die Beantwortung: X

Fragen	Stimme überhaupt nicht zu	Stimme eher nicht zu	Stimme weder zu noch dagegen	Stimme eher zu	Stimme voll und ganz zu
Es ist wichtiger Loyalität und Pflichtgefühl gegenüber anderen zu fördern, als Eigeninitiative zu fördern					
Die Loyalität gegenüber der Gruppe ist wichtiger, als der individuelle Gewinn					
Individuelle Belohnungen sind nicht so wichtig, wie das Wohlergehen der Gruppe					
Die Akzeptanz innerhalb der Gruppe ist wichtiger, als Unabhängigkeit und Autonomie im Beruf					
Gruppenerfolg ist wichtiger, als der individuelle Erfolg					
Ich denke ich wäre der erste innerhalb meines Freundeskreises, der weiß, über welche Mobilen Apps man am besten einkauft.					
Ich denke ich wäre der erste innerhalb meines Freundeskreises,					

der über eine neue Mobile App einkaufen würde.					
Ich denke ich bin derjenige, der am meisten Kenntnisse über Mobile Apps innerhalb meines Freundeskreises hat.					
Ich denke, ich würde über Mobile Apps einkaufen, auch wenn ich niemanden kennen würde, der dies bereits macht.					
Durch die Benutzung von Mobilten Apps des Lebensmitteleinzelhandels, erhöht sich meine Einkaufsleistung					
Die Benutzung von Mobilten Apps des Lebensmitteleinzelhandels erhöht die Einkaufsproduktivität					
Die Benutzung von Mobilten Apps des Lebensmitteleinzelhandels erhöht meine Einkaufseffektivität für Lebensmittel					
Die Benutzung von Mobilten Apps des Lebensmitteleinzelhandels ist nützlich, um den Einkauf zu beschleunigen.					
Mobile Apps vom Lebensmitteleinzelhandel sind verständlich und nachvollziehbar.					
Die Benutzung von Mobilten Apps des Lebensmitteleinzelhandels beanspruchen keine hohen geistigen Anstrengungen.					

Es ist leicht über Mobile Apps von Lebensmitteleinzelhändlern einzukaufen.					
Es ist einfach Mobile Apps von Lebensmitteleinzelhändlern dafür zu benutzen, um Produkte zu kaufen, die ich gerne haben möchte.					
Die Entscheidung für die Benutzung von Mobilen Apps des Lebensmitteleinzelhandels beinhaltet ein allgemein höheres Risiko					
Die Sicherheitssysteme der Mobilen Apps von Lebensmitteleinzelhändlern sind nicht ausreichend konzipiert für den Schutz meines Accounts					
Mobile Apps von Lebensmitteleinzelhändlern würden nicht einwandfrei laufen und die Zahlungsvorgänge könnten unkorrekt verlaufen.					
Die Benutzung von Mobilen Apps der Lebensmitteleinzelhändler beinhaltet Unsicherheit für Zahlungen.					
Internet Hacker könnten über die Mobilen Apps von Lebensmitteleinzelhändlern die Kontrolle über meinen Account übernehmen					
Meine Familie (z.B., Eltern, Partner, Kinder) denken, dass ich die Einkäufe über die Mobilen Apps von Lebensmittelhändlern machen sollte.					

Die Medien schlagen oft vor, unsere Einkäufe über die Mobil Apps der Lebensmitteleinzelhändler zu tätigen.					
Meine Freunde denken, ich sollte über Mobile Apps der Lebensmitteleinzelhändler, meine Einkäufe tätigen.					
Angenommen, ich hätte Zugriff auf eine Mobile App eines Lebensmitteleinzelhändler dann würde ich diese nutzen.					
Wäre der Zugriff einer Mobil App von einem Lebensmitteleinzelhändler vorhanden, dann würde ich voraussagen, dass ich diese Benutzen würde					
Ich plane, in den nächsten Monaten die mobile Anwendung von Lebensmittelhändlern zu verwenden					
Antwortmöglichkeiten:	Gar nicht	Einmal die Woche	Zwei- bis dreimal die Woche	Vier- bis fünfmal die Woche	Mehr als fünfmal die Woche
Wie oft nutzen Sie Mobile Apps von Lebensmitteleinzelhändlern innerhalb der Woche?					
Antwortmöglichkeiten:	Keine Benutzung	1-3 h	3-5 h	5-7 h	>7 h
Wie viele Stunden verbringen Sie mit der Benutzung von Mobil Apps der Lebensmitteleinzelhändler jede Woche?					

Demografische Fragen:

Welchem Geschlecht gehören Sie an?

- Männlich
- Weiblich

Welcher Altersgruppe gehören Sie an?

- 18-25 jährigen Altersgruppe
- 26-30 jährigen Altersgruppe
- 31-35 jährigen Altersgruppe
- 36-40 jährigen Altersgruppe
- 41-45 jährigen Altersgruppe
- 46 Jahre oder älter

Wie ist Ihr Familienstand?

- ledig
- verheiratet

Welches ist Ihr höchster schulischer oder akademischer Abschluss?

- Abitur
- Bachelor
- Master
- Promotion/Doktor
- Sonstige

Wo liegt Ihr jährliches Einkommen?

- unter € 25,000
- €25,001-€34,999
- €35,000-€49,999
- €50,000-€74,999
- €75,000-€99,999
- €100,000-€124,999
- über €125,000

Vielen Dank für Ihre Teilnahme. Sofern Sie daran interessiert sind, den Amazon Gutschein im Wert von 50 € zu gewinnen, schreiben Sie bitte unten Ihren Vornamen, Namen und Ihre E-Mail Adresse nieder. Der Gewinner wird Ende April bekannt gegeben.

Name:

Vorname:

E-Mail Adresse:

