Improvement of acceptance of mobile commerce

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ABSTRACT

Although almost 80 percent of the people has a smartphone these days, only 10 percent of online purchases are made via smartphones. There seems to be no clear reasons given in existing literature as for why this percentage is so low. This research aims to discover the facilitating and impeding factors for the attitude of consumers towards mobile purchasing. A literature review was conducted and the factors that are extracted from various models that explain the adoption process are tested through a questionnaire. Analyzes is done after collecting data from 376 valid respondents. The findings show that, in contradiction with literature found in the literature review, 'perceived ease of use' of the technology acceptance model is the most critical factor for consumers to either purchase or not purchase via smartphones. In addition, security and compatibility of websites contribute to one's attitude towards purchasing via smartphones. The results of this research are useful for companies to keep in mind when adjusting their mobile strategy, for example moving from IT-driven to business-driven. This study contributes to literature by critically analyzing previous studies and gaining alternative results with respect to previous studies. Future research should focus on the technical aspects of smartphones and websites to further influence higher adoption rates.

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Technology acceptance model, Diffusion of innovation, Consumer satisfaction, Perceived ease of use, M-commerce, Smartphones

1. INTRODUCTION

This research is in line with the Research Priorities 2016-2018 Topic number #3, by the Marketing Science Institute (MSI), with one of the research questions stating: 'How does mobile change decision making and behavior?'

Since the introduction of smartphones people have widely accepted them up to a point that we cannot live without them anymore, almost 80% of the people has some sort of smartphone (Nielsen, 2016). Although mobile web browsing is steadily growing since 2009, it is just slightly ahead of desktop web browsing at this moment (Gibbs, 2016). With at least 70% of the adults in the Netherlands owning a smartphone in 2016 (Statista, 2016) yet only 9% of all online purchases is done using smartphones (Ecommerce News Europe, 2017), mobile commerce can be improved on several aspects. 'Mobile commerce, also referred as m-commerce, is the use of wireless handheld devices such as cellular phones, tablets and laptops to conduct commercial transactions online (Mobile Commerce, sd). Mobile commerce transactions continue to grow, and the term includes the purchase and sale of a wide range of products and services, such as online banking, bill payment and information delivery' (Mobile Commerce, sd). 'In India, Flipkart — the largest eCommerce player — has even unplugged the desktop Web and only engages with its consumers via mobile' (Husson, 2016), It is therefore not surprising to see that m-commerce will play an increasing role in our daily lives.

Therefore, m-commerce is an important factor for marketers to keep in mind. Because of the time limit, the focus of this research lies on smartphones usage and the purchases made via smartphones in comparison to purchases made via PC's/laptops, instead of m-commerce as a whole. Because mobile shopping is still in its infancy, there is potential in turnover when the impeding factors can be reduced to a minimum. When businesses can develop a better mobile strategy, more conversion rate can be gained and therefore more turnover can be increased.

While reviewing literature on mobile commerce, statistics and literature are available when it comes to differences between buying behavior via smartphones versus PC/laptop, but there are no clear reasons or answers given to which factors facilitate people in their behavior towards mobile shopping. This research will position itself in this gap and tries to give insight why people purchase less using smartphones than using PC's/laptops by combining widely known models like the Technology Acceptance Model (from now on referred to as TAM) (Davis et al, 1989) and the innovation diffusion model (Rogers, 1995) with newly collected data. With these models, one can develop a strategy for implementation that keeps in mind the factors that influence people's acceptance and diffusion of innovations.

When looking at a study about (Adobe, 2015), the businesses that have a well-developed mobile strategy have multiple characteristics in common namely: Manage, Acquire, Analyze and Engage. Development of mobile strategy begins with managing, updating, and publishing a mobile app or mobile website across smartphone and tablet platforms.

An empirical study in Macau was conducted to investigate acceptance of mobile commerce (Lai et al, 2013). The researchers found that privacy concerns are a big influencer of adoption of mobile commerce. This is very similar to this research. However, consumers in the Netherlands are behind China when it comes to acceptance of mobile commerce and mobile purchasing. In the Netherlands purchases via smartphone represent less than 10 percent, while in the United Kingdom for example, it is 30 percent, and in China it is even 70 percent (Ecommerce News Europe, 2017).

Furthermore, another study (Nilashi et al, 2015), found that security, design, and content influence customer's trust in a website. Because shopping via smartphones happens often via websites, this study can prove to be helpful. There are different factors that influence adoption of mobile commerce, and there is no systematic description of why people are reluctant towards purchasing on smartphones. Therefore, the purpose of this study is to look into the adoption process of mobile commerce.

This study will give insight in which factors are of influence between acceptance of both web shopping and mobile shopping and gives answer to the question what impeding factors are according to people, although the omnipresence of smartphones, in the commerce via smartphones compared to Personal Computer (PC)/laptop (Ecommerce News Europe, 2017). In addition, this research will give insight in possible improvements of m-commerce to increase acceptance towards mobile shopping, and hereby increasing numbers of m-commerce. This report also gives recommendations to business to consumers (B2C) marketers in making decisions when creating mobile strategies, how companies approach mobile apps (Nitschke, 2016), for the coming years. Also, current study gives insight whether a compatible mobile website is perceived as important and if people think websites are compatible or not. Finally, this research will give insight into what people believe will be the future when it comes to mobile shopping.

This aim of this study is to identify the factors for the attitude towards purchasing via smartphones. Marketers can, with the results of this study, develop strategies in order to increase m-commerce and therefore increase their market share and/or gross profit.

1.1. Research questions:

- What are facilitating and/or impeding factors for attitude towards mobile shopping
- What are possible ways of improving mobile shopping in response to these factors?

1.2. Sub questions:

- What do people think are the differences between web shopping and mobile shopping?
- What are the opinions towards mobile shopping?
    - What are the opinions towards shopping via PC/laptop
- How can future technologies facilitate people regarding their attitude towards mobile shopping?

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- How do people think new technologies can play a part in improving the acceptation of mobile e-shops? (I.e. Virtual Reality /Augmented Reality)

Because literature mentions different factors, i.e. ease of use and security, are important for people in their attitude towards mobile shopping the research question will give insight into these factors and see if the findings are corresponding with existing literature.

The paper is organized as follows. Section 2 is the literature review and describes the research model and its key constructs. Section 3 will be the methodology part, including data collection and study procedure. Section 4 is the results part, presenting the analytical results of this study. Section 5 will be the discussion. At last, the conclusion is stated in section 6.

2. LITERATURE REVIEW

Much literature is available of the TAM and diffusion of innovation model, which provide an insight into why people are accepting or declining new technologies. When combining these models with the data that will be collected regarding purchasing through smartphones, the results will give a better understanding why it is still in its infancy in the Netherlands. Conducting literature search is important because it gives a better interpretation and to be able to compare the outcomes of this study.

2.1. Previous research

Researchers (Lai et al, 2013) performed a research about the user acceptance of mobile commerce in Macau, China. They conducted an empirical study where the unified theory of acceptance and use of technology (UTAUT) played a big part as a framework. They added privacy concern as a negative factor to the model. They held a questionnaire of 219 valid sets, and the results showed that the users agreed that positive factors – performance expectancy, effort expectancy and facilitating conditions – will lift the behavioral intention of the m-commerce services. This study also indicates that negative factor – privacy concern – influences the behavioral intention of the users towards adopting m-commerce in Macau. In the paper of Lai et al., the researchers found that users do not concern 'easy to use' as an important factor for m-commerce. (Lai et al, 2013) performed a study that is similar to this study, but in a different country and different culture. Also, the difference in year can play a part. With the questionnaire held by this study, it is investigated if 'ease of use' is indeed not important in m-commerce in the eyes of the respondents.

In addition, a meta-analysis of mobile commerce adoption and the moderating effect of culture was performed (Zhang et al, 2012). 53 studies have been analyzed and tested for a correlation between the factors of the TAM model. (Zhang et al, 2012) found that perceived ease of use is more critical in eastern cultures than in western cultures. I expect 'ease of use' to be a critical factor in the attitude of people towards mobile commerce and therefore present study will investigate whether this 'ease of use' is perceived as important and what other factors are of influence. In addition, they found that culture does have specific effects on mobile commerce adoption, which explains current developmental discrepancies and indicates future evolutionary directions.

Researchers (Nilashi et al, 2015) performed a study in which the role of Security, design and content factors on customer trust in mobile commerce is investigated. For this research, Analytic Network Process (ANP) from the Multi-Criteria Decision Making (MCDM) approaches and fuzzy logic from Artificial Intelligence (AI) approaches are used. The outcome of their study helped managers and service providers to ascertain the trust level of their websites and allow them to improve the quality of the website.

The original papers of both the TAM (Davis et al, 1989) and diffusion of innovation model (Rogers, 1995) are considered to be important as well. The study which collaborated the Theory of reasoned action (TRA), the model which is the predecessor of the TAM model is also looked into (Fishbein and Ajzen, 1975). These studies all give factors that influence ones attitude towards an innovation and these factors are investigated in present study, where the model of Rogers et al. is the most extended. The TAM and diffusion of innovation model are explained in further detail in the next paragraph.

The TAM model and diffusion of innovation model have their focus on the determinants of adoption while ignoring the factors that lead to consumer resistance to innovation. (Ram et al, 1989) found two categories of barriers causing innovation resistance: functional and psychological barriers. These categories can be further categorized as usage barrier, value barrier, risk barrier, tradition barrier, and image barrier. (Ram et al, 1989) have developed strategies for breaking each of these innovation barriers in their research. When looking at the adoption of purchasing via smartphones, these strategies to break each barrier are kept in mind to come up with conclusions. This could also be the case in present research and will be included in the questionnaire.

Literature about research that equals this subject and setting seems limited. However, when looking at the literature mentioned above, there is literature available about the adoption and behavior of people towards m-commerce in the rest of the world. Therefore, it should be possible to investigate what the problems for adoption of mobile purchasing are and to set up a questionnaire for empirical data.

This study will give an insight into the behaviors of people when it comes to purchasing via smartphones. This research will not investigate the technical improvements that should be made in order to get more consumers to purchase through smartphones.

2.2. Research model

In order to investigate what the problems are for adoption of mobile purchasing in the Netherlands and hereby answering the research questions, the factors that are important to determine ones attitude towards a system/innovation need to be investigated. Two convenient, widely known models that will be used in this determination as a framework are the Technology Acceptance Model (Davis et al, 1989) and the diffusion of innovation model (Rogers, 1995). The models are operationalized by asking questions that are related to the various factors included in the models. The most important factors that are operationalized in the questions asked are 'perceived usefulness' and 'perceived ease of use'.

2.2.1. Technology Acceptance Model

The Technology acceptance model (TAM) is a theory developed by Davis et al. to theorize the usage behavior of computer technology. Davis developed his theory from another theory called Theory of reasoned action (TRA) (Fishbein and Ajzen, 1975) to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. Davis et al. came up with the most important factors towards acceptance of an innovation, namely: actual use , behavioral intention (BI),

attitude toward using (A), perceived use (U) and perceived ease of use €[6]. His model can be seen in figure 2.1.

Perceived use (U) is defined as ‘‘the degree to which a person believes that using a particular system would enhance his or her job performance’’ (Davis et al, 1989). Perceived ease of use € is defined as ‘‘the degree to which a person believes that using a particular system would be free of effort’’ (Davis et al, 1989). Behavioral intention (BI) is defined as ‘’the strength of one’s intention to perform a specific behavior’’ (Fishbein and Ajzen, 1975). Attitude toward using (A) is defined as ‘an individual’s positive or negative feelings (evaluative affect) about performing the target behavior’ (Fishbein and Ajzen, 1975). BI is determined by A, which is influenced by both U and E. Nowadays, TAM has become well-established as a robust and powerful model for predicting user acceptance.

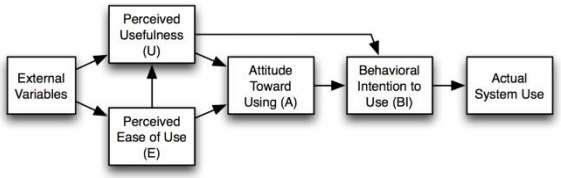

Figure 1. Technology acceptance model by (Davis et al, 1989)

The TAM is used as a framework for setting up the questionnaire, and to analyze the opinions given in the questionnaire.

2.2.2. Diffusion of innovation theory

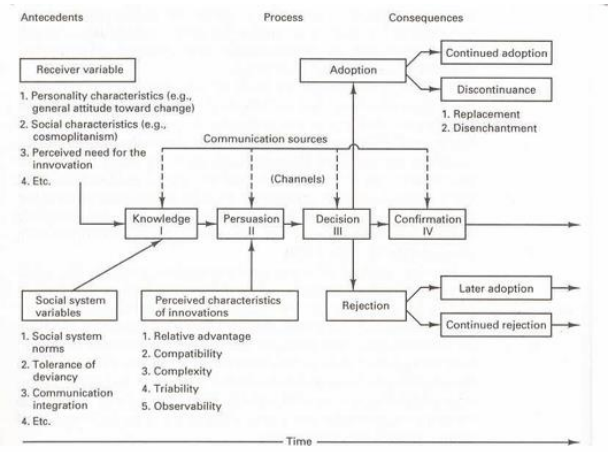

Figure 2. Diffusion of innovation model by (Rogers, 1995)

There are four steps in this model: Knowledge, Persuasion, Decision and Confirmation.

To get an idea how this model works, one must start with the factor Knowledge and the variables needed for it. After that, work your way through the model until you get at the final step: Confirmation. Although the two antecedents Receiver variable and Social system variable are important for the knowledge of an innovation, the most important factor for adoption of a system are the perceived characteristics of innovations in the Persuasion phase. This factor includes 5 steps, which all need to be high (except for complexity, which needs to be low) for an innovation to be adopted quickly. The antecedents cannot be changed, but the process can.

Knowledge: The person becomes aware of an innovation and has some idea of how it functions. In this stage the individual is first exposed to an innovation but lacks information about the innovation. It should be noted that during this stage of the process the individual has not been inspired to find more information about the innovation. The two variables in this step are: receiver variable and social system variable.

Persuasion: In this stage the individual is interested in the innovation and actively seeks information / detail about the innovation. The individual will use 5 characteristics of innovations for this information. The person will form a favorable or unfavorable attitude towards the innovation. Below is an explanation of the 5 perceived characteristics of innovations:

Relative advantage: ‘Relative advantage measures how improved an innovation is over a competing option or the previous generation of a product. Potential users need to see how an innovation improves their current situation’. (Yocco, 2015)

Compatibility: ‘Compatibility refers to the level of compatibility that an innovation has with individuals as they assimilate it into their lives. Potential adopters need to know that your innovation will be compatible with their life and lifestyle. If an innovation requires a huge lifestyle change or if the user must acquire additional products to make your innovation work, then it is more likely to fail. Innovations meet with the greatest success when users are able to seamlessly adopt them — when they replace an existing product or idea, for the better’. (Yocco, 2015)

Complexity: ‘Complexity or simplicity refers to how difficult it is for adopters to learn to use an innovation. Complexity slows down the gears of progress. The more complex an innovation, the more difficult it will be for potential adopters to incorporate it into their lives. Potential adopters do not usually budget much time for learning to use an innovation. The more intuitive an innovation, the more likely it will be adopted’. (Yocco, 2015)

Trialability: ‘Trialability describes how easily potential adopters can explore your innovation. Trialability is critical to facilitating the adoption of an innovation. Potential users want to see what your innovation can do and give it a test run before committing. This is the underlying concept of trial sizes for tangible goods, and demo or beta releases for digital goods. Potential adopters can see for themselves what life might be like once they adopt the product’. (Yocco, 2015)

Observability: ‘Observability is the extent to which the results or benefit of using an innovation are visible to potential adopters. We covered in the first article that not everyone adopts an innovation immediately. The adopter types who come after early adopters rely on seeing members of this group using an innovation. Observability extends beyond having earlier adopters use an innovation in view of later adopters. Potential adopters of all types must clearly see the benefit of adopting an innovation and using it’. (Yocco, 2015)

Decision: In this stage the individual takes the concept of the innovation and weighs the advantages / disadvantages of using the innovation and decides whether to adopt or reject the innovation. Due to the individualistic nature of this stage Rogers notes that it is the most difficult stage to acquire empirical evidence.

Confirmation: Although the name of this stage may be misleading, in this stage the individual finalizes their decision to continue using the innovation and may use the innovation to its fullest potential.

The sources of communication. The communication channels take the messages from one individual to another. It is through

the channel of communication the Innovations spreads across the people. It can take any form like word of mouth, SMS, any sort of literary form etc.

The results of present research are reflected at the diffusion of innovation model to see what the most important factors are in m-commerce and in order to know in which phase m-commerce stands in the Netherlands and what can be done to reach the final phase: Confirmation.

3. METHODOLOGY

3.1. Type of research

Literature research showed that TAM and Diffusion of innovation model can be useful to critically analyze attitude of people towards an innovation and therefore, is was chosen as framework for present research.

The reason that a questionnaire was spread instead of different methods, for example interviews, is that it provides speedy results with a large potential audience, a larger sample group means it is more generalizable. Another advantage of a questionnaire is the fact that it is relatively easy to fill in and it secures anonymity. Although questionnaires do have their disadvantages like skipping some questions or giving dishonest answers, the before mentioned pros exceed these disadvantages. In addition, a questionnaire was spread to find out what the experienced facilitating and impeding factors are. What factors are important for people when buying via smartphones and what factors provides reluctance towards buying via smartphones.

3.2. Data collection

After handing out the questionnaires through Facebook™ and WhatsApp™, the differences and the main points of interest were analyzed by interpreting answers of respondents and whether they are reluctant towards purchasing via smartphone. Next to this, it was analyzed what the facilitating and impeding factors were. Then, improvements were suggested that can help mobile shopping get more accepted.

The age categories that are investigated:

18-24

25-35

36-50

50+

The reason to exclude -18 is that this group is more difficult to analyze because they are not always legally able to buy products/services online and if they are available to buy products/services themselves, the parents/legal guardian will have control over it.

3.2.1. Study procedure

When clicking on the link for the questionnaire, people received an explanation of this research, what the purpose of the research was and were subsequently asked to participate.

The questions were asked in order to see why people do or do not buy via their smartphones.

First, general questions were asked. To begin with, the gender and age of the participant. After asking if the participant has a smartphone, asked was if the participant buys products/services through their smartphones. If that was the case, questions were asked what they like and dislike about purchasing via smartphones. Next to this, the respondents were asked if they prefer buying via smartphones or via PC/laptop. If the participant does not buy via the smartphone, questions were asked to see why they do not buy via smartphones. At last, questions about the difference between smartphones and PC's/laptops were asked and how they see the future of buying via smartphones.

The questions asked can be found in Appendix A.

3.2.2. Permission ethical committee

Performing research which includes human beings requires permission of the Ethical Committee of the faculty of Behaviour, Management, and Social Sciences (BMS) of the University of Twente. Approval has been given under file number BCE17370, which can be found in Appendix B.

4. RESULTS

In this chapter the results are mentioned. First, the general results are mentioned after which the facilitating factors towards purchasing via smartphone are given. After this, the impeding factors are mentioned, both for the respondents that do not buy via smartphones and the respondents that do buy via smartphones. To conclude this chapter, the ideas the respondents have with regards to the future are mentioned.

4.1. General results

In total, the questionnaire had 376 respondents. However, two sets of the questionnaire were eliminated for not giving answer to first 2 questions, so it is not known if these respondents are male/female and their age. Of the valid 374 respondents, 186 were female (49.7%) and 188 were male (50.3%). 122 respondents were between 18-24 years old (32.6%), 49 were between 25-35 years old (13.1%), 121 were between 36-50 years old (32.4%) and 82 were older than 50 (21.9%).

Table 1. General results

General results	Gender	Amount	Percentage
	Female	186	49.7
	Male	188	50.3
	Total	374	100
Age category	Category	Amount	Percentage
	18-24	122	32.6
	25-35	49	13.1
	36-50	121	32.4
	50+	82	21.9
	Total	374	100

N=374

From the 374 respondents, 330 (88.2%) are using a smartphone in the process of buying, this process includes looking up information of the product/service to the actual transaction of the product/service)

While forecasts thought 50% of all people buying online will make at least one purchase through a smartphone from 2017 on (Emarketer, 2016), the results of present research show that 269

(79.6%) of the people who filled out the questionnaire are using a smartphone for actual transactions of products/services. While almost 80% of the people who filled out the questionnaire use their smartphone for the actual transaction of a product/service, yet only 9% of all online transactions are made via a smartphone in the Netherlands (Ecommerce News Europe, 2017).

When asking if the respondents were always open to using smartphones for online purchases, 249 (81.1%) said they did. The majority of the respondents who were not open for it initially said it changed because mobile purchasing became more and more standard and it became better.

However, while the vast majority uses their smartphone in the process of purchasing and even for the actual transaction of a product/service, the questionnaire has shown that still the majority of the respondents (61.9%) purchases more on PC/laptop than on their smartphones. Why this phenomenon occurs will be discussed in the following section.

4.2. Facilitating factors

The variables given below are the answers given to the questionnaire, these factors will be placed underneath the factors of the TAM or diffusion of innovation model. Below an overview of the facilitating factors for buying via smartphones is given:

4.2.1. Speed of transaction (usefulness, relative advantage)

With 238 respondents, speed of the transaction is the most given facilitating factor out of the questionnaire. This is partly because it is related to the next factor: always near you, but also because the processors are in most cases quicker than the ones in our PC's/laptops. ''With each passing season, another wave of mobile devices is released that's more capable and more powerful than the generation preceding it. We're at the point where anyone armed with a current model smartphone or tablet is able to handle almost all of their at-home—and even at-work—tasks without needing anything else''(Lohrmann, 2016). In addition, you do not need to start you PC/laptop and to search for the product but you can just do it via the smartphone which is quicker.

4.2.2. Always near you (usefulness, relative advantage)

This factor is, as stated before, related to the first factor. 235 respondents chose the smartphone is 'always near you' as a facilitating factor. When you are not at home or simply do not have the opportunity to get behind a PC/laptop, you still can shop via your smartphone, assuming you have wireless connection.

4.2.3. Ease of use (ease of use, complexity)

With 214 respondents choosing 'ease of use' as a facilitating factor, it is found that it is still a very good determining factor when it comes to adoption of m-commerce. Almost 80% of the respondents believe 'easy to use' to be a facilitating factor.

4.2.4. Clarity (Compatibility)

Clarity is both a facilitating and impeding factor. Of all respondents, 52 think clarity is a good thing when talking about purchasing through smartphones however, 122 people see it as an impeding factor regarding the questionnaire. This has to do with the fact that people do not find it clear what to do on a small screen.

4.2.5. Paying without the need of a mobile banking scanner (usefulness, relative advantage)

With 133 respondents choosing 'paying without the need of a mobile banking scanner', this factor is an important one as well. This one is closely related to the 'speed of transaction' factor as well, since without the need of a mobile banking scanner, the transaction will be much quicker. You do not have to search for your debit card and the scanner, but can pay with a single code on your smartphone. On a computer this is not (yet) possible.

4.2.6. Buying is possible, even if your PC/Laptop does not have a Wi-Fi connection (usefulness, relative advantage)

Although this was not mentioned often, still it is a facilitating factor. Since internet connection problems are common, buying through smartphones by 3G/4G can save you time and can be the reason you buy something in the first place. When buying something that has a timer on it, like an auction, internet connection problems can make you lose that product/service.

4.3. Impeding factors for not buying

4.3.1. (Perceived) Security issues (compatibility,)

With 39 (23.6%) respondents giving this as an impeding factor, this is an opportunity for mobile retailers, since it is proven that smartphones are actually not safer or less safe than PC's/laptops. 'If you absolutely need to make a purchase while traveling, make sure you are connecting to websites using encrypted HTTPS connections. HTTPS stands for HyperText Transfer Protocol Secure, which means that the communication between a website and your computer is encrypted to increase security'. (Davis, 2013) Another problem is when one would purchase via a public connection, those are most of the time not secure. But again, this problem exists on PC's/laptops as well.

4.3.2. Difficult on a small screen (ease of use, compatibility, complexity)

This was the most criticized factor, 90 (54.5%) respondents find it difficult to purchase on a smartphone because of the small screen it has. This would be a difficult factor to improve, since making the screen bigger has additional disadvantages. The respondents would find it better when the layout would be improved.

4.3.3. Do not know how to do it (Complexity, triability, observability, receiver variable)

This factor is not an impeding factor in the way that it is a problem of smartphones. Presumably, it has more to do with the fact people are reluctant towards change. Managing change is an important issue in dealing with innovations.

4.3.4. Never done it (Complexity, triability, observability, receiver variable)

This factor is similar to the previous factor. People do not like change and will probably resist it until they got some idea of why this innovation is important/good (Cameron & Green, 2015). Of all respondents, 17(10.3%) people thought this is impeding factor for not purchasing via smartphones.

4.3.5. Wanting to buy as much as possible in physical stores (Receiver variables. Social; system variable)

Of all respondents, 47 (28.5%) responded that they want to buy as much as possible in physical stores. The reasons they have are spreading from goodwill to the enjoyable time they have when going into the store and purchase it there. Having a talk and getting advice is still an important factor for people to be reluctant towards mobile purchasing.

4.3.6. Wanting to see the product in real (relative advantage, receiver variable)

This factor is similar but somewhat more specific than the previous one. Respondents perceive it to be useful that they can see the products in real life and that they can, for example, try on clothes or try the product.

4.4. Impeding factors experienced when buying

4.4.1. Websites are not always compatible on smartphones (compatibility, ease of use, complexity)

The majority of respondents, namely 211, found that the websites on which they purchase their products/services are not always compatible. This can have multiple reasons, from pictures/videos that cannot be shown to redirection to the desktop site. These problems can all be very annoying for potential customers and should be avoided. (Google, sd)

4.4.2. Difficult on small screen (compatibility, ease of use, complexity)

In addition to the 90 respondents giving this as an impeding factor for not buying via smartphones, 188 respondents give this as an impeding factor they experienced when buying. Market reports on smartphone adoption show that since 2008 the screen size of smartphones has steadily grown (Danova, 2013). However, when looking at the responses of the survey, most of the respondents still find it difficult to purchase via smartphones because of the small screens. (Kim et al, 2015) found that 'large screen size and video mode promote heuristic processing, while small screen size and text mode encourage systematic processing'. Heuristic processing leads to greater affective and behavioral trust while systematic processing is associated with cognitive trust.

4.4.3. Clarity (compatibility)

This impeding factor has to do with the previous factors. Since respondents find it difficult to purchase via smartphones due to the small screens, respondents find the website not clear enough to purchase from. In addition, websites are not always compatible on smartphones. These factors are causing the respondents to not finding mobile purchasing clear and easy. 122 respondents find mobile purchasing not clear and therefore clarity an impeding factor.

4.4.4. More prone to errors than on PC/laptop (ease of use, complexity, triability)

Another impeding factor that is experienced when buying is the fact people believe that purchasing via smartphones is much more prone to errors than via PC/laptop. This believe is present with 62 respondents.

4.4.5. Need to get used to it (triability, complexity, ease of use)

Another impeding factor people experience when they do purchase via smartphones is the fact that they need to get used to it. This is, however, not an impeding factor solely for purchasing via smartphones but as well as for every other new innovation. These respondents had to get used to purchasing via PC/laptop presumably as well.

4.5. Results per age category

While there is no clear sign that facilitating factors differ between the various age categories, there are more differences to be seen when looking at the impeding factors. While people in every category said the small screen and compatibility are impeding factors while buying via smartphones, there is a difference distinguishable between age categories 18-24 and 50+, namely that the younger category thinks buying via smartphones is more prone to error than via PC/laptop, while people from the age category 50+ believe that getting used to mobile shopping is an impeding factor.

When analyzing the differences between age categories it can be seen that the age category 18-24, however second in percentage that buys via smartphones (see Table 2), has the lowest percentage when it comes to preference of buying via smartphones (see Table 3).

Table 2. Buying via smartphones between age categories

Age	N	Buying via smartphones	Not buying via smartphones
18-24	122	90 (73.77%)	32 (26.23%)
25-35	49	38 (77.55%)	11 (22.45%)
36-50	121	86 (71.07%)	35 (28.93%)
50+	82	46 (56.10%)	36 (43.90%)

N=374

Table 3. preference when buying via smartphones between age categories

Age	N	Preference via smartphones	Preference via PC/laptop
18-24	90	36 (40%)	54 (60%)
25-35	38	21 (55.26%)	17 (44.74%)
36-50	86	51 (59.30%)	35 (40.70%)
50+	46	25 (54.35%)	21 (45.65%)

N=260

4.6. Results regarding framework

When looking at these results with regard to the framework, some findings come up. With the TAM model, like mentioned before, the two most important factors that influence are the 'perceived usefulness' and 'perceived ease of use'. When analyzing the questionnaire, the findings show that for the TAM, 'perceived usefulness' is only facilitating when it comes to purchasing via smartphones and is not given once as an impeding factor. 'Perceived ease of use' however, was mentioned both as a facilitating and a major impeding factor.

When looking at the diffusion of innovation model, the results of the questionnaire showed that of the seven factors measured, five were perceived as impeding, while only three were considered as facilitating. The most given impeding factors were the small screen size, less clarity of the buying process and the low compatibility. These factors can be placed under the complexity and compatibility factor of the diffusion of innovation model.

4.7. Future ideas

When asking the people what they reckon will be the future when it comes to mobile purchasing, the vast majority thinks that the current state will not be the end. 77% thinks that there will be various applications to make sure more purchases will be made via smartphones. Another 10.7% responded that they reckon smartphones will be substituted by another technology, like Nano-chips. Just 11.2% thinks that the current state of mobile shopping will stay the same.

4.8. Extended results questionnaire

For the extended results of the questionnaire, one can inspect Appendix C or for even more insight through: (Google Forms, 2017).

Table 4. Results survey

Facilitating Factors	Factor	Amount
	Speed	238 (78.3%)
	Always near	235 (77.3%)
	Ease of use	214 (70.4%)
	Clarity	52 (17.1%)
	Paying without scanner	133 (43.8%)
	Other	8 (2.6%)
Impeding factors for not buying	Factor	Amount
	Security issues	39 (23.6%)
	Small screen	90 (54.5%)
	Do not know how	10 (6.1%)
	Never done it	17 (10.3%)
	Physical stores	47 (28.5%)
	Other	29 (17.6%)
Impeding factors when buying	Factor	Amount
	Sites' compatibility	211 (71.5%)
	Small screen	188 (63.7%)
	Clarity	122 (41.4%)
	More prone to errors	62 (21%)
	Need to get used to it	12 (4.1%)
	Other	7 (2.4%)

5. DISCUSSION

The goal of this research was to identify the facilitating- and impeding factors for purchasing via smartphones. In addition, the goal was to find possible ways of reducing the impeding factors to a minimum.

5.1. General results

Facilitating factors of mobile purchasing are that consumers experience faster transactions. Smartphones are with them almost all the time, and therefore people can purchase what they want whenever they want. In addition, people do not always need online banking-scanners which they do need when purchasing via PC's/laptops.

However, the problem is that most of the facilitating factors for some, are impeding factors for others. 'Ease of use' is a facilitating factor for more than 200 respondents, but for around 100 respondents it is an impeding factor for not buying and over 200 respondents find it an impeding factor they experience while buying via smartphones.

Literature stated that 'perceived ease of use' is not that important in m-commerce in Macau (Lai et al, 2013). However, with nearly all the respondents giving this as either a facilitating- or impeding factor, one can state this is still an important factor to keep in mind for the Netherlands.

Literature stated that 'perceived ease of use' is more critical in eastern cultures than in western cultures, while 'perceived usefulness' is more vital for western countries (Zhang et al, 2012). However, the results of the questionnaire show that 'perceived ease of use' is still very important in the respondents' eyes. Also, if ease of use is more critical in eastern cultures than in western cultures, then it should be less important for the Netherlands, since the Netherlands has a western culture. However, while purchases via smartphones represent 70 percent in China, in the Netherlands this number is less than 10 percent (Ecommerce News Europe, 2017). Hence, it can be concluded that 'ease of use' is a critical factor in the Netherlands

The main takeaways when it comes to facilitating factors for purchasing via smartphones are that smartphones are fast, always near users and the ease of use is perceived as high. While speed and smartphones always being near users seem obvious, ease of use is criticized by previous studies as 'not being that important'. However, in this study it has become clear that 'perceived ease of use' is both a facilitating and impeding factor for the respondents. This states that 'perceived ease of use' is, in contrast to what researches in Macau (Lai et al, 2013) found, important after all. When applying this in the TAM model, 'perceived ease of use' is weighing the heaviest in the attitude of people towards making purchases via smartphones. In addition, the diffusion of innovation model states that 5 factors are important for the adoption of an innovation. Of these 5 factors, complexity is perceived high with the people that are reluctant towards buying and relative advantage is perceived high with the majority of the respondents as well. With 81.1% of the respondents being open to purchasing via smartphone from the start, one can say 'perceived usefulness' is high among the respondents.

Although 'compatibility' seems low with most respondents this does not have a major effect on the attitude towards purchasing via smartphones of the respondents. It is a major impeding factor the respondents experience while buying, but not so much an impeding factor for not buying via smartphones.

The main takeaway when it comes to impeding factors is, as well as being a takeaway for the facilitating factors, 'perceived ease

of use' being important for the adoption of m-commerce. The majority of the respondents answered that the small screen and websites' compatibility had a big influence in this.

At last, it is interesting to see that the age group 18-24 is the only age group that prefers buying via PC/laptop over buying via smartphone. This is a result that I did not expect since the category are the generation that grows up with smartphones.

5.2. Strengths and limitations

5.2.1. Strengths

As discussed before, literature seems limited as for why the Netherlands are behind when it comes to purchasing via smartphones. Chapter 2 gave an overview of other studies regarding this matter. Results of this research are mainly for exploratory reasons, as well as reviewing if the results of earlier research applies for the Netherlands as well.

This study has shown both facilitating and impeding factors for people in their attitude towards mobile shopping. In addition, this research can help companies to develop a mobile strategy when keeping in mind those facilitating and impeding factors.

Lastly, the questionnaire had a good spreading between male/female and the different age categories, and is therefore more representative for the whole population. When asking people to fill in a survey about smartphone usage it is expected to get mostly young respondents. However, when looking at the results it can be seen that the majority of respondents are older than 35.

5.2.2. Limitations

Like every study, this study does have its limitations. The biggest limitation will be that of self-reported data. Self-reported data is limited by the fact that it cannot be independently verified most of the time. Another limitation is that with conducting qualitative research, there is always going to be bias to some extent, since there is always a form of subjectivity to the answers being made by the researchers. Another problem can be that the sample group is biased, this is because the questionnaire is sent to people that are close contacts and therefore it could be that the numbers are not a true representation of the whole population. However, by trying to get over 200 respondents it is tried to make this bias as small as possible. Also because my questionnaire focused mainly on a small region of the Netherlands due to the respondents, it could be that the results are not representing the whole of the Netherlands.

Regardless of the effort made to search comprehensive studies to include in this literature review, some may not be included.

Another limitation is the fact that the answers given in the survey are sometimes double. The answer: 'want to buy as much as possible in physical stores, for whatever reason' is sometimes specifically answered in the 'other' category with answers like: 'wanting to try on clothes' or 'seeing the product in real'.

At last, more studies about attitude towards mobile shopping should be conducted in order to get a better understanding of this topic.

5.3. Future research

Since this research focused mainly on the behavior of the respondents, future research is needed to investigate what technical improvements could be made for mobile shopping to become widely accepted and adopted. Further role of demographic factors, experience with technology, perceived risk and risk taking behavior should also be investigated. Next to this, the role of culture should be investigated more, since the facilitating- and/or impeding factors could vary across different cultures. At last, more research should be conducted as to why the age group 18-24 does not prefer buying via smartphones, while the other age groups do prefer this. Future studies could use this research to further explore mobile commerce and its facilitating and impeding factors in the Netherlands.

6. CONCLUSION

The goal of this research was to identify the facilitating- and impeding factors in their attitude towards purchasing via smartphones instead of PC's/laptops. In addition, the goal was to find ways to reduce the impeding factors and therefore improve the attitude towards purchasing via smartphones. Facilitating factors for the respondents' attitude towards mobile shopping were mainly the speed of the transaction and the fact that it is possible at any given time and at any given place.

Impeding factors for the respondents' attitude towards mobile shopping were mainly ease of use, this is in contrast to what literature states, namely that ease of use is not that important in m-commerce (Lai et al, 2013). Another impeding factor is security issues. Although there is no clear reason why people have higher security concerns with smartphones than with PC's/laptops, this is an important factor to keep in mind.

Possible ways of improving mobile shopping in response to these factors could be: making the screens of smartphones even bigger than it is at this moment, however, new problems may arise when doing so. The smartphones would become more expensive and less portable. Since being 'always near' or 'portable' is an important factor as well, maybe a way to reduce this factor is to improve the clarity of the websites without making the screens larger. This would be a technical improvement and, like mentioned before, is not elaborated on in this study. Another factor that is prone to improve mobile shopping is the fact that people perceive smartphones to be less safe than PC's/laptops. Since smartphones are neither more secure or insecure than PC's/laptops, changing the way the websites are shown can make a real difference here. Making mobile websites more compatible so all the images will be shown can also be a real improvement for the attitude of the people. Hence, after analyzing the data it can be concluded that (Nilashi et al, 2015) were right with their study when stating that security, design, and content are the factors which influence customer's trust.

Statistics have shown that less than 10% of the people in the Netherlands make purchases on their smartphone[11], but the questionnaire showed us a way higher percentage. Hence, it can be concluded that the sample of respondents are not reluctant towards mobile shopping after all. Although the majority still purchases more on PC's/Laptops than via smartphones, almost 90% of the respondents believe that various applications and/or new technologies will arise to make sure more purchases will be made via smartphones.

The biggest recommendation this study gives is when developing a mobile strategy one must keep in mind that 'perceived ease of use' is, in contradiction with earlier research, a very important factor when it comes to attitude towards mobile shopping. Therefore companies must have a clear, error free website that is compatible with every device. Layout should be good, i.e. no image display faults or other problems. This is in line with the strategy (Ram et al, 1989) created for breaking the usage barrier. Thus, the biggest improvement will be the reduction of this major-impeding factor.

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8. APPENDICES:

8.1. Appendix A: Questionnaire

1.Welk geslacht heeft u?

- ○ Man
- ○ Vrouw

2.Wat is uw leeftijdscategorie?

- ○ 18-24
- ○ 25-35
- ○ 36-50
- ○ 50+

3.Heeft u een smartphone?

- ○ Ja
- ○ Nee

4.Gebruikt u de smartphone wel eens voor een aankoop van een product/service? (van informatie zoeken tot het echt aankopen)

- ◯ Ja
- ◯ Nee

5.Indien ja, waarvoor gebruikt u de smartphone? (meerdere antwoorden mogelijk)

- ☐ Het kopen van een product/service (dus ook betalen via de smartphone)
- ☐ Informatie zoeken over een product/service
- ☐ Recensies lezen over het product/service
- ☐ Winkel zoeken waar het product/service te verkrijgen is
- ☐ Overige...

6.Indien u niet koopt via de smartphone, wat is de reden hiervan? (meerdere antwoorden mogelijk)

- ☐ Ik ben bang voor de veiligheid van de transactie
- ☐ Ik vind het lastig om alles in te vullen op zo'n klein scherm
- ☐ Ik weet niet goed hoe het werkt
- ☐ Ik heb nog nooit via de smartphone een aankoop gedaan en weet dus niet wat mij te wachten staat
- ☐ Ik probeer zoveel mogelijk om in de winkel te kopen (om wat voor reden dan ook)
- ☐ Overige...

7.Indien u wel aankopen doet via de smartphone, wat zijn voor u voordelen hiervan? (meerdere antwoorden mogelijk)

- [ ] Snel
- [ ] Altijd bij de hand
- [ ] Makkelijk
- [ ] Overzichtelijk
- [ ] Je kan betalen zonder internetbankier-scanner
- [ ] Overige...

8.Indien u wel aankopen doet via de smartphone, wat zijn voor u nadelen/problemen hiervan? (meerdere antwoorden mogelijk)

- [ ] Klein scherm
- [ ] Minder overzichtelijk
- [ ] Ik heb het idee dat het eerder verkeerd gaat dan op de PC/laptop
- [ ] Het is nog heel erg wennen
- [ ] De sites zijn niet altijd goed gemaakt voor smartphones
- [ ] Overige...

9.Stond u altijd al open voor het gebruik van een smartphone voor aankopen online? (indien u niet koopt via de smartphone, dan is deze vraag niet van toepassing voor u)

- ( ) Ja
- ( ) Nee

10.Indien nee, waardoor is dit veranderd?

Korte antwoordtekst

11.Wat vind u van het koopproces via de smartphone? (meerdere antwoorden mogelijk)

- [ ] Handig
- [ ] Onhandig
- [ ] Gemakkelijk
- [ ] Moeilijk
- [ ] Snel
- [ ] Langzaam
- [ ] Overige...

12.Kunt u uitleggen waarom?

Tekst lang antwoord

13.Wat vind u het grootste verschil tussen kopen via de smartphone en via PC/laptop?

- ( ) PC/laptop heeft een groter scherm
- ( ) Smartphone is altijd bij de hand
- ( ) Snelheid
- ( ) Veiligheid van de PC/laptop als het om aankopen gaat
- ( ) Overige...

14.Koopt u meer via de smartphone of via de PC/laptop?

- ( ) Smartphone
- ( ) PC/laptop

15.Hoe ziet volgens u de toekomst eruit wat betreft aankopen via de smartphone?

- Ik denk dat hoe we het nu hebben, blijft
- Ik denk dat de smartphones plaats zullen maken voor iets anders (denk aan nano-chips of een heel nieuw prc
- Ik denk dat er diverse toepassingen komen die ervoor zorgen dat er steeds meer online aankopen worden ge
- Overige...

8.2. Appendix B: Ethical Approval

Universiteit Twente - Be 5 mei (7 dagen geleden)

aan mij, e.constantinid., l.j.m.blikman, a.j.kragt, j.n.verenjans

Geachte onderzoeker,

Dit is een bericht vanuit de webapplicatie voor de aanvraag v
boordeling van een voorgenomen onderzoek door de Commi
Ethiek.

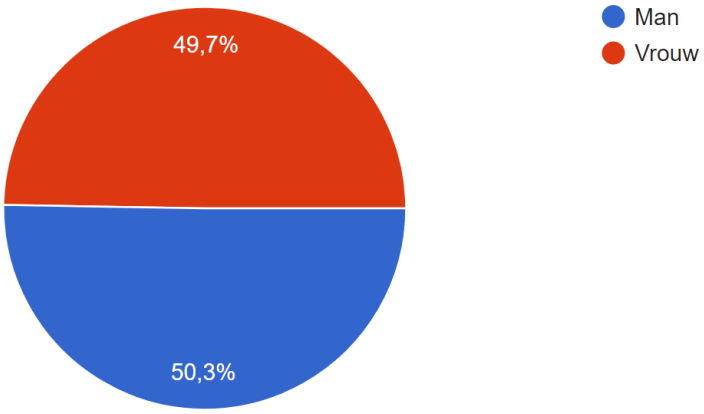
Aanvraagnr.	: 17370
Titel van het onderzoek	: improvement of mobile E-shopping
Datum aanvraag	: 25-04-2017
Onderzoeker	: K.P. Siers
Onderzoeksbegeleider	: E. Constantinides
Lid Commissie Ethiek	: A.M. von Raesfeld Meijer
Gebruik SONA	: Nee

Uw onderzoek is goedgekeurd door de commissie.

8.3. Appendix C: Data set questionnaire

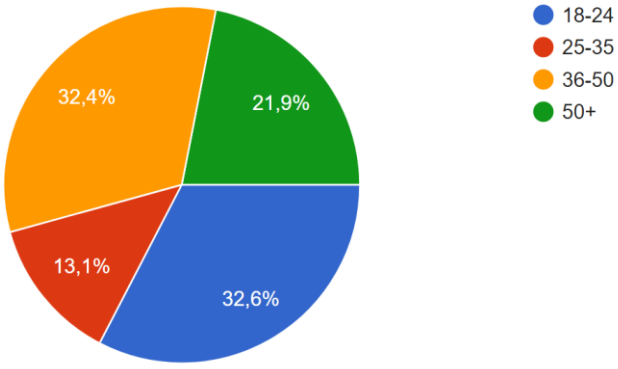
1.Welk geslacht heeft u?

374 reacties



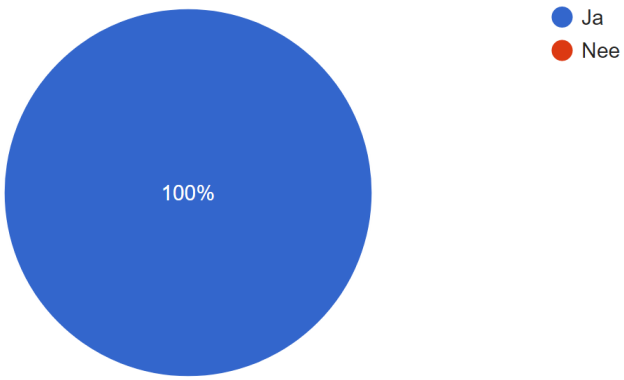
2.Wat is uw leeftijdscategorie?

374 reacties



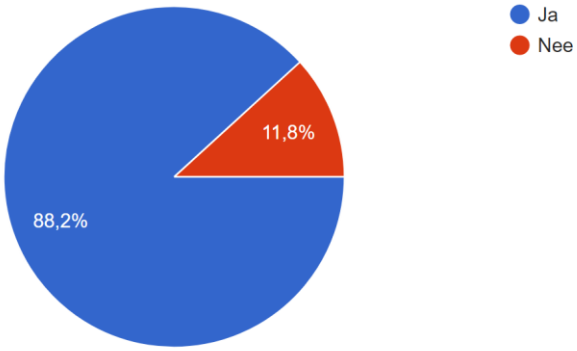
3.Heeft u een smartphone?

369 reacties



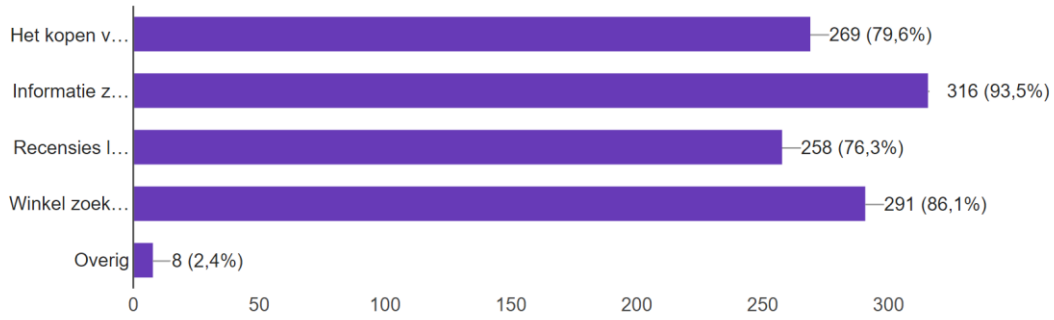
4.Gebruikt u de smartphone wel eens voor een aankoop van een product/service? (van informatie zoeken tot het echt aankopen)

374 reacties



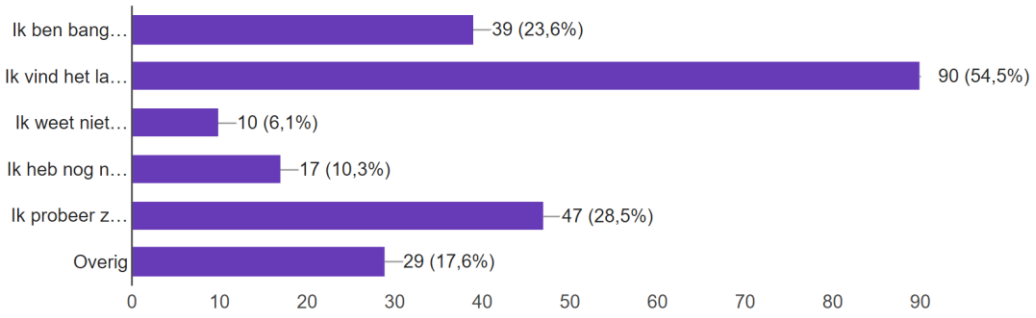
5.Indien ja, waarvoor gebruikt u de smartphone? (meerdere antwoorden mogelijk)

338 reacties



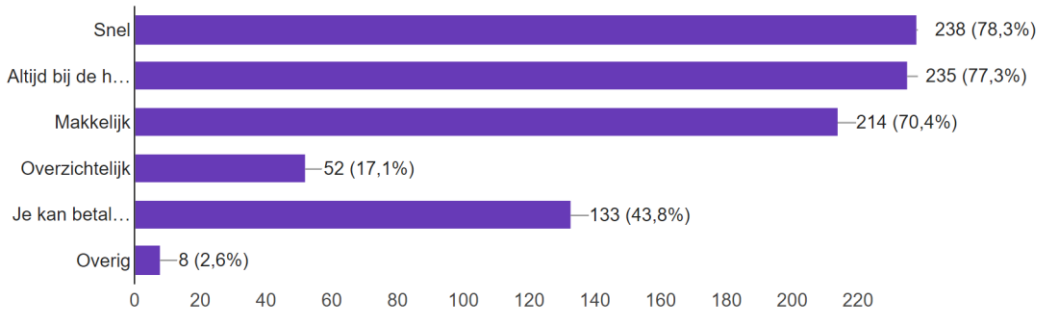
6.Indien u niet koopt via de smartphone, wat is de reden hiervan? (meerdere antwoorden mogelijk)

165 reacties



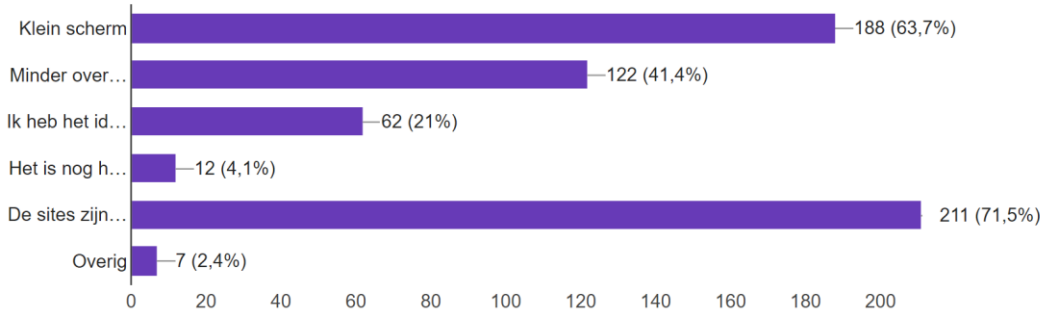
7.Indien u wel aankopen doet via de smartphone, wat zijn voor u voordelen hiervan? (meerdere antwoorden mogelijk)

304 reacties



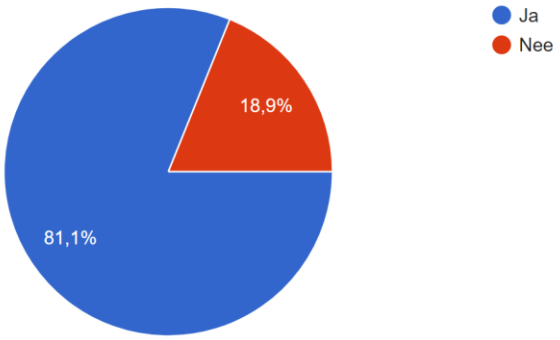
8.Indien u wel aankopen doet via de smartphone, wat zijn voor u nadelen/problemen hiervan? (meerdere antwoorden mogelijk)

295 reacties



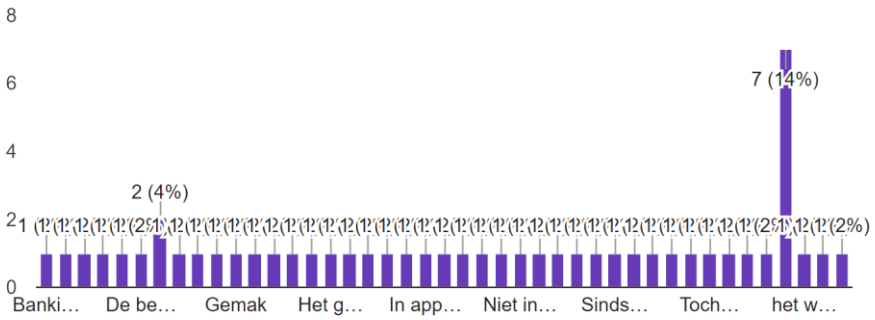
9.Stond u altijd al open voor het gebruik van een smartphone voor aankopen online? (indien u niet koopt via de smartphone, dan is deze vraag niet van toepassing voor u)

307 reacties



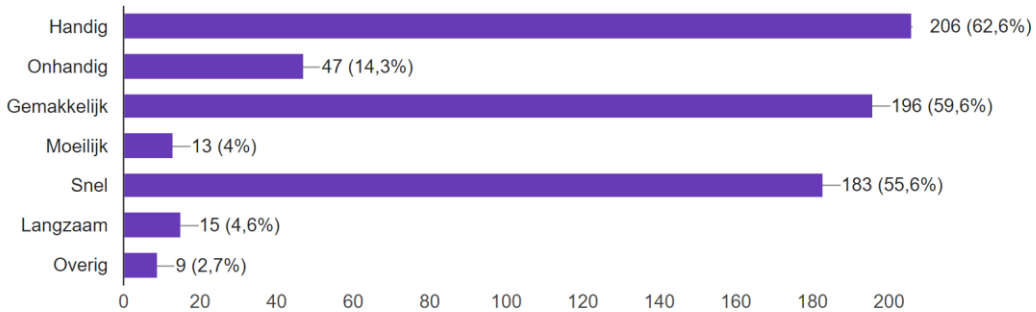
10.Indien nee, waardoor is dit veranderd?

50 reacties



11.Wat vind u van het koopproces via de smartphone? (meerdere antwoorden mogelijk)

329 reacties



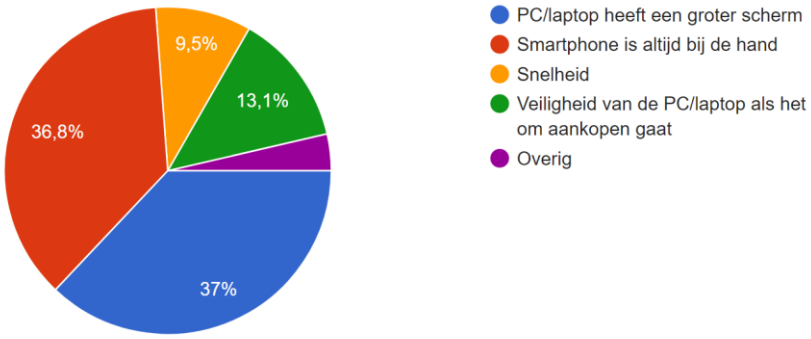
12.Kunt u uitleggen waarom?

186 reacties

Nee
Nee
Nee
Nee
Altijd bij de hand
Altijd bij de hand
Altijd bij de hand
Typt langzamer
Typt langzamer
Typt langzamer
Te klein scherm
Te klein scherm

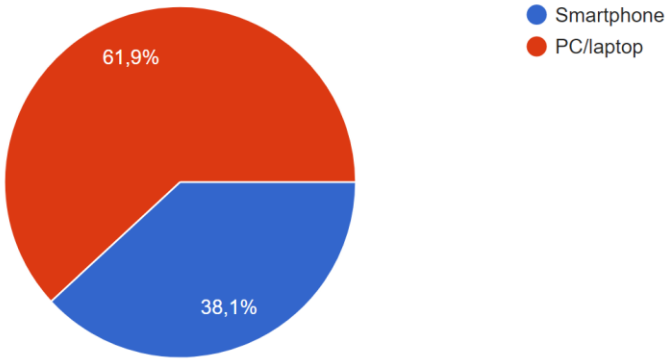
13.Wat vind u het grootste verschil tussen kopen via de smartphone en via PC/laptop?

359 reacties



14.Koopt u meer via de smartphone of via de PC/laptop?

362 reacties



15.Hoe ziet volgens u de toekomst eruit wat betreft aankopen via de smartphone?

365 reacties