

# The influence of privacy concerns on m-commerce engagement



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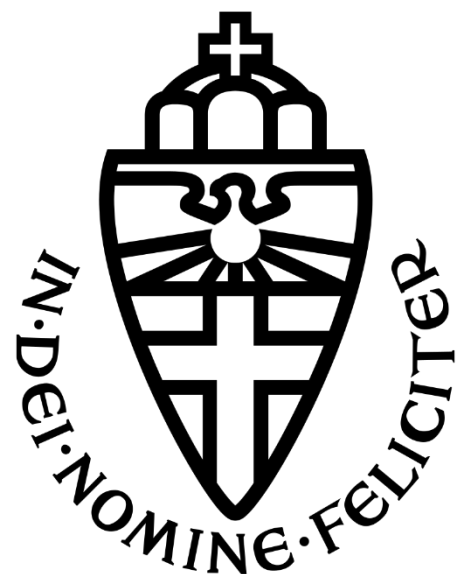
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Radboud University Nijmegen

Marketing

Anouk de Bert (s4041410)

Thesis coach: Dr. H.W.M. Joosten



## Preface

In front of you lies my thesis about the influence of privacy concerns on m-commerce engagement. Finishing my thesis was not possible without all the help I got. I would like to thank my thesis coach Herm Joosten for his feedback and tips that helped me finish my thesis. Furthermore, I would like to thank all the respondents who took the time to fill in the survey and helped me to get the data I needed. Last but not least, I will thank my family and friends for their support and motivation to work hard.

## Abstract

Privacy concerns can influence mobile-commerce engagement. Privacy concerns about location tracking has been found to negatively influence m-commerce engagement. In other research, there was no relationship found between privacy concerns about location tracking and m-commerce engagement. We studied the relationship between six privacy concerns, including location tracking, and m-commerce engagement. Furthermore, the effect of the moderator of perceived control on the relationships was investigated. A study with six privacy concerns on the three dimensions of m-commerce engagement (conative, affective and cognitive) did not confirm our expectations. Only the privacy concerns about unauthorized secondary use had a negative influence on m-commerce engagement. We found no relationship between the other five privacy concerns and m-commerce engagement. The moderator of perceived control did not influence the relationship between unauthorized secondary use and m-commerce engagement.

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# 1. Introduction

## 1.1 Background

A whole new way of trafficking of the last years is evolving. The marketplace emerged from a physical marketplace to a broader marketplace which includes both a physical and an electronic marketplace. This electronic marketplace is defined in business literature as e-commerce. E-commerce is *a networked information system that serves as an enabling infrastructure for buyers and sellers to exchange information, transact, and perform other activities related to the transaction before, during, and after the transaction* (Varadarajan and Yadav, 2002). According to Laudon and Traver, e-commerce is about the digitally enabled commercial transaction between and among organizations and individuals (2003). From these definitions, we can conclude that e-commerce includes a transaction at which the interaction between the parties is electronic. Mostly, e-commerce refers to trading via the Internet, which provides websites for selling products or services online.

Over the last year (2015), the worldwide added mobile devices increased by more than half a billion, namely 563 million. In 2015, global mobile data traffic grew 74 percent (Cisco Visual Networking Index Global Mobile Data Traffic Forecast, 2016). The result is an increase in commerce through these mobile devices and the origin of the term mobile-commerce. According to market research done by Paypal, a growth rate of mobile commerce in the Netherlands of 46% is expected in the next few years (Ecommerce News, 2015). Conducting electronic commerce via mobile devices is called mobile-commerce or m-commerce (Chen, Zhang, Lee, 2013). M-commerce is an extension of e-commerce and consists of mobile electronic business transactions supported by the wireless environment (Coursaris, Hassanein & Head, 2002).

Mobile devices possess unique characteristics. Five characteristics are defined in the study by Larivière et al. (2013). The authors found portable, personal, networked, textual/visual and converged as relevant characteristics of mobile devices. Portable refers to the possibility to use it all the time and to carry the device with you wherever you want. Personal means that you can store personal information on your device. The owner of the mobile device tends to use them constantly for their own purpose. The networked characteristic contains a wireless connection that creates a fast connectivity with the Internet. Mobile devices permit textual or visual communication, as opposed to traditional audio exchange. The last characteristics refers to the combination of purposes that mobile devices include, like making phone calls, online shopping and watching videos. Research provided by Coursaris and Hassanein (2002) show

differences in the communication mode, Internet access devices, development languages & communication protocols and enabling technologies. Communication mode corresponds with the networked characteristic. M-commerce is conducted through a variety of different devices, whilst e-commerce is conducted mostly through computers. New protocols are introduced regarding HTML, such as WAP. Technology needs to fit with WAP. The same characteristics of m-commerce, like on the move, presentation, processing and interaction modalities were found by Kourouthanassis et al (2012).

Some of the characteristics of m-commerce contain advantages for marketers. For example, personal advertising possibilities increase because the mobile device is personal. Due to the wireless connection customers could receive those offers everywhere. Besides that, customers are able to obtain the offer by purchasing whenever they want and wherever they are at the moment. On the other hand, m-commerce has some disadvantages. Marketers want to gain personal information of the customers to identify their wants and needs. The result is the increase of privacy concerns. There exists a conflict between one-to-one marketing and the customers' privacy rights (Pitta et al., 2003). We have to pay a price for the connectivity. Like Gary Kovacs spoke with the words: *'just as the Internet has open up the world for each and every one of us, it is also open up each and every one of us to the world'* (TED, 2012). When browsing on the Internet, we leave our personal information, interests and preferences in the digital network of the mobile devices. As a result, we need to give up some of our privacy and privacy concerns will increase.

Research done in three different countries of the European Union shows a high perceived privacy threat rate of at least 25% in the categories of unsolicited mobile advertising, collecting unapproved personal information, including personal data into mobile marketing databases and making an unapproved use of personal information in the mobile commerce environment (Gurău and Ranchhod, 2009). Collected personal information in the mobile context, included mostly location data. Location tracking is a specific privacy concern that exist in m-commerce, because the mobile device is contrary to the personal computer. People can take their mobile device with them wherever they go.

In some cases, customers can decide beforehand if they want to share personal information, like location data with commercial organizations. For example, when downloading an application of a commercial store, your permission is asked to give insight into your location. Customers may then perceive control about the information they share with commercial organizations.

## 1.2 Research problem

A few researchers have investigated the effect of location tracking on m-commerce engagement, but these have shown contradictory results. In short, m-commerce engagement refers to customers' behavioral manifestation toward a firm or brand (Van Doorn, 2010). Those studies showed different results about the effect of location tracking on m-commerce engagement. Eastin et al. (2016) investigated among others the privacy concern of location tracking to predict mobile commerce engagement. Location tracking was not a significant predictor of mobile commerce activity. Another way of mobile commerce engagement is location based services adoption. Location based services offers a customer, via a mobile device, information based on their current location. A negative significant effect of privacy concerns to influence user adoption of location based services was found by the study of Fodor and Brem (2015). Both studies show contradictory results about the effect of privacy concerns of location tracking on mobile commerce engagement. According to Barkuus and Dey (2003), customers are less concerned about location tracking when they consider the service as useful. Eastin et al. (2015) indicate that awareness could have a moderating role on the relationship. Fodor and Brem (2015) said that giving the users control can change their behaviour. However, we expect a moderating role of perceived control. Just the awareness of collecting data is not enough to influence the relationship. Awareness includes knowledge, but control also includes actual behaviour. When customers perceive control, they think they can influence the process by their actions.

This research will investigate the relationship between privacy concerns, in particular location tracking, and mobile commerce engagement. Furthermore, the effect of perceived control on this relationship will be investigated.

## 1.3 Purpose of the research

Eastin et al. (2016), Fodor and Brem (2015) and Barkuus and Dey (2003) have already researched the effect of privacy concerns of location tracking. As mentioned before, those studies show contradictory results. It is not clear if there is an effect of privacy concerns of location tracking on m-commerce engagement. No further research has been done to find out if there is an effect or not. Literature suggests that the effect of privacy concerns of location tracking on m-commerce engagement differs depending on the effect of perceived control of tracking those location data. The purpose of this research is to investigate if there is an effect of privacy concerns of location tracking on m-commerce engagement and if so, whether there is a moderating effect of perceived control on this relationship.



#### 1.4 Research question

The conflict in research results in the following research question:

*How do privacy concerns of location tracking in m-commerce affect m-commerce engagement, and what is the effect of perceived control on this relationship?*

To answer this question, we need to define the concepts of privacy concerns, m-commerce engagement and perceived control. Furthermore, the relationship between privacy concerns and m-commerce engagement and the effect of the moderator on this relationship will be discussed.

#### 1.5 Preliminary model

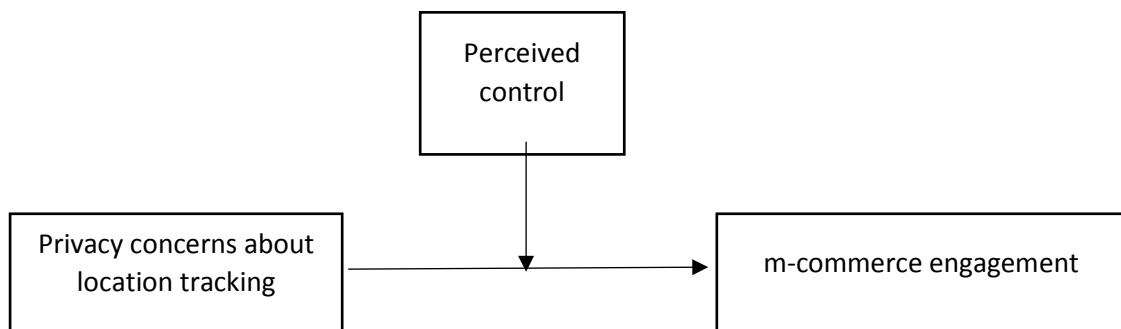


Figure 1. Preliminary model

We will elaborate on this preliminary model in this research.

#### 1.6 Research relevance

This research is relevant due to two perspectives. At first, there is a conflict in marketing literature. Contradictory research results were found about the effect of privacy concerns of location tracking on m-commerce engagement. By conducting this research, we will investigate what the effect of privacy concerns of location tracking on m-commerce engagement is in the Netherlands.

Secondly, this research contains a practical relevance. Marketers could use the results of the research to develop their marketing strategies. If there is a moderating effect of perceived control on the relationship between privacy concerns and m-commerce adoption, they could provide some information about tracking data to their customers and offer them the possibility to give permission to track those data. Improving their marketing strategy could lead to increasing profits of the company.

## 1.7 Research model

This thesis is divided into five chapters. Chapter 1 introduces the current research problem by explaining the conflict in marketing literature and formulating the research question. The second chapter provides a literature review of the existing theory about the concepts of privacy concerns and m-commerce engagement. We will also discuss the moderator of perceived control. Chapter 3 consist of the methodology for the research, followed by chapter 4 which presents the analysis and the results of the research. The 5<sup>th</sup> and last chapter includes the conclusion and implications for further research.

## 2. Literature review

### 2.1 Introduction

In this literature review, we will elaborate on the concepts of the research question. First, we will define the dependent variable of this research: m-commerce engagement. Then, the concept of the independent variable of privacy concerns will be explained. Followed by the explanation of the effect of privacy concerns on m-commerce engagement. We will formulate hypotheses on the effects. To conclude, the moderator of control and the effect of this moderator on the relationship between privacy concerns and m-commerce engagement will be discussed. Again, hypotheses on the effect will be formulated.

### 2.2 Mobile commerce engagement

To define the term ‘engagement’ in m-commerce, we could approach engagement with different perspectives. Mostly, in marketing literature engagement is defined from a cognitive, emotional or behavioral perspective (May et al., 2004; Hollebeek, 2012; Cheung, 2015). The engagement dimensionality could be unidimensional, one perspective has been used, or multidimensional, which includes at least two perspectives to define engagement (Brodie et al., 2011). Within the marketing literature, authors use the term ‘customer engagement’ or ‘consumer engagement’. Some studies focus on the cognitive and/or affective dimension, whereas others target the behavior of customers (conative). Van Doorn (2011) investigated customer engagement behaviors and sees the concept as customers behavioral manifestation toward a brand or firm (Hollebeek, 2013). According to Verhagen (2015), customer engagement is more than purchasing, it also includes other behavioral actions like word-of-mouth, collaboration of customers, after-sales service and co-creation (Brodie et al., 2011; Hollebeek, 2013). Contrary, Brodie et al. (2011) describe engagement as *‘a psychological state which occurs by virtue of interactive customer experiences with a focal agent/object within specific relationships’*. The emphasis is more on the cognitive aspect instead of on behaviour of customers. On the other hand, many authors combine the different perspectives when defining the term engagement, using the multidimensional perspective. For example, engagement is described as *‘a psychological process that models the underlying mechanisms by which customer loyalty forms for new customers of a service brand as well as the mechanisms by which loyalty may be maintained for repeated purchase customers of a service brand’* (Bowden, 2009). The mentioned process includes the conative perspective, as well as the cognitive- and affective perspective. The formation of commitment for new customers could

be considered as a cognitive aspect and the development of affective commitment toward the service brand could be seen as an affective aspect for purchase, resulting in brand loyalty (Bowden, 2009). Furthermore, customer engagement is determined as *the level of a person's cognitive, emotional, and behavioral presence in brand interactions with an online community* (Patterson et al., 2006; Chan et al., 2014). This definition also reflects the three different perspectives; conative, affective and cognitive. In marketing literature, authors emphasize different aspects of engagement depending on the industry of their market research.

In the electronic commerce sector, the acceptance of electronic commerce can be measured by the intention to transact and online-transaction behavior (Pavlou, 2003). The intention to transact refers to the conative aspect, but also includes the underlying cognitive and affective perspectives. Both last mentioned perspectives include the knowledge and feelings that lead to acting (behavior). With the increase of the use of social media, social commerce comes up. Social commerce is seen as a social form of electronic commerce, because there is a large role for customers in it (Liang and Turban, 2011). The context of social commerce includes four stimuli, namely sales campaigns, personalization, interactivity and consumer generated content (Erdoğan and Tatar, 2015). M-commerce can be compared in a way with social commerce, because mobile has some overlapping aspects with social commerce due to the characteristic of personality. Eastin et al. (2015) measure m-commerce engagement through m-commerce activity. Activity included downloading music and mobile applications, text or call friends or family about products or services, take a picture of a product and send it to others, compare product prices, find store locations, find coupons, research product features, check product availability, purchase products or services online (Eastin et al., 2015). Those items refer to the three perspectives of m-commerce engagement; conative, affective and cognitive. For example, talking with friends contains emotions, doing product research includes generating new knowledge and purchasing products refers to behaviour. So engagement is not just about behavior, also emotion and thinking play a role. In this research in the m-commerce sector we use the definition of Chan et al. which includes the three perspectives; conative, affective and cognitive. The used definition reads: *'the level of a person's cognitive, emotional, and behavioral presence in brand interactions with an online community'*.

## 2.2 Privacy concerns

There are a lot of divergent definitions of information privacy in literature. Information privacy is defined as *'the claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others'*

(Westin, 1967) or *'the ability (i.e., capacity) of the individual to control personally (vis-a-vis other individuals, groups, organizations, etc.) information about one's self'* (Stone et al., 1983). Another typification is *'the desire of individuals to control or have some influence over data about themselves'* (Bélanger and Crossler, 2011).

A recurring aspect in the definitions above is the control of unauthorized secondary use of information. Information privacy concerns exist of multiple dimensions, of which the control aspect often recurs in the different definitions. Stone et al. distinguishes four dimensions of privacy concerns, namely: information collection, storage, usage and release (Stone et al, 1983). The consumer cannot influence or control the elaboration of those dimensions. Research in 1996 resulted also in four dimensions, which are: collection, errors, unauthorized secondary use and improper access (Smith, Milberg and Burke, 1996). These authors again refer to privacy concerns of, for example, collection and usage of data. The four dimensions of Smith, Milberg and Burke could be better described as: data collection, unauthorized access, unauthorized secondary use and data accuracy (Chen, Zang, Lee, 2013). The dimensions are being defined as follow. Data collection is about concerns of excessive collecting of personal data and the way in which these information is stored. Unauthorized access contains concerns over access to personal data by unauthorized persons. Unauthorized secondary use refers to the use of collected data for other purposes than was intended beforehand. Data accuracy concerns exist when consumers are concerned about the protection of personal data against accidental or intentional errors (Chen, Zang, Lee, 2013).

The specific Internet dimensions of privacy, instead of the dimensions of traditional marketing, were identified by research of Malhotra et al. and are collection, control and awareness (Malhotra et al., 2004). Collection refers to the permitted data exchange consistent with the agreement. Control captures the opportunity to decide to exit the Internet or not and awareness represents understanding of the practices. Whilst Eastin argued that privacy concerns have six dimensions, like data collection, data control, unauthorized secondary use, improper access, location tracking and awareness, related to online settings (Eastin et al., 2015). Three out of the six dimensions are similar to the dimensions formulated by Malhotra et al. (2004). Collection captured the degree a customer worries about the data being collected in relation to the value of received benefits. Control refers to the degree that consumers are concerned about their ability to have ownership of their personal data and control access to it. Awareness reflects a privacy concern about gathering data by mobile advertisers and the way of processing and using those collected data (Eastin et al., 2015). The factors unauthorized secondary use and improper access were already mentioned by Smith, Milberg and Burke in 1996. Unauthorized

secondary use includes concerns about possible distribution of personal data to third parties without their permission (Eastin et al., 2015). Improper access is not defined by Eastin et al. (2015), so therefore we use the definition of improper access formulated by Smith, Milberg and Burke (1996): '*concerns over access to personal data by unauthorized persons*'. The dimension of location tracking is a relatively new dimension, arisen due to the wireless network. It includes the degree of concerns about collecting and using user location data (Eastin et al., 2015). Especially in the m-commerce sector, location tracking will be an important factor. M-commerce operates on the wireless network and location data is being tracked to adjust the best offer based on the personal situation of the customer.

In this research we will use the six dimensions of Eastin et al. (2015). These dimensions best represent the important elements of privacy concerns in the m-commerce sector. The authors included the mostly used dimensions in marketing literature, like collection, control and awareness, but also a relatively new privacy concern as location tracking. For the m-commerce sector, this dimension is important and interesting to investigate. Furthermore, the dimensions of unauthorized secondary use and improper access will be included in the research.

### 2.3 Relationship of privacy concerns and m-commerce engagement

An expected influence of privacy concerns on commerce engagement is not a new phenomenon. According to Pavlou (2003) trust and perceived risk are important variables that will have an influence on the acceptance of electronic commerce. Customers experience a risk of loss of privacy when providing personal information (Pavlou, 2003). Besides that, they worry about the technological infrastructure and identity uncertainty. Furthermore, some authors already investigated the effect on m-commerce engagement. Eastin et al. (2015) researched the effect of their formulated six privacy concern dimensions on m-commerce engagement. Four out of six dimensions show a significant result, namely control, unauthorized access, trust in mobile advertisers and attitude toward m-commerce. The dimensions control and unauthorized access have a negative influence on m-commerce engagement, but the dimensions of trust in mobile advertisers and attitude toward m-commerce showed a positive influence. The dimensions predicted 43% of the variance in m-commerce engagement (Eastin et al., 2015). The dimension of collection did not result in a significant effect, whilst other researchers show an association between collecting data and smartphone use (Sipior et al., 2014). Possibly, collection does have an influence on m-commerce engagement, because it has on smartphone use in general. Another dimension of which the effect on m-commerce engagement is not clear yet is location tracking.

The possibility of a relationship between privacy concerns of location tracking and m-commerce engagement is investigated by different researchers (Eastin and al., 2015; Fodor and Brem, 2015). The results of the different researchers are contrary and whereas Eastin et al. (2015) sees no significant effect of privacy concerns of location tracking on m-commerce engagement, Fodor and Brem found that there is a negative significant effect of privacy concerns that influence user adoption of location based services.

We expect that five of the six dimensions of privacy concerns will have a negative significant effect on m-commerce engagement. Four dimensions already showed an effect in earlier research (Eastin et al., 2015) and as regards to the other two, there is no consensus about their effect on m-commerce engagement in marketing literature. According to the research of Eastin et al. (2015), collection has no significant effect. We expect a different result of that privacy concern, because the number of customers that install add blockers increases by 41% in the last year (PageFair, 2015). Based on reactions of friends and customers, the expectation is that the dimension of location tracking results in a negative significant effect on m-commerce engagement. Customers are reserved when commercial organizations ask them to share their location with them. Privacy concerns about location tracking will also influence their behavior, cognition and emotions toward m-commerce. When customers are concerned about their privacy, this will have a negative influence on the engagement toward m-commerce. This point of view results in the following hypotheses:

*Hypothesis 1A: The privacy concerns of data collection will negatively influence m-commerce engagement.*

*Hypothesis 1B: The privacy concerns of data control will negatively influence m-commerce engagement.*

*Hypothesis 1C: The privacy concern of unauthorized secondary use will negatively influence m-commerce engagement.*

*Hypothesis 1D: The privacy concern of improper access will negatively influence m-commerce engagement.*

*Hypothesis 1E: The privacy concern of location tracking will negatively influence m-commerce engagement.*

*Hypothesis 1F: The privacy concern of awareness will negatively influence m-commerce engagement.*

Hereby, we can place a comment that moderators could play a role on this relationship. In marketing literature, a possible moderator as awareness is mentioned (Barkuus and Day, 2003; Eastin et al., 2015). As stated before, we think that just awareness is not enough to have an influence on the relationship between privacy concerns and m-commerce engagement and expect that a moderator need to imply customer actions/influences. Awareness is about the present knowledge of customers' privacy concerns, whereas perceived control also contains actual behavior. We think that actions/actual behavior will be necessary to influence the relationship between privacy concerns and m-commerce engagement. Those actions are not present when we study a possible moderator as awareness. Therefore, we investigate the possible moderating effect of perceived control.

#### 2.4 Perceived control

Customers are sometimes able to control the data being collected. In literature, this is captured by the variable of 'perceived control'. Perceived control is defined as *the belief that one can determine one's own internal states and behavior, influence one's environment, and/or bring about desired outcomes* (Wallston et al., 1987). The variable of perceived control can be split into two dimensions.

Control can refer to the available knowledge about the data that is being tracked. Mostly, organizations ask for permission to use cookies on their website based on the obligation they have due to the Cookiewet. Based on experiences of friends, it is not always clear which personal data of website visitors will be collected. In the mobile sector, customers download applications to improve their usability of a service in comparison to the website. When start downloading the application, they ask for permission to share some personal information, like location, with the organization.

Furthermore, the variable control could also address the power that a customer has on deciding which information to share with an organization. The definition of Wallston et al. (1987) expresses that power by the sentences 'influencing the environment' and 'the opportunity to contain desired outcomes'. Customers could decide to accept cookies or not before visiting the website. Similar to websites, customers have the same opportunity when downloading an application. They could give the permission to share data or turn it down and cancel their download.

#### 2.5 Effect of control on relationship

As mentioned before, moderators could possibly play a role on the relationship between privacy concerns and m-commerce engagement. The expectation is that the negative effect of



privacy concerns could be reduced when customers perceive that they have control. Customers would be less concerned when they have the knowledge of data being collected and the reason behind tracking those data. Besides that, when customers could decide if they want to share their personal information or not, this will also reduce their privacy concerns. They have it in their own hands if they would give up some of their privacy to receive a service. This reasoning is captured in the following hypothesis.

*Hypothesis 2: Perceived control of data being tracked will reduce the negative effect of privacy concerns on m-commerce engagement.*

We can examine the moderating role of perceived control for the six different privacy concerns. When customers are concerned about data control and they perceive control, we expect that the moderator will reduce the experienced negative effect on m-commerce engagement. The concern of unauthorized access also will be expected less when customers perceive control in the way that they have the power to give permission. This mainly relates to the second dimension of perceived control. The same applies to the concern of location tracking. When customers could decide it by their own if they want to share the data, it possibly will reduce their concerns and the negative effect on m-commerce engagement will be less. This results in the following hypothesis.

*Hypothesis 2A: Perceived control will reduce the negative effect of the privacy concerns of data control, unauthorized access and location tracking on m-commerce engagement.*

With respect to the privacy concerns of data collection, improper access and awareness, the expectation is that the moderator of perceived control will not significantly affect the relationship between those privacy concerns and m-commerce engagement. The fact that you have knowledge about the data being collected and you have influence on that collection will not automatically imply that this improves the value of received benefits. Mostly, customers have to share personal information to receive benefits. If they do not share this information, they will not receive the benefits. Control with regard to improper access will also not significantly influence the relationship between privacy concerns and m-commerce engagement. Perceived control includes control with regards to knowledge about data being tracked and the power to decide which information to share. Customers could not know for what reason the data is collected and if it will be shared with unauthorized persons. The same applies to awareness. Customers perceive control about sharing data, but cannot influence the

way that personal information is processed and used by marketers. Based on experiences with friends, control does not change the awareness. The following hypothesis could be formulated.

*Hypothesis 2B: Perceived control will not affect the negative effect of the privacy concerns of data collection, improper access and awareness on m-commerce engagement.*

**2.6 Conceptual model**

The concepts of the research model could be translated into a conceptual model. The conceptual model visualized the earlier mentioned hypotheses. It shows the expected negative effect that privacy concerns will have on m-commerce engagement. Furthermore, we expect a moderating role of perceived control on this relationship. This moderator will possibly decrease the negative influence of the privacy concerns that have a significant effect on m-commerce engagement.

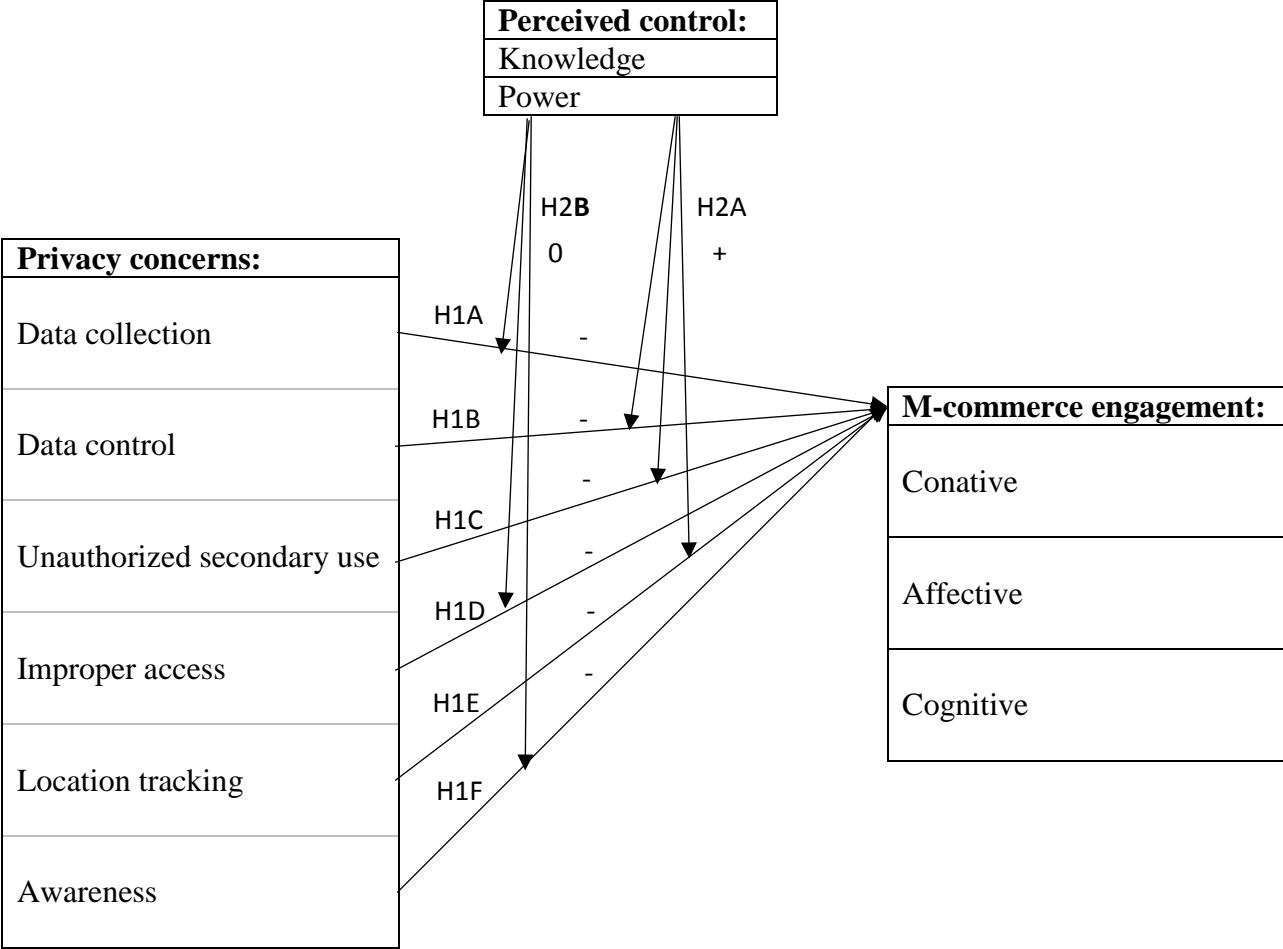


Figure 2. Conceptual model

## 3. Methodology

### 3.1 Introduction

The objective of this research is to determine the influence of privacy concerns, in particular location tracking, on m-commerce engagement. Furthermore, the effect of a moderator of perceived control on this relationship will be investigated. In chapter 2, we formulated hypotheses that will be tested by this research to find an answer on the research question. To test these hypotheses, we set up a methodology. The next paragraph will describe the chosen research design for this research. Subsequently, the method of data collection will be discussed. Furthermore, the research sample will be described. Followed by an operationalization of the dimensions and a description of the method of analysis that will be used for the data. To conclude, we discuss the research quality.

### 3.2 Design

The research will have a quantitative design. The most commonly used data collection method to measure consumer engagement in the last years has been self-report measures (O'Brien, 2010). A self-report study is a method used to gain insight into customers' feelings, emotions and attitudes. For example, this method can be a survey or interview. Based on prior research, the survey instrument can be considered as the most appropriate technique to measure consumers' perception of their level of engagement (O'Brien, 2010; Webster and Ho's, 1997). A survey is a good research design when measuring emotions, feelings and perceptions of customers (Vennix, 2010). To measure the influence of privacy concerns on m-commerce engagement in this research, we conducted a survey. Dimensions such as emotions, feelings and perceptions could be best measured by using a survey that exist of questions that need to be answered by participants on a five-point Likert scale from 1 'not at all' to 5 'very strongly'.

To investigate the effect of the privacy concerns, we measure the influence of the six dimensions of privacy concerns formulated by Eastin et al. (2015). In order to measure all of the privacy concerns separately, we split those dimensions when formulating the survey questions. Each part of the questions represents a subject that refers to one of the six privacy concerns. For example, questions about data control or questions about location tracking.

### 3.3 Data collection

The data for this research will be collected by an online survey. The online survey will be spread via social media and e-mail to reach participants for this research. Participants are asked to keep their last m-commerce practice in mind when answering the survey questions. At first it is essential to know if the participant has experiences with m-commerce, because the

target group of our research exist of customers that have such experiences. To help the participant remember the experience, we will ask them when the experience has taken place, what the purchase was and where the purchase has taken place. The survey questions are aimed at sharing customer experiences with m-commerce to measure the effect of their privacy concerns on m-commerce engagement. The participants will be informed that there are no right or wrong answers, we are interested in their perceptions. Furthermore, we will inform them that the research is for academic purposes and that their anonymity is guaranteed.

This survey will be translated from English into Dutch, because this is the most common language in the Netherlands. The translated survey will be back translated into the original language, which is in this research English. Although, a lot of Dutch customers have a good understanding of the English language, we want to prevent possible errors in the measurement. For this reason, the questions will be asked in Dutch. The translation process of the collected answers takes place via back translation.

### 3.4 Sample

The sample of this research will be taken in the Netherlands. For this research it is important that the participant has experiences with m-commerce. The sample needs to consist of participants that own a mobile device. Besides that, it is necessary that they came in contact with m-commerce. We do not expect that the whole Dutch population has such experiences. The elderly use in general more traditional ways of commerce instead of m-commerce. For this reason, we expect the sample will mostly include the younger customers of the population. Due to the data collection method, we also expect to mainly reach this part of the population. We will reach our target group by approaching via online channels. We can describe the sample as a convenience sample. The sample composed of accidental participants who want to participate on the research. The sample will be taken at random and can be considered as a not-aselect sample survey.

### 3.5 Operationalization

The concepts of the conceptual model need to be operationalized to measure the right concepts. Therefore, we formulate a definition of all of the concepts that is operationalized and which creates the possibility to measure a variable. An overview of the variables with accompanying dimensions and items is presented in appendix A.

Privacy concerns about *data collection* are the degree of which customers worry about the data being collected in relation to the perceived benefits (Eastin et al., 2015). This dimension will be measured using a four-item measure for data collection which is taken from Smith et al.

(1996). For example, 'It bothers me to share personal data with commercial organizations on my mobile device'.

Privacy concerns about *data control* are the degree of customer concerns about the ability to control access of personal data and perceive ownership about their information (Eastin et al., 2015). The scale taken from Smith et al. (1996) included a three-item measure of control referring to the heart of consumer privacy. An example is: 'It was possible to decide about the personal data I would like to share with the organization'.

Privacy concerns about *unauthorized secondary use* are the perceived consumer concern that personal data is being spread to third parties without their prior permission (Eastin et al., 2015). The information is collected for one purpose, but used for another purpose without authorization from the customers (Smith et al., 1996). We adapted a four-items scale of Smith et al. (1996) for unauthorized secondary use.

Privacy concerns about *improper access* are the concern that data about individuals are readily available to people not properly authorized to view or work with this data (Smith et al., 1996). In this research we will measure improper access by three-items of Smith et al. (1996). An example item: 'Companies should devote more time and effort to preventing unauthorized access to personal information'.

Privacy concerns about *location tracking* are defined as the level of concern that customers' data is being collected and used (Eastin et al., 2015). The construct will be measured by using a four-item measure of location tracking. For example, 'It harasses me that commercial organizations track my location on my mobile devices'.

Privacy concerns about *awareness* are the degree of customer concerns about commercial organizations disclosing the way data gathered from mobile devices is collected, processed and used (Eastin et al., 2015). We adapted the three-item measure scale of awareness. An example item: 'Commercial organizations tracking personal information on my mobile device should reveal the way data is collected, processed and used'.

All items will be measured on a five-point Likert scale ranging from strongly disagree (score = 1) to strongly agree (score = 5).

The affective and conative drive how customers acts on their feelings and thinking. When measuring the effect of privacy concerns on m-commerce engagement, conative, affective and cognitive are the dimensions that capture m-commerce engagement. We adapted

the 31-items scale of user engagement of O'Brien (2010). For example, 'I forgot about my immediate surroundings while shopping on this website'. Furthermore, a distinction is made between the cognitive, affective and conative dimensions when measuring m-commerce engagement.

Those items will be measured on a five-point Likert scale ranging from strongly disagree (score = 1) to strongly agree (score = 5) with a sixth option for 'not applicable'.

*Perceived control* can be split into two dimensions, namely information and power (Wallston et al., 1987). Information refers to the knowledge about tracking data. Power is about having power to participate in making decisions. The privacy enhancing technology creates the ability to the consumer to control his privacy (Spiekermann, 2005). In the research we measure those dimensions by a five-item scale of Spiekermann (2005). An example item: 'I feel that I can steer the intelligent environment in a way I feel is right'.

The items will be measured on a five-point Likert scale ranging from strongly disagree (score = 1) to strongly agree (score = 5) with a sixth option for 'not applicable'.

The survey ended with asking for the respondent's demographics like gender, age and level of education.

### 3.6 Data analysis

After collecting the data, we will analyse the measures. To test the formulated hypotheses, a linear regression analysis will be conducted. We will use SPSS to examine the data. The measurement model of the research consists of 61 items measuring 11 dimensions and 3 variables. First of all, we investigate the relationship between privacy concerns and m-commerce engagement. Furthermore, the influence of perceived control on this relationship will be studied. We will do this by conducting another regression analysis.

The quality of the research needs to be taken into account. Therefore, we took some measures before analysing the data. At first, the validity and reliability will be tested. Also, we investigate the sample size of the research.

## 4. Data interpretation and analysis

### 4.1 Introduction

This chapter will firstly describe the sample of the research. After that, we will investigate the quality of the data by providing a reliability analysis, validity analysis and a factor analysis. Then, we start analysing the model to test the formulated hypotheses with regression analysis. We need to check the assumptions for regression analysis before we can conduct a linear regression analysis. Finally, we will use regression analysis and interpret the data output.

### 4.2 Sample description

The sample of this research consist of the respondents that have filled out the online survey. After closing the survey, the data of 109 respondents was collected. However, not all of the respondents has fully answered all of the questions. There were four respondents which declare that they were not able to answer the questions, because they had no experience with shopping via a mobile device. This results in some missing data. We choose to eliminate those four respondents from the collected data, because of the small number of missing data. At the end, the data of 105 valid respondents will be analysed.

The last three questions of the survey were asked to gain some insights into the demographic characteristics of the respondents. Everyone that has an experience with shopping online via a mobile device was able to participate We asked the respondents about their gender, age and education level. The survey was filled in by 69 women and 36 men. An overview of the age categories can be found in table 1. As expected, especially people in the age category of ‘younger than 25’ or ‘between 25 and 35’ years have filled in the survey (81.9%). Possibly, this can be clarified by the fact that especially younger people use mobile devices in contrary to older people. Most of the respondents were high educated (HBO/WO).

*Table 1: age categories*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid < 25 years	61	58.1	58.1	58.1
25 till 35 years	25	23.8	23.8	81.9
35 till 45 years	3	2.9	2.9	84.8
45 till 55 years	8	7.6	7.6	92.4
> 55 years	8	7.6	7.6	100.0
Total	105	100.0	100.0	

### 4.3 Results

To analyse the data, we labelled all of the questions of the survey. An overview of those labels can be found in Appendix C. The labels will be used in further analyses in this chapter. First, we conduct reliability analyses and factor analyses to test the collected measures. The reason behind those tests is to check if respondents has answered the questions correctly and if there are no response sets that show a pattern.

#### 4.3.1 Reliability analyses

The first thing to check is the reliability of the used survey. Reliability refers to the grade of consistency between multiple measurements of a variable, which means that a survey should show the same results under consistent conditions (Hair et al., 2014). The individual items measure the same construct in different points at time. We used the Cronbach's Alpha to check if the variables are reliable and measure the reliability coefficient. In general, a value of  $\alpha$  of .6 is acceptable, but in an ideal situation the value of  $\alpha$  exceeds .85 (Hair et al., 2014). When the value of  $\alpha$  is below .6, the survey will not be reliable because the overall consistence of the measures is too low. In that case, deleting items can improve the value of  $\alpha$ . According to Hair et al. (2014), deleting an item is conceivable when it will result in an increase of at least .05.

The reliability analyses of the variables privacy concerns and m-commerce engagement show that both values of  $\alpha$  are above .84. Those values lie above .6 and reach almost the ideal situation of .85. The reliability analysis of perceived control shows a value of  $\alpha$  that is too low ( $<.6$ ). The value of .574 reach almost the acceptable value of  $\alpha$  of .6. An overview of the reliability SPSS data of both variables can be found in Appendix D. Table 2 shows the main results of the reliability analyses. Furthermore, we will test if we can improve the value of  $\alpha$  if we delete an item. The SPSS data shows in some cases a very little increase of the value of  $\alpha$  when deleting an item. For this research, we have used existing scales to measure the variables. Therefore, the overall consistency of the measures is already been proven and we will not delete any items. The reliability of this research is good, it measures the same construct.

*Table 2 summary reliability analyses*

Variable	Cronbach's Alpha	N of Items
Privacy concerns	.848	21
M-commerce engagement	.849	30
Perceived control	.574	5



### 4.3.2 Factor analyses

The variables in this research, privacy concerns and m-commerce engagement, can be regarded as latent variables. It is impossible to measure those variables directly, but we can measure them indirectly. We will use factor analysis to check if the survey questions indirectly measure the variables (Field, 2009).

First, we need to look at the KMO-test and Bartlett's test of sphericity. KMO-test and Bartlett's test of sphericity measures the strength of relationships among the variables. The KMO-test shows a value between 0 and 1. The partial correlations should be small, if the variables show common factors. The closer the KMO-test value is to 1.0, the smaller the partial correlations are. A KMO-test value of 0.5 indicates that the correlation matrix equals the partial correlation matrix. The value should be at least 0.5 to be considered as acceptable, a value greater than 0.8 can be considered as good. The Bartlett's test of sphericity measures the equality of variances across groups against the inequality of variances for at least two groups. Equality of variances is also called homogeneity. The Bartlett's test of sphericity is used to see if the variables in the population correlation matrix are uncorrelated. The observed significance level is 0.000. This value is significant, because it is less than 0.05. Therefore, we can conclude that the relationship among the variables is strong. Appendix E shows both the data of the KMO-test and the Bartlett's test of sphericity. Based on those data, it is allowed to proceed with the factor analyses.

#### 4.3.2.1 Factor analysis of privacy concerns

We check the eigenvalue of the factors to describe the number of factors of a variable. Factors should at least have an eigenvalue of 1. Data showed in Appendix E point out six factors for the variable of privacy concerns which explain 63.6% of the variance. This SPSS data is conforming the research of Eastin et al. (2015), where they also classified six dimensions of privacy concerns. We will determine the factor loading and used a rotation method to interpreted the data. For this rotation we used the direct oblimin method, since this is permitted because there is at least one correlation that shows a value above .30. All communalities show a value above .30 and meet the requirement. Furthermore, we need to check for possible cross loadings. If an item is loading on more than one factor, it is cross loading and the item has to be deleted. This is the case when there is a difference less than  $|.20|$  between the two highest factor loadings. Unless there is a good reason not to delete an item. After deleting, a new factor analysis has to be done. We need to repeat this until there are no cross loadings in the dataset anymore. Based on the SPSS data, we deleted item aw1. This item shows the lowest value of factor loading and it is also a cross loader. After deleting, we kept six factors which explain

65,2% of the variance. We considered deleting item ia2 and dac1, because those items show multiple cross loaders. Eventually, we decided not to delete those two items. Deleting will result in less explained variance and we except cross loaders, because they all measure the same variable of privacy concerns. Both items refer to the access of personal information. For this reason, it is logical that they are correlated.

#### 4.3.2.2 Factor analysis of m-commerce engagement

We also looked at the eigenvalues of the variable m-commerce engagement. The SPSS output shows seven factors that has an eigenvalue above 1. Those factors explain 70.6% of the variance. According to the marketing literature, we defined three dimensions namely conative, affective and cognitive. Although, we decided not to delete any of the items. The items that need to measure the same dimensions, score most of the time a high value on the same factor. There are cross loadings or items that show a low value, but deleting those items will not result in less factors or a better value of the factor loadings. The same applies to a regression with three fixed factors. Again, we found a lot of cross loadings. Besides that, we used items to measure m-commerce engagement which were already used in previous research. Therefore, the quality of the items is already proven.

Both the reliability analyses and factor analyses proved that the constructs of privacy concerns and m-commerce engagement are measured by the items as stated in Appendix A. We have deleted the item aw1, because it was a cross loader. The factor analysis of m-commerce engagement showed some results we did not expect, but we kept all of the items since they were already used in previous research. The same applies for the variable of perceived control. The results showed an almost acceptable Cronbach's Alpha and we used items that were also used in earlier research. Therefore, we kept the items of perceived control. The constructs can be considered as variables. xx

#### 4.3.3 Assumptions

Before doing a linear regression analysis, we need to check some assumptions about the data used in this research. An overview of the used data for testing those assumptions can be found in Appendix F. There are four assumptions of linear regression that need to be tested. Furthermore, we test the type of variables and added this as an extra assumption. In this paragraph five assumptions will be tested. The assumptions are: type of variables, normal distribution, multicollinearity, homoscedasticity and linearity.

First of all, we test the assumption about the type of variables. The variables of the conceptual model need to be quantitative. Both the independent variable and the dependent

should be measures at the continuous level and needs to be of interval level. For measuring the two variables, we used a five-point Likert scale. A Likert scale is an ordinal scale, but sometimes it can be seen as an interval scale. There is some discussion in literature about the right scale (Hair et al, 2014). It is permitted to treat Likert scales as interval scales and therefore we will reprimand it as an interval scale in this research. The assumption is met, the type of variables in this research is fine.

Secondly, it is important that the data is normally distributed. To test this assumption, we need to look at the skewness and kurtosis. We can conclude that there is a normal distribution of the data when the value of the skewness and kurtosis are within two times the standard error of the skewness and kurtosis. The data of this research shows that both the skewness and kurtosis are less than two times the standard error of skewness and kurtosis. The data is normally distributed, so the second assumption is ok.

*Table 3 Skewness and kurtosis*

	Privacy concerns	M-commerce engagement
Skewness	.188	.113
Std. Error of Skewness	.237	.243
Kurtosis	-.074	-.474
Std. Error of Kurtosis	.469	.481

The third assumption is about multicollinearity. Independent variables should not correlate too high. Furthermore, the relationship between the independent variables should not be linear. In the conceptual model of this research is just one independent variable, so there is no multicollinearity. The third assumption is fulfilled.

The fourth assumption contains the presence of homoscedasticity. Homoscedasticity refers to the same error across all values of the independent variables. In other words, the residual variances should be constant. Scatterplots of those residual plots can be interpreted to notice the presence of homoscedasticity. You need to look if there is a pattern visible. If there is not such a pattern, then the assumption of homoscedasticity is met. The scatterplot in Appendix F shows no clear pattern, so the fourth assumption is also met.

Last, the fifth assumption is about linearity. Linearity means that there is a relationship between the independent and dependent variable. To test the assumption, we need to examine residual plots. There is linearity, when the plot shows points that lie around the zero line. The

plots can be found in Appendix F. The points do not show a clear pattern and contain an equally horizontal band, so the assumptions are fulfilled.

The five tested assumptions are all fulfilled. It is permitted to use linear regression analysis to analyse the data in this research.

#### 4.3.4 Linear regression analyses

After testing the five assumptions, we can accomplish a linear regression analysis to analyse the data in this research. By using linear regression analysis, we are able to test the formulated hypotheses and answer the research question. Regression analysis can be used to test the influence of the independent variable on the dependent variable and whether this influence will be positive or negative. We have formulated nine hypotheses in total, that can be distributed over two main hypotheses. We will accomplish a regression analysis for the hypotheses. An overview of the used results for the regression analyses can be found in Appendix G.

*Table 4 Regression analyses*

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	100.103	11.854		8.445	.000
Datacollection	.956	.456	.259	2.098	.039
Datacontrol	-1.039	.705	-.173	-1.474	.144
Unauthorizedsecondaryuse	-.425	.555	-.084	-.765	.446
Improperaccess	-.665	.833	-.096	-.798	.427
Locationtracking	-.191	.470	-.049	-.407	.685
Awareness	-.170	1.220	-.017	-.139	.890

The first six hypotheses focused on the effect of one of the six privacy concerns on m-commerce engagement. Those six privacy concerns will be tested as follows: data collection, data control, unauthorized secondary use, improper access, location tracking and awareness. After conducting a regression analysis, we see a non-significant value of .265 for the model when our significance level is .05. The adjusted  $R^2$  shows a value of .018 which means that just 1.8% of the variance of the dependent variable will be explained by the independent variables. The model is not significant, so the independent variables do not have effect on m-commerce

engagement. This is an unexpected surprising result in our research. A possible explanation for the nonsignificant model can be the high number of items that measures m-commerce engagement. We decided to change the measurement scale, by choosing the three items per dimension that scores the best. Then, we will conduct new regression analyses and interpret the SPSS output of the regression analyses. An overview of the results of the regression analyses can be found in Appendix H. The model with the conative variable shows a nonsignificant value of .290. Again, this is not what we expected. The model with the affective variable shows a significant value of .004. We can interpret the results of this model. The model with the cognitive variable shows a value of .184 and can also be considered as nonsignificant. The tables below show the most important results of the analyses.

*Table 5 Regression analyses after changing measurement scale (conative)*

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	3.511	.547		6.413	.000
Datacollection	-.011	.020	-.067	-.556	.580
Datacontrol	-.030	.031	-.107	-.970	.335
Unauthorizedsecondaryuse	.006	.025	.024	.225	.822
Improperaccess	.039	.036	.125	1.072	.287
Locationtracking	-.032	.022	-.173	-1.450	.150
Awareness	-.027	.055	-.058	-.486	.628

Table 6 Regression analyses after changing measurement scale (affective)

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	3.010	.678		4.442	.000
Datacollection	.034	.025	.152	1.346	.181
Datacontrol	-.068	.039	-.184	-1.760	.082
Unauthorizedsecondaryuse	-.102	.032	-.328	-3.197	.002
Improperaccess	.056	.046	.133	1.213	.228
Locationtracking	.046	.027	.189	1.685	.095
Awareness	-.068	.068	-.113	-1.000	.320

Table 7 Regression analyses after changing measurement scale (cognitive)

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	3.352	.842		3.979	.000
Datacollection	.075	.032	.279	2.368	.020
Datacontrol	-.039	.048	-.091	-.822	.413
Unauthorizedsecondaryuse	-.033	.039	-.092	-.855	.394
Improperaccess	-.086	.060	-.170	-1.440	.153
Locationtracking	-.018	.034	-.064	-.541	.590
Awareness	.018	.088	-.025	.207	.837

First, we describe the results of the regression analysis with the measurement scale without any changes. Then, we will change the measurement scale and see if there are any changes in the results. We are aware of the nonsignificant models, just the model of the affective variable is significant. Therefore, the acceptance or rejection of hypotheses will be based on the significant model.

*Hypothesis 1A: The privacy concern of data collection will negatively influence m-commerce engagement.*

For the first hypothesis, we used the SPSS data about data collection and accomplished a linear regression analysis with m-commerce engagement as dependent variable. The data shows a significant relationship of  $p = .039$  between data collection and m-commerce engagement. This value is below the requirement of a significance level of  $p < .05$ . We can interpret this relationship as a negative relationship between data collection and m-commerce engagement. We expected a negative relationship between data collection and m-commerce engagement. Nevertheless, the total model was not significant. We can conclude that if there was an effect, this effect was caused by data collection.

Now, we changed the measurement scale and will interpret the new results. The output shows only a significant result for the cognitive variable. This model was not significant, so we can only say that when there was an effect this effect can be caused by data collection. The significant model of the affective variable shows a nonsignificant value (.181) for this privacy concern. For this reason, we reject hypothesis 1A.

*Hypothesis 1B: The privacy concern of data control will negatively influence m-commerce engagement.*

Next, we will provide the same analysis, but now for the privacy concern of data control. The data shows no significant relationship between data control and m-commerce engagement. Data control has a significance level of  $p = .144$  and does not meet the requirement of  $p < .05$ . There are no important changes after changing the measurement scale. All three p-levels are nonsignificant ( $p = .335$ ,  $p = .082$  and  $p = .413$ ), We can reject hypothesis 1B, because there is no relationship at all between the privacy concern of data control and m-commerce engagement.

*Hypothesis 1C: The privacy concern of unauthorized secondary use will negatively influence m-commerce engagement.*

The following tested hypothesis is about the privacy concern of unauthorized secondary use. Again, the SPSS output shows a non-significant relationship between the variable of unauthorized secondary use and m-commerce engagement. The significance value of  $p = .446$  exceeds the requirement of  $p < .05$ . This is the same for the other two models that are nonsignificant ( $p = .822$ , and  $p = .394$ ). The significant model of the affective variable shows a significant value of  $p = .002$ . We found a negative effect of the privacy concern of unauthorized secondary use and m-commerce engagement for the affective dimension. We will accept hypothesis 1C, because the expected negative influence between unauthorized secondary use and m-commerce engagement is proven right.

*Hypothesis 1D: The privacy concern of improper access will negatively influence m-commerce engagement.*

As fourth, we will test the influence of concerns about improper access on m-commerce engagement. The data output gives a significance value of  $p = .427$ . As can be seen, this value does not meet the requirement of a significance level of  $p = .05$ . The p-values after changing the measurement scale are also  $>.05$ , namely  $p = .287$ ,  $p = .228$  and  $p = .153$ . There is no relationship between improper access and m-commerce engagement according to the data. Therefore, we will reject hypothesis 1D.

*Hypothesis 1E: The privacy concern of location tracking will negatively influence m-commerce engagement.*

The next tested hypothesis consists of the effect of privacy concerns of location tracking on m-commerce engagement. A significance value of  $p = .685$  will not meet the required significance level of  $p < .05$ . The significance values of  $p = .150$ ,  $p = .095$  and  $p = .590$  showed by the three models after changing the measurement scale will also not meet the significance level of  $p < .05$ . We can reject the hypothesis that location tracking has a negative influence on m-commerce engagement. There is no relationship between the independent variable and dependent variable at all.

*Hypothesis 1F: The privacy concern of awareness will negatively influence m-commerce engagement.*

The last out of those six hypotheses comprises the effect of concerns of awareness on m-commerce engagement. Based on the data output, we see that the relationship between awareness and m-commerce engagement is non-significant. The output shows a significance value of  $p = .890$ , so this value higher than the significance level of  $p < .05$ . The same applies for the p-values after changing the measurement scale. The data shows p-values of  $.628$ ,  $.320$  and  $.837$ . We can conclude that there is no relationship between awareness and m-commerce engagement, which results in the rejection of hypothesis 1F.

We have now tested the effect of six different privacy concerns on m-commerce engagement. Furthermore, we will investigate if this effect (when there is a relationship between the variables) will change when customers experience control. Therefore, we will test the influence of a moderator of perceived control. This will be done by testing the next three hypotheses:



*Hypothesis 2: Perceived control of data being tracked will reduce the negative effect of privacy concerns on m-commerce engagement.*

*Hypothesis 2A: Perceived control will reduce the negative effect of the privacy concerns of data control, unauthorized access and location tracking on m-commerce engagement.*

*Hypothesis 2B: Perceived control will not affect the negative effect of the privacy concerns of data collection, improper access and awareness on m-commerce engagement.*

Although, the regression analyses of the first six hypotheses led to the rejection of five of the formulated hypotheses. We found only a positive relationship between the variables unauthorized secondary use and m-commerce engagement. Anticipating on the results, we will not test hypothesis 2B because we did not find a relationship between the privacy concerns of data collection, improper access and awareness on m-commerce engagement.

We include the moderator of perceived control into the regression analysis. An overview of the output can be found in Appendix I and a summary of the results in table 8 till 10.

*Table 8 Regression analysis conative incl. moderator*

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	2.876	.054		53.098	.000
ControlCentr	.015	.021	.080	.730	.467
UnauthorizedCentr	-.018	.028	-.076	-.642	.522
UnauthorizedControl	-.001	.008	-.021	-.192	.848

Table 9 Regression analysis affective incl. moderator

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	1.755	.069		25.545	.000
ControlCentr	.005	.026	.021	.200	.842
UnauthorizedCentr	-.093	.034	-.301	-2.720	.008
UnauthorizedControl	-.000	.010	-.002	-.022	.982

Table 10 Regression analysis cognitive incl. moderator

Model	Coefficients				
	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	2.193	.083		26.420	.000
ControlCentr	.018	.033	.058	.547	.586
UnauthorizedCentr	-.058	.041	-.160	-1.413	.161
UnauthorizedControl	-.001	.012	-.012	-.114	.910

Again, the data output shows that two models are not significant. The significance values of those model are  $p = .874$  (conative) and  $p = .543$  (cognitive). The explanatory power of those regression models can be considered as bad, because the models are not significant. The model of the affective variable shows a significant value of  $p = .030$ . When we look at the results of the analysis of the significant model, we see a non-significance relationship between unauthorized secondary use and m-commerce engagement moderated by perceived control ( $p = .982$ ). For this reason, we can reject hypothesis 2 and 2A. We found no relationship between the other five privacy concerns and m-commerce engagement, so we will not investigate the effect of the moderator of perceived control on those relationships.

#### 4.3.5 Summary regression analyses

Hypothesis	Description	Result
1A	The privacy concern of data collection will negatively influence m-commerce engagement.	Rejected
1B	The privacy concern of data control will negatively influence m-commerce engagement.	Rejected
1C	The privacy concern of unauthorized secondary use will negatively influence m-commerce engagement.	Accepted
1D	The privacy concern of improper access will negatively influence m-commerce engagement.	Rejected
1E	The privacy concern of location tracking will negatively influence m-commerce engagement.	Rejected
1F	The privacy concern of awareness will negatively influence m-commerce engagement.	Rejected
2	Perceived control of data being tracked will reduce the negative effect of privacy concerns on m-commerce engagement.	Rejected
2A	Perceived control will reduce the negative effect of the privacy concerns of data control, unauthorized access and location tracking on m-commerce engagement.	Rejected
2B	Perceived control will not affect the negative effect of the privacy concerns of data collection, improper access and awareness on m-commerce engagement.	-

## 5. Conclusion and recommendations

### 5.1 Introduction

The research question in this research was formulated as: *How do privacy concerns of location tracking in m-commerce affect m-commerce engagement, and what is the effect of perceived control on this relationship?* We have done some linear regression analysis in chapter four to answer this research question. In this chapter, we will link the outcomes of the analyses to the hypotheses, resulting in answering the main research question of this research. Furthermore, we formulate recommendations for marketing managers based on the conclusions. Also, we will comment on the quality of the research. At the end of this chapter, we give some suggestions for further research.

### 5.2 Conclusion

In order to answer our research question, we formulated nine hypotheses. We first investigated if there was a relationship between a privacy concern and m-commerce engagement. According to the marketing literature, we defined six different privacy concerns: data collection, data control, unauthorized secondary use, improper access, location tracking and awareness. The regression model was not significant and therefore we decided to change the measurement scale of m-commerce engagement. We picked out the three items that measured one of the dimensions of m-commerce engagement the best. This resulted in nine items (three per dimension). Only the model of the affective variable showed a significant value. The data of the regression analyses showed only a (negative) relationship between the privacy concern of unauthorized secondary use and m-commerce engagement. There was no relationship found between the five other privacy concerns and m-commerce engagement. This led to the acceptance of hypothesis 1C and rejection of the other five hypotheses. Furthermore, these results led to the rejection of hypotheses 2 and 2A. The regression analysis showed that there was no relationship between unauthorized secondary use and m-commerce engagement, when we included the moderator. We found no relationship between the variables as mentioned in hypothesis 2B, so we did not check the effect of a moderator on this expected relationship.

Based on these findings, we can conclude that privacy concerns of location tracking do not affect m-commerce engagement. There is no relationship between location tracking and m-commerce engagement. Therefore, it is not meaningful to investigate the effect of perceived control on this relationship.

The results are unexpected and surprising. We used measurement scales that were already used in previous research. Therefore, we do not think that the measurement scales can

be the reason for the results. Also, after changing the measurement scales, the data did not show the results we expected. The research is based on the opinion of 105 respondents, maybe the sample size is not big enough. It is also possible that there is no relationship between the privacy concern of location tracking and m-commerce engagement. This result can confirm previous research performed by Eastin et al. (2015). Also they did not find a relationship between the variables. Nevertheless, they found relationships between other privacy concerns and m-commerce engagement like control and unauthorized access. Our results show a relationship between unauthorized secondary use and m-commerce engagement, but not between control and m-commerce engagement. In conclusion, our results can confirm previous research, but our research shows also contradictory results with earlier studies. Further research is necessary to investigate the relationship between privacy concerns and m-commerce engagement.

### 5.3 Recommendations

All hypotheses, except one, have been rejected. We expected a negative influence of privacy concerns on m-commerce engagement, but we just found such an influence for the variable of unauthorized secondary use. This is an interesting result for marketing managers in the m-commerce sector. The other five investigated privacy concerns do not have an influence on m-commerce engagement. Managers should focus on the privacy concerns about the unauthorized secondary use to keep the level of customers' engagement stable. Surprising is the result that there is no relationship between location tracking and m-commerce engagement. Location tracking can be seen as a part of data collection, because they collect data when tracking your location. We found a significant result of the relationship between data collection and m-commerce engagement, but this model was not significant. If there was an effect, it can be caused by data collection. In that case, we expected also a significant relationship between location tracking and m-commerce engagement. The results did not show a significant relationship between location tracking and m-commerce engagement. We recommend managers not to focus on privacy concerns of customers, because they will not influence their m-commerce engagement. Just a little attention should be given to privacy concerns of unauthorized secondary use.

### 5.4 Research quality

The scales we used in the research were taken from previous research. Therefore, the reliability and validity of the scales is already tested. In chapter 4, we have also done reliability analyses and factor analyses to check the scales. The factor analysis of the items of the variable m-commerce engagement was not consistent with the dimensions we found in literature. Instead

of the three dimensions that were commonly used in marketing literature, we found seven factors. The items we used in this research were taken from previous research and have already been tested. The scale of this research was an existing scale and for this reason we decided not to delete any of the items. Changing the measurement scale was not that effective as we expected. Nevertheless, the factor analyses provided for this research showed different results.

Furthermore, we checked the assumptions for linear regression analyses. All of the assumptions were met. After conducting regression analysis to test the first six hypotheses, the data showed a non-significant value for the regression model. This means a low explanatory power of the model. We decided to change the measurement scale and to interpret the data before changing the scale and after changing the scale. The low explanatory power will negatively influence the quality of the research. Also, the regression model with included moderator showed a non-significance value for two out of three regression models. Again, there is a low explanatory power and the effect on the quality of the research will be negative.

The regression analyses of the first six hypotheses resulted in just one accepted hypothesis. All of the other hypotheses were not significant and resulted in a rejection. This led to a regression of hypothesis 2 and 2A. We did not check hypothesis 2B, because we found no relationship between the variables of data collection, improper access and awareness and m-commerce engagement.

## 5.5 Suggestions for further research

Marketing literature showed significant results for a negative relationship between privacy concerns and m-commerce engagement. This research showed the opposite, five out of six hypotheses were rejected. There was no relationship between those privacy concerns and m-commerce engagement. In general, privacy is a recurring aspect in the marketing context. Due to the fast changing technology, customers should share their personal information via the Internet more and more. It became 'normal' to do business via online channels. This can be a reason for the surprising results of our research. Customers get used to share their personal information via Internet and are maybe less worried than a few years before. It is interesting to investigate this reasoning.

Most of the respondents in this research have an age below 35 years old. It can be interesting to investigate if there is a difference between age groups in the relationship of experiencing privacy concerns and m-commerce engagement. We expect for example that older people are more concerned, because their knowledge about m-commerce and privacy is less than the knowledge of younger people. When you should do the same research with respondents with an age of at least 35 years old, this can lead to different results.

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## 7. Appendix A Operationalization

Variable	Dimension	Items
Privacy concerns	Data collection	1. It usually bothers me when companies ask me for personal information
		2. When online companies ask me for personal information, I sometimes think twice before providing it.
		3. It bothers me to give personal information to so many online companies.
		4. I'm concerned that online companies are collecting too much personal information about me.
	Data control	5. Consumer online privacy is really a matter of consumers' right to exercise control and autonomy over decisions about how their information is collected, used and shared.
		6. Consumer control of personal information lies at the heart of consumer privacy.
		7. I believe that online privacy is invaded when control is lost or unwillingly reduced as a result of a marketing transaction.
	Unauthorized secondary use	8. Companies should not use personal information for any purpose unless it has been authorized by the individuals who provided the information.
		9. When people give personal information to a company for some reason, the company should never use the information for any other reason.
		10. Companies should never sell the personal information in their computer databases to other companies.

		11. Companies should never share personal information with other companies unless it has been authorized by the individuals who provided the information.
	Improper access	12. Companies should devote more time and effort to preventing unauthorized access to personal information.
		13. Computer databases that contain personal information should be protected from unauthorized access-no matter how much it costs.
		14. Companies should take more steps to make sure that unauthorized people cannot access personal information in their computers
	Location tracking	15. I believe that the location of my mobile device is mostly monitored by organizations.
		16. It bothers me that advertisers can track my location on my mobile device.
		17. It bothers me that I receive unsolicited advertisements based on my location.
		18. Companies should ask permission to track my location.
	Awareness	19. Companies seeking information online should disclose the way the data are collected, processed and used.
		20. A good consumer online privacy policy should have a clear and conspicuous disclosure.
		21. It is very important to me that I am aware and knowledgeable about how my personal information will be used.
M-commerce engagement	Cognitive	22. I lost myself in this shopping experience.
		23. I was so involved in my shopping task that I lost track of time.
		24. I blocked out thing around me when I was shopping on this website.

		25. When I was shopping, I lost track of this world around me.
		26. The time I spent shopping just slipped away.
		27. I was absorbed in my shopping task.
		28. During this shopping experience I let myself go.
		29. This shopping website is attractive.
		30. This shopping website was aesthetically appealing.
		31. I liked the graphics and images used on this shopping website.
		32. The screen layout of this shopping website was visually pleasing.
	Affective	33. I felt frustrated while visiting this shopping website.
		34. I found this shopping website confusing to use.
		35. I felt annoyed while visiting this shopping website.
		36. I felt discouraged while visiting on this website.
		37. Using this shopping website was mentally taxing.
		38. This shopping experience was demanding.
		39. I felt in control of my shopping experience.
		40. I could not do some of the things I needed to do on this shopping website.
		41. Shopping on this website was worthwhile.
		42. I consider my shopping experience a success.
		43. This shopping experience did not work out the way I had planned.
		44. My shopping experience was rewarding.
		45. I would recommend shopping on this website to my friends and family.
		46. I was really drawn into my shopping task.
		47. I felt involved in this shopping task.

		48. This shopping experience was fun.
	Conative	49. I continued to shop on this website out of curiosity.
		50. The content of the shopping website incited my curiosity.
		51. I felt interested in my shopping task.
Perceived control	Information	52. Through the privacy enhancing technology I would always be informed of whether and in what form the electronic environment recognizes me.
		53. Using the privacy enhancing technology I would always know when and by whom I have been read out.
	Power	54. I feel that I can steer the intelligent environment in a way I feel is right.
		55. Thanks to the privacy enhancing technology the electronic environment and its reading devices will have to subdue to my will.
		56. Due to the privacy enhancing technology I perceive perfect control over the activities on my device.

## 8. Appendix B survey

Beste participant,

Bedankt voor het meewerken aan deze vragenlijst. Momenteel volg ik de master Business Administration, met als specialisatie marketing. Deze vragenlijst is onderdeel van mijn onderzoek naar de vraag welke rol zorgen omtrent privacy spelen bij consumenten ten aanzien van de opvatting over mobiele commercie.

Mobiele commercie gaat over transacties (kopen en verkopen) van producten/services via mobiele apparaten, zoals smartphones, tablets en laptops.

Bij dit onderzoek is jouw mening van groot belang. Probeer zo eerlijk mogelijk te antwoorden, er zijn geen goede of foute antwoorden. Natuurlijk blijven de ingevulde gegevens anoniem.

Mochten er vragen zijn, neem dan gerust contact op via [a.debert@student.ru.nl](mailto:a.debert@student.ru.nl)

Alvast hartelijk bedankt voor de medewerking!

Groeten,

Anouk

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Allereerst volgen een aantal algemene vragen over uw laatste transactie op een mobiel apparaat.

- Wat was uw laatste aankoop?
- Wanneer heeft u deze aankoop gedaan?
- Bij wie heeft u het product/de service aangeschaft?

Er volgen enkele stellingen over zorgen die kunnen ontstaan bij consumenten over hun privacy wanneer zij een aankoop doen. Houd bij de beantwoording van de stellingen je laatste aankoop in gedachten. Op een schaal uiteenlopend van helemaal mee oneens tot helemaal mee eens kun je je mening aangeven.

	Helemaal oneens	Oneens	Neutraal	Eens	Helemaal eens
Meestal stoort het mij wanneer bedrijven mij vragen om persoonlijke informatie					
Wanneer online bedrijven vragen om persoonlijke informatie denk ik soms twee keer na voordat ik gegevens verstrek.					
Het stoort mij om persoonlijke informatie te geven aan zo veel online bedrijven.					
Ik ben bang dat online bedrijven te veel persoonlijke informatie verzamelen over mij.					
Mijn online privacy is een consumentenrecht om controle en autonomie uit te oefenen op beslissingen hoe informatie wordt verzameld, gebruikt en gedeeld.					
Controle van persoonlijke informatie is belangrijk voor consumenten privacy.					
Ik geloof dat online privacy wordt geschaad wanneer er geen controle is of de controle ongewild verminderd is als gevolg van een marketingtransactie.					
Organisaties mogen geen informatie gebruiken voor enig doel, tenzij het is toegestaan door de personen die de informatie verstrekt hebben.					

Wanneer consumenten persoonlijke informatie verstrekken voor een bepaalde reden, dan mogen organisaties de informatie nooit voor een ander doel gebruiken.					
Organisaties mogen nooit persoonlijke informatie uit hun databases verkopen aan andere organisaties.					
Organisaties mogen nooit persoonlijke informatie met andere organisaties delen, tenzij het is toegelaten door de persoon die de gegevens heeft verstrekt.					
Organisaties moeten meer tijd en moeite besteden aan het voorkomen van ongeautoriseerde toegang tot persoonlijke informatie.					
Computerdatabases die persoonlijke informatie bevatten, moeten worden beschermd tegen onbevoegde toegang onafhankelijk van de kosten die daarbij komen kijken.					
Bedrijven moeten meer ondernemen om ervoor te zorgen dat onbevoegden geen toegang verkrijgen tot hun computers.					
Ik denk dat de locatie van mijn mobiele apparaat vrijwel altijd wordt gevolgd door organisaties.					
Het stoort mij dat adverteerders mijn locatie volgen op mijn mobiele apparaat.					



Het stoort mij dat ik ongevraagd advertenties ontvang op basis van mijn locatie.					
Organisaties moeten toestemming vragen om mijn locatie te volgen.					
Organisaties die online zoeken naar informatie moeten de manier waarop gegeven worden verzameld, gebruikt en verwerkt bekend maken.					
Een goed consumenten online privacy beleid moet duidelijk zijn.					
Het is heel belangrijk voor mij dat ik mij bewust ben en goed ben geïnformeerd over hoe mijn persoonlijke informatie zal worden verwerkt.					
<p>Nu volgen enkele stellingen over de ervaringen tijdens het winkelen. Houd bij de beantwoording van de stellingen je laatste aankoop in gedachten. Op een schaal uiteenlopend van helemaal mee oneens tot helemaal mee eens kun je je mening aangeven.</p>					
Ik verloor mijzelf in de winkelervaring.					
Ik was zo betrokken bij het winkelen dat ik de tijd vergat.					
Ik blokkeerde dingen om mij heen toen ik aan het winkelen was op de website.					
Toen ik aan het winkelen was, had ik geen aandacht voor de wereld om mij heen.					
De tijd dat ik aan het winkelen was ging zo voorbij.					

Ik ben opgegaan in het winkelen.					
Ik liet mijzelf gaan tijdens deze winkelervaring.					
De website was aantrekkelijk.					
De website was esthetisch aantrekkelijk.					
Ik vond de gebruikte afbeeldingen en foto's op de website leuk.					
De lay-out van de website was visueel aangenaam.					
Ik voelde mij gefrustreerd tijdens een bezoek aan de website.					
Ik vond de website verwarrend om te gebruiken.					
Ik voelde mij geërgerd tijdens een bezoek aan deze website.					
Ik voelde mij ontmoedigd tijdens een bezoek aan deze website.					
Het gebruik van de website was mentaal belastend.					
De winkelervaring was opdringerig.					
Ik voelde mij in controle tijdens mijn winkelervaring.					
Ik kon enkele dingen niet doen die ik moest doen op de website.					
Winkelen op de website was de moeite waard.					
Ik beschouw mijn winkel ervaring als een succes.					
Deze winkelervaring verliep niet zoals gepland.					
Mijn winkelervaring was de moeite waard.					

Ik zou winkelen op deze website aanraden aan mijn familie en vrienden.					
Ik was meegezogen in het winkelen.					
Ik voelde mij betrokken bij het winkelen.					
De winkelervaring was leuk.					
Ik bleef winkelen op deze website uit nieuwsgierigheid.					
De inhoud van de website heeft mijn nieuwsgierigheid gestimuleerd.					
Ik was geïnteresseerd in het winkelen.					
<p>De laatste stellingen gaan over de mate waarin je controle ervaart bij de aankoop. Houd bij de beantwoording van de stellingen opnieuw je laatste aankoop in gedachten. Op een schaal uiteenlopend van helemaal mee oneens tot helemaal mee eens kun je je mening aangeven.</p>					
Ik wil altijd geïnformeerd worden over de vraag of en in welke vorm de elektronische omgeving mij herkent.					
Ik zou altijd willen weten door wie en wanneer mijn persoonlijke gegevens zijn uitgelezen.					
Ik heb het gevoel dat ik de intelligente omgeving kan sturen op een manier die goed voelt.					
Dankzij het verbeteren van de privacy technologie zal de elektronische omgeving moeten worden onderworpen aan mijn wil.					

Als gevolg van verbetering van de privacy ervaar ik perfecte controle over de activiteiten op mijn mobiele apparaat.					
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Tot slot zou ik graag een aantal demografische gegevens willen hebben.

- Wat is je geslacht?
- Wat is je leeftijd?
- Wat is je hoogst genoten opleiding?

Heel erg bedankt voor de medewerking!

## 9. Appendix C Labels

1	Meestal stoort het mij wanneer bedrijven mij vragen om persoonlijke informatie.	dc1
2	Wanneer online bedrijven vragen om persoonlijke informatie denk ik soms twee keer na voordat ik gegevens verstrek.	dc2
3	Het stoort mij om persoonlijke informatie te geven aan zo veel online bedrijven.	dc3
4	Ik ben bang dat online bedrijven teveel persoonlijke informatie verzamelen over mij.	dc4
5	Mijn online privacy is een consumentenrecht om controle en autonomie uit te oefenen op beslissingen hoe informatie wordt verzameld, gebruikt en gedeeld.	dac1
6	Controle van persoonlijke informatie is belangrijk voor consumenten privacy.	dac2
7	Ik geloof dat online privacy wordt geschaad wanneer er geen controle is of de controle ongewild verminderd is als gevolg van een marketingtransactie.	dac3
8	Organisaties mogen geen informatie gebruiken voor enig doel, tenzij het is toegestaan door de personen die de informatie verstrekt hebben.	usu1
9	Wanneer consumenten persoonlijke informatie verstrekken voor een bepaalde reden, dan mogen organisaties de informatie nooit voor een ander doel gebruiken.	usu2
10	Organisaties mogen nooit persoonlijke informatie uit hun databases verkopen aan andere organisaties.	usu3
11	Organisaties mogen nooit persoonlijke informatie met andere organisaties delen, tenzij het is toegelaten door de persoon die de gegevens heeft verstrekt.	usu4
12	Organisaties moeten meer tijd en moeite besteden aan het voorkomen van ongeautoriseerde toegang tot persoonlijke informatie.	ia1
13	Computer databases die persoonlijke informatie bevatten, moeten worden beschermd tegen onbevoegde toegang onafhankelijk van de kosten die daarbij komen kijken.	ia2
14	Bedrijven moeten meer ondernemen om ervoor te zorgen dat onbevoegden geen toegang verkrijgen tot hun computers.	ia3
15	Ik denk dat de locatie van mijn mobiele apparaat vrijwel altijd wordt gevolgd door organisaties.	lt1
16	Het stoort mij dat adverteerders mijn locatie volgen op mijn mobiele apparaat.	lt2
17	Het stoort mij dat ik ongevraagd advertenties ontvang op basis van mijn locatie.	lt3
18	Organisaties moeten toestemming vragen om mijn locatie te volgen.	lt4
19	Organisaties die online zoeken naar informatie moeten de manier waarop gegeven worden verzameld, gebruikt en verwerkt bekend maken.	aw1
20	Een goed consumenten online privacy beleid moet duidelijk zijn.	aw2
21	Het is heel belangrijk voor mij dat ik mij bewust ben en goed ben geïnformeerd over hoe mijn persoonlijke informatie zal worden verwerkt.	aw3
22	Ik verloor mijzelf in de winkelervaring.	co1
23	Ik was zo betrokken bij het winkelen dat ik de tijd vergat.	co2

24	Ik blokkeerde dingen om mij heen toen ik aan het winkelen was op de website.	co3
25	Toen ik aan het winkelen was, had ik geen aandacht voor de wereld om mij heen.	co4
26	De tijd dat ik aan het winkelen was ging zo voorbij.	co5
27	Ik ben opgegaan in het winkelen.	co6
28	Ik liet mijzelf gaan tijdens deze winkelervaring.	co7
29	De website was aantrekkelijk.	co8
30	De website was esthetisch aantrekkelijk.	co9
31	Ik vond de gebruikte afbeeldingen en foto's op de website leuk.	co10
32	De lay-out van de website was visueel aangenaam.	co11
33	Ik voelde mij gefrustreerd tijdens een bezoek aan de website.	af1
34	Ik vond de website verwarrend om te gebruiken.	af2
35	Ik voelde mij geërgerd tijdens een bezoek aan deze website.	af3
36	Ik voelde mij ontmoedigd tijdens een bezoek aan deze website.	af4
37	Het gebruik van de website was mentaal belastend.	af5
38	De winkelervaring was opdringerig.	af6
39	Ik voelde mij in controle tijdens mijn winkelervaring.	af7
40	Ik kon enkele dingen niet doen die ik moest doen op de website.	af8
41	Winkelen op de website was de moeite waard.	af9
42	Ik beschouw mijn winkel ervaring als een succes.	af10
43	Deze winkelervaring verliep niet zoals gepland.	af11
44	Mijn winkelervaring was de moeite waard.	af12
45	Ik zou winkelen op deze website aanraden aan mijn familie en vrienden.	af13
46	Ik was meegezogen in het winkelen.	af14
47	Ik voelde mij betrokken bij het winkelen.	af15
48	De winkelervaring was leuk.	af16
49	Ik bleef winkelen op deze website uit nieuwsgierigheid	con1
50	De inhoud van de website heeft mijn nieuwsgierigheid gestimuleerd	con2
51	Ik was geïnteresseerd in het winkelen.	con3
52	Ik wil altijd geïnformeerd worden over de vraag of en in welke vorm de elektronische omgeving mij herkent.	in1
53	Ik zou altijd willen weten door wie en wanneer mijn persoonlijke gegevens zijn uitgelezen.	in2
54	Ik heb het gevoel dat ik de intelligente omgeving kan sturen op een manier die goed voelt.	po1
55	Dankzij het verbeteren van de privacy technologie zal de elektronische omgeving moeten worden onderworpen aan mijn wil.	po2
56	Als gevolg van verbetering van de privacy ervaar ik perfecte controle over de activiteiten op mijn mobiele apparaat.	po3

## 10. Appendix D reliability analyses

Scale: privacy concerns

### Reliability Statistics

Cronbach's Alpha	N of Items
,848	21

### Item-Total Statistics

	Cronbach's Alpha if Item Deleted
dc1	,840
dc2	,848
dc3	,838
dc4	,832
dac1	,839
dac2	,846
dac3	,843
usu1	,850
usu2	,842
usu3	,842
usu4	,846
ia1	,839
ia2	,847
ia3	,845
lt1	,853
lt2	,828
lt3	,839
lt4	,842
aw1	,838
aw2	,841
aw3	,842

Scale: m-commerce engagement

### Reliability Statistics

Cronbach's Alpha	N of Items
,849	30

**Item-Total Statistics**

	Cronbach's Alpha if Item Deleted
co1	,837
co2	,836
co3	,838
co4	,838
co5	,838
co6	,835
co7	,834
co8	,847
co9	,849
co10	,845
co11	,850
af1	,848
af2	,847
af3	,849
af4	,850
af5	,850
af6	,850
af7	,859
af8	,849
af9	,850
af10	,853
af11	,852
af12	,852
af13	,850
af14	,834
af15	,841
af16	,847
con1	,836
con2	,837
con3	,843

Scale: control

**Reliability Statistics**

Cronbach's Alpha	N of Items
,574	5



**Item-Total Statistics**

	Cronbach's Alpha if Item Deleted
in1	,493
in2	,514
po1	,582
po2	,466
po3	,532

## 11. Appendix E factor analyses

Scale: privacy concerns

**Correlation Matrix**

		dc1	dc2	dc3	dc4	dac1	dac2	dac3	usu1	usu2	usu3	usu4
Correlation	dc1	1,000	,398	,669	,473	,130	,170	,187	-,034	,093	,172	-,021
	dc2	,398	1,000	,388	,214	,154	,166	,068	,127	-,025	,168	,156
	dc3	,669	,388	1,000	,573	,333	,278	,208	-,074	,162	,273	-,113
	dc4	,473	,214	,573	1,000	,393	,199	,320	-,064	,257	,226	,017
	dac1	,130	,154	,333	,393	1,000	,284	,366	,092	,301	,129	,216
	dac2	,170	,166	,278	,199	,284	1,000	,501	-,007	,184	,243	,123
	dac3	,187	,068	,208	,320	,366	,501	1,000	-,053	,252	,205	,197
	usu1	-,034	,127	-,074	-,064	,092	-,007	-,053	1,000	,368	,242	,297
	usu2	,093	-,025	,162	,257	,301	,184	,252	,368	1,000	,540	,382
	usu3	,172	,168	,273	,226	,129	,243	,205	,242	,540	1,000	,402
	usu4	-,021	,156	-,113	,017	,216	,123	,197	,297	,382	,402	1,000
	ia1	,143	,150	,250	,351	,419	,057	,164	,257	,226	,175	,235
	ia2	,233	-,057	,068	,118	,142	,085	,065	,133	,185	,188	,215
	ia3	,125	,095	,044	,357	,186	-,038	,202	,140	,139	,028	,204
	lt1	,200	-,097	,090	,214	,095	,041	,237	-,004	,039	,014	,035
	lt2	,378	,131	,492	,551	,404	,224	,248	,105	,428	,406	,223
	lt3	,392	,203	,413	,450	,247	,066	,041	,026	,210	,206	,071
	lt4	,140	,122	,191	,302	,159	,072	,086	,033	,118	,268	,170
	aw1	,179	,048	,183	,340	,349	,174	,331	,219	,275	,312	,284
	aw2	,167	,191	,193	,334	,347	,165	,158	,128	,324	,210	,294
aw3	,152	,183	,180	,357	,352	,091	,129	,257	,041	-,020	,191	

**Correlation Matrix**

		ia1	ia2	ia3	lt1	lt2	lt3	lt4	aw1	aw2	aw3
Correlation	dc1	,143	,233	,125	,200	,378	,392	,140	,179	,167	,152
	dc2	,150	-,057	,095	-,097	,131	,203	,122	,048	,191	,183
	dc3	,250	,068	,044	,090	,492	,413	,191	,183	,193	,180
	dc4	,351	,118	,357	,214	,551	,450	,302	,340	,334	,357
	dac1	,419	,142	,186	,095	,404	,247	,159	,349	,347	,352
	dac2	,057	,085	-,038	,041	,224	,066	,072	,174	,165	,091
	dac3	,164	,065	,202	,237	,248	,041	,086	,331	,158	,129
	usu1	,257	,133	,140	-,004	,105	,026	,033	,219	,128	,257
	usu2	,226	,185	,139	,039	,428	,210	,118	,275	,324	,041

usu3	,175	,188	,028	,014	,406	,206	,268	,312	,210	-.020
usu4	,235	,215	,204	,035	,223	,071	,170	,284	,294	,191
ia1	1,000	,273	,541	,172	,361	,179	,313	,262	,405	,372
ia2	,273	1,000	,268	,201	,191	,024	,057	,197	,161	,198
ia3	,541	,268	1,000	,107	,136	,126	,171	,283	,272	,339
lt1	,172	,201	,107	1,000	,282	,228	,186	,124	,203	-.030
lt2	,361	,191	,136	,282	1,000	,670	,439	,394	,397	,236
lt3	,179	,024	,126	,228	,670	1,000	,393	,206	,265	,309
lt4	,313	,057	,171	,186	,439	,393	1,000	,264	,324	,346
aw1	,262	,197	,283	,124	,394	,206	,264	1,000	,387	,403
aw2	,405	,161	,272	,203	,397	,265	,324	,387	1,000	,332
aw3	,372	,198	,339	-.030	,236	,309	,346	,403	,332	1,000

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,740
Bartlett's Test of Sphericity	Approx. Chi-Square	781,133
	df	210
	Sig.	,000

**Communalities**

	Initial	Extraction
dc1	1,000	,781
dc2	1,000	,673
dc3	1,000	,786
dc4	1,000	,650
dac1	1,000	,530
dac2	1,000	,643
dac3	1,000	,744
usu1	1,000	,556
usu2	1,000	,658
usu3	1,000	,711
usu4	1,000	,555
ia1	1,000	,599
ia2	1,000	,635
ia3	1,000	,627
lt1	1,000	,596
lt2	1,000	,782
lt3	1,000	,704
lt4	1,000	,552
aw1	1,000	,459
aw2	1,000	,445
aw3	1,000	,660

Extraction Method: Principal  
Component Analysis.

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5,563	26,491	26,491	5,563	26,491	26,491
2	2,163	10,299	36,790	2,163	10,299	36,790
3	1,688	8,040	44,830	1,688	8,040	44,830
4	1,431	6,816	51,646	1,431	6,816	51,646
5	1,345	6,407	58,053	1,345	6,407	58,053
6	1,155	5,499	63,552	1,155	5,499	63,552
7	,915	4,356	67,907			
8	,847	4,033	71,940			
9	,806	3,840	75,780			
10	,749	3,567	79,347			
11	,692	3,296	82,642			
12	,642	3,056	85,698			
13	,567	2,699	88,397			
14	,446	2,125	90,522			
15	,384	1,831	92,353			
16	,374	1,780	94,132			
17	,318	1,516	95,649			
18	,294	1,400	97,048			
19	,238	1,135	98,184			
20	,215	1,023	99,207			
21	,167	,793	100,000			

Extraction Method: Principal Component Analysis.

**Component Matrix<sup>a</sup>**

	Component					
	1	2	3	4	5	6
dc1	,517	-,546	,024	-,093	,109	,442
dc2	,336	-,267	,023	-,264	,639	,099
dc3	,589	-,604	,116	-,078	,174	,158
dc4	,709	-,345	-,125	,107	-,031	,000
dac1	,598	,056	,005	,302	,159	-,230
dac2	,364	-,107	,504	,425	,221	-,121
dac3	,452	-,003	,340	,645	,036	-,087
usu1	,241	,552	,028	-,350	,214	,154
usu2	,514	,372	,450	-,168	-,141	,065
usu3	,498	,207	,551	-,319	-,062	,105
usu4	,389	,581	,214	-,116	,085	,000
ia1	,599	,253	-,385	,079	,075	,129
ia2	,333	,258	-,105	,134	-,164	,633
ia3	,434	,274	-,499	,222	,094	,238

lt1	,293	-,098	-,100	,237	-,629	,199
lt2	,771	-,158	,107	-,196	-,314	-,117
lt3	,583	-,342	-,111	-,369	-,248	-,194
lt4	,505	-,018	-,211	-,245	-,232	-,372
aw1	,596	,246	-,011	,134	-,004	-,159
aw2	,604	,183	-,134	-,006	-,033	-,166
aw3	,516	,139	-,480	,020	,300	-,234

Extraction Method: Principal Component Analysis.

a. 6 components extracted.

After deleting aw1

Communalities		
	Initial	Extraction
dc1	1,000	,812
dc2	1,000	,670
dc3	1,000	,778
dac1	1,000	,555
dac2	1,000	,665
dac3	1,000	,738
usu1	1,000	,548
usu2	1,000	,686
usu3	1,000	,715
usu4	1,000	,551
ia1	1,000	,632
ia2	1,000	,649
ia3	1,000	,613
lt1	1,000	,623
lt2	1,000	,782
lt3	1,000	,716
lt4	1,000	,569
aw2	1,000	,455
aw3	1,000	,635

Extraction Method: Principal  
Component Analysis.

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings <sup>a</sup>
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4,796	25,244	25,244	4,796	25,244	25,244	2,822
2	2,025	10,660	35,903	2,025	10,660	35,903	2,566
3	1,673	8,803	44,706	1,673	8,803	44,706	2,752
4	1,411	7,424	52,131	1,411	7,424	52,131	2,401
5	1,344	7,076	59,207	1,344	7,076	59,207	1,395
6	1,143	6,014	65,221	1,143	6,014	65,221	2,690
7	,890	4,684	69,904				
8	,799	4,204	74,108				
9	,784	4,128	78,237				
10	,712	3,747	81,983				
11	,651	3,427	85,410				
12	,587	3,088	88,499				
13	,477	2,510	91,009				
14	,380	2,000	93,009				
15	,346	1,823	94,833				
16	,306	1,609	96,442				
17	,264	1,390	97,832				
18	,231	1,216	99,048				
19	,181	,952	100,000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

**Component Matrix<sup>a</sup>**

	Component					
	1	2	3	4	5	6
dc1	,506	-,569				,466
dc2	,357				,639	
dc3	,574	-,624				
dac1	,596			,326		
dac2	,375		,491	,438		
dac3	,435		,359	,636		
usu1		,526		-,334		
usu2	,537	,342	,477			
usu3	,519		,544	-,340		
usu4	,429	,537				
ia1	,617		-,372			
ia2	,351					,625
ia3	,417	,338	-,457			





dc3	,388	-,833		,352		
dac1	,377			,614		,423
dac2				,784		
dac3				,836		
usu1			,621			,354
usu2			,788	,301		
usu3			,767			
usu4			,687			,329
ia1	,313					,757
ia2			,347		-,531	,443
ia3						,766
lt1					-,736	
lt2	,753	-,427	,400	,346		
lt3	,785	-,438				
lt4	,735					
aw2	,494		,332	,302		,474
aw3	,402					,685

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

**Component Correlation Matrix**

Component	1	2	3	4	5	6
1	1,000	-,212	,140	,215	-,030	,185
2	-,212	1,000	-,105	-,179	,052	-,087
3	,140	-,105	1,000	,169	-,041	,230
4	,215	-,179	,169	1,000	-,060	,102
5	-,030	,052	-,041	-,060	1,000	-,023
6	,185	-,087	,230	,102	-,023	1,000

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

Scale: m-commerce engagement

**Correlation Matrix**

	co1	co2	co3	co4	co5	co6	co7	co8	co9	co10	co11
Correlation co1	1,000	,448	,472	,383	,406	,388	,619	,168	,116	,254	,085
co2	,448	1,000	,541	,486	,499	,639	,529	,096	-,004	,155	-,044
co3	,472	,541	1,000	,815	,537	,637	,441	-,049	-,159	,010	-,084
co4	,383	,486	,815	1,000	,514	,644	,443	,144	,035	,125	,008
co5	,406	,499	,537	,514	1,000	,623	,447	,128	,086	,123	,024

co6	,388	,639	,637	,644	,623	1,000	,595	,159	-,016	,148	,009
co7	,619	,529	,441	,443	,447	,595	1,000	,195	,125	,308	,032
co8	,168	,096	-,049	,144	,128	,159	,195	1,000	,756	,669	,662
co9	,116	-,004	-,159	,035	,086	-,016	,125	,756	1,000	,611	,684
co10	,254	,155	,010	,125	,123	,148	,308	,669	,611	1,000	,664
co11	,085	-,044	-,084	,008	,024	,009	,032	,662	,684	,664	1,000
af1	,251	,306	,303	,131	,226	,100	,253	-,299	-,218	-,166	-,231
af2	,233	,313	,326	,145	,277	,283	,212	-,340	-,342	-,171	-,248
af3	,177	,338	,300	,151	,177	,146	,195	-,385	-,294	-,233	-,382
af4	,166	,279	,227	,121	,094	,069	,173	-,335	-,312	-,249	-,323
af5	,096	,183	,119	,077	,111	,111	,182	-,323	-,308	-,246	-,275
af6	,136	,100	,059	-,008	,097	-,033	,086	-,098	-,049	,004	-,141
af7	-,111	-,081	,050	,030	-,233	-,011	-,141	-,009	-,037	-,094	-,031
af8	,280	,261	,329	,168	,182	,131	,362	-,416	-,252	-,183	-,317
af9	,042	,026	-,107	-,058	,058	,041	,106	,344	,350	,201	,248
af10	,013	-,060	-,096	-,003	-,080	,039	,082	,212	,151	,159	,197
af11	,115	,127	,212	,116	,012	-,031	,196	-,325	-,293	-,216	-,297
af12	,039	-,134	-,001	,030	-,007	,087	,004	,277	,166	,123	,289
af13	,048	,036	-,054	,079	,134	,173	,163	,462	,398	,430	,467
af14	,518	,501	,436	,486	,430	,637	,625	,229	,120	,247	,133
af15	,274	,288	,182	,324	,244	,408	,307	,352	,163	,428	,225
af16	,120	,158	,096	,221	,218	,232	,140	,426	,374	,364	,463
con1	,434	,407	,187	,221	,297	,426	,552	,351	,186	,442	,187
con2	,324	,356	,177	,297	,311	,405	,404	,544	,349	,552	,323
con3	,244	,263	,204	,190	,293	,291	,362	,305	,253	,332	,237

		af1	af2	af3	af4	af5	af6	af7	af8	af9
Correlation	co1	,251	,233	,177	,166	,096	,136	-,111	,280	,042
	co2	,306	,313	,338	,279	,183	,100	-,081	,261	,026
	co3	,303	,326	,300	,227	,119	,059	,050	,329	-,107
	co4	,131	,145	,151	,121	,077	-,008	,030	,168	-,058
	co5	,226	,277	,177	,094	,111	,097	-,233	,182	,058
	co6	,100	,283	,146	,069	,111	-,033	-,011	,131	,041
	co7	,253	,212	,195	,173	,182	,086	-,141	,362	,106
	co8	-,299	-,340	-,385	-,335	-,323	-,098	-,009	-,416	,344
	co9	-,218	-,342	-,294	-,312	-,308	-,049	-,037	-,252	,350
	co10	-,166	-,171	-,233	-,249	-,246	,004	-,094	-,183	,201

co11	-.231	-.248	-.382	-.323	-.275	-.141	-.031	-.317	.248
af1	1,000	,631	,792	,700	,505	,571	-.195	,510	-.280
af2	,631	1,000	,742	,606	,502	,380	-.119	,483	-.193
af3	,792	,742	1,000	,834	,636	,518	-.122	,542	-.339
af4	,700	,606	,834	1,000	,713	,576	-.124	,496	-.360
af5	,505	,502	,636	,713	1,000	,579	-.078	,388	-.274
af6	,571	,380	,518	,576	,579	1,000	-.188	,338	-.223
af7	-.195	-.119	-.122	-.124	-.078	-.188	1,000	-.046	,171
af8	,510	,483	,542	,496	,388	,338	-.046	1,000	-.222
af9	-.280	-.193	-.339	-.360	-.274	-.223	,171	-.222	1,000
af10	-.394	-.301	-.453	-.417	-.321	-.333	,068	-.160	,587
af11	,506	,458	,531	,488	,340	,299	-.156	,566	-.344
af12	-.371	-.331	-.510	-.406	-.247	-.279	,174	-.308	,412
af13	-.405	-.421	-.509	-.439	-.307	-.296	,098	-.295	,359
af14	,178	,259	,111	,051	,150	,055	-.012	,225	,167
af15	-.087	,035	-.092	-.119	-.025	-.032	,084	-.062	,133
af16	-.366	-.250	-.385	-.304	-.261	-.276	,093	-.218	,362
con1	,148	,124	,067	,076	,135	,222	-.145	,073	,136
con2	-.082	-.048	-.187	-.140	-.135	-.047	-.042	-.124	,256
con3	-.079	-.030	-.131	-.198	-.209	-.186	,004	-.049	,250

		af10	af11	af12	af13	af14	af15	af16	con1	con2	con3
Correlation	co1	,013	,115	,039	,048	,518	,274	,120	,434	,324	,244
	co2	-.060	,127	-.134	,036	,501	,288	,158	,407	,356	,263
	co3	-.096	,212	-.001	-.054	,436	,182	,096	,187	,177	,204
	co4	-.003	,116	,030	,079	,486	,324	,221	,221	,297	,190
	co5	-.080	,012	-.007	,134	,430	,244	,218	,297	,311	,293
	co6	,039	-.031	,087	,173	,637	,408	,232	,426	,405	,291
	co7	,082	,196	,004	,163	,625	,307	,140	,552	,404	,362
	co8	,212	-.325	,277	,462	,229	,352	,426	,351	,544	,305
	co9	,151	-.293	,166	,398	,120	,163	,374	,186	,349	,253
	co10	,159	-.216	,123	,430	,247	,428	,364	,442	,552	,332
	co11	,197	-.297	,289	,467	,133	,225	,463	,187	,323	,237
	af1	-.394	,506	-.371	-.405	,178	-.087	-.366	,148	-.082	-.079
	af2	-.301	,458	-.331	-.421	,259	,035	-.250	,124	-.048	-.030
	af3	-.453	,531	-.510	-.509	,111	-.092	-.385	,067	-.187	-.131
	af4	-.417	,488	-.406	-.439	,051	-.119	-.304	,076	-.140	-.198

af5	-.321	,340	-.247	-.307	,150	-.025	-.261	,135	-.135	-.209
af6	-.333	,299	-.279	-.296	,055	-.032	-.276	,222	-.047	-.186
af7	,068	-.156	,174	,098	-.012	,084	,093	-.145	-.042	,004
af8	-.160	,566	-.308	-.295	,225	-.062	-.218	,073	-.124	-.049
af9	,587	-.344	,412	,359	,167	,133	,362	,136	,256	,250
af10	1,000	-.327	,542	,375	,033	,180	,200	,006	,106	,123
af11	-.327	1,000	-.373	-.325	,099	-.074	-.284	,086	,001	-.026
af12	,542	-.373	1,000	,430	,056	,120	,421	,103	,197	,216
af13	,375	-.325	,430	1,000	,137	,241	,542	,083	,277	,311
af14	,033	,099	,056	,137	1,000	,446	,235	,509	,468	,340
af15	,180	-.074	,120	,241	,446	1,000	,339	,516	,515	,320
af16	,200	-.284	,421	,542	,235	,339	1,000	,272	,470	,480
con1	,006	,086	,103	,083	,509	,516	,272	1,000	,666	,455
con2	,106	,001	,197	,277	,468	,515	,470	,666	1,000	,591
con3	,123	-.026	,216	,311	,340	,320	,480	,455	,591	1,000

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,812
Bartlett's Test of Sphericity	Approx. Chi-Square	1901,363
	df	435
	Sig.	,000

#### Communalities

	Initial	Extraction
co1	1,000	,547
co2	1,000	,590
co3	1,000	,828
co4	1,000	,774
co5	1,000	,669
co6	1,000	,815
co7	1,000	,719
co8	1,000	,794
co9	1,000	,810
co10	1,000	,739
co11	1,000	,749
af1	1,000	,733
af2	1,000	,611
af3	1,000	,837
af4	1,000	,792
af5	1,000	,734

af6	1,000	,690
af7	1,000	,846
af8	1,000	,732
af9	1,000	,667
af10	1,000	,748
af11	1,000	,705
af12	1,000	,603
af13	1,000	,535
af14	1,000	,620
af15	1,000	,598
af16	1,000	,531
con1	1,000	,800
con2	1,000	,778
con3	1,000	,587

Extraction Method: Principal  
Component Analysis.

### Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings <sup>a</sup>
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7,565	25,216	25,216	7,565	25,216	25,216	5,485
2	6,621	22,070	47,286	6,621	22,070	47,286	5,252
3	2,278	7,594	54,880	2,278	7,594	54,880	5,110
4	1,392	4,640	59,520	1,392	4,640	59,520	4,101
5	1,198	3,993	63,513	1,198	3,993	63,513	4,848
6	1,121	3,735	67,248	1,121	3,735	67,248	1,667
7	1,004	3,348	70,596	1,004	3,348	70,596	3,439
8	,928	3,093	73,689				
9	,818	2,727	76,416				
10	,698	2,328	78,744				
11	,690	2,301	81,044				
12	,602	2,008	83,053				
13	,548	1,826	84,878				
14	,529	1,764	86,642				
15	,482	1,607	88,249				
16	,420	1,401	89,650				
17	,407	1,358	91,008				

18	,363	1,209	92,216				
19	,348	1,160	93,377				
20	,301	1,005	94,382				
21	,274	,914	95,295				
22	,257	,856	96,151				
23	,213	,711	96,862				
24	,184	,612	97,475				
25	,173	,576	98,051				
26	,165	,552	98,602				
27	,148	,494	99,096				
28	,120	,402	99,498				
29	,086	,286	99,784				
30	,065	,216	100,000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

### Component Matrix<sup>a</sup>

	Component						
	1	2	3	4	5	6	7
co1	-,037	,675	-,007	,072	,116	-,242	,113
co2	-,141	,730	-,151	-,081	,035	,002	-,082
co3	-,216	,663	-,452	-,282	,171	,050	,162
co4	-,025	,669	-,387	-,352	,164	,128	,090
co5	-,034	,670	-,186	-,240	,184	-,162	-,257
co6	,031	,771	-,373	-,138	,044	,095	-,225
co7	-,019	,781	-,039	,165	,018	-,270	,078
co8	,689	,317	,412	-,147	,143	,087	,013
co9	,600	,186	,512	-,148	,297	-,043	,204
co10	,544	,410	,502	-,108	,025	-,008	,103
co11	,628	,170	,448	-,146	,261	,067	,178
af1	-,724	,336	,243	,085	,152	-,037	,069
af2	-,667	,371	,039	,147	,039	,065	-,012
af3	-,834	,292	,168	,048	,109	,105	,057
af4	-,785	,240	,223	,106	,149	,186	,000
af5	-,652	,212	,178	,244	,163	,308	-,227
af6	-,528	,191	,498	,149	,212	,161	-,182
af7	,145	-,126	-,322	,173	-,002	,683	,456
af8	-,605	,310	-,062	,225	,049	-,213	,409
af9	,547	,093	-,095	,531	,255	-,052	,006
af10	,538	-,028	-,288	,518	,242	-,216	-,043

af11	-,612	,191	,115	,077	-,277	-,184	,405
af12	,584	,015	-,269	,368	,197	,080	-,095
af13	,684	,159	-,042	,024	,180	,009	,081
af14	,062	,768	-,104	,118	-,036	,024	,004
af15	,306	,537	,037	,095	-,294	,317	-,136
af16	,616	,327	-,051	-,002	-,045	,183	,083
con1	,147	,689	,288	,247	-,344	,030	-,204
con2	,429	,632	,198	,065	-,382	,062	-,035
con3	,379	,492	-,004	,108	-,395	-,092	,159

Extraction Method: Principal Component Analysis.

a. 7 components extracted.

### Pattern Matrix<sup>a</sup>

	Component						
	1	2	3	4	5	6	7
co1	-,088	,398	,160	,167	-,100	-,179	,356
co2	-,146	,600	-,027	-,008	-,209	-,080	,055
co3	,040	,903	-,035	-,098	,131	,141	,167
co4	,072	,902	,085	-,130	,061	,152	,008
co5	-,035	,744	,024	,019	-,005	-,315	-,118
co6	-,033	,801	-,140	,068	-,244	-,036	-,174
co7	-,070	,386	,060	,230	-,265	-,211	,388
co8	,009	,050	,767	,015	-,168	-,016	-,163
co9	-,014	-,036	,934	,023	,107	-,034	,053
co10	-,002	-,026	,744	-,070	-,278	-,073	,037
co11	-,013	-,019	,875	,018	,053	,059	-,031
af1	-,604	,103	,024	-,119	,084	-,092	,319
af2	-,529	,170	-,202	-,049	-,073	-,002	,213
af3	-,647	,137	-,083	-,208	,071	,029	,247
af4	-,745	,062	-,049	-,147	,058	,064	,154
af5	-,852	,017	-,159	,046	-,061	,072	-,103
af6	-,838	-,130	,183	-,055	-,011	-,097	-,042
af7	-,061	,003	-,001	,094	-,031	,926	,059
af8	-,220	,107	-,129	,056	,113	,040	,711
af9	-,065	-,109	,115	,793	-,035	,057	,054
af10	,132	-,063	-,087	,860	,075	-,058	,059
af11	-,062	-,129	-,146	-,299	-,140	,016	,670
af12	,060	,029	-,014	,671	-,033	,136	-,170
af13	,218	,142	,393	,313	,000	,084	-,067
af14	-,123	,433	,026	,163	-,387	,005	,151
af15	-,075	,120	,021	,004	-,705	,164	-,185

af16	,197	,173	,293	,138	-,303	,213	-,089
con1	-,213	-,046	,031	,060	-,831	-,167	,016
con2	,106	,033	,186	-,046	-,784	-,030	,023
con3	,329	,024	,043	,023	-,621	,007	,259

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 10 iterations.

### Structure Matrix

	Component						
	1	2	3	4	5	6	7
co1	-,187	,564	,192	,162	-,388	-,276	,452
co2	-,271	,717	,030	,009	-,438	-,176	,273
co3	-,157	,865	-,086	-,072	-,185	,064	,351
co4	-,050	,854	,085	-,012	-,273	,089	,171
co5	-,150	,749	,100	,065	-,316	-,359	,100
co6	-,111	,860	,031	,154	-,504	-,082	,058
co7	-,188	,622	,168	,228	-,535	-,312	,502
co8	,267	,120	,863	,320	-,439	-,048	-,271
co9	,231	-,007	,892	,268	-,212	-,080	-,120
co10	,158	,130	,813	,204	-,516	-,144	-,049
co11	,256	,001	,860	,280	-,236	,022	-,197
af1	-,771	,227	-,251	-,394	,032	-,267	,553
af2	-,692	,306	-,364	-,301	-,073	-,146	,466
af3	-,833	,234	-,385	-,502	,078	-,149	,519
af4	-,854	,161	-,345	-,449	,081	-,112	,419
af5	-,836	,126	-,344	-,260	-,001	-,073	,182
af6	-,794	-,004	-,055	-,298	-,009	-,259	,183
af7	,133	-,023	-,036	,151	,018	,911	-,066
af8	-,466	,251	-,328	-,193	,045	-,090	,801
af9	,251	-,011	,335	,802	-,206	,105	-,109
af10	,385	-,033	,178	,843	-,071	,050	-,126
af11	-,392	,054	-,330	-,456	-,034	-,111	,746
af12	,364	,035	,243	,737	-,160	,227	-,310
af13	,452	,135	,564	,539	-,246	,132	-,235
af14	-,163	,646	,173	,221	-,610	-,090	,289
af15	,011	,348	,273	,193	-,729	,110	-,099
af16	,373	,252	,507	,409	-,476	,224	-,188
con1	-,207	,323	,279	,157	-,850	-,270	,154
con2	,130	,333	,469	,216	-,856	-,092	,048
con3	,271	,277	,310	,245	-,675	-,018	,205



Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

### Component Correlation Matrix

Component	1	2	3	4	5	6	7
1	1,000	-,140	,274	,346	-,009	,194	-,312
2	-,140	1,000	,055	,076	-,382	-,072	,227
3	,274	,055	1,000	,307	-,342	-,052	-,171
4	,346	,076	,307	1,000	-,219	,087	-,169
5	-,009	-,382	-,342	-,219	1,000	,080	-,089
6	,194	-,072	-,052	,087	,080	1,000	-,142
7	-,312	,227	-,171	-,169	-,089	-,142	1,000

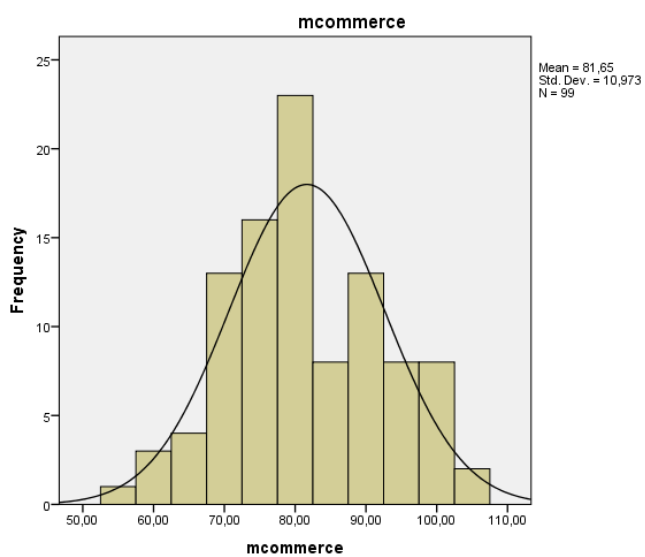
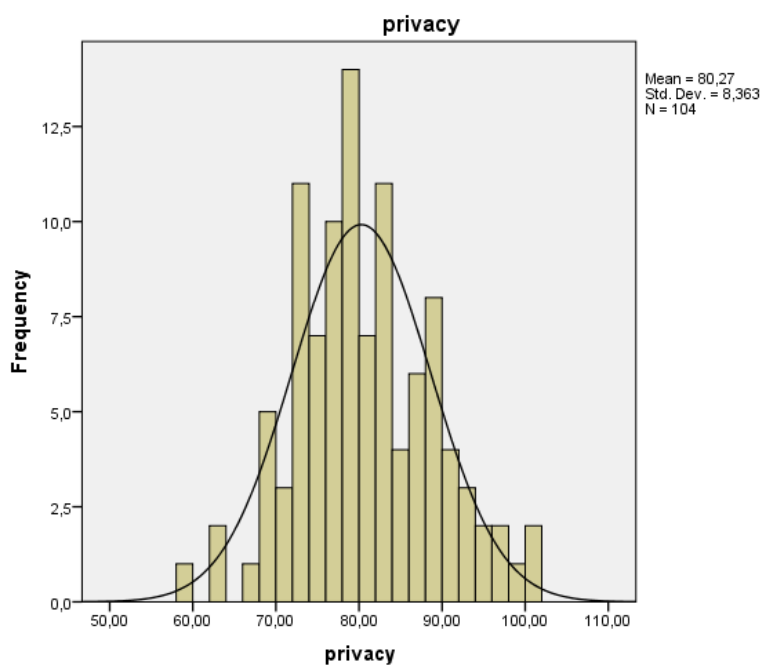
Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

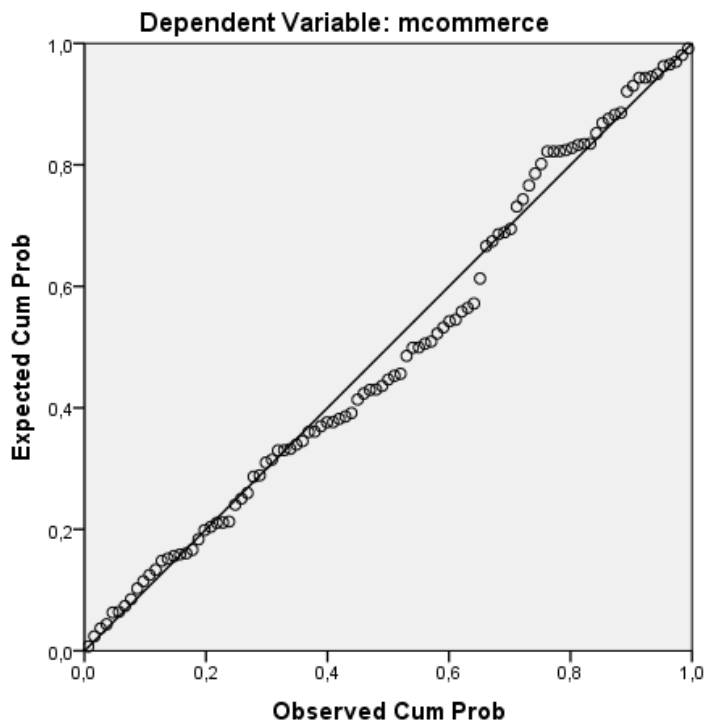
## 12. Appendix F assumptions

Normality:

Statistics			
		privacy	mcommerce
N	Valid	104	99
	Missing	1	6
Skewness		,188	,113
Std. Error of Skewness		,237	,243
Kurtosis		-,074	-,474
Std. Error of Kurtosis		,469	,481

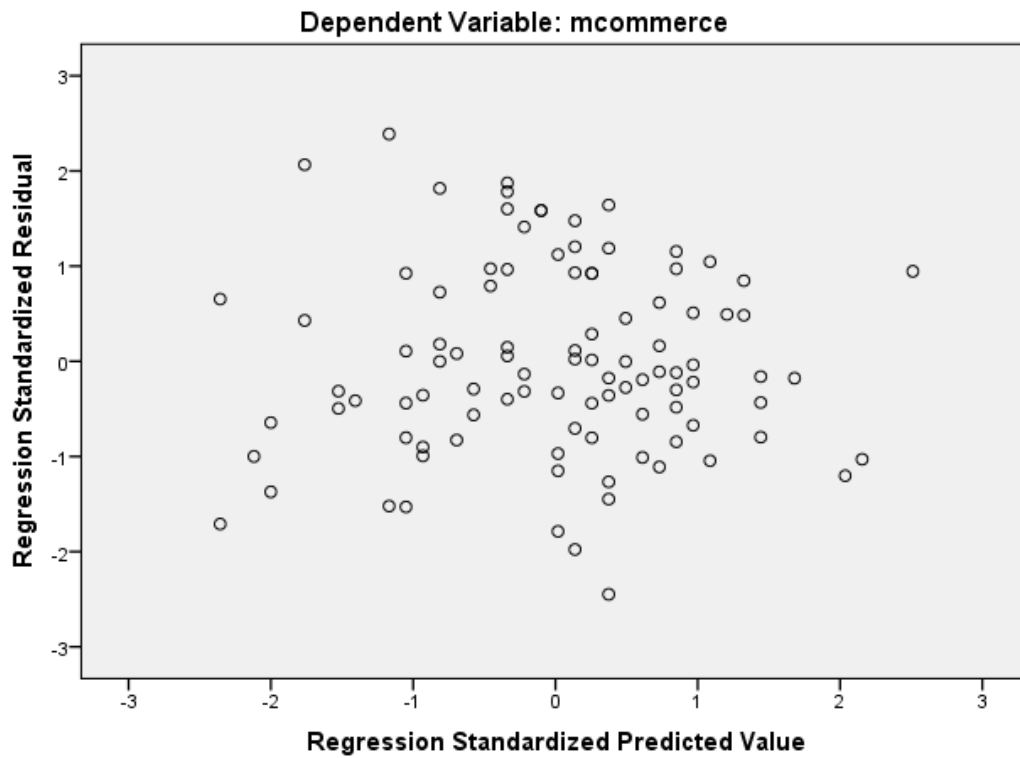


Normal P-P Plot of Regression Standardized Residual



Homoscedasticity en linearity:

Scatterplot



### 13. Appendix G linear regression analyses

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,280 <sup>a</sup>	,078	,018	10,87379

a. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacollection, datacontrol, improperaccess, locationtracking

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	922,605	6	153,767	1,300	,265 <sup>b</sup>
	Residual	10878,022	92	118,239		
	Total	11800,626	98			

a. Dependent Variable: mcommerce

b. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacollection, datacontrol, improperaccess, locationtracking

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	100,103	11,854		8,445	,000
	datacollection	,956	,456	,259	2,098	,039
	datacontrol	-1,039	,705	-,173	-1,474	,144
	unauthorizedsecondaryuse	-,425	,555	-,084	-,765	,446
	improperaccess	-,665	,833	-,096	-,798	,427
	locationtracking	-,191	,470	-,049	-,407	,685
	awareness	-,170	1,220	-,017	-,139	,890

a. Dependent Variable: mcommerce

## 13. Appendix H regression analyses after changing measurement scale

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,270 <sup>a</sup>	,073	,014	,50593

a. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacontrol, locationtracking, improperaccess, datacollection

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,915	6	,319	1,247	,290 <sup>b</sup>
	Residual	24,317	95	,256		
	Total	26,232	101			

a. Dependent Variable: conative

b. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacontrol, locationtracking, improperaccess, datacollection

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,511	,547		6,413	,000
	datacollection	-,011	,020	-,067	-,556	,580
	datacontrol	-,030	,031	-,107	-,970	,335
	unauthorizedsecondaryuse	,006	,025	,024	,225	,822
	improperaccess	,039	,036	,125	1,072	,287
	locationtracking	-,032	,022	-,173	-1,450	,150
	awareness	-,027	,055	-,058	-,486	,628

a. Dependent Variable: conative

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,426 <sup>a</sup>	,181	,129	,63413

a. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacollection, datacontrol, improperaccess, locationtracking

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8,449	6	1,408	3,502	,004 <sup>b</sup>
	Residual	38,201	95	,402		
	Total	46,650	101			

a. Dependent Variable: affective

b. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacollection, datacontrol, improperaccess, locationtracking

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,010	,678		4,442	,000
	datacollection	,034	,025	,152	1,346	,181
	datacontrol	-,068	,039	-,184	-1,760	,082
	unauthorizedsecondaryuse	-,102	,032	-,328	-3,197	,002
	improperaccess	,056	,046	,133	1,213	,228
	locationtracking	,046	,027	,189	1,685	,095
	awareness	-,068	,068	-,113	-1,000	,320

a. Dependent Variable: affective

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,293 <sup>a</sup>	,086	,029	,79081

a. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacollection, datacontrol, locationtracking, improperaccess

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,653	6	,942	1,506	,184 <sup>b</sup>
	Residual	60,037	96	,625		
	Total	65,689	102			

a. Dependent Variable: cognitive

b. Predictors: (Constant), awareness, unauthorizedsecondaryuse, datacollection, datacontrol, locationtracking, improperaccess

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	3,352	,842		3,979	,000
	datacollection	,075	,032	,279	2,368	,020
	datacontrol	-,039	,048	-,091	-,822	,413
	unauthorizedsecondaryuse	-,033	,039	-,092	-,855	,394
	improperaccess	-,086	,060	-,170	-1,440	,153
	locationtracking	-,018	,034	-,064	-,541	,590
	awareness	,018	,088	,025	,207	,837

a. Dependent Variable: cognitive

## 14. Appendix I regression analyses moderator

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,084 <sup>a</sup>	,007	-,023	,51555

a. Predictors: (Constant), UnauthorizedControl, ControlCentr, UnauthorizedCentr

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,184	3	,061	,231	,874 <sup>b</sup>
	Residual	26,048	98	,266		
	Total	26,232	101			

a. Dependent Variable: conative

b. Predictors: (Constant), UnauthorizedControl, ControlCentr, UnauthorizedCentr

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,876	,054		53,098	,000
	ControlCentr	,015	,021	,080	,730	,467
	UnauthorizedCentr	-,018	,028	-,076	-,642	,522
	UnauthorizedControl	-,001	,008	-,021	-,192	,848

a. Dependent Variable: conative

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,295 <sup>a</sup>	,087	,059	,65929

a. Predictors: (Constant), UnauthorizedControl, ControlCentr, UnauthorizedCentr

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4,054	3	1,351	3,109	,030 <sup>b</sup>
	Residual	42,596	98	,435		
	Total	46,650	101			

a. Dependent Variable: affective

b. Predictors: (Constant), UnauthorizedControl, ControlCentr, UnauthorizedCentr



### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	1,755	,069		25,545	,000
	ControlCentr	,005	,026	,021	,200	,842
	UnauthorizedCentr	-,093	,034	-,301	-2,720	,008
	UnauthorizedControl	,000	,010	,002	,022	,982

a. Dependent Variable: affective

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,146 <sup>a</sup>	,021	-,008	,80583

a. Predictors: (Constant), UnauthorizedControl, ControlCentr, UnauthorizedCentr

### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,402	3	,467	,720	,543 <sup>b</sup>
	Residual	64,288	99	,649		
	Total	65,689	102			

a. Dependent Variable: cognitive

b. Predictors: (Constant), UnauthorizedControl, ControlCentr, UnauthorizedCentr

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	2,193	,083		26,420	,000
	ControlCentr	,018	,033	,058	,547	,586
	UnauthorizedCentr	-,058	,041	-,160	-1,413	,161
	UnauthorizedControl	-,001	,012	-,012	-,114	,910

a. Dependent Variable: cognitive