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ATTITUDES TOWARDS MOBILE PAYMENT

AN EMPIRICAL STUDY OF THE CONSUMERS' PERCEPTION OF SECURITY, PRIVACY AND
CONVENIENCE

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Abstract

Mobile payment is a new payment method that is being introduced on the Swedish market, but has not yet come to its breakthrough. This thesis investigates the attitude the Swedish consumer has towards mobile payment. Based on previous surveys and theory, three main attributes, security, privacy and convenience, were chosen to represent the attitude of the consumer towards mobile payment. In order to analyze the data obtained from the surveys conducted, the multi-attribute attitude model was used. The model showed that convenience was the most beneficial attribute in mobile payment, followed by security and then privacy. Security was the attribute that the survey participants valued the most when it comes to payment methods, but was also the attribute they thought that mobile payment would lack the most. Therefore security was determined to be the most important aspect when it comes to the success of mobile payment.

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1 Introduction

1.1 Background

The payment methods are currently developing within several different fields. Internet payment is a method that has been growing quickly and is currently frequently used and new technologies of paying in stores are being introduced on the market (Weber, R. & Darbellay 2010). The increasing amount of devices that have a potential to be used for electronic payment and the decreasing use of cash creates a demand for new payment methods (Mallat, Niina & Tuunainen 2008). Consumers all around the world are more willing to use the mobile phone for financial purposes than ever before (KPMG 2010). Financial services through mobile phones are attracting consumers because of its convenience. Mobile financial services embrace mobile payment and mobile banking. (Weber, R. & Darbellay 2010)

It is now possible to use the mobile phone for everyday purchases such as vending, ticketing, parking and to buy bus tickets (Mallat, Niina & Tuunainen 2008). These examples are different ways of using mobile payment, which can be defined as taking advantage of wireless communication and other similar technologies by using mobile devices, such as mobile phones, smart-phones, or personal digital assistants (PDAs) to pay for goods, services and bills. (Dahlberg, Tomi et al. 2008)

One of the most important reasons for the predicted rise of mobile payment is the amount of mobile phones in use and the consumers' willingness to adopt new mobile functionality (Jacob et al. 2007). Mobile payment is an evolutionary progression towards a more fluid and agile social existence (Shin 2010). Global surveys have shown that 49-61 percent of the consumers (depending on survey) want to use mobile payment (Chen 2008). Currently 30 percent of the daily trade in Sweden is conducted with mobile phones (Edberg 2010). There are several methods of paying by using a mobile phone and when summarizing these different ways of paying, basically all kinds of mobile phones that have been developed after 2004 can be used for mobile payment (Babra 2010).

It is important to consider which aspects of mobile payment that matters the most to the consumers. As with any payment system, trust is vital in mobile payment (Zmijewska, Lawrence & Steele 2004b). Two components of trust are security and privacy and more than 90 percent of the respondents to a global study made by KPMG (2010) stated that security and privacy are troubling issues when it comes to mobile payment. The concern about data

privacy had also risen compared to previous studies (KPMG 2010). The benefits of mobile payment are also a vital aspect for the question if it is going to be able to succeed or not (Linck, Pousttchi & Wiedemann 2006). In this paper, the different aspects of value creation that mobile payment brings are gathered under the term “convenience”. Therefore, the most relevant attributes in consumers’ attitudes towards mobile payment seem to be security, privacy and convenience.

According to a recent study, Swedish people are relatively disinclined to change to mobile payment. The main reason to the reluctance is that the consumers are satisfied with the current payment methods and that there is a concern about the security. (Fridh Kleberg 2010)

1.2 Problem formulation

The field of mobile payment is developing quickly and is becoming a viable payment method in Sweden, despite the consumers’ reluctance. In a literature review about mobile payment by Dahlberg *et al.*(2008, p. 179), it was stated that “[...] to improve the quality and relevance of mobile payment research, we [...] recommend that researchers collect more empirical data backed by guiding theories [...] Yet, we believe that more theory based empirical research is needed to enhance the current understanding of the mobile payment services markets”. Furthermore, previous studies on mobile payment have been measuring to what extent certain variables exist. They have, however, not taken into account how important the variable is. This is an important aspect to consider since each variable might not be of equal importance to the respondent. (Zmijewska, Lawrence & Steele 2004b) Therefore, a study analyzing to what extent an attribute exists and how important the attribute is in mobile payment, should be conducted to give a deeper insight about consumers’ attitudes towards mobile payment. The attributes that together represent the consumers’ attitude towards mobile payment are security, privacy and convenience.

1.3 Objective

The objective of this paper is to analyze the Swedish consumers’ attitude towards mobile payment. The consumers’ attitude is represented by three attributes: security, privacy and convenience. The importance of these three attributes will be determined and a comparison between them will be conducted.

1.4 Limitations

Due to proximity limitations, most of the participants in the study were business students in the Uppsala region. The main age focus of the study was people between 18 and 36.

1.5 Structure

The paper is organized as follows. Section 2 of this paper presents the theoretical framework used based on the concepts of security, privacy and convenience. In section 3 the research model is presented, as well as the tools for analyzing the empirical results. This is followed by section 4, where a description of the empirical results is given. Thereafter the data is analyzed in section 5 by using the tools presented in section 3. Section 6 discusses the results provided in the previous section. Finally, in section 7 and 8 conclusions are drawn and suggestions for further research are presented.

2 Attitudes

There are many different definitions of what an attitude is and one explanation is that an attitude is a relatively enduring evaluation of a concept (Peter & Olson 2010; Quester et al. 2007). Seen from a marketing perspective, an attitude is regarded as a “learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object” (Fishbein & Ajzen 1975, p. 6). An attitude object is anything that a person can have an attitude towards, such as physical objects, issues, people, experiences and events. Therefore an attitude can be defined as an overall evaluation of the attitude object. (Quester et al. 2007)

As with any payment system, trust is of high importance in mobile payments (Zmijewska, Lawrence & Steele 2004b). Since trust is an expression of belief it is hard to be influenced directly. Additionally, the mobility makes it even harder to build trust. (Karnouskos et al. 2004) According to Egger (2001), trust in payment systems is influenced by anonymity, security, reliability, the amount of control that users have, and the status of the one that introduces the system. Also Schierz, Schilke & Wirtz (2010) agree that when it comes to security risks when using electronic services, the likelihood of privacy invasion has been found to be a big concern among the consumers. Security and privacy are two important aspects for mobile payment, since they are critical in fostering the user’s trust towards mobile payment. (Karnouskos et al. 2004) Furthermore, it is important to improve the consumers’ perception about security and privacy since this is crucial for sustainable activity in electronic payment. (Linck, Pousttchi & Wiedemann 2006) According to Linck, Pousttchi & Wiedemann (2006), mobile payment will bring convenience to the consumer. Several studies also conclude that the convenience aspect is important for mobile payment to succeed. (Zmijewska, Lawrence & Steele 2004b) Therefore, the important aspects of security, privacy and convenience will be used in this paper to analyze the consumers’ attitude towards mobile payment.

2.1 Security

Since mobile payment is a form of electronic payment via a wireless medium it can cause security issues. For new users that are utilising mobile payment, it can imply trust problems to rely on an unfamiliar technology. There is a growing concern about risks of being hacked and identity thefts which can make consumers carefully consider whether or not to adopt the payment method unless potential security problems have been recognized and attended to. (Chen 2008) If personal information is gained by a third party without the consumers consent

or by being hacked, the credibility of the payment method can suffer. (Luarn & Lin 2005) Therefore, effort should be directed to emphasize the low risk and prioritised particularly in the introduction of mobile payment, since early negative experiences with mobile payment can have a negative impact on the adaption of upcoming mobile payment innovations. (Chen 2008)

It is essential that mobile payment solution providers and participating vendors provide a secure transaction environment. The typical requirements for data security in general also apply to mobile payments, which are confidentiality, data integrity, authentication and non-repudiation (Chen 2008; Mallat, N 2007; Shon & Swatman 1998). In a previous survey about mobile payment, Chen (2008) found that consumers had a great concern about the security issues. About 52,7 percent of the respondents did not believe that mobile payment is secure.

Dahlberg *et al.* (2003) believe that perceived security and trustworthiness of different parties significantly affect consumers' perception of a mobile payment system (Zmijewska, Lawrence & Steele 2004b). The users' lack of perceived security is according to Shin (2010) the biggest cause to why users chose to not use mobile payment.

Security refers to the safety of information, so that it is restricted to only authorized individuals. The systems and processes used to contain, control, and access information are also connected to the concept of security. (KPMG 2010)

Given the risk of being hacked, trusting the security is more critical compared to conventional payment methods (Shin 2010). Whether consumers decide to use an electronic payment method or not are highly dependent on the quality of security statements available to them. Therefore the security statements should be easy to locate. Furthermore, the statements themselves should be explicit and easy to interpret and attract the consumers' attention. If consumers do not regard the electronic payment method as secure they will not use it, and therefore measures have to be taken so that consumers trust is granted. Technical solutions can be used to make sure the users' personal information, such as names, address, and contact details, is protected. (Kim et al. 2010) A big concern when it comes to mobile payment is the risk of financial loss and this is holding the adoption of mobile payment back (Shin 2010). Furthermore, Chen (2008) considers security to be the biggest concern when it comes to mobile payment.

2.2 Privacy

Anonymity and privacy play an important role for mobile payment (Mallat, N 2007), since the users are very sensitive to sharing their personal information due to the security risks involved (Kim et al. 2010).

Privacy can be described as how personal information is managed by organizations. The information that organizations gain is obtained with the consumers' authorization to be used for specific purposes. What personal information is obtained and what the organization does with it is a part of the privacy aspect. (KPMG 2010) Sharing of this information without the consumers' permission would be a breach of privacy. It is possible to have security without privacy, but it is however not possible to have privacy without sufficient security (KPMG 2010).

In a study made by Chen (2008), the respondents showed a concern about the amount of data that is collected by companies and the ambiguity of the reason for the data collection. According to a recent global study made by KPMG (2010), consumers show more anxiety than ever over the privacy of their personal information. 79 percent expressed their concern about unauthorized access to personal data. However, the study also showed that the recipients seemed to be more open than ever to allow their personal data to be tracked. 58 percent said they would allow their personal profile information and online usage to be tracked if the outcome would be lower costs. Therefore transparent privacy policies are crucial to gain the consumers' trust. (KPMG 2010)

Chens study (2008) stated that 48,2 percent were concerned that mobile payment would put their privacy at high or very high risk. Furthermore, in another study it was shown that more than 90 percent of mobile payment users are somewhat or very concerned about both their personal privacy and information's security (KPMG 2010). The same results can be seen in a study by Pousttchi (2003) where 96 percent of the respondents indicated that confidentiality of data is important to them (Zmijewska, Lawrence & Steele 2004a). The global trend indicates that mobile payment users are in fact becoming more, not less, concerned about security and privacy and these two issues dominate the consumers' concerns about online and mobile transactions. Nevertheless, the consumers are more and more open to set the security and privacy aside in order to get the advantages and convenience of conducting their businesses with the help of their mobile. (KPMG 2010) It is important for consumers that the

information they provide, when conducting an electronic transaction, cannot be obtained by a third party. (Kim et al. 2010)

2.3 Convenience

If a product is going to be introduced to a market it needs to have customer value which would make the consumers use the product. The main advantages of using cashless payment is often said to be the increased transaction speed and the convenience (Chen 2008). In a study made by Pousttchi and Wiedemann (2005), they reported about advantages of mobile payment. According to the study, consumers benefit from mobile payment, especially when it comes to convenience. The consumers can make payment transactions from any location at any time, it is easier to handle micropayments (less than 10 EUR/USD), no cash is needed at vending machines and payment is faster. (Linck, Pousttchi & Wiedemann 2006) In a study made by Visa, it was found that purchases made through contactless technology were 25 percent faster than the once that were done with cash (Chen 2008).

There have been several empirical studies that have shown that there is a relationship between the ease of use and user acceptance in various fields. Studies have also suggested that the ease of use is an important factor for success when it comes to mobile payment. (Zmijewska, Lawrence & Steele 2004b) Mobile payments are commonly expected to increase consumer convenience by reducing the need for coins and cash in small transactions and increasing the availability of purchase possibilities (Coursaris & Hassanein 2002). It is important that mobile payment offers the user several benefits that would increase the efficiency and effectiveness and therefore increase the job performance of the consumer (Zmijewska, Lawrence & Steele 2004b). Chen (2008) also points to the increased performance as an important aspect when it comes to mobile payment. Transaction speed and that mobile payment ought to be effortless should be the main focuses (Chen 2008).

In Pousttchis (2003) study on conditions for acceptance of mobile payment procedures 83 percent of the respondents answered that it was “very important” or “important” to not have to buy a new mobile phone to use mobile payment.

Prior research on electronic funds transfer at the point of sales suggests that the relative advantages of electronic payment systems include costs savings, reduced processing of paper-based payments, such as cash and checks, speed at check-out counters, faster collection of funds, and enhanced inventory management (McFadyen 1987; Weber, M. & Kantamneni

2002). Jacob (2007) suggests that the financial information that one receives by using mobile payment devices is an important aspect since it helps record keeping and can therefore give the consumer a better possibility to stay within budget.

Another aspect that might be more of a long term aspect due to habits is that with mobile payment the consumer would only have to carry one device, the mobile phone, with them and leave the wallet at home. This should be seen as an important motivator for using mobile payment. (Bielski 2007)

2.4 Summary of theory

Since mobile payment is a new way of paying, there is unfamiliarity towards the technology. There is a concern among the consumers if this new way of paying will keep their data confidential and have enough protection against hacking to prevent that a financial loss occurs. Consumers show more anxiety than ever over their personal information, but are also willing to bend their rules about security and privacy if convenience or lower costs could be gained. The main advantage of mobile payment is the convenience it brings in form of increased transaction speed, ease of use and cost reductions.

3 Methodology

3.1 Survey structure

In order to get an understanding of the consumers' attitudes towards mobile payment, a quantitative research was performed in form of a web-based survey, see Appendix 2. The survey was created with questions from three prior research surveys that have been made about mobile payment and the questions were adapted to fit the purpose of this research. The survey was built on the three constructs chosen to investigate: security, privacy and convenience, which expanded into five statements each. The survey was structured according to the multi-attribute attitude model, which will be discussed further in section 3.5.1. The measurement items were formulated as Likert-type statements and are based on a seven-point scale, ranging from 1 ("strongly disagree") to 7 ("strongly agree") (Schierz, Schilke & Wirtz 2010). The statements and their origin can be seen in Table 2. The response categories are kept in the same order to avoid confusing the respondents. Furthermore, there are only positive statements in the survey to make the data fit better with the multi-attribute attitude model, which was used to analyze the data.

3.2 Pilot study

Two researchers, in the marketing field at Uppsala University, were consulted about the representativeness and suitability of the statements and the structure of the survey. A pilot study was also made to make sure that the respondents would be able to fill in the survey correctly so that there would be no difficulties in collecting the data. The survey was sent out to 10 people, made up of business students, friends and family. Six people who received the survey filled in the questionnaire and afterwards short interviews were held with each and one of them. The interviews were made to find out if they were recording and interpreting the statements correctly, if any pictures would have been needed to support the statements or if the respondents found it hard to make their way through the survey. This is in line with the recommendations that Saunders, Lewis & Thornhill (2009) suggests when performing a pilot study. The respondents had only minor comments and after summarizing the feedback only some small changes were made.

Table 1 – Measurement items

Construct	Item	References
Security I believe that...	...mobile payment methods have sufficient security controls to prevent fraud	(Chen 2008)
	...mobile payment services are secure in conducting payment transactions	(Schierz, Schilke & Wirtz 2010)
	...the risk of an unauthorized third party overseeing the payment process is low	(Schierz, Schilke & Wirtz 2010)
	...mobile payment methods have sufficient security controls to maintain data confidentiality	(Chen 2008)
	...mobile payment is more secure than card payment	(Chen 2008)
Privacy I believe that...	...the risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile payment services	(Schierz, Schilke & Wirtz 2010)
	...the risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile payment services	(Schierz, Schilke & Wirtz 2010)
	...the data exchanged when using mobile payment is handled confidential	(Chen 2008)
	...there is less risk involved in using mobile payment compared to card payment	(Chen 2008)
	...I will be required to provide a minimal amount of personal information when using mobile payment	(Chen 2008)
Convenience I believe that...	...there are few steps required to complete the transaction	(Zmijewska, Lawrence & Steele 2004b)
	...it is easier to use mobile payment than card payment	(Chen 2008)
	...it is easier to use mobile payment than cash	(Chen 2008)
	...the interaction with mobile payment services is clear and understandable	(Schierz, Schilke & Wirtz 2010)
	...using mobile payment will save me time	(Chen 2008)

3.3 Data collection

Uppsala was a suitable place to perform this study since there is currently a campaign running which aims to reduce the use of cash, with the slogan “Cash free Uppsala” (*Kontantfritt Uppsala* 2010). Additionally, another pilot study about mobile payment is currently going on in Uppsala, which has received medial attention. Furthermore, the mobile payment method used in that pilot study is supported by one of the biggest banks in Sweden. Because of these aspects Uppsala is a city that has advanced further in comparison to many other cities and could therefore represent a possible evolution of mobile payment in Sweden.

The survey was sent out on the 25th of November to 1005 business students at Uppsala University which were enrolled in the Bachelor in Business and Economics program on the 25th of November 2010 or studied “Business and Enterprise, Basic Course A”, in the year of 2008. On the 30th of November 2010, 123 respondents had voluntarily filled in the survey and the questionnaire was closed. The internet was used as a medium to send out the survey. The response rate was 12,2 percent which is a good result since the response rate of web survey is lower than traditional surveys (Shin 2010). Using a survey has the advantage that the data can be collected from a wide range of people in a relatively short time period and in an economical way (Saunders, Lewis & Thornhill 2009). Furthermore all the data that was collected was delivered in an electronic form, which made the transfer and analysis of the data easier. The survey was sent out by email with a short introductory presentation of the study with a hyperlink to the survey. The participants were given explicit information, that no requirements were needed to be able to take part in the survey. It was clearly stated that the respondent did not even need to have used mobile payment methods before, since what was going to be investigated was the general opinion and attitude towards mobile payment. We did not give the respondent any particular reason to fill in the survey like vouchers, other than that it would be of great value for the study.

3.4 Sample

The decision to investigate attitudes towards mobile payment, of particularly the business students, was based on the assumption that they are potential users of mobile payment. Additionally, the aim was to send out the survey to about 1000 people and since the Uppsala business students’ emails were accessible through the Uppsala University administrative office it was suitable to send it out to them for practical reasons. Because of that Uppsala was a given place to perform the study. 123 respondents participated in the survey, 47 percent

were female and 53 percent were male, ranging from the age of 18 to 36, with an average and median age of 23 years. The respondents were anonymous when filling out the survey, since we did not have any links between personal information and the survey.

3.5 Statistical tools

3.5.1 The Multi-attribute Attitude Model

The multi-attribute attitude model was used to structure the statements and to analyze the data from the survey. The previous studies have pointed out that there has been a lack in the surveys, that have been made so far, about attitudes towards mobile payment (Zmijewska, Lawrence & Steele 2004b). The aspect that has been missing when analyzing different variables is the criterion that weighs the importance of the variable, since each variable might not have equal importance to the user. Current research has only determined whether or not a certain variable exists. (Zmijewska, Lawrence & Steele 2004b)

The multi-attribute attitude model focuses on the consumers' beliefs of multiple products or brand attributes. The main statement in this theory is that the evaluation of significant beliefs cause general attitude towards the product or brand. The overall attitude towards an object is determined by two variables: the strengths of the prominent beliefs associated with the object and the evaluations of those beliefs. (Peter & Olson 2010)

Equation 1 - Multi-attribute Attitude Model

$$A_b = \sum_{i=1}^n W_i X_{ib}$$

Where A_b = attitude towards the object, X_{ib} = strength of the belief that the object has attribute i, n = the number of attributes considered and W_i = the evaluation of attribute i. (Quester et al. 2007) For further details about the multi-attribute attitude model, see Appendix 1.

$W_i X_{ib}$ can assume a value from 1 to 49 since the answer of W_i and X_{ib} each ranges from 1 to 7. Consequently, A_b ranges from 1 to 147. Mobile payment consists of the three attributes (X_{ib}): security, privacy and convenience. In order to determine the overall attitude towards mobile payment, five statements were given for each of the three attributes to determine the strength of the belief that mobile payment fulfills the attributes. Additionally, three weighing questions were asked to evaluate the importance of the attributes (W_i).

To avoid that the respondents rank the three different attributes at the value of 7, the respondents were asked to rank the three different attributes to get them to reflect about the importance of the attributes before answering the weighing questions.

3.5.2 The Cronbach alpha coefficient analysis

The Cronbach alpha coefficient was used to determine the reliability of the statements in the different subsections. When one measures the reliability by using the Cronbach alpha coefficient one gets a value of internal consistency, which is to what degree the items that are used in the scale are measuring the same attribute. (Pallant 2005) The attributes in this research are security, privacy and convenience. The result of the Cronbach alpha coefficient determined whether or not the items should be kept for further analysis since the Cronbach alpha coefficient might prove that the mentioned item is not measuring the attribute wanted. Ideally the Cronbach alpha coefficient for a scale should be above 0,7 to be reliable (Pallant 2005).

4 Survey results

In Table 2 the average answer and the variance for each statement from the survey is displayed. The respondents answered on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). 80 percent of the respondents had previously used mobile payment.

Table 2 - Survey answers

Construct	Item	Average	Variance
Security I believe that...	...mobile payment methods have sufficient security controls to prevent fraud	3,587	1,844
	...mobile payment services are secure in conducting payment transactions	4,140	1,872
	...the risk of an unauthorized third party overseeing the payment process is low	3,633	2,117
	...mobile payment methods have sufficient security controls to maintain data confidentiality	3,983	1,899
	...mobile payment is more secure than card payment	2,488	2,235
Privacy I believe that...	...the risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile payment services	3,727	1,767
	...the risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile payment services	3,966	2,389
	...the data exchanged when using mobile payment is handled confidential	4,075	1,179
	...there is less risk involved in using mobile payment compared to card payment	3,165	2,322
	...I will be required to provide a minimal amount of personal information when using mobile payment	4,372	2,136
Convenience I believe that...	...there are few steps required to complete the transaction	5,150	2,246
	...it is easier to use mobile payment than card payment	3,383	2,810
	...it is easier to use mobile payment than cash	3,892	3,593
	...the interaction with mobile payment services is clear and understandable	4,719	1,987
	...using mobile payment will save me time	4,488	2,602

Table 3 - Average result of the constructs

Construct	Average
Security	3,566
Privacy	3,861
Convenience	4,326

4.1 Security

The first attribute of mobile payment that the respondents were to express their attitude towards was security. The survey answers in the security construct got the average answer of 3,566, which is below the neutral answer of 4. The statement that the respondents disagreed with the most was the statement about the comparison between the security of mobile payment compared to the security of card payment and this statement got the average answer of 2,488. Another interesting aspect to this statement was that it was also the statement with the biggest variance in security (2,235), which indicates that this is a statement that the consumers disagreed on. The statement with the lowest variance was the one regarding the security of transactions when it comes to mobile payment, it got the score of 4,140.

4.2 Privacy

Privacy was the second attribute that the respondents were asked to express their attitude about. The perceived privacy that the respondents believed mobile payment would bring, got a bit higher result than security, resulting in a value of 3,861. As with security, the statement that got the lowest score was the one regarding the privacy of mobile payment compared to the privacy of card payment and as with security, this statement also had a high variance (2,322). The statement that got the lowest variance (1,179) in the whole survey was the statement about whether or not the data exchanged when using mobile payment is handled confidential. This statement got a neutral result of 4,075. That mobile payment only requires the user to provide a minimal amount of information, was the statement that the participants agreed with the most (4,372) when it comes to privacy.

4.3 Convenience

The third and last attribute in the survey was regarding the respondents' attitude towards the convenience of mobile payment. Out of the three constructs convenience was the attribute that the participants expect to find the most in mobile payment (4,326). As with security and privacy the comparison between card payment and mobile payment got the lowest score (3,383) followed by the comparison with cash (3,892). The variance follows the same pattern as with security and privacy, and got the highest value on these two statements in convenience (2,810 and 3,593). Of all the statements in the survey, the one regarding that there are few steps to complete a transaction with mobile payment, was the one the respondents concurred with the most (5,150).

4.4 Cronbach alpha coefficient analysis

To prove the reliability of the statements in the survey, a Cronbach alpha coefficient analysis was performed. The results that can be seen in Table 4 show that all the constructs resulted in alpha values above 0,7, which proves their reliability. Each statement in the different constructs is reliable, which can be seen in Appendix 3, since the alpha value of each construct would decline if any statement was removed.

Table 4 - Reliability Statistics

Construct	Cronbach's Alpha
Security	0,829
Privacy	0,784
Convenience	0,797

4.5 Weighing questions

The weighing questions are used in the multi-attribute attitude model to get a value for how the participants value the given attribute. The respondents answered on a scale ranging from 1 ("not important") to 7 ("very important").

Table 5 - Weighing questions & answers

Construct	Item	Average
Security This is how important it is for me that...	...the payment method I use is secure	6,289
Privacy This is how important it is for me that...	...my personal information is collected and treated confidentially when paying	5,620
Convenience This is how important it is for me that...	...the payment method I use is user friendly	5,934

4.6 The Multi-attribute Attitude Model

To determine the attitude that the consumers have towards mobile payment, the multi-attribute attitude model was implemented (Equation 1). In order to determine the attitude, the value for the constructs was calculated and then summarized.

The values in the calculations seen in Equation 2 are taken from the average values for security, privacy and convenience in Table 2, which contains the belief associated with the object (X_{ib}), and Table 5, which contains the weighing questions evaluating those believes (W_i).

Equation 2 - Calculation of $W_i X_{ib}$

$$\text{Security: } W_i \times X_{ib} = 6,289 \times 3,566 \approx 22,429$$

$$\text{Privacy: } W_i \times X_{ib} = 5,620 \times 3,861 \approx 21,699$$

$$\text{Convenience: } W_i \times X_{ib} = 5,934 \times 4,326 \approx 25,672$$

These values determine the attitude towards the three areas, security, privacy and convenience in mobile payment. The attributes can take a value ranging from 1 to 49.

Security is the attribute which the consumers believe that mobile payment possesses the least (3,566) as can be seen in Table 3. Because the weighing value of security was high (6,289), the overall value of security became 22,429. Even though privacy has a higher perceived

value (3,861) than security, it got a lower total score of 21,699 since it has a lower weighing value (5,620). The attribute that the participants perceived that mobile payment has the most was convenience (4,326), which also got a high weighing value (5,934). Consequently the overall value of convenience became 25,627, which is the highest of the three constructs. In summary, convenience got the highest value for mobile payment according to this survey, followed by security and then privacy.

To get the total attitude towards mobile payment these three areas were summarized according to the multi-attribute attitude model (Equation 1).

Equation 3 - Overall attitude towards mobile payment

$$A_b = \sum_{i=1}^3 W_i X_{ib} = 22,429 + 21,699 + 25,672 \approx 69,800$$

The overall attitude towards mobile payment got the total value of 69,800. This value can be used if a comparison between mobile payment and other payment methods wants to be made by using the multi-attribute attitude model.

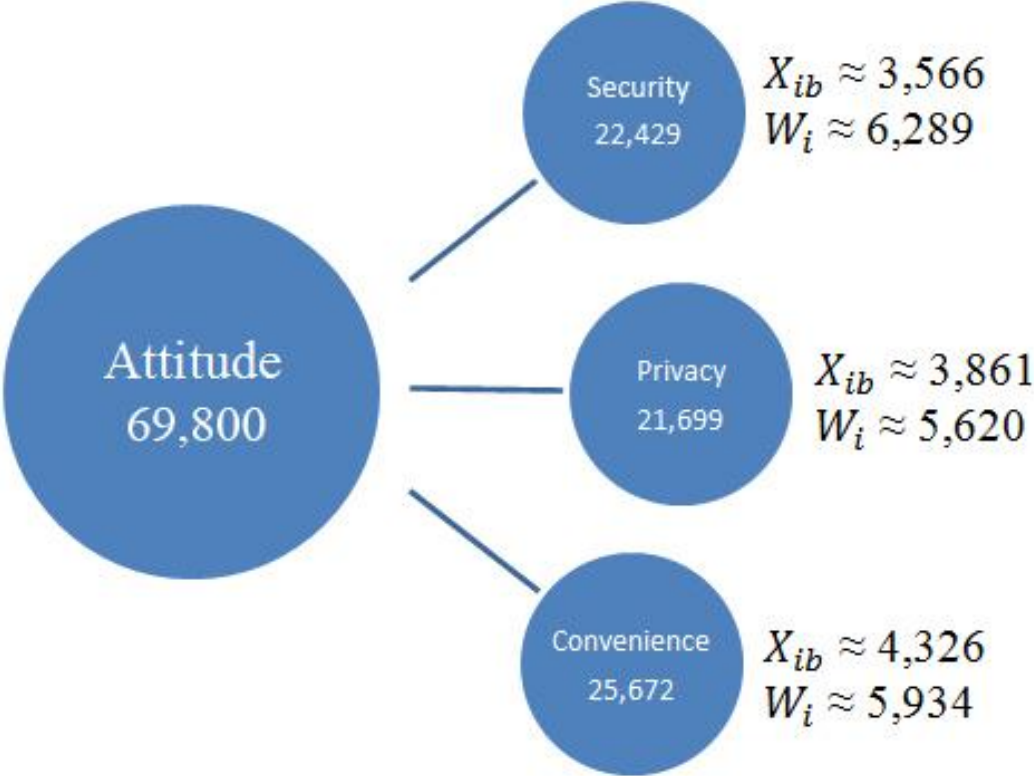


Figure 1 - Multi-attribute Attitude Model

An illustration of how Equation 2 and Equation 3 are connected to become the multi-attribute attitude model.

The values that can be seen in the constructs of security, privacy and convenience indicate the worth of these attributes in mobile payment. The value of the constructs ($W_i X_{ib}$) is based on the consumers' attitude towards the attribute (W_i) and the perceived value of that attribute in mobile payment (X_{ib}). Therefore, this is a valid method to use to make a comparison between the three constructs.

5 Data analysis

5.1 Security

The survey indicates that there is a concern about the risk that identity thefts can occur. This is a concern that Chen (2008) discusses, and Chen believes that this issue can make the consumers hesitate towards using mobile payment. The participants of the survey generally disagree with the statement that mobile payment methods have sufficient security controls to prevent fraud and that the risk of an unauthorized third party overseeing the payment process is low. If a consumer would be hacked or a third party would gain personal information, the likelihood of a loss of credibility regarding mobile payment is high (Luarn & Lin 2005).

There is also a concern about being hacked and that this could result in a financial loss. The participants of the survey generally believe that mobile payment services are secure in conducting payment transactions, which could indicate that this is not as much of a concern as expected when reviewing the literature (Shin 2010). The consumers seem unsure about whether mobile payment will be secure enough to keep their information confidential or not.

Security was the attribute that the consumers value the highest (6,289) when it comes to payment methods, which is in line with what was mentioned in the literature (Chen 2008). This attribute is however the one that gets the lowest score (3,566) on mobile payment since the participants did not believe that mobile payment methods contain enough security, just as previous studies have shown as well (Chen 2008). Previous studies have stated that the most important reason to why users would choose not to use mobile payment, was the perceived lack of security (Shin 2010), which the survey conducted in this paper also indicated. Furthermore, the participants did not believe that mobile payment is more secure than card payment.

5.2 Privacy

According to the literature, there is ambiguity to what degree consumers want privacy (KPMG 2010). On the one hand almost every respondent in previous studies answered that they are concerned about their privacy (KPMG 2010; Zmijewska, Lawrence & Steele 2004a), it is however not stated to how strong their concern is. On the other hand the studies also state that many of the respondents are willing to sacrifice their privacy to gain convenience or cost reductions. (KPMG 2010)

The participants believe that when using mobile payment the privacy will not be kept to the same degree as when using card payment. The survey conducted in this paper indicates that the consumers are unsure whether or not their privacy will be kept confidential. According to Zmijewska, Lawrence & Steele (2004b), the confidentiality of data is important to the consumers.

Privacy was the attribute that was valued lowest (5,620) by the consumers when it came to payment methods. This result is not as high as expected, since previous studies have shown that privacy is very important for the consumers (KPMG 2010; Zmijewska, Lawrence & Steele 2004a). There was an uncertainty among the participants to what degree mobile payment would ensure the consumers privacy (3,861).

5.3 Convenience

Most participants in the survey agreed that mobile payment will be time saving, which the previous surveys also showed (Linck, Pousttchi & Wiedemann 2006). From the consumers' perspective, the transaction speed is, according to the literature, a big advantage when using mobile payment (Chen 2008).

According to the survey made by Visa, mobile payment is faster than cash payment methods (Chen 2008). Nevertheless, the participants in the survey are not convinced that mobile payment will be faster than either cash payment or card payment.

Generally, the participants believe that mobile payment will be easy to use. This is mentioned as an important factor when it comes to the success of mobile payment (Zmijewska, Lawrence & Steele 2004b). The importance of the convenience attribute towards payment methods was rated (5,934) which is between security and privacy. This was the attribute that the consumers perceive that mobile payment has the most (4,326).

6 Discussion

Since mobile payment is a fairly new technology that has not yet reached a broader market in Sweden, little is known about the technology behind the different mobile payment methods. Therefore, it is no surprise that the recipients are hesitant towards mobile payment.

Due to the unfamiliarity of the technology the consumers are unsure whether or not they can trust mobile payment. The security aspect of trust is the biggest concern for the consumers when it comes to mobile payment which indicates that it is probably the key to whether or not mobile payment will become an accepted payment method by the Swedish consumers. The perceived lack of security puts mobile payment at a disadvantage compared to traditional payment methods such as cash and card payment, since these are still believed to be more secure than mobile payment. The use of payment on a platform that is not specially designed for payment might feel less secure since all the traditional payment methods have only had one use, payment. Since mobile phones have multiple purposes and no restrictions on what programs can be run on them, there might also be a higher risk for hacking to occur. Given the risk of being hacked, it is more important to trust the security in mobile payment methods, in relation to traditional payment methods. The precautions that are being taken to prevent security breaches in mobile payment can however not be at the cost of a lower convenience, since convenience is the main advantage of mobile payment.

The privacy that mobile payment offers is more connected to the company behind the product than the trust in the product's technology. This due to the fact that privacy is referring to what personal information is collected and what is done with it by the company behind the product or service. Because privacy got the lowest importance of the three different attributes, less focus should be directed to the privacy aspect of mobile payment. This is a bit contradictive since privacy has been one of the aspects that has been rated the highest in previous studies. One possible reason for this could be that there is a difference between the global views on mobile payment compared to the opinion of the Swedish consumers. It does however follow the trend of the society in general, where more and more personal information is available due to the digitalization of information. The privacy implied when using cash payment can never be competed with when using some type of electronic payment method. Therefore the focus should rather be on the security and convenience than on privacy. The privacy does, however, need to be on an acceptable level.

It has been mentioned that consumers are willing to sacrifice security and privacy to gain convenience or cost reduction advantages. If this is really the case, then there has to be a compromise between the security, privacy and convenience when using mobile payment.

When comparing mobile payment with cash payment, the advantages gained when using mobile payment is the reduction of coins and cash that needs to be possessed. Other than this, studies have shown that mobile payment is supposed to be faster than cash payment, which is something that the consumers are not convinced of. When comparing the convenience of mobile payment to card payment the survey indicated that the respondents thought that it would be easy to use mobile payments, but not as easy as to pay by card. Even though the respondents generally believed that mobile payment would not be as easy to use as cash- or card payment, they believed that it would save them time. This poses the question, how can it be harder to use, but still save time? Generally when comparing mobile payment to traditional payment methods, the variance is big. This indicates that the attitudes to whether or not mobile payment is better than traditional payment methods differ.

The amount of mobile phones that are in use and the consumers' willingness to adopt new mobile functions are aspects which are in favor of the success of mobile payment. 80 percent of the respondents had used some kind of mobile payment. Because of this, most of the respondents should have been able to express their attitude towards mobile payment based on their own experiences. There are several different types of mobile payment methods currently available and therefore the attitude might vary depending on which type of mobile payment method is utilized, or to what extent it has been used.

7 Conclusions

In this paper the attitude towards mobile payment among Swedish consumers has been analyzed based on the three constructs of: security, privacy and convenience. These three aspects were all confirmed by the participants to be important for mobile payment, but to different degrees. After analyzing the results of the survey by implementing the multi-attribute attitude model, convenience was found to be the most beneficial attribute in mobile payment, followed by security and then privacy. After rating the importance of the three attributes when it comes to payment methods, security got the highest rating, followed by convenience and then privacy. Convenience was found to be the attribute that the respondents believed mobile payment had the most, followed by privacy and last security. No distinct difference of attitude towards mobile payment could be found when comparing gender and age. To conclude, security is the most valued attribute, but least perceived attribute of mobile payment. Consequently, for mobile payment to succeed, a change of the consumers' attitude towards the security aspect of mobile payment is needed.

8 Further research

To validate the conclusions that were drawn in this paper, a broader study of the attitudes towards mobile payment needs to be done. The sample should reflect the Swedish society concerning geographic and demographic patterns. For instance, if a wider age range were to be examined, a different result could have been found and differences between age groups could be analyzed.

Another aspect to examine is the different kinds of mobile payment methods, instead of doing a general survey, as the survey performed in this paper. To gain more in depth information about consumer attitudes towards mobile payment, qualitative interviews could be a complement to this study.

There are several important attributes regarding mobile payment. Security, privacy and convenience were however found to be the most important attributes for the purpose of this paper. Nevertheless, it would give a wider perspective of mobile payment if research were to be conducted on more variables, such as cost, compatibility, expressiveness and mobility.

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Appendix 1 - Multi-attribute Attitude Model

The multi-attribute attitude model focuses on the consumers' beliefs of multiple products or brand attributes. The main statement in this theory is that the evaluation of significant beliefs cause general attitude towards the product or brand. The overall attitude towards an object is determined by two variables: the strengths of the prominent beliefs associated with the object and the evaluations of those beliefs. (Peter & Olson 2010, p. 136) In the simplest version of the multi-attribute attitude model the attributes of the evaluation are assumed to be equally important. This leads to the equation seen in Equation 4.

Equation 4 - Multi-attribute Attitude Model

$$A_b = \sum_{i=1}^n X_{ib}$$

(Quester et al. 2007, pp. 340-1)

Where A_b = attitude towards the object, X_{ib} = strength of the belief that the object has attribute I, and n = the number of attributes considered. (Peter & Olson 2010, p. 136; Quester et al. 2007, pp. 340-1)

When an assumption about the value of the evaluation is not made, it has to be included in the equation as it can be seen in Equation 5.

Equation 5 - Multi-attribute Attitude Model

$$A_b = \sum_{i=1}^n W_i X_{ib}$$

Where W_i = the evaluation of attribute i.

This version is useful in many different situations, it does however assume that more is always better, which is not always the case, there can sometimes be too much of something. In the case that this aspect wants to be shown in the result, one has to add another factor into the equation, namely the ideal point.

Equation 6 - Multi-attribute Attitude Model

$$A_b = \sum_{i=1}^n W_i |I_i - X_{ib}|$$

Where I_i = the consumer's ideal level of performance on attribute i.

Appendix 2 - Survey

Attityder till mobilbetalning

Välkommen till vår enkät om mobilbetalning. Vi är två studenter som skriver vår kandidatuppsats vid Uppsala Universitet. Vi har kontaktat dig för att vi vill undersöka din generella uppfattning och attityd till mobilbetalningar. För att svara på enkäten behöver du alltså inte ha använt någon mobilbetalningstjänst tidigare. Din medverkan betyder enormt mycket för oss och enkäten tar ca 5 minuter att genomföra och vi garanterar din anonymitet.

När du svarar på enkäten är det bra att ha i åtanke att vad som menas med mobilbetalning är köp av varor eller tjänster som kan genomföras på alla sorters mobiler producerade efter år 2004, vilket inkluderar smart-phones och Personal Digital Assistants (PDAs). Exempelvis kan mobilbetalning användas vid köp av en bussbiljett eller vid betalning i en affär istället för att använda kontanter eller kortbetalning. Tekniskt sätt finns det många olika lösningar på hur mobilbetalningar kan genomföras, allt från att använda SMS, till ett program i mobilen som fungerar likt användandet av kontokort.

Ålder

Vänligen ange din ålder med siffror.

Kön

Kvinna

Man

Har du använt dig av mobilbetalning.

Ja

Nej

Appendix 3 - Cronbach alpha coefficient analysis

Security

Reliability Statistics

Cronbach's Alpha	N of Items
,829	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
...mobilbetalning har bra säkerhetskontroller för att motverka bedrägeri.	14,29	19,901	,653	,788
...transaktioner som genomförs med mobilbetalning är säkra.	13,73	19,198	,722	,768
...risken är låg för att en obehörig tredje part tar del av transaktionsuppgifter.	14,24	19,944	,587	,806
...mobilbetalning är tillräckligt säkert för att hålla mina personliga uppgifter konfidentiella.	13,89	19,946	,635	,792
...mobilbetalning är säkrare än kortbetalning.	15,39	20,053	,545	,819

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
17,88	29,681	5,448	5

Privacy

Reliability Statistics

Cronbach's Alpha	N of Items
,784	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
...risken för missbruk av personlig information (t ex säljare, belopp) är låg vid användande av mobilbetalning.	15,60	17,712	,605	,729
...risken för missbruk av betalningsinformation (t ex kontokortsnummer, bankkontoinformation) är låg vid användande av mobilbetalning.	15,36	16,966	,552	,747
...information angående mobilbetalning hanteras konfidentiellt.	15,25	19,405	,599	,740
...mobilbetalning innebär en mindre risk att konfidentiell information sprids jämfört med kortbetalning.	16,16	17,094	,547	,749
...minimal personlig information behöver lämnas ut vid mobilbetalning.	14,98	17,692	,532	,753

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
19,34	26,346	5,133	5

Convenience

Reliability Statistics

Cronbach's Alpha	N of Items
,797	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
...det krävs få moment för att genomföra en mobilbetalning.	16,53	26,234	,540	,770
...det är lättare att använda mobilbetalning än kortbetalning.	18,32	24,630	,545	,769
...det är lättare att använda mobilbetalning än kontantbetalning.	17,81	23,452	,520	,783
...det är enkelt och användarvänligt att använda mobilbetalning.	16,97	24,794	,697	,727
...mobilbetalning sparar tid.	17,20	24,078	,627	,742

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
21,71	36,634	6,053	5