Mobile Payments in Burkina Faso

- A Quantitative Study of University Students’ Attitudes and Perceptions towards Mobile Payments in Burkina Faso

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Abstract

The discussion regarding information and communication technologies (ICT) in developing countries has gained increased attention within the past two decades. In Africa, mobile payment (m-payment) services have opened up great possibilities for people excluded from formal financial services. However, few studies have been conducted in West African countries despite significant growth of m-payment services in these countries. Thus, this research aims to address this gap and provide increased knowledge of m-payments in the West African country, Burkina Faso.

Specifically, the purpose of this research is to investigate attitudes and perceptions towards m-payment services among university students in Ouagadougou, Burkina Faso. Influences of factors from prior research have been tested in a new context and contributions in terms of empirical data from a specific developing country are made. The theoretical framework upon which the findings are based consists of the widely used Technology Acceptance Model (TAM) as well as other relevant theories within this research field.

In order to achieve the purpose of this research, a survey research was conducted in Ouagadougou, Burkina Faso, where 319 questionnaires were handed out to university students at all faculties of Université de Ouagadougou. The quantitative data was analyzed through statistical methods accordingly. To illustrate the findings, a self-constructed research model is presented. The research model explains the influence of factors on attitudes towards m-payment services among university students.

The authors have been able to demonstrate a generally positive attitude towards m-payment services among students in Burkina Faso as well as successfully extend the TAM in a new context. Additional empirical results on perceptions and attitudes towards m-payment services in other developing countries on the African continent are requested for future research. Moreover, an inclusion of country-specific factors to the TAM is another area of interest for future research.

Key words: ICT, Burkina Faso, m-payments, university students, attitudes, technology acceptance model
# Table of Content

1. **INTRODUCTION** ................................................................. 1
   1.1 PURPOSE .............................................................................. 1
   1.2 CHOICE OF SUBJECT ......................................................... 1
   1.3 PROBLEM BACKGROUND .................................................. 2
   1.4 FRAME OF REFERENCE ..................................................... 3
      1.4.1 Information and Communication Technologies .................. 3
      1.4.2 Mobile Financial Services ........................................... 5
      1.4.3 Burkina Faso ................................................................. 5
      1.4.4 Overview of Burkina Faso’s ICT Sector and Mobile Market ....... 6
      1.4.5 Students ...................................................................... 7
   1.5 PROBLEM DISCUSSION ...................................................... 7
   1.6 CONTRIBUTION ................................................................. 9
      1.6.1 Academic Contribution ................................................ 9
      1.6.2 Practical Contribution .................................................. 9
   1.7 LIMITATIONS ................................................................. 9

2. **RESEARCH PHILOSOPHIES AND APPROACHES** .................... 11
   2.1 PHILOSOPHICAL APPROACH .............................................. 11
   2.2 EPISTEMOLOGY .................................................................. 11
   2.3 THEORETICAL APPROACH ................................................. 12
   2.4 QUANTITATIVE METHOD .................................................. 12
   2.5 LITERATURE SEARCH ..................................................... 13
   2.6 SOURCE CRITICISM ......................................................... 13

3. **THEORETICAL FRAMEWORK** ............................................ 15
   3.1 TECHNOLOGY ACCEPTANCE THEORIES .............................. 15
      3.1.1 The Theory of Reasoned Action .................................... 15
      3.1.2 Theory of Planned Behavior ....................................... 15
      3.1.3 The Technology Acceptance Model ............................... 15
   3.2 DIFFUSION OF INNOVATION THEORY ................................ 17
   3.3 UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY ... 17
   3.4 NETWORK EXTERNALITIES ............................................. 17
   3.5 PERCEIVED RISK ........................................................... 18
   3.6 TRUST ............................................................................. 19
   3.7 MODERATING FACTORS .................................................. 20
   3.8 RESEARCH MODEL .......................................................... 20

4. **PREVIOUS RESEARCH** ..................................................... 23
   4.1 PREVIOUS STUDIES ON ICT, TAM AND MOBILE PAYMENTS ... 23
      4.1.1 ICT-focused Studies ................................................... 23
      4.1.2 Empirical Studies ...................................................... 25
8. SOCIAL AND ETHICAL CONSIDERATIONS ................................................................. 71
9. TRUTH CRITERIA ........................................................................................................ 72
   9.1 VALIDITY ......................................................................................................................... 72
      9.1.1 Construct Validity ................................................................................................... 72
      9.1.2 Internal Validity ...................................................................................................... 73
      9.1.3 External Validity and Generalizability .................................................................. 73
   9.2 RELIABILITY AND REPLICATION ........................................................................ 73
REFERENCE LIST ............................................................................................................ 75
APPENDICES .................................................................................................................... 87
Appendix 1 - Questionnaire in English and French .......................................................... 87
Appendix 2 - Correlation table ......................................................................................... 96
Appendix 3 - Regression analysis (gender) ..................................................................... 97
List of tables:
Table 1. Factors included in previous empirical ICT-research 25
Table 2. Mapping of empirical articles reviewed 32
Table 3. Sources of Measurements Instruments 37
Table 4. Faculties at Université de Ouagadougou 38
Table 5. Abbreviations of factors 47
Table 6. Characteristics of participants 47
Table 7. Mean values of participants 51
Table 8. Cronbach’s alpha and Inter-item correlation values of the sample 53
Table 9. Regression (attitude) 55
Table 10. Regression (perceived usefulness) 57
Table 11. Regression (perceived risk) 59
Table 12. Regression (trust) 61
Table 13. Faculty influence on factors 63
Table 14. Regression (age) 64
Table 15. Results from model hypotheses testing 67

List of figures:
Figure 1. Original Technology Acceptance Model 15
(Davis, 1986, p. 24): self-constructed
Figure 2. The Conceptual Research Model including Hypotheses 20
Figure 3. Sub model 1 (attitude) 42
Figure 4. Sub model 2 (perceived usefulness) 42
Figure 5. Sub model 3 (perceived risk) 43
Figure 6. Sub model 4 (trust) 43
Figure 7. Gender distribution of participants 48
Figure 8. Age distribution of participants 49
Figure 9. Faculty distribution of participants 50
Figure 10. M-payment service usage among participants 50
Figure 11. Mean values of participants 52
Figure 12. Sub model 1: regression result (attitude) 56
Figure 13. Sub model 2: regression result (perceived usefulness) 58
Figure 14. Sub model 3: regression result (perceived risk) 60
Figure 15. Sub model 4: regression result (trust) 62
Figure 16. Research model on student attitudes towards using 64
m-payment services
1. INTRODUCTION

In this chapter, the incentives that led up to the choice of research topic are presented. In addition, a brief problem background and frame of reference are given in order to provide the reader with relevant background information. The problem discussion ends with identifying the research gap on which the research question is based. Finally, theoretical- and practical contributions are stated.

1.1 PURPOSE

The objective of this study is to investigate university students’ perceptions and attitudes towards mobile payment (m-payment) services in Burkina Faso by empirically testing determinants that are relevant for the m-payment context. It aims to investigate perceptions and attitudes of m-payment services in order to contribute to the limited research conducted in this field in a specific developing country where the fast development of m-payment services is highly relevant. The purpose of this study is to investigate perceptions and attitudes through the use of a conceptual model. The conceptual model is derived from the technology acceptance model (TAM) and other relevant factors from previous research. This study will contribute with an extended version of the TAM, which will be tested in a new context. Results from this research may provide future guidance for researchers, organizations, and other actors seeking knowledge regarding attitudes and perceptions of mobile phones as a payment- and transaction method among populations in developing countries. This study focuses on the micro-level of society in Ouagadougou and on the observable implications of Information and Communication Technologies (ICT) for the young population in the capital.

1.2 CHOICE OF SUBJECT

Both authors attend the International Business Program at Umeå School of Business and Economics, and the possibility of conducting an empirical study abroad motivated us in our search of research topic and in the construction of a relevant research question. An interest for economic development in developing countries became our starting point. Upon reviewing the financial sector and economic development in many African countries, a recurring subject was the widespread phenomenon of m-payment services. Similar services are gaining popularity in Sweden as well. The recently introduced m-payment service Swish was in 2014 one of the most popular apps to download in Sweden (Aronsson, 2015). The digital currency, Bitcoin, is another indicator of the search for alternative transaction methods. Bitcoin works with a network of users conducting transactions outside formal financial institutions, such as banks, and may be a revolutionizing way of conducting money transfers within the near future (ITU, 2013, pp. 9-10). Faster and easier ways to conduct transactions are key features of future transaction methods as we are moving towards a society that is becoming less dependent on cash. However, in this aspect, Western countries may not be at the leading edge of progress.

In many African countries, m-payment services are already established payment systems used in everyday life. The topic of m-payment services in Africa is highly relevant and has received increased attention from Swedish press, companies and development agencies. Initial literature searches indicated that the regions of East- and
South Africa are more commonly occurring than West Africa in previous studies concerning m-payment services in Africa. However, West Africa is different to East and South Africa in many aspects. In East Africa, the telecom sector is less fragmented and the rural-urban migration is twice as large (Mwanza, 2014). These aspects led us to look closer at West African countries and Burkina Faso was found to be an interesting country concerning this subject. In the West African country Burkina Faso, little research on the topic could be found, although a large part of the population is using m-payment services for money transactions. It is important to conduct research in developing countries, such as Burkina Faso, which has not received sufficient focus considering the proliferation of m-payment services in the country. The country has been hosting large international ICT conferences where the issue has been discussed (ICT Best Practices Forum in Burkina Faso, 2013). This research is based on a two-week field study conducted in the beginning of April 2015 in Ouagadougou, Burkina Faso. The data was collected during a four-day period at Université de Ouagadougou.

1.3 PROBLEM BACKGROUND

The world is becoming increasingly globalized; hence businesses and people are adapting their ways of structuring activities in order to obtain the greatest advantages possible from new means of communicating and doing business. Mobile transactions have become more evident when it comes to trading and transferring money in peoples’ everyday lives. Constant advancements of mobile technologies have not only facilitated transactions connected to formal financial services, but also resulted in that a type of informal finance has emerged, mainly through m-payment systems, opening up great possibilities for people excluded from formal financial services. Informal financial transactions have been defined as those financial transactions that are taking place outside regulations on financial sectors and banking (Aryeetey, 2005, p. 14).

The majority of the world’s population lives in developing countries; therefore research aiming to spur development in these countries is important for this purpose alone (Walsham et al., 2007, p. 317). In 2011 roughly 2.6 billion people lacked access to formal financial services and of these, 1 billion people owned a mobile phone (Dermish et al. 2011, p. 81).

A survey conducted in 2007 showed that there were more people in Africa using mobile phones than there were people having access to a bank account (ResearchICTAfrica, 2007). The survey also showed that mobile phones are the most used ICT on the continent. The mobile phone coverage have increased greatly throughout African countries, at the end of the 1990’s, mobile phone coverage in Africa was mainly available to people living in North African countries and South Africa. During 1999, only ten percent of the population on the African continent had access to mobile phone coverage. By 2008, that number exceeded 60 percent, corresponding to more than 447 million people (Aker & Mbiti, 2010, pp. 208-209). In 2008, the use of mobile phones in African countries was increasing faster than in developed countries in the western part of the world (Hahn & Kibora, 2008, p. 87). The Ericsson Mobility Report, 2014 forecasted that by the end of 2014, mobile subscriptions in Sub-Saharan Africa would increase to more than 635 million. This number is expected to increase to 930 million by 2019 (Ericsson, 2014, p. 2). This rapid spread of mobile phone technology suggests an opportunity for economic development, as empirical results indicate a relation between the spread of ICT and economic progress (Baliamoune-Lutz, 2003, p. 166).
M-payment services have become popular in many African countries and over half of all m-payments in the world are occurring in Africa (Abrahamson, 2015). In many developing countries in Africa, it is more common to use m-payment services in order to pay bills or fees instead of transferring money via bank services, as bank offices are rare outside cities and bank accounts may be difficult to obtain. The services are text message-based and works as a platform for people to easily send and receive money. This new way of sending and storing money has caught the interest of large mobile operators, such as the Swedish company Ericsson, that since 2012 has cooperated with the major communications company Mobile Technology Networks (MTN), which is established on the African continent.

Business magazines have covered the development of m-payments in Africa, emphasizing the importance these services have had in facilitating the everyday life for millions of citizens in various African countries, regardless of if they live in cities or in rural areas (Abrahamson, 2015; Rosengren, 2015, p. 25; Swahn, 2015, p. 50). The services enable people to buy airtime on their prepaid cards and for a small transfer fee; customers are able to transfer airtime to another user using the same network (Porteous, 2006, p. 23). People in the industry have expressed that countries such as Sweden are lagging behind certain African countries in this sense, seeing that payment methods, such as Swish, have become popular only in recent years. These services have created an alternative currency, i.e. airtime and African mobile operators have managed to develop a type of cyber currency, which can be sent from one part of a country to another, simply by pressing a button. In 2006, banks and formal financial institutions were not involved in these types of transactions (Porteous, 2006, p. 23). However, when arriving in the country for this survey research, it became clear that today, banks such as Western Union and Ecobank, cooperate with m-payment service providers and offer m-payment services.

Burkina Faso is one of the least developed countries in the world (The World Bank Group, 2015); nevertheless, the mobile phone technology has reached the furthest areas of the country in less than ten years (Hahn & Kibora, 2008, p. 92). Despite the low literacy rate of 28.7 percent in Burkina Faso (INSD, 2007) the mobile phone can still serve as a payment method since it does not require the user to be literate (Baliwamout-Lutz, 2003, p. 161). Companies in Burkina Faso, such as Airtel, Telmob and Telecel, provide similar services as MTN, which do not require Internet access; instead money is transferred through text messages.

1.4 FRAME OF REFERENCE

1.4.1 Information and Communication Technologies

The implementation of ICT in developing countries has proven to be a factor of great importance for future development in these countries (Moens et al., 2010, p. 34). It has for example been suggested that African countries may benefit from ICTs in areas such as education, economics and medicine (Polikanov & Abramova, 2003, p. 42). There is no fixed definition of ICT, but the abbreviation includes devices such as phones, radios, computers and the Internet, faxes and television (Gerster & Zimmermann, 2003, p. 4). ICT assists and facilitates the way information can be created, obtained and saved through various types of technology.
In their paper, Gerster and Zimmerman (2003, p. 7) argue for three approaches when defining ICT based on the current overall discussion of the topic. The approaches represent a technical, a content based and a user-side based approach, in which the former concerns productivity, the content-based one focuses on the creation of information, and the latter is used with regard to utilization and diffusion of ICT. This paper will adopt a user-side based approach.

What is certain is that ICT is today vastly accountable for the current development in the world, and is present in most people's daily lives. The opportunities brought from the exponential advancements within ICT have spawned an interest regarding to what extent this progress has ability to reduce the differences between the developed world and those parts of the world that are still characterized by underdevelopment and poverty (Polikanov & Abramova, 2003, p. 42). Evidence demonstrating the role ICT might play when it comes to determining to what extent countries are able to benefit from globalization are increasing (Haller & Siedschlag, 2011, p. 3775). Many people advocate the importance of implementation and use of ICT based on that it is a key factor in helping developing countries advance, both economically, but also socially (Andoh-Baidoo, 2013, p. 44). In their study, Bhavnani et al., (2008, p. 9) demonstrate the importance of mobile telecommunications as a significant driver in economic growth and research groups at institutions such as the International Monetary Fund and the World Bank argue for ICTs as vital elements for growth in developing countries (Fink et al., 2002, p. 2; Lehman et al., 2003, p. 3).

Albeit the benefits experienced from the implementation of ICT, African countries are still struggling with adapting ICT (Bagchi & Udo, 2007, p. 45). Previous studies focusing on the adoption of ICT have determined aspects that influence the difficulties of implementing ICT, including the political atmosphere, costs of implementation, values, the socio-cultural atmosphere, the level of openness to trade and the level of income and economic growth (Andoh-Baidoo et al., 2014, pp. 44-45). Previous studies show for example that those businesses that are facing international competition, hence operating in export markets, tend to have a more optimistic view on innovation and may be more prone to adopt novel technologies (Haller & Siedschlag, 2011, p. 3777). Many authors suggest ICT as a priority area for investments in development, and more specifically as a way to stimulate these countries’ economies (Bagchi & Udo, 2007, p. 45).

The relevance of the subject of ICT to Burkina Faso is displayed through the numerous international conferences, Best Practices Forums and roundtable discussions held in the country. The third ICT Best Practices Forum in Burkina Faso was held in 2010, and was attended by more than 300 governments and company representatives from 55 various countries (ICT Best Practices Forum in Burkina Faso, 2013). In 2013, the United Nations’ International Telecommunication Union (ITU) assisted the Government of Burkina Faso in arranging a Best Practices in ICT for Africa, which was held in Ouagadougou (ITU, 2015). Certain developing African countries are lagging behind others, when it comes to integrating mobile networks. This can partly be explained by the fact that the investments needed for the expansion of telecommunications have not been distributed equally across the African continent and market liberalization has progressed at different speeds in various countries (Williams et al., 2011, p. 15). Burkina Faso is among those ten countries in Sub-Saharan Africa that has managed to establish a mobile network coverage reaching more than 90 percent of the population,
together with countries such as Mauritius, South Africa and the Seychelles. During the same period, 13 countries on the continent had only achieved coverage of less than 50 percent (Williams et al., 2011, p. 150).

1.4.2 Mobile Financial Services
Mobile financial services include both m-payments and mobile banking. In this section, these concepts are described. This study focuses on attitudes and perceptions towards m-payment services, however no specific limitations are made in terms of mobile banking in this study.

A rather recent phenomenon within the area of ICT in developing countries is the use of mobile phones as “pocket-banks”. This issue has been discussed in previous research as a possibility to integrate a large part of the population that has previously been unable to benefit from formal financial services (Asongu, 2013, p. 7; Dermish et al., 2011; Morawczynski & Pickens, 2009). Since 2005, mobile financial services have emerged in many developing countries on the African continent (Aker & Mbiti, 2010, p. 220). M-payment services are considered to be the most potentially important features of mobile commerce for the future and do not have to involve any formal financial institutions, such as banks, whereas mobile banking enables customers to manage bank accounts from mobile services (Mallat et al., 2004, pp. 42-46). Various definitions of m-payments have been presented in previous research. Some definitions focus solely on cell phones as the key characteristic, whereas others incorporate all mobile devices used for communication in the definition (Schierz et al., 2010, p. 210). Mobile banking is defined as customer interaction by a mobile appliance with a bank by Barnes and Corbitt (2003, p. 3). Reports have shown that in 2012 more than 2.5 billion people in the world did not have access to a bank account and the majority of these people live in developing countries (Klapper & Demirguc-Kunt, 2012, p. 2). As this study focuses on one of the least developed countries in the world (The World Bank Group, 2015), where few have access to bank accounts, main focus is on m-payment services rather than mobile banking.

1.4.3 Burkina Faso
Burkina Faso is a landlocked country located in West Africa, bordering six countries: Mali, Niger, Benin, Togo, Ghana and the Ivory Coast. The capital, Ouagadougou, is located in the middle of the country. Burkina Faso is a poor country, even by West African standards and living conditions are difficult for most Burkinabé (UNCDF, 2015). United Nations Human Development Index (HDI) positioned Burkina Faso at 183 out of 187 countries in terms of long-term progress in three areas; health, access to knowledge and standard of living (Malik, 2013, p. 143). The literacy rate does only reach 28.7 percent (INSD, 2007) and life expectancy is estimated to 56 years (The World Bank, 2015). The former French colony, at the time known as Upper Volta, gained independence in 1960. The country is home to Muslims, Christians and people with indigenous beliefs. More than 90 percent of the economically active population in Burkina Faso are working in the agriculture sector, as is common in countries in sub-Saharan Africa, where up to two-thirds of the population are employed in agriculture (AGRA, 2013, p. 20).

President Blaise Compaoré has ruled the country since 1987 but in 2014, he was forced to resign after a revolt against his long hold on power. The demonstrations and uprisings connected to this conflict caused the Swedish Ministry of Foreign Affairs to issue a
travel alert to avoid unnecessary travels to the country. However, at the time of writing, the security situation in Burkina Faso has returned to normal and only travels to the northern part of the country are discouraged (Sveriges Ambassad, 2014).

1.4.4 Overview of Burkina Faso’s ICT Sector and Mobile Market

Burkina Faso has made noteworthy progress in the area of infrastructure, especially when it comes to ICT. Despite the widespread poverty in the country, an increasing portion of Burkina Faso’s population is using mobile phones (Briceño-Garmendia and Domínguez-Torres 2011, p. 2). Although the country has adopted key institutional reforms, such as market liberalization and access to private capital in order to enable expansion of ICT use, Burkina Faso still faces many challenges in ICT implementation. In the 2011 World Bank working paper, Briceño-Garmendia and Domínguez-Torres (2011, pp. 33-34), pointed out poor infrastructure and relatively high prices for ICT use compared to other African countries, as major ICT challenges. Lack of skills and knowledge in how to use and support technology have been stated as additional factors behind ICT challenges in Burkina Faso (AGRA, 2013, p. 24). 1996 was the year when the population of Burkina Faso started to use mobile phones. It was made possible through funding from the company Telmob, which was the first mobile phone company in the country (Anago, 2004). In 2005, mobile penetration in Burkina Faso amounted to 5.3 users per 100 citizens, while in 2009; the number had increased to 29 (Briceño-Garmendia & Domínguez-Torres, 2011, p. 31). In 2009, only 11.9 percent of the population over 16 in Burkina Faso had access to a bank account, whereas nearly 30 percent of the same population owned a mobile phone (Comninos et al., 2009, p. 3). Today, the mobile penetration rate in Burkina Faso amounts to 43 percent (eHNA, 2015). Survey responses have also shown that more people in Burkina Faso trust m-payments if supported by mobile phone operators than if supported by banks, the former corresponding to 17.6 percent and the latter to 13 percent (Comninos et al., 2009, p. 13).

Burkina Faso is one of the fast growing markets for telecommunications in Africa. Already in 2010, the mobile penetration was seen as relatively high, as more than 4 million inhabitants, out of 16 million, owned a mobile phone (Nordblom, 2010). In 2012, the mobile operator Airtel, together with Ecobank, launched the m-payment service M-ligdi, or M-money, in Burkina Faso, aiming to improve access to financial services among the Burkinabé people. In Burkina Faso, as in many other developing countries, only people within certain income- and geographic ranges have access to formal financial services. Thus, most people in developing countries have previously been dependent upon risky and expensive informal channels. With the introduction of mobile financial services, the value of money transfers conducted through mobile phones are expected to increase significantly as a result of increasing trust in these services together with the growing number of providers offering m-payment services (APO, 2012).

Today, m-payment services are frequently used by most Burkinabé in their everyday lives. M-payment service providers offering these services are prevalent, not only in the capital of Ouagadougou, but in rural areas as well. Obtaining a license for providing m-payment services is relatively easy, and it is common that many vendors who sell products, such as fruits and crafts etc. add this service to their already existing business. Through these kiosks or boutiques, people are able to top up their prepaid cards with airtime, transfer money and receive cash. In other words, cash are turned into what can be called “virtual currency” or “digital money”. These text-messages, or “digital
money”, can also be paid with directly in stores and it is not uncommon that people use m-payment services in order to pay their energy bills etc. Students providing m-payment services on campus is a common sight. Furthermore, security is a large issue in Burkina Faso and being able to send money to other villages through a text-message, instead of physically transporting cash and thus being exposed to robbery has greatly reduced the risks and has contributed to improving the daily lives of the Burkinabé (Making Finance Work for Africa, 2014).

1.4.5 Students
Great possibilities are presented for young generations in African countries that have grown up with mobile phones and that have found new creative ways to use relatively simple techniques (Rosengren, 2015, p. 25). Previous studies have pointed out students as an interesting segment when investigating new technology as university students is the consumer segment that first adopts m-commerce, mainly because of a high education level and the potential of higher income in the future (Yang, 2005, p. 265). As university students gain higher education, it can be implied that this segment is more likely to receive advanced positions in work life and become more influential. Previous research has concluded that the age of university students positively affect their openness to new ICTs (Lightner et al., 2002, p. 380). Essential for the expansion and development of the m-payment sector in Africa is the combination of the young population and the ongoing urbanization (Swahn, 2015, p. 55).

When founded in 1974, the university of Ouagadougou had 374 students (Université de Ouagadougou, 2015). In 2008/2009, the number of students had increased to 32 623, in which 23 063 were male students and 9 560 were female students (INSD, 2013). The university expanded quickly and in 2011, that number corresponded to around 56 000 students (Ministère des affaires étrangères et européennes, 2011, p. 1). Legris et al., (2003, p. 202) argue that the student segment is a homogeneous group living in a “simpler” environment and being less exposed to influential factors, such as responsibilities and roles, of the real world. Conducting this research on a homogenous group contributes to that the research model measures what it intends to measure by minimizing the possibility of external social factors influencing attitudes and perceptions towards m-payments. Results from this study will expectantly reveal the robustness of the research model. No studies assessing students’ attitudes towards ICT or m-payment services in Burkina Faso have previously been conducted, hence this study contributes with additional empirical research of a relevant target segment.

1.5 PROBLEM DISCUSSION
The debate regarding ICT was previously concerned with the relevance of ICT to developing countries. However, today there is no contradictory debates concerning the relevance, rather focus has shift to how ICT can be beneficial for these countries (Walsham et al., 2007, p. 317). The economic impact of m-payment services in developing countries has been suggested to differ greatly from that of developed countries (Bourreau and Verdier 2010, p. 2). This may partly be explained by the fact that in many developing countries there are more mobile phones per capita than there are payment cards, in contrast to developed countries where the situation is the opposite. This presents an opportunity for m-payment services to spread as electronic payment solutions as these will not have to compete with existing payment methods to the same extent as in a developed country (Bourreau & Verdier, 2010, p. 2). The development of mobile technology may decrease the digital divide and allow developing countries to
leapfrog the years of wired technology and infrastructure that developed countries have
 gone through. Leapfrogging is a concept where a developing country chooses to adopt an
 idea or model from a developed country without going through the development
cycle of the developed country (Deans 2005, p. 98). In Europe, Canada and the United
States, the telecommunications industry began investing in landlines before mobile
phone networks, but in Africa the development of mobile phones has efficiently
leapfrogged the landline development (Aker & Mbiti, 2010, p. 209). In many African
countries, people are “unbanked”, which gives the expansion of mobile payment
services a significantly different dimension than in Western developed countries
(Strandberg, 2011).

When implementing ICT, it is essential to understand people’s attitudes towards new
technology and what affects adoption of, for example, m-payment services. When attempting to understand peoples’ perceptions and attitudes towards technology, the
TAM, developed by Davis (1989), is a well-known research model that has been widely
used when examining individuals’ willingness and acceptance towards technology and
information systems (Surendran, 2012, p. 175). It looks at how two factors, perceived
usefulness and perceived ease of use affect individuals’ attitudes towards the use of
technology. Further, the model may include external aspects, such as social and cultural
characteristics, affecting the two main factors (Surendran, 2012, pp. 175-176).

There are a number of previous studies incorporating the TAM, which have examined
user adoption attitudes through surveys (e.g. Arvidsson, 2014; Kim et al., 2010; Yang,
2005). These three studies have all reached a similar conclusion, i.e. that the TAM is a
suitable model for measuring different factors affecting individuals’ attitudes and
perceptions towards technology. However, all of these studies were conducted in
developed countries, namely in Sweden (Arvidsson, 2014), South Korea (Kim et al.,
2010) and Singapore (Yang, 2005). Upon further research, the studies that examine m-
payment adoption factors appear more frequent in developed countries than in
developing, and none could be found in Burkina Faso. Among the reviewed previous
studies, only two were targeted at university students (Kim et al., 2010 & Yang, 2005).
Attitudes towards m-payment services among younger people is of interest as Bruijn et
al. (2009, p. 20) mention the role that the mobile phone plays in the life of the younger
generation and how youths are more likely to adopt new technologies. Considering that
65.5 percent of the population in Burkina Faso is younger than 25 (CIA, 2014), the
youth segment is a highly relevant target group for research. Attitudes among university
students towards m-payment services should be of interest for mobile operators. By
knowing what factors that affect students’ opinions, companies can adapt their business
practices accordingly to better respond to this large segment of the population. As the
youths are the future, focus should be on investigating how they perceive m-payment
services in order to successfully take advantage of the benefits that ICT has shown to
have in developed countries. This discussion emphasizes the importance of treating this
subject from the perspective of the future of the country, leading up to the following
research question:

“What influence do the factors in the proposed research model have on perceptions and
attitudes towards the use of mobile payment services among university students in
Burkina Faso?”
1.6 CONTRIBUTION

1.6.1 Academic Contribution
From an academic perspective, this thesis will contribute with increased knowledge concerning what factors that are affecting preferences and attitudes towards m-payment services among university students in Burkina Faso. The study includes data collected in the specific geographical area of Ouagadougou in Burkina Faso, focusing on university students, which is a previously unexplored area for research in terms of m-payment services. The results provide a foundation for future research, as these can be extended to research questions trying to explain more general links between adoptions of m-payment services. This research aims to add to the existing knowledge of m-payment services, but will also work as a framework for future research by serving as a complement providing evidence from a rather narrow perspective of ICT. Further, the study will contribute to empirically testing the TAM in the context of a developing country, as this model has been more widely adopted in developed countries. The TAM will be extended using various external factors, thus further contributing to the extension of the TAM in regard to the context of m-payment services.

1.6.2 Practical Contribution
Knowledge of preferences and attitudes among students towards m-payment services should be of interest for both domestic and foreign organizations involved in the m-payment service sector, as the student group in Burkina Faso may become influential actors in society. Several foreign actors have already shown an interest in the African ICT market and mobile sector, and are currently expanding their activities. Mobile phone operators play a much greater role when it comes to m-payments in Burkina Faso compared to developed countries, where m-payments are closely connected to banks. As mobile transactions are made through selling and buying airtime on prepaid cards, a challenge for competing mobile operators is to create and maintain customer loyalty. Knowledge about perceptions and attitudes of m-payment services are therefore highly relevant to actors in this field in order to improve and develop business operations. Moreover, this study may be beneficial for various organizations or bodies working for improvements that may derive from increased integration of new ICTs into society. Findings may assist in strategic organizational decision-making by revealing knowledge of an important consumer group who may view m-payment services as useful transaction methods.

1.7 LIMITATIONS
As with any empirical research, this study includes limitations. The data was collected in one country, however m-payment usage varies in different countries and findings from this study may not be applicable to other countries. An additional limitation refers to the population of the study, which focuses on one group of individuals within the country, namely university students at Université de Ouagadougou. As attending university in Burkina Faso is difficult for many Burkinabé due to costs, the chosen population entails limitations in terms of to what extent the findings can be generalizable. In 2011, the university had around 56 000 students (Ministère des affaires étrangères et européennes, 2011, p. 1), and the large number of students along with the limited time in the country made it impossible to collect data from the entire population of university students. Further, travels outside the capital were not recommended for safety reasons and thus all data was collected from one university.
The study does not differentiate between different m-payment service providers and therefore no conclusions based on the data can be made towards specific providers. This also limits the generalizability of the results as the majority of the students may be using the same provider. The study focuses on all transactions made through m-payment services. Additional services and offers from mobile operators are not considered. Multiple regression analyses are conducted in this study. This method of analysis is not as common as Structural Equation Modeling (SEM) analyses, which is used more frequently in the previous studies reviewed in chapter 4. These two analyses methods along with additional limitations concerning data collection and processing are discussed in chapter 5.
2. RESEARCH PHILOSOPHIES AND APPROACHES

This chapter presents the theoretical philosophies and approaches constituting the base for the purpose of this study. This research is based upon a positivistic philosophy, adopting a deductive approach. The quantitative nature of the study is discussed followed by a presentation of the literature search. The chapter ends with criticism of the sources used in this study.

2.1 PHILOSOPHICAL APPROACH

The two major philosophical approaches within science: subjectivism and objectivism are defined by numerous core assumptions of reality (ontology), knowledge (epistemology), pre- or undetermined human nature, and methodology. These assumptions are dependent on each other, and the chosen methodological approach results from these (Lynch, 2004, p. 398). The assumption of ontology is concerned with the nature of reality, if reality is “the nature of one's mind” or if things have existence (Burrell and Morgan 1979, p. 1). The subjectivist- and objectivist approaches to social science are two extreme stands and philosophical positions in research are more commonly positioned somewhere in the range between these continuum's polar opposites (Lynch, 2004, p. 398). An extreme subjectivist ontological position argue that reality, outside one’s self, does not exist, thus reality does not exist, rather it is a depiction of one's imagination. Adopting a subjectivist approach implies that the results obtained does not reflect reality, as these are subjectively obtained, thus the results are relative.

Within the other extreme position, objectivism, the world is viewed as real, as an empirical entity, regardless of how individuals’ perceive this external reality (Lynch, 2004, pp. 400-401). The research approach of this study is quantitative, as the data is collected through questionnaires. This approach is strictly positivistic with some room for interpretation and thus falls into the category of objectivism. Interests and beliefs have not influenced this study or the methods used in this study. Further, objectivists argue that values and skills etc. are independent of the subject of research and is not affected by, or affects, the subject of research (Remenyi et al. 1998, p. 33). The goal of objectivistic research is to identify causal explanations in order to describe symmetries in the social behavior of humans (Easterby-Smith et al. 1991, 23). As this study aims to identify relationships between numerous variables, such as perceived risk and trust, in relation to attitudes towards m-payment service usage, it is positioned within the range of objectivistic philosophical approaches. Objectivism has been criticized, as it is not seen appropriate when investigating a phenomenon in social science, instead subjectivism is seen as more suitable when investigating the complex nature of human beings that is characterizing social science research (Lynch, 2004, p. 404). However, based on the aim of this study, the objectivistic approach is seen as more suitable, compared to a subjectivist approach.

2.2 EPISTEMOLOGY

As this study aims to investigate what factors that are influencing university students’ perceptions and attitudes towards m-payments, it is categorized within the positivistic research philosophy. This study is based on existing theory within acceptance- and perceptions of technology for the development of hypotheses. From the hypotheses based on previous studies, a research model has been developed. The research model forms the basis for the hypothesis test. Thus, this study can be categorized within the
positivist research philosophy (Easterby-Smith et al., 2012, p. 22). The subject of perceptions and attitudes towards m-payment services is well covered in previous research, which facilitates the search for suitable theories and previous research. Further, Gray (2014, p. 21) underlines the value-free way of conducting research in the philosophy of positivism, dealing with facts and not with values. Data collection through the use of questionnaires allows questions to be asked in the exact same way and results to be examined with consistency through statistical software, thereby minimizing the influence of personal perceptions and values. Rather than focusing on qualitative data, research adopting a positivistic philosophy highlights the use of quantitative data through analysis by statistical tests (Punch, 2013, p. 17). The use of structured methods facilitates a replication of this study by future researchers. The other of the two main scientific philosophies in social sciences, hermeneutics, is based on interpretations and understanding. This approach deals with human perceptions and experiences mediated through language and expressions. Hermeneutics is commonly used within the field of culture- and human sciences (Eriksson & Kovalainen, 2008, p. 20). A positivistic approach is adopted in this research, as the intention is to explain factors influencing perceptions and attitudes.

2.3 THEORETICAL APPROACH
Research conducted in the field of social sciences is often depicted through two approaches: inductive or deductive (Arnbom & Bjerke, 2009, p. 91). As this study begins with investing what previous studies have found within the area of m-payment services, and from existing theories formulating hypotheses, the approach of this research can be identified as deductive. The alternative inductive approach aims to explain patterns and begins with observations that result in that new theories can be formulated (Babbie, 2015, p. 50). In order to accomplish the goal of an objectivistic research, i.e. describe symmetries in the social behavior of humans through causal explanations, results from a sample size are generalized through a deductive process, which includes formulating hypotheses, which in turn are developed from previous knowledge of this subject (Lynch, 2004, p. 404). As this study attempts to assess what influence factors in the research model have on students’ perceptions and attitudes towards the use of m-payments, the data for this thesis will be collected using a quantitative approach with a deductive reasoning.

2.4 QUANTITATIVE METHOD
There are two methodological approaches to research studies, a quantitative- or a qualitative approach. A quantitative approach is focused on categorizing participants’ opinions or existing data into pre-determined categories in order to make generalizations (Yilmaz, 2013, p. 313). In comparison, the qualitative method is focused on understanding and interpreting data through inductive measures, such as in-depth interviews (Yilmaz, 2013, p. 313).

Previous research conducted on issues related to m-payments has used both qualitative (Eriksson & Trinh, 2012; Mallat, 2007; van der Heijden, 2002) and quantitative measures (Arvidsson, 2014; Kim et al., 2010; Yang, 2005). Given the nature of the research question in this study, a quantitative approach was deemed appropriate. Collecting data by providing questionnaires to a large sample can generate data, which enables general factors affecting participants’ attitudes towards various issues to be found (Yilmaz, 2013, p. 313). In this case, the issue refers to attitudes towards m-payment services. In comparison, using a qualitative approach can be problematic in
terms of transforming interviewees’ answers into standardized comparable answers (Punch, 2014, p. 87). Previous studies that have applied a qualitative approach in their research have also mentioned the limitations inherent with this method. Mallat (2007, p. 430) mentions that due to the small sample size in her study, the generalizability of the results to the population is problematic. Furthermore, van der Heijden (2002, p. 442) recommends future research to use quantitative methods to generate insight to different factors affecting the acceptance of m-payment systems. As this study strives to produce generalizable results to the greatest extent possible given the limitations, a quantitative approach is perceived appropriate in order to reach a large enough sample.

2.5 LITERATURE SEARCH

Previous literature on the subject has formed the basis for this study. The reviewed articles in chapter 4 include literature published between the years of 1998 and 2010. The main search engine used for finding relevant literature on the subject has been Google Scholar, which reveals literature results also available at the Umeå University Library website. Examples of databases used are Business Source Premier, EBSCO and DiVA, which are all credible institutions for scientific journals. Examples of search terms used are: attitudes toward m-payments, consumer attitudes, diffusion of innovation theory, ICT in Africa, m-payment adoption, mobile phones and economic development, network externalities, payment systems, perceived ease of use, perceived usefulness, perceived risk, technology acceptance model, theory of planned behavior, trust and unified theory of acceptance and use of technology.

References in the initial articles reviewed assisted in finding relevant results from previous studies. From chapters including future research suggestions, further literature has been obtained and areas of investigation were excluded in order not to repeat previous studies. Research articles represent the main sources in this study, as the research area is dynamic and facts, numbers and findings may become out of date rather quickly. Thus, books have primarily been used in order to show an understanding of the knowledge progression of the subject.

2.6 SOURCE CRITICISM

In the Scandinavian context, source criticism has been defined as the basic method for critically evaluating historical sources (Edelberg & Simonsen, 2015, p. 1). Leth and Thurén (2000, p. 18) refer to source criticism as the method developed in the science of history to clear out sources that did not provide well-founded knowledge from those that did. As a result, four criteria for source criticism was established; authenticity, time, dependency and tendency, discussed by Ejvegård (2003, pp. 62–65), among others. These criteria, or core principles, are further discussed in the book about source criticism by Thurén (2001).

Much literature on ICT and m-payments can be found. However, previous studies on this subject are more prevalent in developed countries. Logically, studies including the TAM are more frequently applied in research conducted in developed countries, as the model aims to assess attitudes towards technology. Among the 13 empirical studies reviewed in section 4.2, two have been conducted in developing countries, namely Musa (2006) and Sukkar and Hasan (2005). The available literature on m-payments in developing countries, specifically in African countries, is limited as the area of research is fairly new. Much of the previous research included in this study focus on countries other than Burkina Faso, the reason being that literature on m-payments in Burkina Faso...
is limited. Previous studies were included based on the following criteria: contextual relevance well-cited- and recognized studies, methods and theory.

Leth and Thurén (2000, p. 18) discuss the importance of distinguishing between sources of different nature: between primary sources, secondary sources and tertiary sources. Secondary sources have been used in this study, such as scientific articles. To minimize the risk of information being misrepresented, no secondary references have been used. The subject of m-payments in Africa is a fairly recent topic within academic research, and primary literature on the subject should be seen as snapshots representing results that correspond to a particular point in time.

Trustworthiness is central in source criticism. A source may be altered in order to fit the objective of the researcher; therefore solid evidence for the originality of a source increases reliability. As the material used in this study has been collected from reliable and respected scientific journals, the risk of beautified or false results is minimized and trustworthiness is increased. Further, a predominant part of the scientific articles that have been used are peer reviewed, i.e. controlled by other researchers. Further, a source is considered more trustworthy if it is current. Sources that are created closer to the event, which they are trying to portray, are considered more accurate as the description of the event is with greater certainty closer to the actual event. The aim has been to find as recently published scientific articles as possible, relevant to this study. Among the previous studies reviewed in chapter 4, only two, Jarvenpaa et al., (1999) and Oshikoya and Hussain (1998) have been conducted prior to year 2000.

The theoretical foundation of this study is based on the TAM, developed by Davis (1986), further tested and validated in his article from 1989. Thus, it has been necessary to use primary sources that are not as current. These older sources used in this study can be motivated as trustworthy as they are well cited in more recent studies. Research articles (e.g. Chen 2008; Jarvenpaa et al., 1999; Kim et al., 2010; Pavlou, 2003; Schierz et al., 2010; Wang et al., 2008) have been the main sources used in the argumentation for the methodological choices made in this research paper. These sources support that the research methods used in this study corresponds with commonly recognized methodological choices made in previous similar studies.
3. THEORETICAL FRAMEWORK

This chapter presents technology acceptance theories that are extensively used in this area of research. Previous literature, on which these theories are based, is presented in the following chapter in order for the reader to be able to create an understanding of the concepts discussed in previous literature. The theories deal with acceptance of new technology, networks, trust and risk. As this study is hypothesis testing, the theories will result in hypotheses, which will be tested at a later stage.

3.1 TECHNOLOGY ACCEPTANCE THEORIES

Many theories have been developed in order to attempt to explain what determines the acceptance and behavior of individuals towards information technology- and systems. Among those most widely used are the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), and the TAM (Surendran, 2012, p. 175).

3.1.1 The Theory of Reasoned Action

TRA was developed by Fishbein & Ajzen (1975) as a framework to better understand how intentions are formed. TRA shows that intentions are formed by two variables; the individual’s attitude towards the behavior and the subjective norm, which are in turn affected by various factors. By measuring how a selected factor affects these two variables, information can be generated in order to predict the intention of the individual (Fishbein & Ajzen, 1975, p. 334).

3.1.2 Theory of Planned Behavior

The TRA model was later extended to the Theory of Planned behavior (TPB) by Ajzen (1985) to include another variable that affects individuals’ intentions; perceived behavioral control. Perceived behavioral control includes the individual’s belief in regard to his or her own resourcefulness as well as given opportunities for performing a certain action (Madden et al., 1992, p. 4). Madden et al. (1992, p. 9) conclude in their comparison of TRA and TPB, that TPB was superior to TRA in explaining variations in behavioral intentions. TRA has since then been extended to the TAM, developed by Davis (1989) in order to understand why technology adoption among individuals is affected by their beliefs and attitudes (Yang, 2005 p. 260). The TAM is frequently applied by researchers in a variety of information systems and has been recognized as a suitable model to examine technology acceptance behaviors (Kim et al., 2010, p. 311). The TAM is the most extended version of these models and is most suited to answer the research question in this study. TRA and TPB will therefore be disregarded as models for analysis in this study.

3.1.3. The Technology Acceptance Model

Fred D. Davis developed the TAM in 1986, presented in figure 1. The model has been extensively used in previous research in order to describe acceptance among individuals for information systems (Surendran, 2012, p. 175). The precursor of the TAM is the Theory of Reasoned Action (TRA) developed by Ajzen & Fishbein (1975). Davis aimed to develop an improved measurement of the TRA, in order to better predict and explain individuals’ acceptance of technology (Davis, 1989, p. 320). Two major objectives formed the basis for the study, improving the general understanding of user acceptance processes and establishing a new basis for testing user acceptance before implementing new systems (Davis, 1986, p. 7). The TAM allows for external variables to be accounted when attempting to explain information system usage (Kim et al., 2010, p.
The model suggests that perceived usefulness and perceived ease of use are the main determinants of using a technology or system (Chen, 2008, p. 37). The TAM model is a popular model found in an extensive amount of literature on technology acceptance. The popularity of the model is shown in the large amount of recent empirical support (Luarn & Lin, 2005, p. 875). The model has previously been modified in various ways. Wixom and Todd (2005, pp. 86-87) present three general ways by which the model has been extended: including factors found in related models and adding additional factors and earlier constructs of perceived usefulness and perceived ease of use.

Figure 1. Original Technology Acceptance Model (Davis, 1986, p. 24): self-constructed

Adding a number of factors that have been included in previous research concerning m-payment services will extend the TAM in this study. The extended model is presented in section 3.8. Apart from the two main factors of the model, perceived usefulness and perceived ease of use, the original TAM has been extended to also include the following factors:

- Network externalities (perceived number of users and technology specific value)
- Trust (perceived size, perceived reputation, satisfaction with past m-payment transactions)
- Perceived risk
- Demographic factors (age, gender, faculty affiliation)

Perceived usefulness is defined as: “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320). Previous research suggests different variables that affect people’s attitudes towards using a system. Perceived usefulness is one of two main factors, suggesting that a person is more likely to use a system if this system contributes positively to his or her job. Perceived usefulness has been determined to have the stronger influence of the two factors (Shin, 2009, p. 1346).

**H1: Perceived Usefulness has a positive effect on Attitudes towards using mobile payment services among university students**

The second main determinant, perceived ease of use is defined as: “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). Although a system may be beneficial for a person to use, the system might be complex to use and thereby be perceived as not worth the effort. Previous studies (Chen, 2008; Musa, 2006; Shin 2009; Schierz et al., 2010; Yang, 2005) support Davis’ (1989) argument for that perceived usefulness and perceived ease of use have a positive correlation on consumers’ attitudes towards using various systems. Four studies (Kim et
al., 2010; Luarn & Lin, 2005; Schierz et al., 2010; Sukkar & Hasan, 2005) included in chapter 4, suggest that perceived ease of use affect perceived usefulness. Therefore, this relationship will also be tested in this study.

H2a: Perceived Ease of Use has a positive effect on Perceived Usefulness of mobile payment services among university students

H2b: Perceived Ease of Use has a positive effect on Attitudes towards using mobile payment services among university students

3.2 DIFFUSION OF INNOVATION THEORY
The Diffusion of Innovation Theory, also called Innovation Diffusion Theory (IDT), was introduced by Rogers (1995) and is an alternative or complement to the TAM that can be used when researching adoption behavior. IDT is described as a theory that explains a number of interesting aspects, e.g. the innovation decision process, factors that affect adoption and innovation adoption rate and likelihood (Chen, 2008, p. 38). Moore and Benbasat (1991, p. 197) argue that there exists some similarities between the factors considered in the IDT and the TAM, complexity and relative advantage from the IDT are quite similar to perceived ease of use and perceived usefulness included in the TAM. Given these similarities and the possibilities to extend the TAM with factors of interest, this study will present an extended version of TAM.

3.3 UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY
The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh et al. (2003) by comparing eight other user acceptance models and creating a unified model that covers relevant variables from the other models. It consists of four factors that affect behavior together with moderating factors, such as age and gender (Venkatesh et al., 2003, p. 447). Two of the factors are similar to perceived usefulness and perceived ease of use of the TAM, namely performance expectancy and effort expectancy (Venkatesh et al., 2003, p. 447; 450). The third factor, social influence, is similar to network externalities, which is included in this study. The fourth factor of facilitating conditions is not considered relevant for this study. Considering the similarities in factors and customizability of the TAM, UTAUT will be disregarded in favor of an extended version of the TAM in this study.

3.4 NETWORK EXTERNALITIES
The essence of network externalities is that the more people using a product, the better utility the product is suggested to have. Perceived benefits of a product are increasing with the number of users of the product (Wang et al., 2005, p. 18). A positive correlation between the number of users and increased utility reveals that network externalities exist (Katz & Shapiro, 1994, p. 96). Further, a positive network externality implies that the value of using a certain product increases with the amount of units sold of this product (Economides, 1996, p. 678). A significant amount of previous studies have included network externalities in order to assess the value of a network economy. The concept allows for distinction between indirect- and direct benefits of networks (Au & Kauffman, 2008, p. 183). Three studies that are worth looking at in order to obtain a valuable overview of the literature on the subject of network externalities are the work by Economides (1996), Liebowitz (2002), and Shapiro and Varian (1999). Network
externalities have been used in research areas such as electronic data interchange (Wang & Seidmann, 1995), digital wireless phones (Kauffman & Techatassanasoontorn, 2005) and electronic banking and ATM networks (Gowrisankaran & Stavins, 2004). Network externalities is a well-established concept which has been found to successfully explain technology acceptance (Wang et al., 2008, p. 102). In this study, network externalities are thought to have a positive influence on perceived usefulness and perceived risk in the extended version of TAM.

Previous empirical research conducted on network externalities has divided the concept of network externalities into sub-terms. Questions in survey studies have been based upon these sub-terms. Lin and Lu (2011, p. 1160) divided network externalities into six categories: number of members, number of peers, perceived complementarily, usefulness, enjoyment and continued intention to use. A common and recurring division of network externalities is to include number of users and technology specific value (also called technology utility), which has been done in the studies by Wang et al., (2005, p. 28) and Wang et al., (2008, p. 110). Wang et al. (2008, p. 103) argue that the number of users of the product or service has a significant effect on individuals’ acceptance behavior. However, as it is hard for the participants in this study to know the actual number of users, their perception of the amount of users will be asked, in consistency with Wang et al. (2005). Wang et al., (2008, p. 103) further argue that except for the influence that the number of users have, the benefit of the technology itself, its technology specific value, also has an effect on individuals’ acceptance behavior. Therefore a division of network externalities based on perceived number of users and technology specific value, will be made in this study.

Previous studies have tested the relationship between network externalities and adoption (Mallat, 2007, p. 426) and perceived usefulness (Wang et al., 2008, p. 104). However, the thought that network externalities would have an influence on perceived risk have not been tested in previous research. In this study, the influence of the critical mass is perceived to have a negative correlation with perceived risk.

H3a: Technology Specific Value has a positive effect on Perceived Usefulness of mobile payment services among university students

H3b: Technology Specific Value has a negative effect on Perceived Risk towards using mobile payment services among university students

H3c: Perceived Number of Users has a positive effect on Perceived Usefulness of mobile payment services among university students

H3d: Perceived Number of Users has a negative effect on Perceived Risk towards using mobile payment services among university students

3.5 PERCEIVED RISK
Peter and Ryan (1976, p. 184) talk about perceived risk as consisting of the uncertainty of loss and the importance of said loss. Perceived risk has been defined as: “The extent to which the prospective user expects m-payment to be risky” (Chen, 2008, p. 39). Schierz (2010, p. 211) proposes, along with previous studies, that perceived security, i.e. low perceived risk, has an effect on consumers’ attitudes towards the usage of m-payment services. When researching consumer acceptance behavior it is interesting to
study what effect the perceived risk has on adoption behavior instead of just focusing on the technological risk. Cho (2004, p. 828) argues for this and mentions that consumers also consider to what extent a risk will affect them rather than just the nature of the risk. Further, he emphasizes the benefits with information of consumers’ perceived risk when trying to predict a certain behavior. Shin (2009, pp. 1343-1344) mentions the lack of studies that incorporate subjective risk and security perceptions in models and that those studies that analyze risk tend to focus on the more technological aspect. He further argues for the inclusion of perceived risk in the research model as perceived security and actual security may differ greatly, e.g. a technology may be misleading and appear more safe than it actually is (Shin, 2009, p. 1346). In 2007, Yang et al., (p. 172) investigated the use of ICTs by college students. Their study showed that students’ perceived risk affected their use of ICTs negatively. Given these arguments and the impact that perceived risk has shown to have on adoption behavior in previous studies (e.g. Chen, 2008; Mallat, 2007; Schierz, 2010; Shin, 2009), perceived risk will be included in the extended version of the TAM in this study. The external factor of perceived risk is thought to influence students’ attitude towards m-payment services, thus the following hypothesis is to be tested:

**H4: Perceived risk has a negative effect on Attitudes towards using mobile payment services among university students**

### 3.6 TRUST

Trust is a factor that has been widely used in many theories and models in order to explain behavior and attitudes towards m-payments. Deutsch (1958) was the first researcher studying the term trust. He concluded that trust exists in all types of relations and that a lack of trust between people may result in negative outcomes (Deutsch, 1958, s. 265). Suh and Han (2003, p. 140) define trust in the e-commerce environment as social glue that simplifies interaction between customers and firms. It has been documented that trust influences transaction intentions, which in turn affects transaction behavior (Pavlou & Grefen, 2004, p. 39). Further, researchers have concluded that trust is among the most important factors affecting intentions to use internet-services and that high trust results in lower perceived risk (Kim et al., 2008, p. 554). Trust has become increasingly important in mobile commerce (Misra & Wickamasingshe, 2004, p. 372) and has thus been a critical factor to address in research on information systems and ICTs (Shin, 2009, p. 1346). Further, trust has been documented to have a positive effect on perceived usefulness (Gefen et al., 2003, p. 62). In his paper, which has been cited over 2450 times, Pavlou (2003, p. 110) emphasizes the existing empirical support for integrating trust in the TAM. Given the found influence of trust on intentions and attitudes, this factor will be included in the extended version of the TAM in this study.

Further, the external factors of perceived size, perceived reputation and satisfaction with past mobile transactions will be included in the research model as factors affecting trust. These external factors have been added to the TAM in previous research (e.g. Jarvenpaa et al., 2000; Pavlou, 2003). In their study, Jarvenpaa et al., (2000, p. 48) investigated whether perceived size and perceived reputation affect consumer trust in the context of internet stores, based on the assumption that size influence impressions and in turn, trustworthiness. Pavlou (2003, p. 122) investigated consumer acceptance of electronic commerce, by integrating risk and trust factors with the TAM. Web-retailer reputation and satisfaction with previous online transactions were included as external factors thought to affect trust. Pavlou (2003, p. 118) could show that reputation plays a role in
transaction intentions among consumers. Moreover, he could show that satisfaction with past transactions had a positive but non-significant effect on transaction intentions. Based on the finding in previous studies, these external factors are thought to have influence on trust in this study as well. Thus, perceived size and perceived reputation of mobile service providers and satisfaction with past mobile transactions are included as external factors affecting trust.

**H5a:** Trust has a positive effect on Perceived Usefulness towards using mobile payment services among university students

**H5b:** Trust has a negative effect on Perceived Risk towards using mobile payment services among university students

**H5c:** Perceived Size has a positive effect on Trust towards mobile payment service providers among university students

**H5d:** Satisfaction with past transactions has a positive effect on Trust towards mobile payment service providers among university students

**H5e:** Perceived Reputation has a positive effect on Trust towards mobile payment service providers among university students

### 3.7 MODERATING FACTORS
Demographic factors have been suggested to have an influence on perceived usefulness and perceived ease of use in the TAM and are therefore common to include as external or moderating variables in extended versions of the TAM. Yang (2005, p. 262) included three external factors: gender, age and specialization in his study exploring factors affecting students’ adoption of mobile commerce in Singapore. Shin (2009, p. 1345) included gender, age and income as moderating factors in his study regarding individuals’ attitudes towards mobile wallets. Shin (2009, p. 1350) observed empirical findings for the influence of age and income on some of the factors in his research model. This result differs from the study by Yang (2005, pp. 273-274) that showed that demographic factors were inconsistent and had no major effect in his study. These different findings may be attributed to the homogeneity of the participants in the study by Yang (2005), as only university students participated while the study by Shin (2009) included a broader target group. As both of these studies presented different results concerning their demographic factors, it is of interest to see what results the inclusion of demographic factors will have on the research model this study. Therefore, three moderating factors will be included in this study: age, gender and faculty affiliation. Faculty affiliation is similar to specialization, which was included in the study by Yang (2005, p. 262), which was shown to have no significant effect on students’ adoption behavior. The reason for the inclusion of faculty affiliation in this study is that the target population in the study by Yang (2009), i.e. students, is similar and thus it is of interest to explore whether this factor will have a significant moderating effect on the research model or not.

### 3.8 RESEARCH MODEL
There are several theories within the academic field of business administration and finance, treating the focus of this study; m-payment services. The TAM is a model that has been frequently used and most of the previous studies on m-payments have included
the TAM as the central model. The model can thus be viewed as reliable. As suggested by the originator of the model, Davis (1989) among others, the TAM will be extended with relevant factors to this context. Network, trust, perceived risk and demographic factors have all been included in previous studies with similar focus and are seen relevant to include in this study. The research models of TRA and TPB are precursors to the TAM and will therefore not be included in this study. As previously argued, the TAM will be used in favor of UTAUT and DIT. The proposed research model is presented in figure 2.

Figure 2. The Conceptual Research Model including Hypotheses. Source: own

**H1:** Perceived Usefulness has a positive effect on Attitudes towards using mobile payment services among university students

**H2a:** Perceived Ease of Use has a positive effect on Perceived Usefulness of mobile payment services among university students

**H2b:** Perceived Ease of Use has a positive effect on Attitudes towards using mobile payment services among university students

**H3a:** Technology Specific Value has a positive effect on Perceived Usefulness of mobile payment services among university students

**H3b:** Technology Specific Value has a negative effect on Perceived Risk towards using mobile payment services among university students
H3c: Perceived Number of Users has a positive effect on Perceived Usefulness of mobile payment services among university students

H3d: Perceived Number of Users has a negative effect on Perceived Risk towards using mobile payment services among university students

H4: Perceived Risk has a negative effect on Attitudes towards using mobile payment services

H5a: Trust has a positive effect on Perceived usefulness towards using mobile payment services among university students

H5b: Trust has a negative effect on Perceived risk towards using mobile payment services among university students

H5c: Perceived Size has a positive effect on Trust towards mobile payment service providers among university students

H5d: Satisfaction with past transactions has a positive effect on Trust towards mobile payment service providers among university students

H5e: Perceived Reputation has a positive effect on Trust towards mobile payment service providers among university students
4. PREVIOUS RESEARCH

This chapter includes a description of some of the more cited studies conducted on the subject of ICT and m-payments, together with research relevant for the purpose of this study. Well-cited articles are included in order to present theories that have been extensively used within the area of ICT and m-payments, whereas other studies are included as they have a geographical- and/or cultural significance to this study. A description of the main content of each study is given and two tables are presented. Table 1 provides the reader with a comprehensive overview of factors used for measuring consumer acceptance, and table 2 summarizing contexts and methods of previous empirical research.

4.1 PREVIOUS STUDIES ON ICT, TAM AND MOBILE PAYMENTS

Previous research in the context of university students has mainly focused on ICT from the perspective of how it can be applied within school systems (Adam, 2003; Adomi & Kpangban, 2010; Bingimlas, 2009). The previous research that studied university students’ attitudes towards m-payment services were conducted in developed countries (Kim et al., 2010; Yang, 2005) and thus this research focusing on a developing country will provide information in a less explored area. The studies are presented in a chronological order, beginning with a study published in 1998 and ending with a study published in 2010. ICT and m-payments are broad issues that have been examined in research in numerous contexts. The relevance of ICT and m-payments has been discussed from many different perspectives using a wide range of approaches. In order to present a comprehensive overview of the selected prior research on ICT and m-payments, relevant theories and suitable contexts, the covered literature is classified into three categories: ICT-focused studies, empirical studies and mobile payments in Africa. These categories are included as they reflect major topics within ICT and m-payments that have inspired researchers in this field up to present time.

4.1.1. ICT-focused Studies

Oshikoya and Hussain, 1998

In 1998, Oshikoya and Hussain from the African Development Bank Group published a paper in which the African development is reviewed in the context of a world that is becoming increasingly globalized by the means of ICTs. During the 1990’s, research on ICT was not unanimous in concluding optimistic outcomes of ICT to the African continent. Rather, researchers were debating whether the integration of ICT in the world might cause the gap between developed and developing countries to increase further. Oshikoya and Hussain (1998, p. 102) divided research into two contrasting schools based on their outlooks of ICT for African countries. The first school was forecasting that ICT might cause major challenges for African countries, as ICT expansion in the rest of the world would further diminish the means necessary to spur economic growth in developing countries. This school argued that African countries would not be able to finance the investments needed in order to take advantage of the ICT development, hence, risking increased marginalization of the global economy. The second school of thought discussed ICT as a major opportunity for developing countries in reducing the income gap between developing and developed countries. Oshikoya and Hussain (1998) examine challenges for development and how ICT could be a solution for these, policies that African countries would need to adopt in order to increase ICT access, initiatives already taken and how the African Development Bank Group would
be able to assist these countries in integrating ICT. The paper concludes that ICT presents opportunities for leapfrogging in Africa, and that those information technologies may lead to reduced poverty and faster economic growth.

Ruthven, 2002
Ruthven (2002) published a study with the aim to understand the limits of informal financial services. The results are based on surveys conducted in 51 settlements in West Delhi. The author included questions targeting what services and devices that were used at the time, preferences and perceptions of choice among users as well as what opportunities there might be for providers to offer new services and products in order to fill market gaps. The study highlights the importance of personal networks and social relations in financial transactions, reflecting factors such as security (Ruthven, 2002, p. 267). The connection between social- and financial relations in a developing country such as India, the main theme of his study, was at the time of publication not an unexplored area. With increased knowledge of complex social relations of residents in Kalibasti of West Delhi, Ruthven (2002, p. 268) hopes to encourage new service providers to enter this area by targeting the urban poor.

Porteous, 2006
Previous studies (Oshikoya & Hussain, 1998; Scott et al., 2004) questioned to what extent poor people in developing countries would be able to integrate ICT and benefit from these new means of communicating and doing business. However, at the time of Porteous’ (2006) publication, researchers had started to agree on the relevance of ICT to the development in African countries. In this report commissioned by the Department for International Development in the US, Porteous (2006) recognizes the potential of ICT in terms of using mobile phones for transactions and payments in developing countries. The report offers a bright outlook on the use of mobile phones as money transaction devices as the infrastructure needed already reaches unbanked people. Porteous (2006, p. 23) mentions how airtime may be able to serve as an alternative currency. Although there were no evidence at the time that airtime was used to transfer money systematically, research examining usage patterns through surveys was underway. Porteous (2006, p. 24) considers the possibility of mobile operators in developing countries gaining stronger financial positions and stronger retail brands than banks as a result of m-payments. The author discusses the risks of anticompetitive “lock-in” of mobile services, such as preventing innovation and hindering competitive pricing, and underlines that lock-in should be avoided (Porteous, 2006, p. 35). Four mobile providers participated in this study by answering a questionnaire aiming to identify barriers to their business models. Results identified barriers of customer adoption, rather than legislative or regulatory concerns. Adoption issues included educating customers in using mobile transactions, trust in and awareness of mobile services, security and user friendliness (Porteous, 2006, pp. 41-42).

Walsham et al., 2007
In a special issue of representative studies conducted on information systems in developing countries, Walsham et al., (2007, p. 317) explicitly state that the former debate on whether developing countries would be able to benefit from ICTs has now been answered with a clear yes. At the time of publication relatively few studies had been published on ICTs in developing countries despite the significance of the subject. Hence Walsham et al., (2007, p. 318) considered there to be a need for a special issue on this topic in order to support and give inspiration to an increasingly important
research area. Only four out of 84 papers were selected to be included in this introductory paper. All four papers demonstrate that the success of information systems in developing countries does not solely depend on the technical aspects of the systems, but that cultural- and social characteristics and local conditions are important to consider in ICT research to specific countries. In terms of methodology, Walsham et al., (2007, p. 324) mentions the advantages with qualitative approaches but hope to see purely quantitative studies assessing broader factors of ICT issues in developing countries for future research work.

Dahlberg et al., 2008
In 2008, Dahlberg et al., (2008) performed an extensive literature review on a more specific area within ICTs, namely m-payments. The review includes research articles with the aim to provide a summary of the past findings within research on m-payments, but also to suggest guidelines for future research on the subject. The authors analyze specific factors influencing m-payments in various contexts. The theoretical framework of the literature review consists of Porter’s five forces model and the generic contingency theory. The findings from the literature review resulted in a framework consisting of both contingency- and market factors affecting various characteristics of m-payments. The framework is to be used to classify previous studies into categories, but also as a research model in order to examine the factors influencing m-payments (Dahlberg et al., 2008, p. 166).

The literature review resulted in a classification of 73 publications on m-payments. The authors could conclude that most research on m-payments had been conducted in the area of technology, i.e. 29 of the publications. The second most popular research area on m-payments includes studies focusing on consumers, in which 20 publications had been made. Less prevalent were studies focusing on mobile providers and legal issues. No study included social and cultural influences on m-payments and few focused on changes in the commercial environment. Prior research included in the 2008 publication by Dahlberg et al., also shows that qualitative measures are more popular than quantitative within m-payments research (Dahlberg et al., 2008, p. 169). A conceptual framework including four contingency factors and five competitive factors was proposed for analyzing the m-payments market. The paper ends with discussing whether m-payment services will merely work as an extension of traditional payment services, or if these may actually develop to become new payment instruments independent from already established payment structures (Dahlberg et al., 2008, p. 178).

4.1.2. Empirical Studies
Table 1 presents what factors the previous empirical studies have covered and if the factors had a significant influence in their respective research model. The purpose of the table is to present what factors that have been implemented in previous studies researching consumer attitudes and perceptions towards ICT. Therefore, individual relationships between factors in previous research studied are not presented in the table. These individual relationships are discussed in the text following table 1. Factors, such as perceived usefulness, perceived ease of use and attitude towards using, are not included in the table as they are inherent to the TAM. An “X” in the table represents that a significant influence was found and a “-” that no significant effect could be documented.
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PC = Perceived Credibility, SE = Self-efficacy, I = Innovativeness, PAB = Past Adoption Behavior, K = Knowledge, CUL = Culture, TC = Technology Cluster, T = Trust, ACC = Accessibility of technology, PSE = Perceptions of Socioeconomic Environment, RA = Relative Advantage, COMP = Compatibility, COST = Costs, NE = Network Externalities (also includes social influence & subjective norm), PR = Perceived Risk/security, PCON = Perceived Convenience, PTS = Perceived Transaction Speed, P = Privacy, MOB = Mobility, REA = Reachability, PS = Perceived Size, REP = Perceived Reputation, S = Satisfaction with previous transactions, F = Frequency of usage
Jarvenpaa et al., 1999
Jarvenpaa et al., (1999) investigated consumer trust in an Internet store by conducting one web survey in Australia and one in Israel in order to conduct a cross country validation of the research model. In their self-constructed Internet Consumer Trust Model, Jarvenpaa et al., (1999) test the influence of perceived size and perceived reputation on trust. Further, trust is thought to have a positive influence on attitudes. Although the model is not an extended version of the TAM, as the factors of perceived ease of use and perceived usefulness are not included, the study is considered relevant to this study, as both studies aim to investigate the same relationships between the above variables. This study is a relevant reference source in terms of measurement items for the questionnaire construction.

Legris et al., 2003
The study conducted by Legris et al., (2003) has been cited over 2100 times and reviews 22 empirical studies from 1980 to 2001 that have used the TAM. The authors review extensions of TAM, connections between factors and measurement instruments used. The authors conclude that the TAM is a useful model but that it should be extended into a broader model that accounts for human- and social factors. This review argues for the extension of the TAM and provides a clear presentation of what measurement instruments have been used and to what extent in previous TAM studies. This contributed to the selection of questions regarding perceived ease of use and perceived usefulness, which were used in the questionnaire for this study.

Pavlou, 2003
In this study, Pavlou (2003) aims to predict consumer acceptance of electronic commerce through the e-commerce acceptance model (Pavlou, 2003, p. 103), in which the two main factors of the TAM are integrated as key drivers to consumer acceptance of e-commerce. Further, Pavlou (2003) added three control variables to trust consisting of reputation, satisfaction with past transactions and frequency. As this study intends to investigate trust, the variables influencing trust in the study by Pavlou (2003) is of interest.

Luarn & Lin, 2005
In 2005, Luarn and Lin proposed an extended version of the over fifteen years old TAM in the context of mobile banking. Similar to many authors before them, extensions of the model by including new factors was suggested. The study on m-banking adoption was made in Taiwan, where 349 respondents attending an e-commerce exposition were asked to participate in a survey (180 surveys were completed) in order to test the extended TAM including new variables, perceived- credibility, self-efficacy and financial cost. Aiming to explain users’ intentions to use mobile banking, the authors hope to increase understanding of how new IT systems are best promoted to users (Luarn & Lin, 2005, p. 875). Their study is well cited and provides a good basis for this study in terms of theory and methods used when examining ICT from a user perspective.

Yang, 2005
Yang (2005) conducted a survey in Singapore in which 866 students participated in order to examine what factors affect their adoption of mobile commerce. The TAM was used in the study and the author included seven individual characteristics as external factors: innovativeness, past adoption behavior, knowledge, technology cluster, age,
gender and academic specialization. The results showed that innovativeness and past adoption behavior were strong predictors while demographic factors such as age and gender were less significant. The author argues that this may be since the participants in the survey are quite homogenous, i.e. university students around the same age. He further argues that this homogeneity reduces the generalizability of the results since university students are highly educated and experienced with new ICTs in comparison to the public in Singapore. However, he also argues that since university students are more likely to be early adopters and innovative they can contribute with information to better understand the adoption process of new technology (Yang, 2005, p. 274). The study by Yang (2005) is of interest for this study as it provides further empirical support for the use of the TAM when researching ICT adoption factors, as well as argues for the inclusion of innovativeness as an external factor in future the TAM research. His study is also very similar to this one in the choice of method, theory as well as target group, and can thus provide valuable guidelines throughout the study.

**Sukkar and Hasan, 2005**
In 2005, Sukkar and Hasan performed a pilot study in order to test the validity of an extended version of the TAM, which included culture as an external factor. They argued that there is lack of evidence supporting the application of the TAM as used in developed countries, to developing countries without some modification to the model to better suit the context of the country in question (Sukkar & Hasan, 2005, p. 381). Culture is found to be an important factor, though complex and hard to measure as a single factor, this shows the importance of considering country specific factors when extending the TAM for this study (Sukkar and Hasan, 2005, p. 395). The authors further highlight that there is a lack of IT-based studies in developing countries and that the majority of studies using the TAM have focused on developed countries (Sukkar & Hasan, 2005, p. 384). Even though the focus of their study is on e-commerce rather than m-payment services the arguments for the need to modify the TAM to the context of the country in question is of interest for this study when developing the research model.

**Musa, 2006**
In his research from 2006, Musa mentions that the TAM is more applicable to developed nations and therefore the model needs to be modified as sub-Saharan Africa has some factors that are not accounted for in the original model (Musa, 2006, p. 222). One difference between developed and developing countries is the availability of the technology in question, as adoption is not always a choice since the technology may not be available to all (Musa, 2006, p. 215). He therefore includes “Accessibility of Technology to Individual” as an external factor that affects perceived usefulness and perceived ease of use. Results showed that accessibility had an impact on perceived ease of use but a rather small effect on perceived usefulness. His study further supports the need to consider country specific factors when developing the research model for this study.

**Mallat, 2007**
The research by Mallat (2007) is a well-cited study that took place in Finland and aimed to explore what factors affect consumers’ adoption of m-payment services. Her study implemented the Innovation of Diffusion Theory (IDT) and was conducted through interviews with different focus groups. The results of her study show that the following factors influenced consumers’ adoption behavior: relative advantage, compatibility, complexity, costs, network externalities, trust and perceived security risks. The results
showed that both the costs of using the service and network externalities had a major impact on consumers’ attitudes towards m-payment services (Mallat, 2007, p. 429). If there was a fee to use m-payment services to e.g. use a vending machine it was a deterrent to the consumer and they used other means of payment (Mallat, 2007, p. 424). Mallat (2007, p. 428) suggests that network externalities should be included in studies that examine m-payment service adoption, since the results of her study shows that the amount of other consumers as well as merchants who use m-payment services have an effect on the consumers’ intention to use the service. The study by Mallat presents different factors that may be of interest for this study and also argues for the inclusion of network externalities as a factor in the research model.

**Chen, 2008**
Chen (2008) conducted a study in the US to develop a research model, which can be used to better understand what factors affect consumer adoption of m-payment services. He conducted interviews with consumers and executives in the business in order to identify key factors that may influence consumer adoption behavior. The interviews resulted in the four following factors: perceived transaction convenience, perceived transaction speed, security concerns and privacy concerns. He then implemented these together with perceived risk as external factors into the TAM, IDT in order to create his model. IDT adds compatibility as a determinant of “intention to use m-payment services” along with perceived usefulness and perceived ease of use of the TAM. This model was then tested by distributing questionnaires to university students, corporations and professional organizations. The results were that compatibility had the biggest effect on consumer intention of the determinants and that transaction convenience affected both perceived usefulness and compatibility. The results also showed that consumers were concerned with the safety and risks of m-payment services, thus Chen (2008, p.46) argues for the importance of risk reduction especially in the early stages of implementation of m-payment services. His study presents further support for the TAM and introduces new external factors as well as the inclusion of IDT and perceived risk in his model, all of which are of interest for this study. Even though consumers’ risk attitudes may differ between the US and Burkina Faso it may be a factor of interest to research nevertheless.

**Wang et al., 2008**
In their study from 2008, Wang et al., presented evidence for the applicability of network externalities to an extended version of the TAM regarding mobile telecommunication products. The study empirically tested the relevance of the concept of network externalities in relation to the TAM in the setting of Multimedia Messaging Services (MMS). Wang et al., (2008) extended the original TAM by combining network externalities, consisting of the two major constructs: technology specific value and number of users into the well-recognized model. The sample consisted of 1352 members of three professional societies in Taiwan, however the response rate only amounted to 12.87 percent. The paper-and-pencil questionnaires were mailed to the selected subjects. A seven-point Likert-type scale was used, where 1 referred to “strongly disagree” and 7 referred to “strongly agree” (Wang et al., 2008, p. 105). Their study provide further evidence for the accuracy of including network externalities into the original TAM in the context of mobile telecommunication innovations. The questions formulated by Wang et al., (2008, p. 110) in order to measure technology specific value and perceived number of users have been adopted in this study, with some modifications in relation to the mobile payment services context.


**Shin, 2009**

In his study from 2009, Shin argued for the limitations and need to extend the TAM when studying mobile wallet adoption and highlights the lack of social context when using the basic model. He therefore proposed the use of the UTAUT as an extension of TAM as it includes social context factors and thus should prove more relevant to his study (Shin, 2009, pp. 1344-1345). His final model included perceived usefulness, perceived ease of use, social influence, perceived security, trust and self efficacy as factors and demographic attributes as moderating effects affecting consumers attitudes and intentions (Shin, 2009, p. 1345). Results of the survey showed that security was the most important factor and social influence was found to have no direct effect on intention to use the service. Even though social influence and self-efficacy had no direct effect, these two factors were shown to have a moderating effect on other factors in the model (Shin, 2009, pp. 1350-1351). The demographic factors age and income were shown to have a moderating effect on intentions and attitudes, while gender proved to have little to no effect. The research by Shin (2009) is of interest for this study as it suggests an alternative model, UTAUT, which includes other factors to consider when constructing the survey. His discussion regarding the inclusion of social context factors can be seen as support for the addition of network externalities in the research model, which was argued for by Mallat (2007, p. 428).

**Schierz et al., 2010**

In a study from 2010 Schierz et al., distributed an online-survey to a mixed group in Germany with the aim of researching consumer acceptance factors towards m-payment services. They implemented an extended version of the TAM that included perceived usefulness and perceived ease of use, individual mobility, subjective norm, perceived compatibility and perceived security (Schierz et al., 2010, p. 214). As Shin (2009) did in his study, Schierz et al. (2010, p. 212) also argue for the inclusion of social context factors when researching acceptance behavior and thus included subjective norm as a factor in their model. The survey received 1447 responses with an even age and gender distribution, and showed that perceived compatibility; individual mobility and subjective norm had the greatest effect on consumers’ attitudes and intention (Schierz et al., 2010, p. 215). These findings are interesting as none of these three factors are included in the original TAM and thus highlights the need to extend the model for this study. Their study also presented evidence that risk had an effect on attitudes and intentions though not as great an effect as other research has shown. Given this result they argue for a less risk focused approach when launching a m-payment service and suggests that managers focus more on other factors such the compatibility of the service with consumers’ current lifestyle (Schierz et al., 2010, p. 215). Their study provides further support for the applicability of an extended version of the TAM when researching m-payment services acceptance factors and also provides suggestions to what factors should be considered when constructing the survey for this study. Further the importance of a subjective norm supports the inclusion of network externalities in the research model.

**Kim et al., 2010**

In 2010, Kim et al. performed a study in South Korea in order to examine the factors that influence people’s intention to use m-payment services. They extended the TAM into the m-payment context and added six external variables, two individual and four system characteristics, that influence the consumer’s intention to use. The two individual factors included personal innovativeness and m-payment knowledge, while
the system characteristics factors referred to mobility, reachability, compatibility and convenience. Conducting a survey in which questionnaires were distributed at universities, companies and Internet cafes among other places tested how these factors affect people’s intention to use m-payment services. They divided the participants into two groups, early- and late adopters, and their result shows that there is a difference in which factors have a greater impact on the intention to use in these two groups. The authors argue that this difference in attitudes among early- and late adopters highlights the need for different strategies and business models among m-payment service providers depending on the target group as well as the current level of m-payment services in the country (Kim et al., 2010, p. 320). This difference in attitudes between the groups is an area of interest for future research (Chen, 2008, p. 47). However as this study will be focusing on university students, which are according to Yang (2005, p. 274) more likely to be early adopters, this difference in attitudes will not be possible to research. Overall their study is similar in both its use of methods and theories, thus it can provide inspiration and guidelines for this study as well as valuable information regarding which external factors to include in the research model.

4.1.3. Studies on Mobile Payments in Africa

Scott et al., 2004

In just a few years, major advancements within ICT occurred and the demand for specifically mobile phones in Africa has exceeded most people’s expectations (Scott et al., 2004, p. 1). This study was conducted for the Commission of Africa, and three main areas are proposed for African countries to be able to exploit the benefits of mobile financial services: expanding access to networks, using phone networks through appropriate services and access to financial services using the phone. Although Scott et al., (2004, p. 2) recognizes mobile phones as an integral part of the African society, these authors deliberate upon the first school of thought presented in the work of Oshikoya and Hussain (1998), when discussing whether or not poor people will be able to benefit from the infinite uses of mobile phones.

Hahn & Kibora, 2008

In their article, Hahn and Kibora (2008) attempt to fill parts of the research gap at the time, focusing on ICT in relation to social and cultural aspects. The aim of the paper is firstly to highlight two specific terms, domestication and cultural appreciation in order to underline the difference in significance that the mobile phones have had in African countries compared to developed countries. Secondly, the authors seek to increase understanding of the use of mobile phones in Burkina Faso in particular (Hahn & Kibora, 2008, p. 103). The interaction between social and economic aspects is essential to consider, and the authors argue that this connection can be understood by studying the mobile phone use in Burkina Faso. Further, Hahn and Kibora (2008, p. 105) conclude that economic criteria is not a sufficient factor in itself when explaining why some societies, such as Burkina Faso, are able to adapt and adopt new ICT to such a wide-ranging degree. Their results suggest the relevance of incorporating additional non-economic factors when using the TAM in this study in order to fully understand m-payments in relation to the specific context.
Duncombe and Boateng, 2009
In their article, Duncombe and Boateng (2009) review 43 research articles in order to describe the current knowledge of the potential of mobile phones used in handling financial services in developing countries. Main foci of previous research on this subject are application design and adoption, whereas studies investigating financial needs in these countries and the impact of m-payments are less prevalent (Duncombe and Boateng, 2009, pp. 1253-1254).

Aker & Mbiti, 2010
In 2010, Aker & Mbiti published a research article covering the past decade’s advancements of mobile phone coverage in Sub-Saharan Africa. The article examines how mobile phones can bring economic benefits to consumers (and producers) through five mechanisms: how the mobile phone can lead to improved access and use of information, how this communication can allow better management of supply chains resulting in increased firm efficiency, how mobile phones can create new jobs, how mobile phones can lead to facilitation of communication between networks and finally how m-payment services can result in improving financial transactions (Aker & Mbiti, 2010, pp. 213-214). The results of the article show that empirical research support potential benefits from m-payments for both producers and consumers on the African continent. Moreover, results suggest that as airtime prices decreases, m-payment services will be increasingly used by subscribers at all income levels (Aker & Mbiti, 2010, p. 229).

Hellström and Tröffen, 2010
Hellström and Tröffen (2010) presents an overview of mobile phone usage in East Africa based on secondary data, statistics and field research conducted in Kenya, Rwanda and Tanzania. The report focuses on trends, obstacles of implementation as well as opportunities for mobile applications. The authors, among others, underline the young population, the high illiteracy rate as well as the weak infrastructure as key aspects when discussing both barriers and opportunities for mobile phone usage (Hellström & Tröffen, 2010, p. 9). The study highlights the importance of conducting research in developing countries in Africa and provides a relatively current depiction of the knowledge progression of ICT in these countries within the past years.
4.2 MAPPING OF ARTICLES

Table 2 provides a mapping of the empirical articles reviewed according to their geographical context, method and model used. The majority of the reviewed empirical studies utilized similar methods and models, i.e. quantitative methods combined with the TAM, when researching consumer acceptance behavior. Although the studies included different geographical context and focus, similar methods and models were adopted, which supports the methodological choices in this study. Further, the majority of the reviewed empirical studies were conducted in developed countries, which highlights the relevance of conducting a study in a developing country such as Burkina Faso.

Table 2. Mapping of empirical articles reviewed

<table>
<thead>
<tr>
<th>Geographical context:</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed country</td>
<td>10</td>
</tr>
<tr>
<td>Developing country</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method:</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative</td>
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</tr>
<tr>
<td>Qualitative</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model:</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAM</td>
<td>9</td>
</tr>
<tr>
<td>IDT</td>
<td>2</td>
</tr>
<tr>
<td>UTAUT</td>
<td>1</td>
</tr>
</tbody>
</table>
5. APPLIED METHOD

In this chapter, the applied method is presented in detail. This study falls within the category of explanatory research in which a survey research has been conducted in Ouagadougou, Burkina Faso. The population refers to all university students at Université de Ouagadougou. The questionnaire is based on factors extensively used in previous research and has been translated into French. The questionnaire was pilot tested before distributed to the target audience. Out of 319 distributed questionnaires, 301 were analyzed. The statistical software of SPSS 22 has been used in order to analyze the data and test the hypotheses.

5.1 RESEARCH DESIGN

As this study aims to examine relationships between variables it can be said to fall within the category of an explanatory study (van Aken, 2005, p. 22). An exploratory, explanatory or descriptive research design is adopted based on the purpose and the nature of the research question and provides guidance in terms of choosing a suitable data collection method. This study tests hypotheses by measuring relationships between variables. Thereafter, the data is analyzed through statistical techniques, a process typically used in studies adopting an explanatory research design (Maxwell & Mittapalli, p. 323). An explanatory design has the ability to explain a variety of phenomena rather than a specific instance of an issue (Baskerville & Pries-Heje, 2010, p. 273). M-payment services in Africa are currently going through a dynamic progress and advancements within this field is occurring constantly (Harry et al., 2014, p. 1). The results presented should be considered as a snapshot of the state of attitudes and perceptions toward m-payment services in Burkina Faso at the time this research was conducted, rather than a representation extending over a longer time period. Thus, this research can be categorized as cross-sectional (Asongu, 2013, p. 9).

5.2 SURVEY RESEARCH

In order to investigate attitudes and perceptions towards m-payment services, conducting a survey research is a suitable approach. Surveys are distinguished based on the form of data as well as the method of analysis, in this study; an analytical survey research is conducted, rather than a descriptive survey research (Gray, 2014, p. 240). A survey is a technique of collecting data, in which questionnaires are widely used. However, surveys do not have to include the use of questionnaires, but in-depth interviews, structured interviews, content analysis and observations can also be part of survey research. Survey research is generally regarded as being quantitative and positivistic and distinguished from qualitative data. A survey allows for the collection of systematic data in order to make systematic comparisons. Further, in survey research, causal analysis is common (Vaus, 2002, p. 3; 6; 7).

The choice of conducting a survey research is based on the aim to collect data from more than one case in order to find connections between variables from which patterns are to be established (David and Sutton, 2011, pp. 172-173). In survey research, the aim is to achieve variation of variables, gained through investigating a sufficiently large sample. In this study, a sample size of 301 university students and the distribution of the questionnaire between the various faculties, contributed to achieving increased variation. The number of participants in this study were dependent upon the short data collection period, and the difficulties of ascertaining all factors of the survey execution beforehand, as communication channels between the place of data collection and the place where the
remaining parts of the study was performed, were limited. Survey research contributes to a better-controlled research process, and increases the chance of collecting data that is representative for the population (Krosnick, 1999, p. 539).

The survey was performed during four days, within a two-week time span. Each respondent was only contacted during one occasion, as the questionnaire was constructed to include all variables. As the survey was conducted in Ouagadougou, Burkina Faso, contacting respondents for a follow-up or for a completion of answers would be connected with numerous complications. Thus, making sure that the survey research was correctly executed and that as many questionnaires as possible were completely and correctly answered was of great importance. Conducting a survey research allows for larger amount of data to be collected in a cost effective way. Further, it facilitates the process of measuring different concepts and allows for systematic techniques to measure variations between variables. In this survey research, questionnaires have been used as the instrument to collect the data, as it enables a phenomenon to be investigated through a systematic collection of quantitative data.

Support for the choice of method for data acquisition in this study has been found in research studies examining similar correlations as this study intends to investigate. Authors, such as Chen 2008; Jarvenpaa et al., 1999; Kim, 2010; Pavlou, 2003; Schierz et al., 2010 and Wang et al., 2008, conducted studies in this chosen research area, where hypotheses were tested based on data collected through surveys, and answered by estimates according to a Likert-type scale.

5.3 POPULATION AND SAMPLING
The population in this study refers to the university students at Université de Ouagadougou. As the amount of students attending the university exceeds 56 000 (Ministère des affaires étrangères et européennes: Fiche Burkina Faso, 2011, s. 1), it is not possible to investigate the entire population. Considering the limited time available for data collection, achieving a representative sample that reflects the entire population is important.

A simple random sample is the most suitable data collection method considering the research question and purpose of this study. Simple random sampling refers to that all individuals included in the population have the same probability of participating in the survey at the same time (Arber, 2001, p. 68). Simple random sampling is considered to generate results that are representative for the entire population. On the contrary, in non-probability sampling certain groups of the population have a greater probability of being included in the survey and results cannot be considered representative to the same extent as those generated from simple random sampling (Arber, 2001, p. 61). Since more than 80 percent of the university students in Burkina Faso attend Université de Ouagadougou, the answers may be generalizable to a larger extent, reflecting the opinions of the majority of the students in Burkina Faso. One can argue that the data collection used in this study cannot be referred to as simple random sampling as some students might not have been present during the rather short data collection period of four days, and could therefore not take part in the survey. Further, the data was collected by distributing questionnaires at each of the seven faculties at a time. Thus, during a certain period, students from a specific faculty had a greater chance of participating in the survey.
In order to achieve a sample as representative for the population as possible, questionnaires were equally allocated between all faculties at Université de Ouagadougou. As the total number of students is not equally allocated between the seven faculties, one can argue that distributing questionnaires equally among the faculties would not result in a representative sample. However, an equal distribution of questionnaires among all faculties was considered the best method for this study because information regarding actual faculty distribution could not be obtained. In terms of gender division of the sample, three options were available; attaining a 50/50 distribution, actual gender distribution or random distribution. As a significant majority of the population consists of men, a 50/50 distribution would not be representative for the population. Further, an actual gender distribution would require data for gender distribution at each faculty, which could not be obtained. Therefore, a random distribution of gender was chosen as it is seen as most representative for the population compared to attaining an equal amount of male and female respondents.

5.4 ACCESS AND ETHICS

As this study is based on data collection in a developing country, access to respondents has greatly influenced the shaping of this study in terms of the procedure- and time available for data collection. This study is personally funded, resulting in a tradeoff between time and costs. The issue of access has been an important discussion from the beginning of this research. Access issues has been central when formulating the research question and deciding upon a relevant target group. Further, safety issues in the country affected the number of universities that could be included in this study. Travels outside Ouagadougou were discouraged at the time of survey conduction. Hence; the data collection has been limited to Université de Ouagadougou.

Cultural and social aspects are important to consider when conducting research in a foreign country. In order to ensure as good access as possible, a large amount of time was dedicated to establish contact with Université de Ouagadougou. At an early stage of the planning process, it had to be ensured that entering the university campus in order to hand out questionnaires would be allowed. Performing a survey research at Université de Ouagadougou requires permission from the principal, which was ensured during the second day in the country through a meeting with the principal. Unfortunately, it was not possible to get access to lecture halls and therefore questionnaires were handed out at the various faculties. Further, a distribution assistant was contacted, in order to reduce the impact of the language barrier as well as increase the quality of the data collected.

Issues concerning ethics and access are closely related in research. When access proves difficult to obtain, researchers may choose to act unethically. However, in this research ethical aspects have been considered throughout the research, and not only during the stage of data collection. It is important that ethical aspects can be justified also when it comes to how the data has been analyzed (Gray, 2014, p. 85). Research collecting data on consumer attitudes and perceptions can sometimes require information that the respondents may be reluctant to provide. Privacy concerns can be reduced by anonymity. This study did not request any personal information that the respondents may be hesitant to share. All answers in this survey research are anonymous. The background and purpose of this study was attached to the questionnaire and was clearly presented in conjunction with delivering the questionnaire. All respondents were given the opportunity to decline the request of participating in the survey.
5.5 CONSTRUCTING THE QUESTIONNAIRE

The questionnaire is based upon factors that are extensively prevalent in similar prior research. This implies that the questions measure what they are intended to measure with greater certainty, contributing to higher construct validity (Bagozzi et al., 1991, p. 423).

When constructing the questionnaire it was important that the questions included gave the answers needed to confirm or deny the stated hypotheses. Therefore, the questionnaire includes questions from previous studies investigating consumer technology acceptance behavior. As perceived usefulness and perceived ease of use are integral parts of the TAM, questions measuring these two factors in consumer technology acceptance studies are similar as they are often based on measures in Davis (1989, p. 340). His research suggest 6 measures each for perceived usefulness and perceived ease of use, which are recurring in later research incorporating the TAM. Legris et al. (2003, p. 197) reviewed 22 empirical TAM studies between 1980-2001 and confirmed the applicability of the measures in Davis (1989) as four of his six questions are shown to be those most prevalent when measuring perceived usefulness and perceived ease of use in these 22 studies. However, these questions need to be modified in order to better measure perceived usefulness and perceived ease of use in the m-payment services context. In this study, questions from Schierz et al. (2010) and Kim et al. (2010) who studied m-payments using the TAM were adopted. Since both Schierz et al. (2010) and Kim et al. (2010) based their questions on previous recognized studies including Davis (1989), the measures can be seen as reliable and relevant for this study. In addition to perceived ease of use and perceived usefulness, external factors have been included in some previous studies incorporating an extended version of the TAM. External factors concerning risk or security of m-payment services are present in some previous studies (e.g. Chen, 2008; Mallat, 2007; Schierz, 2010; Shin, 2009), and upon further research their measurement items are adapted from earlier recognized studies such as Parasuraman et al. (2005) and Pavlou (2003). The questions concerning perceived risk in this questionnaire were adopted from a study by Chen (2008, p. 52) as his measurements were most in-line with this study.

The factor of trust is not included in the majority of prior studies analyzed. Among the studies including trust in their research models (e.g. Mallat, 2007; Shin, 2009), it was not possible to acquire the measurement instruments used in their studies. However, the well-cited study by Pavlou (2003, p. 132) contains a number of instruments for measuring specific factors’ influence on consumers’ attitudes towards web retailers. The questions regarding trust in his study were in turn based on measures from another well cited study by Jarvenpaa et al., (1999), which should enhance the credibility of these instruments. In this study, the questions regarding trust have been adapted from Pavlou (2003), together with his questions concerning satisfaction with past transactions, as this experience is believed to affect consumer trust. However, as Pavlou (2003) focused on web retailers, rather than m-payment services, the wording of the questions had to be slightly altered to better fit the focus of this study. E.g. “This web retailer” was changed to “My m-payment service provider” in the three questions measuring trust. As the question itself remains intact with only an alteration to its focus, the credibility of the instruments should remain unchanged.
The items measuring the influence of perceived reputation and perceived size of m-payment service providers on trust were adapted from the study by Jarvenpaa et al. (1999) who in turn based his study on a recognized research by Doney and Cannon (1997). Also here, the wording of the questions had to be changed in order to better fit the focus of this study, e.g. “This store” was changed to “My mobile payment service provider”. Measuring instruments for factors affecting network externalities, perceived number of users and technology specific value, were adapted from Wang et al. (2008) and the wording was slightly altered to better fit the context of this study. The instruments measuring individuals’ attitudes towards using m-payment services were adopted from Schierz et al., (2010, p. 213) who in turn adapted their measurements from three other studies. As their questions considered consumers’ attitudes towards using m-payment services, these questions were left unaltered in this study.

After adapting and constructing measurements instruments, a total of 38 questions were included in the final questionnaire. A 5-point Likert scale was attached to each question (except for questions 1-4), ranging from 1, “strongly disagree”, to 5 “strongly agree”. Two of the first four questions regarding age and faculty affiliation were instead given a blank space on which to write the corresponding answer. In terms of the questions regarding gender and usage of m-payment services, participants could choose from, “male” or “female” for gender and “yes” or “no” for usage of m-payment services. Initially a 7-point Likert scale was intended to be used but due to translation issues of specific measurement items into French, a 5-point Likert scale was adopted. As previous TAM studies have adopted either a 5 point Likert scale (e.g. Kim et al., 2010; Lin & Lu, 2011) or a 7-point Likert scale (e.g. Cho, 2004; Schierz et al., 2010; Wang et al., 2005), the results of this study are expected to be unaffected by this decision. Moreover, Dawes (2012, p. 7), suggests no significant difference in the results between these two scales.

These 38 questions were thereafter divided into different categories depending on which factor they aimed to measure. E.g. questions 13-18 measure perceived risk, and were thus inserted into a separate section of the questionnaire together with a brief explanation of the concept. This was performed for all factors and sub-headings were in certain cases added separating specific measurement instruments from others. Both the English and the French version of the final questionnaire can be viewed in appendix 1. Table 3 below summarizes the studies from which all measurement instruments were adapted or adopted.

Table 3. Sources of Measurements Instruments

<table>
<thead>
<tr>
<th>Measurement instrument for factor(s)</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived ease of use &amp; perceived usefulness</td>
<td>Schierz et al. (2010) &amp; Kim et al. (2010)</td>
</tr>
<tr>
<td>Perceived risk</td>
<td>Chen (2008)</td>
</tr>
<tr>
<td>Trust</td>
<td>Pavlou (2003)</td>
</tr>
<tr>
<td>Satisfaction with past m-payment transactions</td>
<td>Pavlou (2003)</td>
</tr>
<tr>
<td>Perceived size &amp; perceived reputation</td>
<td>Jarvenpaa et al. (1999)</td>
</tr>
<tr>
<td>Perceived number of users &amp; technology specific value</td>
<td>Wang et al. (2008)</td>
</tr>
<tr>
<td>Attitude towards using m-payment services</td>
<td>Schierz et al. (2010)</td>
</tr>
</tbody>
</table>
5.5.1 Translation of Measurement Instruments

As this study is conducted in Ouagadougou where the official language is French, the questionnaire had to be translated. It cannot be assumed that all respondents understand English to the extent required in order to take part in the survey. It is important to consider the meaning of the questions in order to receive relevant answers in relation to the context and topic of the study. In this study, the source questionnaire refers to the questionnaire that has been translated from English into French. Further, the target questionnaire refers to the translated questionnaire that was delivered and collected in Ouagadougou. As neither of the authors are native speakers of the target language, two independent individuals were contacted to assist with the translation of the questionnaire, one fluent speaker in French and one native speaker, respectively. The source questionnaire was translated into the target questionnaire by these two independent individuals. Thereafter, the two target questionnaires were compared. This translation technique has been named “parallel translation” and Usunier (1998, p. 52) states that this technique results in good wording of the target questionnaire.

5.5.2 Pilot Testing

Before conducting the actual survey research in Ouagadougou, a pilot study was performed on the 30th of March 2015, at Umeå School of Business and Economics in order to refine the questionnaire and reduce potential uncertainties that could occur when delivering the questionnaires to the target group. Ten questionnaires were handed out to students who were not participating in the main survey and one questionnaire was sent to the supervisor of this thesis. Responses from all participants were received with comments regarding the structure of the questionnaire, unclear definitions explaining each concept and the fact that some questions were very similar, which could confuse the respondents. Modifications were made to the questionnaire in response to the comments received from the pilot testing.

5.6 DELIVERING AND COLLECTING THE QUESTIONNAIRE

The questionnaires were distributed during a four-day period to the target audience at Université de Ouagadougou. A total of 319 questionnaires were handed out at the seven faculties, which are presented in table 4 below.

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Faculty (French)</th>
<th>Faculty (English)</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Science Humaine</td>
<td>Human Sciences</td>
<td>SH</td>
</tr>
<tr>
<td>2.</td>
<td>Science Exactes et Appliqués</td>
<td>Applied Sciences</td>
<td>SEA</td>
</tr>
<tr>
<td>4.</td>
<td>Lettres, Arts et Communications</td>
<td>Language, Arts and Communication</td>
<td>LAC</td>
</tr>
<tr>
<td>5.</td>
<td>Science de la Santé</td>
<td>Health Sciences</td>
<td>SDS</td>
</tr>
<tr>
<td>6.</td>
<td>Science Juridique et Politique</td>
<td>Legal and Political Sciences</td>
<td>SJP</td>
</tr>
<tr>
<td>7.</td>
<td>Science de la Vie et de la Terre</td>
<td>Life and Earth Sciences</td>
<td>SVT</td>
</tr>
</tbody>
</table>

Out of 319 distributed questionnaires, 212 were answered in full, 89 were missing some occasional answers, 14 were not returned and 4 lacked too much information in order to be included in this study. Out of the 319 distributed questionnaires, a total of 301
questionnaires were registered in SPSS 22 for the analysis. This gives a non-sampling error of around 5.6 percent of the distributed questionnaires.

A university student majoring in English was asked to assist with the distribution of the questionnaires. His assistance included thoroughly explaining the purpose of the study to the students while distributing the questionnaire, answering participants’ questions and also assisting the authors with checking that participants returned fully completed questionnaires. Some students handed in their questionnaires at the same time, thus some incomplete questionnaires went undetected. It was difficult to know who answered which questionnaire and thus some participants could not be asked to review their questionnaire in order to hand in a fully answered questionnaire. In order to ensure that the questionnaires were answered individually, additional instructions were given by the distribution assistant to the participants to make sure that no focus group discussions occurred, which may influence the data. The authors were present at all times during the distribution of the questionnaires. The average time it took for participants to complete the questionnaires was twenty minutes. In comparison to the pilot study, the corresponding time was ten minutes. This could indicate that Burkinabé participants were more thorough when conducting the survey, but it could also mean that they are not as used to participating in these type of surveys, and therefore needed more time to understand the assignment.

Instructions were given to the distribution assistant in terms of clarifying question 4, which asks if the participant is using m-payment services to send or receive money. The instructions included a clarification of the time frame, i.e. that usage of the service within the last year counts as using m-payment services. This means that questions 27 and 28, asking participants about their satisfaction with previous usage of m-payment services, can still be answered even if they answered “no” to question 4. Further instructions were also given to clarify that questions regarding perceived size and perceived reputation, were to be considered in comparison to other m-payment service providers in the country.

In order to receive responses from students from as many faculties as possible, the questionnaires were distributed at all seven faculties at campus. When distributing the questionnaires at each faculty, two assumptions were made, those were that the individuals asked to participate were students and that they studied at the faculty at which the distribution took place. These assumptions entails risks, such as an uneven distribution between all faculties since participants were not asked which faculty they studied at prior to participating in the survey.

5.7 SAMPLING ERRORS AND LIMITATIONS

When conducting a survey, there are a number of potential sampling errors that could occur. All people in the target group may not participate or answer all questions. Moreover, some questions may be misunderstood. By personally handing out the questionnaire at Université de Ouagadougou, the number of people choosing not participate in the survey could be controlled to a certain extent and this external sampling error could be reduced. However, as the aim was to distribute and collect all 319 questionnaires regardless of how many participants that were asked, the amount of people choosing not to participate should have no effect on the results of this study.
There are a number of internal sampling errors that have to be considered when conducting a survey, such as the risk that some participants do not answer specific questions due to unclear instructions or phrasing, as well as the likelihood of students answering untruthfully. By basing the measurement items in the questionnaire on questions that are present in a number of similar studies with good results, the risk of misunderstanding questions due to phrasing should be reduced. To further reduce misunderstandings, a brief explanation of each concept investigated was inserted. Further, a pilot study was conducted in order to receive feedback on potential sources of misunderstanding in the questionnaire before finalizing it.

During the data collection process of the questionnaire at Université de Ouagadougou, few questions were asked which can imply that instructions were clear and that the participants understood the questions. The clarifications made by the distribution assistant may have answered potential questions that participants could have had while answering the questionnaire.

It is difficult to control whether participants answer truthfully or not. However, by asking a large number of students to participate in the survey, the influence of untruthful answers on the results should be diminished. The respondents were asked to write down what faculty they belong to, rather than fill in predetermined choices. This entails limitations; as two questionnaires contained handwriting that could not be identified, which resulted in a designation in excel of unanswered faculty affiliation. Secondly, it resulted in that students belonging to the same faculty but studying different specializations used different denotations when answering what faculty they belong to. Going through these questionnaires with the distribution assistant who sorted the answers into correct faculty affiliation solved this issue.

5.8 SOURCE CRITICISM TOWARDS PRIMARY DATA

There are two main areas to consider concerning the primary data used in this study: the sample and the data collection method used. The major concern regarding the sample is its generalizability. Information concerning faculty affiliation and the gender distribution among the students could not be obtained; therefore the representativeness of the sample to the population is unclear. However, given the lack of actual gender- and faculty distribution, the random distribution method used for gender as well as the equal distribution method used for faculty affiliation is thought to be appropriate.

The questions measuring perceptions and attitudes were all adopted or adapted from previous studies. In order to reduce potential errors that could have occurred due to the adaption process, the questionnaire was pilot-tested as mentioned. However, the pilot-test was performed with the English questionnaire, rather than the French questionnaire distributed at Université de Ouagadougou. Therefore, potential errors that could have occurred in conjunction with the translation process were not assessed during the pilot-test. To reduce these potential errors, two independent individuals participated in the translation process. In order to reduce potential misunderstandings due to these errors, the distribution assistant, as well as the authors, were present during the distribution of the questionnaire at Université de Ouagadougou, to answer any questions. These issues are discussed in detail in section 5.6. As participation was voluntarily and the questionnaire did not inquire sensitive information, there is a low incentive for participants to answer untruthfully. Even though it is difficult to control potential
untruthful answers, their influence should be reduced by the sufficient number of collected questionnaires.

5.9 DATA PROCESSING

Each questionnaire was assigned a number from 1 to 305 in order to distinguish the anonymous questionnaires from one another. The data processing commenced by transferring all answers into Microsoft Excel. Thereafter, all answers were inserted into SPSS 22 with the exception of four questionnaires that lacked a sufficient amount of answers. A 5-point Likert scale is applied to questions 5 to 38, where 1 refers to “strongly disagree” and 5 refers to “strongly agree”, thus the answers to these questions were recorded using a range of 1 - 5. In terms of gender, 0 was assigned to men and 1 was assigned to women. Age was registered with numerical values and the question concerning usage were recorded with 0 for No and 1 for Yes. Faculty affiliation was registered according to the following scale: SH = 1, SEA = 2, SEG = 3, LAC = 4, SDS = 5, SJP = 6, SVT = 7.

The structure of the questionnaire is based on seven sections, corresponding to each concept within the research model, which in turn corresponds to one or several hypotheses that are to be tested. Testing hypotheses based on separate sections allows inclusion of incomplete questionnaires, as long as the questions referring to the specific concept that is to be tested are fully completed. Incomplete sections are not considered as one missing answer represents a high percentage loss in a particular section. One missing answer of question 5-8, i.e. concerning perceived usefulness, represents a 25 percent loss of responses in this section. Those questions that were unanswered or included multiple answers were registered as unanswered. No systematic pattern of unanswered questions in the questionnaires could be found. Questionnaires that only lacked answers to questions 1 - 4 were included in the analysis as these questions refer to moderating factors and are not required to test the hypotheses.

During the conversion of data from the questionnaires to Excel, both authors participated to ensure that there was no difference between answers given in the questionnaires and answers documented in Excel. Thereafter, questionnaires were double-checked by randomly selecting twenty questionnaires from the total of 305 questionnaires in order to ensure that the conversion process had been conducted properly. When inserting the data into Excel, answers were color coded according to which factor they measured, in order to make the process easier to follow. The data was then inserted into SPSS 22 and analyzed using descriptive statistics in order to find potential errors in the inserted data. This was done to ensure that the analyzed data was correct and that the presented results are representative for the data collected.

According to Spector (1991, p. 30), it is important to ensure that all measurement items are using the same scoring scale, i.e. a high answer to a question represents a high level of the measured factor, before analyzing the data. He argues for the need to reverse the score for those items that are negatively worded, as two items using different scales will cancel out each other and result in a value in the middle. Questions 13-18 refer to the individual’s perceived risk. In this section, a score of 5 for questions 13-16 result in a high level of perceived risk, while a score of 5 refers to a low level of perceived risk for questions 17-18 due to the wording of the questions. The scores for these two questions along with questions 23 and 26 were thus reversed in SPSS 22, using the “Transform” option. In other words, a score of 5 was changed to 1.
After this process, the internal consistency of the questions was tested by assessing Cronbach’s coefficient alpha in order to check their reliability. During this process a number of issues were discovered, e.g. the Cronbach’s alpha for perceived risk was found to be higher if question 17 was deleted. Additional issues are discussed in section 6.2.1. After assessing the reliability of the questions, the questions measuring the same factor were added up and divided by the number of questions in order to get a mean value corresponding to a specific factor, which can then be used for further analysis and testing of the hypothesis.

5.10 ANALYSIS OF THE RESEARCH MODEL
The study focuses on attitudes toward m-payment services, and how attitudes in turn are affected by perceived usefulness, perceived ease of use and perceived risk. The modified research model in this study originates from the TAM developed by Davis (1989) and have been extended to consist of four dependent variables; trust, perceived risk, perceived usefulness and attitude towards using m-payment services. The hypotheses that are to be tested are based on findings in previous research consistent with the relationship between these variables in this research model. In order to clarify the analysis of the research model and the hypotheses that are to be tested, the extended TAM has been divided into four sub models demonstrated below.

![Figure 3. Sub model 1 (attitude)](image-url)
Figure 4. Sub model 2 (perceived usefulness)

Figure 5. Sub model 3 (perceived risk)
5.11 TOOLS FOR DATA ANALYSIS

In this section, the tools used in the data analysis are described, and the analysis methods of Cronbach’s alpha, inter-item correlation, correlation, t-test, analysis of variance, regression analysis and SEM are evaluated. The relevant tools are utilized using the statistical software, SPSS 22, in order to analyze the collected data and test the hypotheses. These hypotheses are tested on the frequently occurring confidence intervals of 0.01 and 0.05, also used in similar previous research (Jarvenpaa et al., 1999; Kim et al., 2010, Shin 2009), in order to verify if the null hypotheses can be rejected or not. In other words, if the analysis shows that there is no significant relation between variables, specific hypotheses will be rejected. Significance tests are performed as this study aims to assess the verity of the hypotheses by comparing these with the observed data. The significance levels of 0.01 and 0.05 were determined in order to avoid Type I and Type II errors. Type I and Type II errors refer to that a true null hypothesis is rejected, and that a false null hypothesis is accepted, respectively (Moore et al., 2008, p. 408).

5.11.1 Cronbach’s alpha

It is important to ensure that the instruments used will produce responses that are reliable and consistent even if the questions are substituted with similar questions (Cronbach, 1951, p. 297). The popular coefficient Cronbach's alpha is used in order to measure internal consistency of the items in the questionnaire to assess the reliability of the scale (Santos, 1999, p. 1). According to Bland et al., (1997, p. 572), the value of the Cronbach’s alpha coefficient should be at least 0.7 in order for the scale to be considered reliable with the sample. However, this coefficient is sensitive to the number of measurement instruments within each factor. It has been suggested that scales containing less than ten items are more likely to generate lower Cronbach’s alpha values (Tavakol & Dennick, 2011, p. 54). When low Cronbach’s alpha values are obtained, reporting the mean inter-item correlation values has been suggested as an alternative measure. The inter-item correlation value should lie within the range of 0.2 to 0.4 (Briggs and Cheek, 1986, p. 115). In this study, the scales of the measurement instrument consist of between two to six items, thus both Cronbach’s alpha and inter-item correlation values are calculated.
5.11.2 Correlation
Correlation analysis is used in order to determine the direction and strength of a linear relationship between two variables (Ahlgren et al., 2003, p. 551). The Pearson correlation coefficient ($r$) determines a linear correlation between variables, and can adopt values ranging between -1 to +1, where a positive value indicates a positive correlation and a negative value indicates a negative correlation. A value of 0 refers to no correlation between the variables and a correlation of 1 indicates a perfectly positive correlation (Tavakol & Dennick, 2011, p. 54). The $r$-value should fall within certain recognized values in order not to cause any complications during the data processing. Values should rather not exceed -0.8 or 0.8 (Gujarati, 2003, p. 359). According to Tabachnick and Fidell (2001, p. 84), the $r$-value should not exceed 0.7. Multicollinearity occurs when the correlation between variables is too high ($r=0.9$ and above) and can cause statistical problems (Tabachnick & Fidell, 2014, p. 122). Other values worth to consider are the variance inflation factor (VIF) and the tolerance value. The VIF provides a quantitative estimate of the severity of multicollinearity and various threshold levels have been set for this factor in previous literature, such as 4 or 10 (O’Brien, 2007, p. 684). The VIF is the inverse of the tolerance value and a tolerance value of less than 0.10 or a VIF of more than 10 have been commonly stated cut-off points for deciding if multicollinearity is present (Craney & Surles, 2002, p. 392). As a multiple regression analysis is performed in this study, problems such as multicollinearity, including VIF- and tolerance values will be considered in section 6.2.2

5.11.3. Anova and t-test
A $t$-test is used to test if a significant difference between two groups on a continuous dependent variable exists (Demšar, 2006, p. 6). In this study, those two groups correspond to males and females, while the dependent variables are the factors included in the research model. A $t$-test will be conducted on all variables to analyze if significant differences between male and female students perceptions and attitudes towards m-payment services exists. Analysis of variance, also known as anova, is a test similar to the $t$-test but is used when the analyzed data consists of more than two groups (Demšar, 2006, p. 10). In this study, faculty affiliation contains seven different groups representing the different faculties at Université de Ouagadougou, hence; an anova test will be performed to analyze the influence of faculty affiliation on the factors in the research model.

5.11.4. Regression Analysis
Regression analyses are various statistical techniques used to establish a relationship between a set of independent variables and a dependent variable (Tabachnick & Fidell, 2014, p. 153). As this study aims to investigate a number of independent variables’ effect on the four dependent variables, in each of the four sub-models presented in section 5.10., a standard multiple regression analysis is performed. The influence of age on the variables in the research model will also be analyzed through standard regression analyses. The reason for performing regression analyses, rather than anova tests for assessing the influence of age is the distinction between continuous variables and categorical variables. In this study, age is classified as a continuous variable, as it has not been coded.

The sample obtained in this study is seen as sufficiently large and normally distributed, two assumptions required for conducting a multiple regression analysis (Osborne
These two assumptions are further discussed in relation to the sample in chapter 6. In numerous previous studies (e.g. Chen, 2008; Schierz et al., 2010; Shin 2009; Wang et al., 2008), SEM techniques have been conducted as alternative analysis methods to multiple regression analysis. According to Walker and Maddan (2008, p. 346), SEM analyses produce similar outputs as regression analyses, however the results obtained from SEM are more difficult to interpret. Walker and Maddan (2008, p. 348) further argue that much time and effort are required to properly understand and conduct SEM analyses. Conducting a multiple regression analysis was therefore selected in favor of performing a SEM analysis based on limited previous knowledge of SEM techniques. Multiple regression analyses are used in previous studies including the TAM (e.g. Venkatesh & Davis, 2000; Yang, 2005), which supports the applicability of the analysis to the TAM studies.

In equation 1, the dependent variable (Y) represents trust, perceived risk, perceived usefulness and attitude towards using m-payment services, as these are all thought to be influenced by a set of independent variables. The variables, xk, incorporate those factors that are thought to influence the four dependent variables shown in section 5.10. The β-value shows the direction of the relationship between the independent and dependent variable, i.e. negative, neutral or positive. Thus, the hypotheses are analyzed according to the following equation:

\[ Y = \beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k + \varepsilon \]  

\( Y \) = Dependent variable  
\( \beta_0 \) = The value of Y when xk is 0  
\( \beta_k \) = Change in Y given a change in xk, all other variables held constant  
xk = kth independent variable  
k (1, 2...k) = Number of independent variables  
\( \varepsilon \) = Random error

The use of SPSS 22 for conducting statistical tests, enabled analysis and calculations of regressions through specifying the dependent- and independent variables into the built-in functions. Although, these regressions have been calculated using statistical software, it is of importance to clarify how these regressions are designed in order to more straightforwardly be able to analyze the results. By determining trust, perceived risk, perceived usefulness and attitudes as a function of other variables, the regression can be said to be a multivariate linear regression.
6. RESULTS & ANALYSIS

In this chapter, a presentation and analysis of the results are provided. The chapter begins with a presentation of descriptive statistics showing the distribution and differences between the moderating factors. This is followed by results from reliability and consistency tests of the measurement items used. Multiple regression analyses are thereafter performed and results and analyses are given for each sub-model in order to confirm or reject the hypotheses. The chapter concludes with analyses of the moderating factors’ influence on the research model.

6.1 DESCRIPTIVE STATISTICS

In order to obtain an overview of the information collected, the data is presented through descriptive statistics. In total, the survey was answered by 305 students. However, four questionnaires lacked too much information and were thereby removed from the sample. A summary of the characteristics of the university students can be seen in table 6. Section 6.1.1 begins with presenting the distribution of gender among the respondents. This is followed by a presentation of the age- and faculty affiliation among the students. Thereafter, information regarding how many of the students that have used m-payment services within the past year is presented. The section ends with a presentation of mean response values for all factors and the differences between male and female respondents. Age, gender and faculty affiliation are then tested to see if they have a significant moderating effect on the research model in section 6.4. A summary of the abbreviations of the factors used in the tables is shown below in table 5. Abbreviations are not used in the text, models or figures, as the purpose is to present the data in formats that are easy to follow and understand.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>ATT</td>
</tr>
<tr>
<td>Perceived Risk</td>
<td>PR</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>PU</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>PEU</td>
</tr>
<tr>
<td>Trust</td>
<td>T</td>
</tr>
<tr>
<td>Satisfaction with past m-payment</td>
<td>S</td>
</tr>
<tr>
<td>transactions</td>
<td></td>
</tr>
<tr>
<td>Perceived Number Of Users</td>
<td>NOU</td>
</tr>
<tr>
<td>Technology Specific Value</td>
<td>TSV</td>
</tr>
<tr>
<td>Perceived Size</td>
<td>PS</td>
</tr>
<tr>
<td>Perceived Reputation</td>
<td>REP</td>
</tr>
</tbody>
</table>
Table 6. Characteristics of participants

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Gender</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>1</td>
<td>Male</td>
<td>242</td>
</tr>
<tr>
<td>19</td>
<td>3</td>
<td>Female</td>
<td>55</td>
</tr>
<tr>
<td>20</td>
<td>14</td>
<td>Total</td>
<td>297</td>
</tr>
<tr>
<td>21</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>42</td>
<td>Usage</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>38</td>
<td>Yes</td>
<td>233</td>
</tr>
<tr>
<td>25</td>
<td>41</td>
<td>No</td>
<td>58</td>
</tr>
<tr>
<td>26</td>
<td>41</td>
<td>Total</td>
<td>291</td>
</tr>
<tr>
<td>27</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>5</td>
<td>Faculty</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>SH</td>
<td>30</td>
</tr>
<tr>
<td>31</td>
<td>2</td>
<td>SEA</td>
<td>57</td>
</tr>
<tr>
<td>32</td>
<td>1</td>
<td>SEG</td>
<td>39</td>
</tr>
<tr>
<td>35</td>
<td>1</td>
<td>LAC</td>
<td>109</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
<td>SDS</td>
<td>19</td>
</tr>
<tr>
<td>37</td>
<td>1</td>
<td>SJP</td>
<td>4</td>
</tr>
<tr>
<td>41</td>
<td>1</td>
<td>SVT</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>286</td>
<td>Total</td>
<td>274</td>
</tr>
</tbody>
</table>

6.1.1 Distribution of Respondents

Out of the 301 questionnaires included in this study, four questionnaires were missing information regarding gender. Thus, 297 questionnaires could be used in order to calculate the gender distribution of the sample. 242 male respondents and 55 female respondents participated in the survey, presented in figure 7 below. The unequal distribution between male and female respondents is explained by the unequal distribution of the population, in which a significant majority are men. Based on the most recent reliable information found, 23 063 were men, and 9 560 were women among the total number of students (32 623) attending Université de Ouagadougou in 2008/2009 (INSD, 2013). This refers to a gender distribution of approximately 70/30 men and women respectively. As this data is not up to date, the current gender distribution has most likely changed. Therefore, aiming to achieve a 70/30 distribution may not be representative for the population. Moreover, an equal gender distribution between respondents was not adopted for reasons explained in section 5.3. The obtained sample consists of 81.5 percent male respondents and 18.5 percent female respondents.
The average age of the respondents is 24.26 years and the difference in mean age between the genders is about one year, 24.44 for men and 23.35 for women. The age distribution of all participants is shown in figure 8 below. Out of the 301 questionnaires, 15 respondents did not provide information regarding age. This represents a non-response rate of around 5 percent. However, as age is a moderating factor in this study, the non-response rate is not thought to affect the results significantly. As previously mentioned, two assumptions were made when distributing the questionnaires. The first of these refer to that all individuals asked are students. The four outliers seen in the figure below are individuals above 35 years old, which is more than 10 years above the average sample age. However, these individuals have provided information regarding faculty affiliation, and are therefore assumed to be students.
The survey was conducted at all seven faculties of Université de Ouagadougou in order to receive a sample better reflecting the population, compared to conducting the survey at a single faculty. The data collection took place during a four-day period, and different faculties were visited each day in order to decrease the risk of students participating twice. Two underlying assumptions were made; firstly that all respondents are students attending Université de Ouagadougou and that these are studying at the faculty where they were found. Out of the 301 questionnaires included in this study, 274 contained information regarding faculty affiliation. In figure 9 below, the distribution between all faculties is presented. Figure 9 shows that most respondents belonged to the faculty of LAC, 39.78 percent. Compared to other faculties, the participation rate was significantly lower among students belonging to the faculties of SJP and SVT, which imply that not all students who were found at each respective faculty actually belonged to this faculty. Further, it can be argued that the respondents not providing any information about faculty affiliation may not be students. This has shown that the assumptions stated above include limitations. As only 27 out of 301 respondents did not provide faculty affiliation, this is not thought to have a significant influence on the results. Unfortunately, it was not possible to obtain the actual distribution of the population between the faculties. Hence, the representativeness of the sample in terms of faculty affiliation cannot be established.

Figure 9. Faculty distribution of participants
Out of the 301 questionnaires, 10 were missing answers regarding usage of m-payment services within the last year. The distribution of usage is shown in figure 10 below. Among the respondents, 80.1 percent stated that they use m-payments services. However, as this study is measuring attitudes and perceptions of m-payment services, answers from respondents who do not use m-payment services are also considered in the research.

![M-payment service usage](image)

Figure 10. M-payment service usage among participants

Table 7 below shows the amount of fully answered questionnaires for each factor, the mean value of the measurements items for each factor, its standard deviation and the difference between male and female participants. The values written in bold refers to the total number of participants, mean values and standard deviation of the sample. It is worth noting that the mean values for perceived risk do not include answers from question 17. This is due to its previously mentioned effect on Cronbach’s alpha and thus the scale’s reliability. This is further discussed in section 6.2.1. As can be observed in figure 11, no major differences between the different genders and the total mean value can be documented. However, in order to detect whether the more extreme values had an effect on the mean values, the 5 percent trimmed mean was calculated using the explore function in SPSS 22. The 5 percent-trimmed mean is a recalculated mean value that removes the 5 percent top and bottom cases (Carson et al., 1996, p. 86). If there is a significant difference between these two mean values, further analysis of the data may be required (Granger and Jeon, 2004, pp. 333-334). In this study, the difference between the two values for all factors can be seen as trivial as the largest difference in values is 0.073 for satisfaction with past m-payment transactions. Therefore, all cases containing answers for specific factors will be included. All factors (except perceived risk) generated a mean value above 3, which represents a neutral opinion. However, low risk values refer to low perceived risk, which implies positive opinions towards m-payment services. Thus, perceptions and attitudes towards m-payment services can be said to be generally positive among university students in Burkina Faso.
Table 7. Mean values of participants

<table>
<thead>
<tr>
<th>Factor</th>
<th>Gender</th>
<th>N</th>
<th>Mean value</th>
<th>Std. deviation</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>Male</td>
<td>237</td>
<td>3.589</td>
<td>0.944</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>54</td>
<td>3.648</td>
<td>0.894</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>294</td>
<td>3.609</td>
<td>0.934</td>
<td>.673</td>
</tr>
<tr>
<td>REP</td>
<td>Male</td>
<td>234</td>
<td>3.607</td>
<td>0.757</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>55</td>
<td>3.600</td>
<td>0.818</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>293</td>
<td>3.605</td>
<td>0.769</td>
<td>.953</td>
</tr>
<tr>
<td>S</td>
<td>Male</td>
<td>237</td>
<td>3.781</td>
<td>0.964</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>55</td>
<td>3.573</td>
<td>1.128</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>296</td>
<td>3.747</td>
<td>0.992</td>
<td>.210</td>
</tr>
<tr>
<td>T</td>
<td>Male</td>
<td>238</td>
<td>3.272</td>
<td>0.891</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>53</td>
<td>3.315</td>
<td>0.992</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>295</td>
<td>3.285</td>
<td>0.921</td>
<td>.757</td>
</tr>
<tr>
<td>NOU</td>
<td>Male</td>
<td>239</td>
<td>3.504</td>
<td>0.916</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>54</td>
<td>3.519</td>
<td>1.027</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>297</td>
<td>3.512</td>
<td>0.932</td>
<td>.915</td>
</tr>
<tr>
<td>TSV</td>
<td>Male</td>
<td>231</td>
<td>4.104</td>
<td>0.658</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>53</td>
<td>3.950</td>
<td>0.783</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>288</td>
<td>4.080</td>
<td>0.682</td>
<td>.139</td>
</tr>
<tr>
<td>PR</td>
<td>Male</td>
<td>234</td>
<td>2.690</td>
<td>0.809</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>53</td>
<td>2.668</td>
<td>0.848</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>288</td>
<td>2.684</td>
<td>0.811</td>
<td>.861</td>
</tr>
<tr>
<td>PU</td>
<td>Male</td>
<td>234</td>
<td>4.228</td>
<td>0.624</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>50</td>
<td>4.260</td>
<td>0.612</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>284</td>
<td>4.225</td>
<td>0.623</td>
<td>.738</td>
</tr>
<tr>
<td>PEU</td>
<td>Male</td>
<td>235</td>
<td>3.440</td>
<td>0.891</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>52</td>
<td>3.452</td>
<td>0.908</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>287</td>
<td>3.443</td>
<td>0.896</td>
<td>.927</td>
</tr>
<tr>
<td>ATT</td>
<td>Male</td>
<td>240</td>
<td>3.965</td>
<td>0.670</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>53</td>
<td>3.849</td>
<td>0.869</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>293</td>
<td>3.950</td>
<td>0.708</td>
<td>.366</td>
</tr>
</tbody>
</table>
6.2 INTERNAL CONSISTENCY AND CORRELATION
In order to conduct hypothesis tests, the quality of the data collected had to be evaluated. This has been done by assessing the internal consistency of the survey questions and the correlation between the various factors through the statistical instruments: Cronbach’s alpha and mean inter-item correlation. The reliability of the scale is assessed through measuring the internal consistency, rather than the test-retest reliability, which is obtained by offering the scale to the same sample twice on different occasions and thereafter calculating the correlation between the two scores. Obtaining a test-retest reliability for this sample was not possible due to the nature of this survey research. Instead, the internal consistency, which indicates how well the items in a scale measure the same factor, has been obtained (Streiner, 2003, p. 100).

6.2.1 Reliability of Measurement Items
Reliability has been defined as "the degree to which measures are free from error and therefore yield consistent results" (Peter, 1979, p. 6). In research, it is agreed that the reliability of a scale has to be assessed in order for it to have practical utility (Peterson, 1994, p. 381). Further, Peterson (1994, p. 381) argues that Cronbach’s coefficient alpha is the most prevalent measure used when assessing scale reliability. However, there is significant discussion regarding what can be considered as “acceptable” Cronbach’s alpha values in research. The studies by Nunnally in 1967 and 1978 have been most widely cited as references in argumentations for sufficient reliability of scales. In 1967, recommended values for reliability ranged between 0.5 and 0.6 (Nunnally, 1967, p. 226). However, in 1978, he increased this value to 0.7 (Nunnally, 1978, pp. 245-246). In this
study, the scale can be considered reliable with our sample when the value of Cronbach’s coefficient alpha is 0.7 or above.

Table 8. Cronbach’s alpha and Inter-item correlation values of the sample

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach’s alpha</th>
<th>Mean inter-item correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>0.398</td>
<td>0.249</td>
</tr>
<tr>
<td>REP</td>
<td>0.457</td>
<td>0.223</td>
</tr>
<tr>
<td>S</td>
<td>0.820</td>
<td>0.696</td>
</tr>
<tr>
<td>T</td>
<td>0.699</td>
<td>0.437</td>
</tr>
<tr>
<td>NOU</td>
<td>0.739</td>
<td>0.484</td>
</tr>
<tr>
<td>TSV</td>
<td>0.705</td>
<td>0.445</td>
</tr>
<tr>
<td>PR</td>
<td>0.676</td>
<td>0.289</td>
</tr>
<tr>
<td>PU</td>
<td>0.753</td>
<td>0.433</td>
</tr>
<tr>
<td>PEU</td>
<td>0.759</td>
<td>0.441</td>
</tr>
<tr>
<td>ATT</td>
<td>0.784</td>
<td>0.479</td>
</tr>
</tbody>
</table>

In table 8 above, two columns presenting the Cronbach’s alpha and mean inter-item correlation values calculated for the sample are shown. In this study, insufficient Cronbach’s alpha values have been reported for perceived size, perceived reputation, perceived risk and trust. Low Cronbach’s alpha values are common for scales consisting of less than ten questions, and may provide explanation to why low Cronbach’s alpha values are obtained for certain factors in this study, although scientifically proven questions from previous research have been used. The mean inter-item correlation is of interest when a specific scale’s overall Cronbach’s alpha values are lower than 0.7. According to Briggs & Cheek (1986, p. 115), the mean inter-item correlation, which should lie between 0.2 and 0.4, might provide a better depiction of the reliability of the scales in cases when these contain less than ten items. If instead reporting the mean-inter item correlation values for perceived size, perceived reputation, perceived risk and trust, these scales lie within the optimal range required for being considered as reliable. However, in order to be consistent when measuring the reliability of the scale, Cronbach’s coefficient alpha is the single measurement used for scale reliability in this study.

As previously mentioned, question 17 reduced the value of Cronbach’s alpha which was seen by performing the reliability analysis in SPSS 22. Through this analysis, the “Cronbach’s Alpha if Item Deleted” value of question 17 was shown to be higher than the total value and was thus removed from the analysis. The removal of question 17 increased the value of Cronbach’s alpha from 0.663 to 0.676. The negative influence of this question on the value might be due to its negative wording in the questionnaire, which might have gone unnoticed by some of the participants. This would mean that some participants answered that they agree with the statement in questions 17, thinking that it meant a high perceived risk, though it actually represented a low perceived risk. Question 18, which is also a negatively worded question regarding perceived risk, does not have a negative influence on Cronbach’s alpha and will not be removed from the data.
The hypotheses corresponding to perceived risk and trust will be tested, although the Cronbach’s alpha values reported for these two factors lie between 0.65 and 0.7. Previous research (e.g. Nunnally, 1967, p. 226) has argued for sufficient Cronbach’s alpha values of 0.6, although this value is debatable. The results from testing perceived risk and trust are analyzed with caution, due to their lower Cronbach’s alpha values. Perceived size and perceived reputation, which have low values even if certain questions are removed, will not be included in the analyses. The scales used to measure perceived size and perceived reputation was adopted from Jarvenpaa et al., (1999), presented in table 3: Sources of Measurements. In their study (Jarvenpaa et al., 1999), the independent variables of perceived size and perceived reputation have shown significant influence on trust. In this study, these two Cronbach’s alpha values lie far below the threshold limit of 0.7, thus, the two hypotheses representing the influence of perceived size and perceived reputation on trust will not be tested. The unsatisfactory reliability levels for perceived size and perceived reputation in this study may be explained by the adaption of the measurement instruments from the context of an Internet store to the context of m-payment services. Further, a different model than the TAM was utilized in the study by Jarvenpaa et al. (1999), which may explain the low measurement values. The different geographical context in which this study was performed, and thus possible cultural differences, may have influenced the reliability of the scale. Another explanation for the low Cronbach’s alpha values might be due to a misunderstanding of the negatively worded questions in the questionnaire. Moreover, the original scale items were translated into French, which might be an additional factor contributing to decreased reliability. However, recognized translation techniques were followed, in order to decrease errors associated with the data results. Additionally, an explanation to insufficient Cronbach’s alpha values may lie in the time aspect of this study compared to the original study by Jarvenpaa et al., (1999). Mobile payment services in developing countries today are a relative new phenomenon, which differs from the transaction techniques familiar to people in developed countries in the western part of the world. This aspect might be able to explain why these two measurement items are no longer sufficient in measuring what they are intended to measure.

6.2.2 Multicollinearity

In order to ensure that the data is not influenced by multicollinearity, the value of the Pearson correlation coefficient (r) and the VIF- and tolerance values have been examined. The value of r is below 0.7, which refers to the suggested threshold value by Tabachnick and Fidell (2001, p. 84). In this study, the lowest tolerance value is 0.706 for the independent variables. Thus, the multicollinearity assumption is not violated, as the tolerance values are not below than 0.1. The absence of multicollinearity is further supported by the VIF values, where the highest value is 1.291, which is below the threshold value of 10 suggested by Craney and Surles (2002, p. 392). The correlation table can be seen in appendix 2.

6.3 SUB-MODELS

In this section, multiple regression analyses are performed for the four sub-models. In order to ensure that the data fulfill the required assumptions for conducting multiple regression analyses including normality, linearity, homoscedasticity, independence of residuals and outliers, the data has been analyzed through normal q-q plots- and p-p plots, detrended q-q plots and scatterplots (Tabachnick & Fidell, 2014, p. 198). The section is divided into four sub-sections based on the sub-models in order to clarify the structure for the reader. Each sub-section begins with a presentation of the results from
the multiple regression analysis. Thereafter the analysis based on the results is presented and compared to findings of previous studies. The analyses are structured around each hypothesis, represented by a specific arrow in the research model. Each sub-section ends with rejecting or accepting the hypotheses. The hypotheses are tested with a significance level of 0.01 and 0.05. If a hypothesis is significant at the 0.01 level, a * is shown next to the β-value in that specific model and a ** if significant at the 0.05 level. If the value is non-significant there is no marking and the proposed hypothesis will be rejected.

6.3.1 Sub-model 1: Attitudes
The first sub-model analyzes the influence of the three independent variables, perceived usefulness, perceived ease of use and perceived risk, on the dependent variable, attitude towards using m-payment services. The adjusted R-square value is 0.185, which means that the independent variables explain 18.5 percent of the variance in attitudes among the participants. Perceived usefulness and perceived ease of use are shown to have a significant effect on attitude at a 0.01 and 0.05 significant level respectively. Perceived risk does not have a significant influence on individuals’ attitudes towards using m-payment services. The results of the regression analysis are summarized in table 9 below.

Table 9. Regression (attitude)

<table>
<thead>
<tr>
<th>Dependent variable: ATT</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU</td>
<td>0.350*</td>
<td>0.000</td>
</tr>
<tr>
<td>PEU</td>
<td>0.155**</td>
<td>0.011</td>
</tr>
<tr>
<td>PR</td>
<td>-0.008</td>
<td>0.883</td>
</tr>
</tbody>
</table>

Adjusted R-square = 0.185, F = 22.028* (0.000)

Figure 12. Sub model 1: regression result (attitude)
By analyzing figure 12, the nature and significance of the influence of the independent variables on attitude can be observed. The $\beta$-value shows whether the factor’s influence is negative or positive and also how a change in the independent value would affect attitudes among students. Perceived usefulness is shown to be the factor, which has the strongest influence on attitude among the three factors. The analysis shows, with 99 percent confidence, that the factor of perceived usefulness has a positive influence on attitudes. This means that university students in Ouagadougou are more positive towards using m-payment services if they perceive the service to be useful. Based on these values the hypothesis H1: “Perceived Usefulness has a positive effect on Attitudes towards using mobile payment services among university students”, can be accepted.

The other factor shown to have a significant influence on students’ attitudes is perceived ease of use. Although not as strong as perceived usefulness, it can be said with 95 percent confidence, to have a positive effect on attitude. This implies that if university students perceive the service to be easy to use they are more positive towards using it. These values support the acceptance of hypothesis H2b: “Perceived Ease of Use has a positive effect on Perceived Usefulness of mobile payment services among university students”.

There are a number of previous studies that documented empirical findings that support these relationships between attitude and perceived ease of use and perceived usefulness (Schierz, 2010, p. 214; Shin, 2009, p. 1350; Sukkar & Hasan, 2005, p. 394). There are also others who have explored intention to use, rather than attitude, and confirmed how perceived ease of use and perceived usefulness affect individuals’ intentions (Kim et al., 2010, p. 317; Pavlou, 2003, p. 118; Wang et al., 2008, p. 108). Their findings may be used to support the results in this study as Shin (2009, p. 1350) observed in his study that perceived ease of use and perceived usefulness indirectly affect intention to use through a positive influence on attitude. All previous studies mentioned in this section except two, Kim et al. (2010) and Sukkar and Hasan (2005), found that perceived usefulness had a greater influence on attitude or intention than perceived ease of use. Sukkar and Hasan (2005, p. 394) mentioned that it might be of interest to test whether people in developing countries value ease of use more than usefulness. However, support for this was not found in this study as perceived usefulness among university students at Université de Ouagadougou was shown to have a greater influence on attitudes than perceived ease of use.

Perceived risk was shown to not have a significant influence on attitude, which suggests that hypothesis H4: “Perceived risk has a negative effect on Attitudes towards using mobile payment services”, should be rejected. This implies that the attitude towards using m-payment services among university students at Université de Ouagadougou is unaffected by their perceived risk of the service. However, support for this result cannot be found in the previous research reviewed, including either perceived risk (Chen, 2008, p. 44; Jarvenpaa et al., 1990; Pavlou, 2003, p. 118) or perceived security, i.e. low perceived risk, (Schierz et al, 2010, p. 214; Shin, 2009, p. 1350). This could imply that a difference between individuals in developed and developing countries concerning risk perception exist, as previous studies investigating this relationship were conducted in developed countries. However, as no previous studies examining this relationship in a developing country could be found, it is difficult to conclude if this result is valid or influenced by errors.
A possible reason for this result may be related to the relatively low Cronbach’s alpha for the measurement items used. As mentioned earlier in section 6.2.1, the low Cronbach’s alpha value may be a result of negatively worded questions or errors in conjunction with the translation process. Considering the low Cronbach’s alpha values for perceived risk in this study and previous studies presenting contrasting results, the rejection of a relationship between perceived risk and attitude based on these results should be done with caution.

6.3.2 Sub-model 2: Perceived Usefulness

Sub-model 2 explores the relationship between the dependent variable perceived usefulness and the four independent variables; perceived ease of use, trust, technology specific value and perceived number of users. The independent variables are shown to explain 36.1 percent of the variance in perceived usefulness through the adjusted R-square value of 0.361. All factors, except perceived number of users, are found to be significant at the 0.01 level. No significant influence is found for perceived number of users. The results of the regression analysis are summarized in table 10 below.

<table>
<thead>
<tr>
<th>Dependent variable: PU</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEU</td>
<td>0.232*</td>
<td>0.000</td>
</tr>
<tr>
<td>T</td>
<td>0.143*</td>
<td>0.008</td>
</tr>
<tr>
<td>TSV</td>
<td>0.375*</td>
<td>0.000</td>
</tr>
<tr>
<td>NOU</td>
<td>0.075</td>
<td>0.149</td>
</tr>
</tbody>
</table>

Adjusted R-square = 0.361, F = 39.852* (0.000)

Figure 13. Sub model 2: regression result (perceived usefulness)
Technology specific value ($\beta=0.375$, $p<0.01$) was the factor exhibiting the strongest and influence on students’ perceived usefulness of m-payment services, presented in figure 13 above. This indicates that if the university students at Université de Ouagadougou perceive the m-payment service to be beneficial, they will also perceive it to be useful. This data supports the acceptance of H3a: “Technology Specific Value has a positive effect on Perceived Usefulness of mobile payment services among university students”. Empirical support for this relationship was also found by Wang et al. (2008, p. 107), who documented a positive and significant relationship between technology specific value and perceived usefulness.

The second factor constituting network externalities, perceived number of users ($\beta=0.075$, $p>0.05$), showed to be non-significant. This implies that the students’ perceived usefulness of m-payment services is unaffected by their perception of the number of users of the services. Based on this the hypothesis H3c: “Perceived Number of Users has a positive effect on Perceived Usefulness of mobile payment services among university students”, is rejected. However, Wang et al. (2008, p.107) found a positive significant relationship between perceived number of users and perceived usefulness in their study. Contrasting results might be due to differences in context, as their study investigates multimedia-messaging services, which was relatively new when the study was conducted and required a multimedia mobile phone (Wang et al., 2008, p. 105). In contrast, the usage of m-payment services in Burkina Faso does not require a specific application or a certain type of mobile phone. Therefore these services might not be as dependent on the number of users as other technologies. This could explain why the perceived number of users was documented to have no significant effect on students perceived usefulness.

Perceived ease of use ($\beta=0.232$, $p<0.01$) was the factor with second highest influence on perceived usefulness among the students. The data shows that students perceive m-payment services to be more useful if it is easy to use. Based on this data the hypothesis H2a: “Perceived Ease of Use has a positive effect on Perceived Usefulness of mobile payment services among university students”, is accepted. This is a common relationship for which empirical consistency is found in all previous studies reviewed (Kim et al, 2010, p.317; Luarn & Lin, 2005, p. 885; Musa, 2006, p. 220; Pavlou, 2003, p. 118 ; Schierz et al., 2010, p. 214; Wang et al., 2008, p. 108).

Trust ($\beta=0.143$, $p<0.01$) was also documented to have a significant and positive effect on perceived usefulness of m-payment services among the students. The data showed that the students’ perceptions of usefulness of m-payment services are positively affected by their trust in the service. This effect was slightly weaker than the effects of technology specific value and perceived ease of use on perceived usefulness, but still supports the acceptance of hypothesis H5a: “Trust has a positive effect on Perceived usefulness towards using mobile payment services among university students”. The positive effect of trust on perceived usefulness is consistent with the empirical findings by Pavlou (2003, p. 118) and Sukkar & Hasan (2005, p. 395).

6.3.3 Sub-model 3: Perceived Risk
The third sub-model demonstrates the influence of the three independent variables, perceived number of users, technology specific value and trust on the dependent variable perceived risk. A value of 0.027 for the adjusted R-square indicates that 2.7 percent of the variances in perceived usefulness can be explained by variances in the
three independent variables. Neither perceived number of users or technology specific
value have a significant effect on perceived risk. Thus, network externalities cannot be
said to significantly influence perceived risk. The third independent variable, trust, has a
negative beta value of 0.2. An increase in trust results in a decrease in perceived risk.
This relationship is true at a 0.01 significance level, all other independent variables held
constant. The results from the regression analysis are summarized in table 11 below.

Table 11. Regression (perceived risk)

<table>
<thead>
<tr>
<th>Dependent variable: PR</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>-0.200*</td>
<td>0.002</td>
</tr>
<tr>
<td>TSV</td>
<td>-0.005</td>
<td>0.939</td>
</tr>
<tr>
<td>NOU</td>
<td>0.046</td>
<td>0.467</td>
</tr>
</tbody>
</table>

Adjusted R-square = 0.027, F = 3.596** (0.014)

The concept of network externalities in this study is comprised of the two independent
variables, perceived number of users and technology specific value. In this study, the
effect of network externalities on perceived risk was tested, with the assumption that the
perceived number of users and technology specific value would have an influence on
perceived risk. From analyzing the results showed in figure 14 above, no significant
relationship between neither perceived number of users nor technology specific value
and perceived risk can be seen. As these hypotheses are self-constructed and not based
on previous empirical findings, it is not surprising that no significant relationship could
be found between network externalities and perceived risk. This may be a reason for the
low adjusted R-square value of 0.026. Worth noting, is the positive beta value
 corresponding to hypotheses H3d, which indicates that an increasing number of users

Figure 14. Sub model 3: regression result (perceived risk)
result in higher perceived risk. Moreover, the negative beta value corresponding to the relationship between technology specific value and trust indicates that higher technology specific value reduces perceived risk, which seems more reasonable. However, these values are not significant and no conclusions regarding the relationship between network externalities and students’ perceived risk towards m-payment services could be drawn. Hypothesis H3b: “Technology Specific Value has a negative effect on Perceived Risk towards using mobile payment services among university students” and hypothesis H3d: “Perceived Number of Users has a negative effect on Perceived Risk towards using mobile payment services among university students”, are therefore rejected.

It has hereby been concluded that no significant influence of network externalities on trust can be established. On the contrary, trust is shown to have a significant influence on perceived risk. Thus, it can be concluded that an increase of trust among students towards m-payment service providers results in a decrease of perceived risk towards m-payment services. It can, with 99 percent confidence, be said that this relationship is true. Thus, hypothesis H5b: “Trust has a negative effect on Perceived risk towards using mobile payment services among university students”, is supported. It should be noted that the Cronbach’s alpha values calculated for trust and perceived risk are both below the threshold value of 0.7, thus, conclusions based on the relationship between these variables should be made with caution.

Further support for the negative relationship between trust and perceived risk is found in several previous studies (Jarvenpaa et al., 1999; Kim, 2008, p. 556; Mallat 2007; Pavlou 2003, p. 118). In the study by Jarvenpaa et al., (1999), the hypothesis stating that higher trust in an internet store reduces the perceived risk related with making purchases from the internet store, could be accepted. Similarly, Kim et al., (2008, p. 556) found convincing empirical evidence that consumer trust negatively affects perceived risk. Although their study did not incorporate the TAM, the authors investigated the influence of trust on risk in the context of online purchases, an area relatively similar to the focus of this study. As described above, Pavlou (2003) investigated the influence of trust on perceived usefulness and perceived ease of use. However, he also expanded the concept to investigate whether trust have an effect on perceived risk, a relationship that he was able to confirm at a 0.01 significance level (Pavlou, 2003, p. 118).

6.3.4 Sub-model 4: Trust
The last sub-model, seen in figure 15 below, shows the influence “satisfaction with previous transactions” have on the dependent variable trust. In this case, a simple regression analysis was performed as the original sub-model has been altered to only consist of one independent variable rather than three. The results of the regression analysis are summarized in table 12. The two previous independent variables, perceived size and perceived reputation, adapted from Jarvenpaa et al., (1999) were shown to have unsatisfactory Cronbach’s alpha values, which were too low considering the threshold limit of 0.7. The scales measuring these two factors did not fulfill the requirements for adequate reliability, thus the collected data corresponding to perceived size and perceived reputation could not be included in the research model and the hypotheses representing the influence of perceived size and perceived reputation on trust were not tested. The value calculated for the adjusted R-square corresponds to 0.209. Satisfaction is shown to have a positive effect on trust and it can be stated that this relationship is true with 99 percent confidence.
As shown in figure 15, satisfaction with previous transactions, \((\beta = 0.460, p < 0.01)\) is positively correlated with trust, rendering support for H5d: “Satisfaction with past transactions has a positive effect on Trust towards mobile payment service providers among university students”. The adjusted R-square of 0.209 implies that 20.9 percent of all variances in trust can be explained by variances in satisfaction with past transactions. Thus, the results indicate that an increase of students’ satisfaction with past m-payment service transactions lead to an increase in trust towards m-payment service providers. Evidence supporting the relationship established in the trust dependent model above can be found in Pavlou (2003, p. 122), who showed that satisfaction with previous transactions have a significant effect on trust.

### 6.4 MODERATING FACTORS

In this study, gender, age and faculty affiliation are thought to have a moderating effect on the variables in the research model. Gender, age and faculty affiliation were tested on each of the variables in the research model to see if they had a significant effect on that specific factor. As previously mentioned in section 5.11 gender was tested through a t-test while faculty affiliation was tested using an analysis of variance test. Since age is a continuous variable, its influence on the factors was tested by inserting it into regression analyses and observing its influence.

The results from the conducted t-test in section 6.1, table 7, showed that gender had no significant effect on any of the variables or relationships in the research model. Empirical support for this result can be found in Shin (2009, p. 1350) who also found that gender had no significant effect on any of his included factors concerning mobile wallets. However, two other reviewed studies Lin and Lu (2011) and Yang (2005)
found that there existed differences between males and females. Lin and Lu (2011, p. 1157) documented that network externality factors had a greater effect on female respondents while males placed greater value on usefulness and enjoyment. This difference in results may be due to the difference in context as their study investigated social network sites. Yang (2005, p. 273) found a significant relationship between gender and perceived usefulness and perceived ease of use. Results showed that females perceived mobile commerce to be more easy to use and useful than males. Yang (2005, p. 273) argued for that the results may be partially due to gender discrepancy in the sample. This may imply that the unequal gender distribution in this study can have influenced the results from the gender analysis. But as previous studies have yielded different results, it is difficult to conclude whether this is the case in this study or not. Although the t-test did not show any significance, regression analyses were conducted as well in order to ensure that no potential influence was missed. The regression analysis showed that gender had no significant effect on any factor. Results from the regression analysis are presented in appendix 3.

The anova analysis was conducted for the moderating factor of faculty affiliation in order to examine if it had a significant influence on the variables. The results are presented in table 13 below. Faculty affiliation was found to have no significant effect on any of the relationships or variables in the research model, which indicates that the students’ perceptions and attitudes are unaffected by their choice of study. This result is similar to what Yang (2005, p. 270) concluded in his study where he rejected his two hypotheses that students’ major of study affected perceived ease of use and perceived usefulness.

Table 13. Faculty influence on factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>0.150</td>
</tr>
<tr>
<td>T</td>
<td>0.136</td>
</tr>
<tr>
<td>NOU</td>
<td>0.360</td>
</tr>
<tr>
<td>TSV</td>
<td>0.125</td>
</tr>
<tr>
<td>PR</td>
<td>0.186</td>
</tr>
<tr>
<td>PU</td>
<td>0.268</td>
</tr>
<tr>
<td>PEU</td>
<td>0.147</td>
</tr>
<tr>
<td>ATT</td>
<td>0.323</td>
</tr>
</tbody>
</table>

The regression analyses conducted for the moderating factor of age showed that age had no significant effect on any of the factors with the exception of trust. The results are presented in table 14. The regression analysis showed that age had a negative significant ($\beta=-0.131 \, p< 0.05$) influence on trust, which implies that the older students had less trust in their m-payment service providers than the younger students. With the exception of trust, the otherwise lack of influence of age on the various factors may be due to the small variance in age among the respondents. This explanation is also suggested by Pavlou (2003, p. 119), who argue that even if demographic factors do not moderate the hypotheses, a low variance value may stifle the potential effects. This is further
supported by Yang (2005, p. 272), who mentions that homogeneity of the respondents may be an explanation for obtaining mixed findings. The effects of age when having a greater variance in the sample can be seen in the study from Shin (2009, p. 1350) who found considerable differences in attitudes and perceptions between age groups.

Table 14: Regression (age)

<table>
<thead>
<tr>
<th>Factor</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>0.010</td>
<td>0.870</td>
</tr>
<tr>
<td>T</td>
<td>-0.131</td>
<td>0.029</td>
</tr>
<tr>
<td>NOU</td>
<td>0.042</td>
<td>0.478</td>
</tr>
<tr>
<td>TSV</td>
<td>0.103</td>
<td>0.091</td>
</tr>
<tr>
<td>PR</td>
<td>-0.066</td>
<td>0.271</td>
</tr>
<tr>
<td>PU</td>
<td>0.059</td>
<td>0.328</td>
</tr>
<tr>
<td>PEU</td>
<td>0.037</td>
<td>0.539</td>
</tr>
<tr>
<td>ATT</td>
<td>0.006</td>
<td>0.920</td>
</tr>
</tbody>
</table>

6.5 AN OVERALL ASSESSMENT OF THE RESEARCH MODEL

Figure 16 below summarizes the results from the regression analyses on the sub-models. From the analyses conducted, it can be concluded that the self-designed research model can explain the influence of attitudes, perceived usefulness, perceived risk and trust among students in the context of m-payment services.

![Research model on student attitudes towards using m-payment services. Source: own](image_url)
Out of the eleven hypotheses tested, four hypotheses, namely H3b, H3c, H3d and H4 could not be confirmed in this study. In sum, empirical support is given for H1, H2a, H2b, H3a, H5a, H5b and H5d. These results are consistent with findings in previous research. The rejection of hypothesis H4, regarding the influence of perceived risk on attitudes towards using m-payment services is a well-documented relationship in previous research, discussed in section 6.3.1. The other three rejected hypotheses are related to network externalities. The inclusion of network externalities in the TAM is rather limited in the reviewed previous studies and thus its influence on the TAM is not as commonly tested as other factors, such as perceived risk or trust. Further, two of three hypotheses, H3b and H3d, investigating the relationship between network externalities and perceived risk were self-constructed. Therefore, it is not surprising that the majority of the rejected hypotheses include the less empirically tested factor of network externalities.

Out of all relationships examined in the research model, the influence of students’ satisfaction with previous transactions on trust is the strongest. Two variables, perceived size and perceived reputation, were removed from the research model due to insufficient reliability values. Thus, significant support for the influence on trust can only be found in satisfaction with previous transactions. The moderating factors considered in the study proved to have little to no effect on the variables in the research model. Age was the only moderating factor, which had a statistically significant effect on the research model, as it was negatively correlated with trust. However, as argued for in section 6.4, the homogeneity of the sample may explain the lack of influence of the moderating factors.

Although statistically significant influences could be found in the research model, the degree to which each sub-model explains variations in the dependent variable varies. The adjusted R-square values for the sub-models range from 0.026 for sub-model 3 and 0.361 for sub-model 2. This implies that there may be other factors not included or genuine randomness that influences the dependent variables. The purpose of this study was to test factors from prior empirical research and theory in a different context, rather than discovering new factors. Thus, the purpose of this study has been fulfilled.
7. CONCLUSION & DISCUSSION

In this chapter, the research question is answered and a discussion reaffirming the purpose of the study is provided. Further, theoretical- and practical contributions are summarized, limitations with the study are discussed and suggestions for future research are given.

7.1 PERCEPTIONS AND ATTITUDES TOWARDS MOBILE PAYMENT SERVICES AMONG UNIVERSITY STUDENTS

The main objective of this study was to determine the influence of chosen factors on university students’ perceptions and attitudes towards m-payment services in Burkina Faso by trying to answer the following research question:

“What influence do the factors in the proposed research model have on perceptions and attitudes towards the use of mobile payment services among university students in Burkina Faso?”

In order to achieve this objective, a self-constructed research model, i.e. an extended version of the TAM was proposed. The results of the empirical analyses support the legitimacy of the original TAM (Davis, 1989). This study aimed to extend the original version of the TAM in the context of m-payment services by incorporating the concept of network externalities, perceived risk, trust and additional independent factors thought to have an effect on trust. The effect of moderating factors was also assessed. The final research model presented in this study reveals further evidence for most relationships documented in previous research. Table 15 summarizes the results from the hypotheses testing. Empirical support is found for H1, H2a, H2b, H3a, H5a, H5b and H5d. No empirical support is found for H3b, H3c, H3d and H4.

The following theories and prior findings are empirically consistent with the results in this study. Perceived usefulness has a significant effect on attitudes, adding further empirical support to the relationship found in previous research (Schierz, 2010, p. 214; Shin, 2009, p. 1350; Sukkar & Hasan, 2005, p. 394). As shown in prior studies (Kim et al., 2010, p.317; Luarn & Lin, 2005, p. 885; Musa, 2006, p. 220; Pavlou, 2003, p. 118; Schierz et al., 2010, p. 214; Wang et al., 2008, p. 108), this study also documented findings that support the relationship between perceived ease of use and perceived usefulness. Perceived ease of use is moreover found to have significant effect on attitudes, consistent with the findings in Schierz (2010, p. 214), Shin (2009, p. 1350) and Sukkar and Hasan (2005, p. 394). This study further supports the documentation of the influence of technology specific value on perceived usefulness, established in Wang et al., (2008, p. 107). The effect of the additional factor, trust, was assessed on perceived usefulness, showing a significant relationship for which further empirical support can be found in Pavlou (2003, p.118) and Sukkar and Hasan (2005, p. 395). Trust was also found to have a significant effect on perceived risk, consistent with the findings in Jarvenpaa et al. (1999), Kim et al. (2008, p. 556), Mallat (2007) and Pavlou (2003, p. 118). Moreover, satisfaction with past transactions was shown to have a significant influence on trust, which also Pavlou (2003, p. 122) concluded.

No empirical support was found for the subsequent relationships and factors. Perceived number of users was found to have no significant effect on perceived usefulness, although empirical evidence for its significance was shown by Wang et al. (2008, p.
107). Reasons for this were discussed in section 6.3.2. The relationship between perceived risk and attitude towards using m-payment services was found to be non-significant, which is in contrast to other previous research findings (Chen, 2008, p. 44; Jarvenpaa et al., 1999; Pavlou, 2003, p. 118; Schierz et al., 2010, p. 214; Shin, 2009, p. 1350). No empirical evidence was found for the two self-constructed relationships concerning the influence of technology specific value and perceived number of users on perceived risk. The two hypotheses concerning the influence of perceived size and perceived reputation on trust were not tested, as discussed in section 6.2.1, due to insufficient measurement reliability. Although, empirical significance for these two relationships were found by Jarvenpaa et al., (1999), it could not be established in this study.

Table 15. Results from model hypotheses testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Relationship</th>
<th>B</th>
<th>p-value</th>
<th>Supported/not supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>PU → A</td>
<td>0.350*</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H2a</td>
<td>PEU → PU</td>
<td>0.232*</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H2b</td>
<td>PEU → A</td>
<td>0.155**</td>
<td>0.011</td>
<td>Supported</td>
</tr>
<tr>
<td>H3a</td>
<td>TSV → PU</td>
<td>0.375*</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H3b</td>
<td>TSV → PR</td>
<td>-0.005</td>
<td>0.939</td>
<td>Not supported</td>
</tr>
<tr>
<td>H3c</td>
<td>NOU → PU</td>
<td>0.075</td>
<td>0.148</td>
<td>Not supported</td>
</tr>
<tr>
<td>H3d</td>
<td>NOU → PR</td>
<td>0.046</td>
<td>0.467</td>
<td>Not supported</td>
</tr>
<tr>
<td>H4</td>
<td>PR → A</td>
<td>-0.008</td>
<td>0.883</td>
<td>Not supported</td>
</tr>
<tr>
<td>H5a</td>
<td>T → PU</td>
<td>0.143*</td>
<td>0.008</td>
<td>Supported</td>
</tr>
<tr>
<td>H5b</td>
<td>T → PR</td>
<td>-0.200*</td>
<td>0.002</td>
<td>Supported</td>
</tr>
<tr>
<td>H5c</td>
<td>PS → T</td>
<td>-</td>
<td>-</td>
<td>Not tested</td>
</tr>
<tr>
<td>H5d</td>
<td>S → T</td>
<td>0.460*</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H5e</td>
<td>REP → T</td>
<td>-</td>
<td>-</td>
<td>Not tested</td>
</tr>
</tbody>
</table>

Results demonstrate a generally positive attitude towards m-payment services among students in Burkina Faso. This research was conducted thoroughly and systematically in an effort to create a model answering the research question by testing the influence of factors on perceptions and attitudes towards m-payment services among university students in Burkina Faso. This objective is considered to have been achieved.

The focus of this study is highly relevant to the area of research, especially as developments within ICTs are occurring at high speed in developing countries and the m-payment services landscape in these countries will change and develop significantly within the near future. As described in section 1.2, many countries, such as Sweden, are moving towards a more cashless society, where services such as Swish and the virtual currency of Bitcoin are just two examples of the need for alternative currencies and transaction methods. Valuable insights are to be gained by developed countries with established formal financial institutions from developing countries such as Burkina Faso, in terms of transaction methods in future cashless societies.
7.2 THEORETICAL AND PRACTICAL IMPLICATIONS

This study offers both theoretical and practical contributions. From a theoretical perspective, the major contributions include successful extension of the TAM in the context of m-payment services in Burkina Faso. Empirical data is provided, supporting the suitability of the TAM through examining emerging m-payment services in Burkina Faso. The results generated in this study render support for the research model in a previously unexplored context in terms of the research topic in relation to the chosen population. This study contributes with results from testing new relationships, not previously examined, such as the influence of network externalities on perceived risk. Thus, the TAM in this study has been extended in a way not previously done. To our knowledge, no prior studies on attitudes towards m-payment services among university students have been conducted in Burkina Faso, thus this study contributes with empirical data from a specific developing country. As most research conducted on m-payment services in Africa is concerned with East Africa, rather than West Africa we believe that this is an area that should receive greater attention.

From a practical standpoint, this study may provide valuable information to m-service providers in terms of students’ attitudes towards m-payment services in Burkina Faso. For example, results show that students value usefulness higher than ease of use. This suggests that m-payment service providers should focus on developing the usefulness of the service rather than its ease of use. It relates to the suggestions made in Kim et al. (2010, p. 320), that providers should continuously adapt their services in order to maintain value for customers. Similarly Schierz et al. (2010, p. 215) argue that service providers should promote their services in a way that is perceived as compatible with the consumers. They further mention the possibility of early adopters to spread the usage of m-payment services, and thus the importance to encourage their usage of the services. Yang (2005, p. 274) mentioned that university students could be seen as early adopters, hence; the perceptions and attitudes of students determined in this study can be of importance in terms of stimulating further diffusion of m-payment services.

This study may also add to the existing knowledge of the m-payments landscape in Burkina Faso, with guidance to providers of these possibly revolutionizing payment systems. Additional research on the subject is beneficial for the country overall, as it can encourage and guide for example government funded incentives and moreover inspire other regions that are in an early adoption phase of mobile payment services. Further, we hope that this research will contribute with inspiration to other students in their choice of research subject and arouse interest for research in developing countries.

7.3 LIMITATIONS

The limitations of this study can be divided into three categories: sample-, model-, and analysis limitations. The sample limitation is related to the fact that data was collected from one specific consumer group in one country, thus the generalizability of the results may be limited and should be done with caution. Further, university students were not asked which m-payment service provider they use and thus no conclusions towards specific m-payment service providers can be made. This implies a possibility that the majority of the sample uses the same provider, which further limits the generalizability.

There are also limitations with the model and the factors included. As discussed in section 6.5, the model does not explain all variations in the dependent variables and country specific factors have not been included. Further, the internal consistency of the
measurement items for perceived risk and trust are less than the set threshold of 0.7, which may have reduced the validity of those specific factors. The limitations of the analyses methods utilized in this study refer to the exclusion the more commonly used SEM analyses in studies of this sort.

7.4 DIRECTIONS FOR FUTURE RESEARCH

Future research will need to assess the generalizability of the findings in this study. This implies additional empirical results on perceptions and attitudes towards m-payment services among students in other developing countries on the African continent, as well as other populations in Burkina Faso. Assessing the perceptions of trust and risk among an older consumer segment in relation to m-payment services may generate rather different results. Nevertheless, further research need to investigate whether this is true. Prior research, in contrast to this study, have found empirical evidence for the relationship between risk and attitudes, thus it would be interesting to assess this relationship using different measurement instruments in future research investigating perceptions and attitudes towards m-payment services among university students in developing countries.

All reviewed prior studies investigating the relationship between risk and attitudes included in this study have been conducted in developed countries (e.g. Chen, 2008; Jarvenpaa et al., 1999; Pavlou, 2003; Schierz et al., 2010; Shin, 2009). These studies have found that risk negatively affects attitudes, which could not be established in this study. As this study has been conducted in a developing country, this might suggest that individuals in developing countries have different perceptions of risk than individuals in developed countries. This is an implication for future research to investigate, in order to determine whether this result was influenced by errors or not.

Testing other relationships between factors in the research model constructed in this study, such as the influence of satisfaction on attitudes, is a direction for future research. Musa (2006, p. 222) argues that less developed countries may contain factors that are not considered in the original TAM, and suggests that the TAM should be extended to include these country specific factors. Further, Walsham et al., (2007, p. 322) highlight the importance of understanding local contexts in terms of applying information systems, further adding to research requesting additional studies including country specific factors. Therefore, a suggestion for future research is to include country specific factors when studying m-payments in developing countries, as these might explain some of the variations of the factors not seen in the original TAM.
When conducting a survey there are two crucial principles that have to be considered, those are that participants willingly give their consent to participate and that their answers are anonymous (Gray, 2014, p. 262). These two principles were considered and fulfilled when conducting the research as argued for in section 5.4. The data in this study was collected solely for the purpose of the study and did not contain an ulterior motive. Another important aspect to consider when conducting this study was that the work was done independently throughout the study and did not depend on collaboration with external actors. The assistance received was in the form of feedback or practical help such as contacting a distribution assistant. The data was processed thoroughly and objectively to minimize errors and avoid subjective influences in the results. Honesty and transparency was prevalent throughout the study in order to present a reliable and trustworthy result.

The research topic is highly relevant for society in Burkina Faso, and includes several societal implications. With regard to the benefits of ICT in developing countries and its potential to improve human development (Musa, 2006, pp. 221-222), this study may contribute to society indirectly by providing information regarding students’ attitudes towards an important area within ICT in Burkina Faso. Further, the results of this study may be of interest for m-payment service providers or other actors in society involved in the m-payment business. Therefore, this study may have an indirect impact on society by providing information within ICT. M-payment services has the potential to reform the financial sector in developing countries as these services use existing communications infrastructure that is already available to unbanked people in urban as well as rural areas. M-payment services open up possibilities for businesses other than banks, such as airtime merchants, to operate on the financial market. More research on m-payment services is needed as there is an increasing amount of people using these services. Thus, it is important to acknowledge attitudes and perceptions towards m-payment services in order to enable an integration of these into smaller businesses and stimulate the commercial climate of society.
9. TRUTH CRITERIA

This chapter aims to give the reader a methodological evaluation based on the truth criteria of validity, reliability and generalizability in relation to this study.

9.1 VALIDITY

In the article by Swanborn (1996, pp. 21-22), a common base for quality criteria in research is discussed, in which he refers to controllability as a necessary condition, reliability as a common criterion and validity as the ultimate criterion. Thus, most emphasis is put on discussing validity in relation to this study, although reliability and generalizability are also evaluated. Measurement validity refers to whether the collection of data sufficiently reflects the concept that is measured (Adcock & Collier, 2001, p. 509). In other words, measurement validity is achieved when results from the data captures the specific concept investigated. The criterion validity has been assessed somewhat differently in research. According to Adcock and Collier (2001, p. 531), measurement validity is frequently discussed together with reliability and measurement error. Whittemore et al., (2001, p. 522) distinguish between validity standards by dividing these into primary and secondary criteria, wherein primary validity criteria include authenticity, integrity, credibility and criticality and secondary criteria refer to vividness, thoroughness, explicitness, creativity, congruence and sensitivity. Further, Moutinho and Hutcheson (2011, p. 147) divide the concept into two sets, namely internal and external validity. In this section, four validity criteria are discussed based on the classification made in Reis and Judd (2014, p. 22), namely construct validity, internal validity and external validity. Evaluating the degree of validity of a study is essential as it determines the trustworthiness of the results.

9.1.1 Construct Validity

Construct validity refers to the ability to measure relationships between abstract concepts (Gray, 2014, p. 153). Construct validity is central in this study as focus is on investigating attitudes. Further, this study includes additional abstract concepts such as trust, perceived risk, perceived usefulness and perceived ease of use. Construct validity has been of great importance in this study because these concepts are widely prevalent in other situations apart from the context of this study and may imply various meanings to different people. Thus, construct validity has been an important aspect to consider in the construction of the questionnaire in order to achieve a survey instrument that measures what it is intended to measure. All questions used in the questionnaire in order to measure specific concepts are either adopted or adapted from previous recognized studies, which indicates that these validated scales possess high construct validity. With validated scales available, it was considered sensible to make use of these, rather than including self-constructed questions for the purpose of this study only.

As the original questions were formulated in English, a translation into French was necessary. This process was thus conducted by using recognized translation techniques. The fact that no uncertainties regarding the translation aroused during the data collection indicates no negative effects on the construct validity. The concepts relating to the two factors of perceived size and perceived reputation in the research model were excluded on the basis of insufficient Cronbach’s alpha values, indicating issues relating to the construct validity of these questions. This study is perceived to have an overall high construct validity, with the exception of the two included factors of perceived risk and trust with Cronbach’s alpha values of less than 0.7.
9.1.2 Internal Validity

Internal validity refers to the extent to which conclusions can be drawn from the results of the study and whether the independent variables actually cause the variations seen in the dependent variables (Gray, 2014, p. 152). According to Swanborn (1996, pp. 22-23), the criterion of internal validity is concerned with designing the study in a way so that alternative causal interpretations can be rejected to at least some extent (Swanborn, 1996, pp. 22-23). Internal validity is associated with the survey research conducted in this study, including the construction of the questionnaire and pilot testing, as well as the theories on which the research model is based on. Various actions have been undertaken in order to achieve high internal validity in relation to the objective of this study, which has been to investigate students’ perceptions and attitudes towards a set of factors that in turn influence other factors. As this study includes well-established theories and a commonly used survey design found in the majority of similar previous studies evaluated, a high internal validity is achieved. Although SEM is a more prevalent analysis technique in previous research within this research topic, SEM and regression analyses are said to produce similar outputs (Walker & Maddan, 2008, p. 346), thus the choice of conducting a regression analysis is not viewed as affecting the internal validity of this study in any manner. Conducting a pilot test of the questionnaire further ensures that the measurement instruments are perceived by the respondents as intended by the researchers. When interpreting the data, caution should be exercised as Yang (2005, p. 274) mentions that studies researching the TAM through self-report data have been criticized due to the difficulty of controlling if participants exaggerate their answers.

9.1.3 External Validity and Generalizability

According to Swanborn (1996, p. 28), the terms external validity and generalizability can be used interchangeably. External validity is related to the generalizability of sample results in terms of the population and across contexts and times (King & He, 2005, p. 882). The sample of this study refers to 301 university students, a group that can be regarded as a relatively homogenous group in a society. However, generalizing the results from this study to the population of more than 56 000 university students at Université de Ouagadougou should be done with caution as the sample, including gender distribution and faculty affiliation, do not fully represent the actual population. Further, the ability to generalize the result to other social groups in the country may be limited based on the specific characteristics of the student population, i.e. their lower age, possessing higher education, and being early adopters of technology.

However, as few studies on this subject in relation to university students in developing countries exist, it is not unlikely that the results may be generalizable to some extent to regions and populations with similar characteristics, such as university students in developing countries in Africa with poor infrastructure but high ICT investments.

9.2 RELIABILITY AND REPLICATION

Reliability is a central aspect to consider in the scientific community, as unreliable result will not be acknowledged in further research (Swanborn, 1996, p. 22). Reliability is concerned with the ability of the measures included in this study to generate the same response from the same individual, considering that the same conditions apply as during the execution of the original study (Leon, 2003, p. 17). Thus, reliability is closely related to the trustworthiness of the results. Both internal and external reliability of a study should be considered. Internal reliability is concerned with the consistency of
analysis, data collection and interpretation of results, whereas external reliability refers to whether the study can be reproduced and thus acquire similar results (Gray, 2014, p. 624). As this study is based upon well-recognized theories, data collection methods and analysis instruments, which produced results that were then analyzed objectively, high internal reliability can be assumed.

Assessing whether results of a research are reliable, i.e. trustworthy, a replication of the study can be conducted. However, as replication is difficult to accomplish, reliability of results is many times only assumed (Swanborn, 1996, p. 22). In order for a study to be replicated, a thorough assessment of each step performed in the study is necessary. In this study, preciseness and clarity in every step have been strived for as much as possible, further increasing the ability to replicate the study.
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APPENDICES

Appendix 1 - Questionnaire in English and French

Questionnaire

Background
We are two university students from the International Business Program at Umeå University, Sweden. We are currently writing our thesis in Business Administration, focusing on mobile payment services, such as M-Ligdi by Airtel, in Burkina Faso. This topic that has received increased attention in Swedish media. The data will be collected through questionnaires at the University of Ouagadougou.

Purpose
The purpose of this study is to identify university students’ perceptions and attitudes towards mobile payment services in Burkina Faso. We want to investigate attitudes and perceptions of mobile payments in order to contribute to the limited research conducted on this subject in Burkina Faso, where mobile payment services is occurring at a significantly fast pace.

The construction of this questionnaire is based on a 5-point likert scale. Each point is clarified below:

1 = strongly disagree
2 = moderately disagree
3 = neutral (neither disagree nor agree)
4 = moderately agree
5 = strongly agree

Thank you for participating!

Jennie & Christoffer
1. Gender  
   □ Male  □ Female

2. Age ______

3. Which faculty are you currently studying at?
   ______________________________________

4. Are you using mobile payment services in order to send or receive money?
   □ Yes  □ No

Chose the option that best corresponds to your opinion. Incorrectly checked boxes will be disregarded.

**PERCEIVED USEFULNESS**

*The statements below refer to the degree to which you believe that using mobile payment services would enhance your performance*

<table>
<thead>
<tr>
<th>5) Mobile payment services are a useful mode of payment</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>6) Using mobile payment services makes the handling of payment easier</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>7) Using mobile payment would enable me to pay more quickly</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
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</table>

<table>
<thead>
<tr>
<th>8) I find mobile payment a useful possibility for paying</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
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</table>

**PERCEIVED EASE OF USE**

*The statements below refer to the degree to which you believe that using mobile payment services would be free of effort*

<table>
<thead>
<tr>
<th>9) Learning to use the mobile payment is easy for me</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
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</table>

<table>
<thead>
<tr>
<th>10) It is easy to perform the steps required to use mobile payment services</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
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</table>

<table>
<thead>
<tr>
<th>11) The interaction with mobile payment services is clear and understandable</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
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</table>

<table>
<thead>
<tr>
<th>12) Overall I find the mobile payment service easy to use</th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
**PERCEIVED RISK**
The statements below refer to the uncertainty of loss and your perception of how much (or little) this loss is worth

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>13)</td>
<td>Compared to traditional payment methods, I believe that using m-payment is riskier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14)</td>
<td>I believe that there will be high potential for loss associated with using m-payment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15)</td>
<td>I believe that there will be too much uncertainty associated with using m-payment</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>16)</td>
<td>I believe that using mobile payment will involve many unexpected problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17)</td>
<td>I believe that the companies enabling me to use mobile payment services will protect my interests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18)</td>
<td>I would not feel safe using mobile payment services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PERCEIVED TRUST**
The statements below refer to how trustworthy you perceive mobile payment services to be

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>19)</td>
<td>My mobile payment service provider is trustworthy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20)</td>
<td>My mobile payment service provider keeps promises and commitments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21)</td>
<td>I trust that my mobile payment service provider keeps my best interests in mind</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Reputation of mobile payment service provider**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Strongly disagree</th>
<th>Moderately disagree</th>
<th>Neutral</th>
<th>Moderately agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>22)</td>
<td>My mobile payment service provider is well known</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23)</td>
<td>My mobile payment service provider has a bad reputation in the market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24)</td>
<td>My mobile payment service provider has a good reputation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Perceived size of mobile payment service provider

<table>
<thead>
<tr>
<th></th>
<th>My mobile payment service provider is a large company</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>My mobile payment service provider is a small player in the market</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>26)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

### Satisfaction with past mobile payment transaction

<table>
<thead>
<tr>
<th></th>
<th>I am satisfied in general with my past mobile payment transactions</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>27)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I am satisfied with the payment services I have received from my mobile payment provider</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>28)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

### NETWORK EXTERNALITIES

*The statements below refer to the more people and businesses in your environment using mobile payment services, the more beneficial you perceive these services to be*

#### Number of users

<table>
<thead>
<tr>
<th></th>
<th>In my opinion, the number of users of mobile payment services is large</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>29)</td>
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<td>□</td>
<td>□</td>
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<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Many of my friends and/or relatives frequently use mobile payment services</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30)</td>
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<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Many mobile phone users frequently make payments using mobile phone services</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

#### Technology-specific value

<table>
<thead>
<tr>
<th></th>
<th>Mobile payment services is a useful technology</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>32)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mobile payment services is a technologically wonderful innovation</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>33)</td>
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<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mobile phone services is valuable for payments</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>34)</td>
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<td>□</td>
<td>□</td>
<td>□</td>
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<td>□</td>
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</tbody>
</table>

### ATTITUDE TOWARDS USING MOBILE PAYMENT SERVICES

<table>
<thead>
<tr>
<th></th>
<th>Using mobile payment services is a good idea</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>35)</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
Using mobile payment services is wise

Using mobile payment services is beneficial

Using mobile payment services is interesting

**Questionnaire**

**Contexte**
_Nous sommes deux étudiants universitaires du programme d'affaires internationales à l'Université d'Umeå, en Suède. Nous écrivons notre essai en administration des affaires, se concentrant sur les services de paiement mobile au Burkina Faso, un sujet qui a reçu une attention accrue dans les médias suédois. Les données seront recueillies par le biais des questionnaires à l'Université de Ouagadougou. Toutes les réponses sont totalement anonymes et ne peuvent pas être remonter jusqu'à vous._

**Objectif**
_L’objectif de cette étude est d’identifier les perceptions et les attitudes parmi des étudiants universitaires envers les services de paiement mobile au Burkina Faso. Afin de contribuer à la recherche limitée à ce sujet au Burkina Faso, où les services de paiement mobile se produis à un rythme sensiblement rapide, nous voulons examiner les attitudes et les perceptions des services de paiements mobiles._

La construction de ce questionnaire est basée sur une échelle de jugement par laquelle la personne interrogée exprime son degré d'accord ou de désaccord vis-à-vis une affirmation. L'échelle contient cinq choix de réponse, précisé ci-dessous:

1 = Pas du tout d'accord
2 = Pas d'accord
3 = Ni en désaccord ni d'accord
4 = D'accord
5 = Tout à fait d'accord

Choisissez l'option qui décrit le mieux votre attitude vis-à-vis l'affirmation en cochant la case appropriée. Les cases males remplies seront ignorait.
1. Sexe
   □ Homme   □ Femme

2. Âge ______

3. Vous étudiez dans quelle faculté actuellement?
   ________________________________

4. Vous utilisez des moyens de payement mobiles pour envoyer ou recevoir de l'argent?
   □ Oui   □ Non

Choisissez l'option qui décrit le mieux votre attitude vis-à-vis l'affirmation en cochant la case appropriée. Les cases males remplies seront ignorées.

**PERCEPTION D’UTILITÉ**

*Mesurez quelle degré vous croyez que l'utilisation de services de payement mobile vous serait utile*

<table>
<thead>
<tr>
<th></th>
<th>Pas du tout d'accord</th>
<th>Pas d'accord</th>
<th>Ni en désaccord ni d'accord</th>
<th>D'accord</th>
<th>Tout à fait d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>5)</td>
<td>Le service de payement mobile est un mode de payement utile</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>6)</td>
<td>Utiliser un service de payement mobile rend le payement plus facile</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7)</td>
<td>Utiliser un service de payement mobile rend le payement plus rapide</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>8)</td>
<td>Je pense que le service de payement mobile est une possibilité utile pour le payement.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

**PERCEPTION DE FACILITÉ D’UTILISATION**

*Mesurez quel degré vous croyez que l'utilisation de services de payement mobile facilite les opérations de payement*

<table>
<thead>
<tr>
<th></th>
<th>Pas du tout d'accord</th>
<th>Pas d'accord</th>
<th>Ni en désaccord ni d'accord</th>
<th>D'accord</th>
<th>Tout à fait d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>9)</td>
<td>D’apprendre à utiliser un service de payement mobile n’est pas une difficulté</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>10)</td>
<td>D’utilisé un service de payement mobile n’est pas une difficulté</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>11)</td>
<td>L’interaction avec le service de payement mobile est claire et compréhensible</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>12)</td>
<td>En général, je pense que le service de payement mobile est facile à utiliser</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
### PERCEPTION DE RISQUE

Mesurez à quel niveau vous percevez qu’il y a un risque de perte économique ou/et de dévoilement d’information privée durant l’utilisation de service de payement mobile

<table>
<thead>
<tr>
<th></th>
<th>Pas du tout d'accord</th>
<th>Pas d'accord</th>
<th>Ni en désaccord ni d'accord</th>
<th>D'accord</th>
<th>Tout à fait d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>13) Comparé aux moyens de payement traditionnel, je crois que l’utilisation deservice de payement mobile est plus risquée</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14) En général, je crois qu'il y a grand risquede perte économique associé à l’utilisation deservice de payement mobile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15) Il y a trop d’incertitude associé à l’utilisation deservice de payement mobile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16) Je crois que l’utilisation de service de payement mobile impliquera beaucoup de problèmes inattendus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17) Je crois que les entreprises de service de payement mobile protégeront mes intérêts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18) Je me sentirai en sécurité durant l’utilisation du service de payement mobile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PERCEPTION DE CONFIENCE

Mesurez à quel degré vous percevez avoir confiance aux services de payement mobile

<table>
<thead>
<tr>
<th></th>
<th>Pas du tout d'accord</th>
<th>Pas d'accord</th>
<th>Ni en désaccord ni d'accord</th>
<th>D'accord</th>
<th>Tout à fait d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>19) Mon fournisseur de service de payement mobile est crédible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20) Mon fournisseur de service de payement mobile tient ses promesses et fait honneur à ses engagements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21) Je suis convaincu que mon fournisseur de service de payement mobile protège mes intérêts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**La réputation des services de payement mobile**

<table>
<thead>
<tr>
<th></th>
<th>Pas du tout d'accord</th>
<th>Pas d'accord</th>
<th>Ni en désaccord ni d'accord</th>
<th>D'accord</th>
<th>Tout à fait d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>22) Mon fournisseur de service de payement mobile est connu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23) Mon fournisseur de service de payement mobile a une mauvaise réputation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24) Mon fournisseur de service de payement mobile a une bonne réputation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Perception de la taille des services de payement mobile

<table>
<thead>
<tr>
<th></th>
<th>Mon fournisseur de service de payement mobile est une grande entreprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td></td>
<td>Mon fournisseur de service de payement mobile est un petit acteur sur le marché</td>
</tr>
<tr>
<td>26</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

### Satisfaction précédente avec payements par transaction mobile

<table>
<thead>
<tr>
<th></th>
<th>En général, je suis satisfait avec mes payements par transaction mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
</tr>
<tr>
<td></td>
<td>Je suis satisfait avec mes payements par transaction mobile que j’ai reçue de mon fournisseur de service de payement mobile</td>
</tr>
<tr>
<td>28</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

### LES EXTERNALITÉS DE RÉSEAU

Se réfère à ce que l’utilité réelle de service de payement mobile dépend de la quantité de ses utilisateurs - le plus d’utilisateur le plus vous percevez bénéficié du service de payement mobile

<table>
<thead>
<tr>
<th>Nombre d'utilisateurs</th>
<th>Pas tout d'accord</th>
<th>Pas d'accord</th>
<th>Ni en désaccord ni d'accord</th>
<th>D'accord</th>
<th>Tout à fait d'accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>29) À mon avis, le nombre d'utilisateurs de service de payement mobile est grand</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30) Plusieurs de mes amis et/ou de ma famille utilisent les services de payement mobile</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31) Beaucoup d'utilisateurs de téléphone mobile utilisent des services de payement mobile</td>
<td>☐ ☐ ☐ ☐ ☐ ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### La valeur spécifique de la technologie

| Le service de payement mobile est une technologie utile                             | ☐ ☐ ☐ ☐ ☐ ☐       |
| Le service de payement mobile est une innovation technologique formidable           | ☐ ☐ ☐ ☐ ☐ ☐       |
| Le service de payement mobile est important pour le payement                         | ☐ ☐ ☐ ☐ ☐ ☐       |

### ATTITUDE VIS-À-VIS L’UTILISATIONS DE SERVICE DE PAYERMENT MOBILE

| Utiliser un service de payement mobile est une bonne idée                            | ☐ ☐ ☐ ☐ ☐ ☐       |
| Utiliser un service de payement mobile est intelligent                              | ☐ ☐ ☐ ☐ ☐ ☐       |
| Utiliser un service de payement mobile est avantageux                                | ☐ ☐ ☐ ☐ ☐ ☐       |
38) Utiliser un service de payement mobile est intéressant

Merci pour votre participation!

Jennie & Christoffer
### Appendix 2 - Correlation table

<table>
<thead>
<tr>
<th>Factor</th>
<th>A</th>
<th>PR</th>
<th>PU</th>
<th>PEU</th>
<th>PT</th>
<th>S</th>
<th>NOU</th>
<th>TSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>-.056</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>.236</td>
<td>.262</td>
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<tr>
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<td>.672</td>
<td>-.056</td>
<td>.527</td>
<td>.347</td>
<td>.331</td>
<td>.346</td>
<td>.323</td>
<td>1</td>
</tr>
</tbody>
</table>
### Appendix 3 - Regression analysis (gender)

<table>
<thead>
<tr>
<th>Factor</th>
<th>$\beta$</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>-0.082</td>
<td>0.164</td>
</tr>
<tr>
<td>T</td>
<td>0.018</td>
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