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Nodir Sanakulov

Mobile Technology Adoption and the Effects of Cultural Factors

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ABSTRACT

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Mobile technologies are an important part of human life in both the personal and professional realms. Many services (banking, news, health, education, etc.) that traditionally offered either face-to-face, telephone, or other conventional platforms and technologies are now establishing services on mobile platforms as well. Mobile gadgets are now also being used by company employees as sales automation tools.

The importance of culture in technology adoption and usage has been well-established. The adoption of any technology includes a set of factors that determine if the technology is either accepted or rejected, and the individual strengths of these determining factors may vary greatly, depending on the importance placed on them by an individual. Because culture affects human behavior, there will be obvious differences in technology adoption between two groups with distinct cultural differences.

This dissertation aims to contribute to the technology adoption literature by conducting a cross-cultural study of consumer smartphone adoption to determine adoption levels in general and the differences between the antecedents of adoption in the included groups in particular. It will also examine salespersons´ adoption and usage of mobile sales customization tools.

The findings will confirm the importance of cultural factors in technology adoption, identify primary variables for adoption within each group, offer conceptualization of MSCT adoption, compile suggestions for further development of the sales tool, and make recommendations that will help increase efficiency in usage and sales.

Keywords: technology adoption, technology acceptance model, UTAUT, cultural factors, smartphones, mobile, sales force automation, mobile sales configuration tool

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TIIVISTELMÄ

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Mobiiliteknologiat ovat tärkeä osa ihmisten elämää sekä yksityis- että työelämän piirissä. Monet palvelut (pankki-, uutis-, terveys- ja koulutuspalvelut jne.), jotka perinteisesti on tarjottu kasvokkain, puhelimitse tai muiden tavanomaisten kanavien ja teknologioiden välityksellä, ovat nyt siirtyneet myös mobiilialustoille. Mobiilivälineitä käytetään yrityksissä myös myynnin automatisoinnin välineinä. Kulttuurin tärkeys teknologian omaksumisessa on osoitettu selkeästi. Teknologian omaksumiseen vaikuttaa joukko eri tekijöitä, mikä määrittää sen, että omaksutaanko teknologia vai ei. Näiden yksittäisten tekijöiden tärkeys voi vaihdella suuresti riippuen yksilöiden näille antamasta painoarvosta. Koska kulttuuri vaikuttaa ihmisten käytökseen, kahden selkeästi eri kulttuurin edustajan välillä on selkeitä eroavaisuuksia teknologian omaksumisessa.

Tämän väitöskirjan tavoitteena on edistää teknologioiden omaksumista käsittelevää kirjallisuutta toteuttamalla kulttuurien välinen tutkimus älypuhelinten omaksumisesta kuluttajien parissa. Tavoitteena on määrittää yleinen omaksumisaste ja erot etnisten ryhmien välillä, erityisesti tässä tutkimuksessa mukana olevien etnisten ryhmien välillä. Tutkimus selvittää lisäksi myyntihenkilöiden mobiiliteknologioiden omaksumista ja käyttöä.

Tutkimuksen tulokset vahvistavat kulttuuristen tekijöiden tärkeyden teknologian omaksumisessa ja identifioivat omaksumiseen vaikuttavat primäärimuuttujat ryhmittäin. Tutkimus myös esittää käsitteellisen viitekehyksen myyntihenkilöiden mobiiliteknologioiden omaksumisesta, tarjoaa ehdotuksia myynnin työkalujen kehitystä varten ja suosituksia tehokkuuden lisäämiseksi myyntityössä mobiililaitteita käyttämällä.

Avainsanat: teknologian omaksuminen, teknologian hyväksymismalli, UTAUT, kulttuuritekijät, älypuhelimet, mobiili, myynnin automatisointi, mobiilimyynnin työkalu

FOREWORD AND ACKNOWLEDGEMENTS

My decision to pursue a doctoral degree was made while working for an international marketing research company at which I experienced marketing research in practice and found it quite exciting. I was assigned to a multi-country project team, which involved conducting projects in at least two countries simultaneously. It was fascinating to see how survey results would vary from country to country regarding different levels of perceptions about technology attributes.

At that time, I knew that I wanted to study technology acceptance, including the effects of cultural factors. Therefore, I applied to JSBE and sent an email to Professor Heikki Karjaluoto expressing my interest in pursuing a doctoral degree under his supervision. He liked my research proposal, and after only a few months, I found myself in the corridors of JSBE. Mika Haapanen, the doctoral school coordinator, told me that I was the first foreign student to be admitted to the doctoral school. Although I am sure it was unintentional, his words put me under enormous pressure to do well.

Why Finland? People ask this question often, and the answer is obvious and straightforward: It is a country with the best educational system, advanced social welfare, modest people, beautiful nature, and great fishing locales. My decision to study in Finland is one of the best I have ever made.

Once the dissertation process began, many setbacks, achievements, disappointments, journal acceptances, journal rejections, productive days, slow progress, and long waits followed. Some of them were motivating, while others were quite frustrating. Even on the worst days, I managed to stay focused by knowing that, no matter what, I was determined to and would therefore succeed. A great source of my strength came from several people to whom I owe my sincere gratitude.

I would like to firstly thank my academic supervisor Heikki Karjaluoto, who guided me through this challenging yet exciting path by helping me stay focused and sharing his invaluable thoughts and ideas, which immensely improved my dissertation's quality. He is a great leader who aims to ensure that everyone on his team stays focused on research. He also tirelessly seeks grant opportunities so that his students are financially secure. I am indebted to him for everything he has done for me.

I would also like to thank all the university professors and lecturers, including those from KATAJA, whose courses I attended. Thanks to them, I gained extensive knowledge on various topics, had opportunities to participate in interesting discussions, and exchanged many ideas.

I would like to thank the deans of JSBE, the Foundation of Economic Education, and the University of Jyväskylä for providing financial support during the past few years, without which completing this dissertation would not have been possible. I am thankful to everyone at JSBE, from the international relations department to the student registrar and secretary. They have all been extremely helpful since my first day at the university. Through their help and

guidance, everything that a foreign student needs, from admission to graduation, went smoothly for me.

Finally, I would like to thank my wife, children, and parents for their support, patience, and understanding during this time. As a father myself, I know how it feels for my parents and what a child´s smallest achievement can mean.

Jyväskylä 8.8.2018, Nodir Sanakulov

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1 INTRODUCTION

1.1 Study background and research questions

Due to recent technological developments, mobile technologies have become an inseparable part of human life (Sánchez-Prieto, Olmos-Migueláñez and García-Peñalvo, 2016), and these advancements offer the possibility of multifunctional usage of mobile gadgets. Apart from functions that the average mobile phone offers, a wide range of new mobile features are now being developed and used by consumers. This development has brought together gadget makers, who develop technologically advanced handsets, with software engineers, who develop software and services, to match users´ rapidly changing expectations regarding speed and unique experiences. A report by Google subsidiary DoubleClick (2016) revealed that 53% of mobile site visits are abandoned if pages take longer than 3 seconds to load. Achieving this speed depends on both hardware makers and software developers. A smartphone is a mobile phone that has a touchscreen, a high-resolution display, and many camera functions. While these features have become the norm, the number of mobile services is increasing rapidly. Smartphones are now used for a wide range of purposes, including mobile learning (Sánchez-Prieto et al., 2016; Liaw, Hatala and Huang, 2010), accessing the internet (Hsiao, 2013), gaming (Chen and Kuan, 2012), healthcare (Luxton et al., 2011), mobile shopping (Groß, 2015; Agrebi and Jallais, 2015), mobile payments (Oliveira et al., 2016), tourism (Dickinson, Hibbert and Filimonau, 2016; O'Regan and Chang, 2015) etc. Moreover, technologic know-how is becoming more accessible, and manufacturing costs are continuously decreasing, which is in turn widening the user segment and causing a rapid progression of mobile technology adoption. Recent statistical information has also confirmed this trend. For example, Gartner (2016) reported a 14.4% increase in smartphone sales in 2015 from 2014, amounting to the sale of 1.4 billion units worldwide. In addition, worldwide mobile subscriptions have grown by more than 20% annually over the last five years, and they were estimated to reach 4.3 billion by the end of 2017 (ITU, 2017). The increasing

numbers of mobile technology users and rapidly developing technologies are shaping the mobile technologies market by attracting companies who traditionally were players in other industries. Top examples of such companies include PC game developers, electronics manufacturers, advertisers, and telecommunications companies. Until recently, Nintendo was a game developer for various platforms. With its release of Pokémon Go, it became a major player in the mobile gaming industry as well, earning as much as 1 billion USD in revenue in less than one year (TechCrunch, 2016). Video game developers of popular game consoles (PSP, Xbox, and PC) have also responded to growing consumer demand and started releasing games for smartphones and tablets. In 2017, over 2 billion users made mobile transactions via mobile phones and tablets (Invesp, 2018), and by the end of 2018, mobile use will reach 70% of eCommence traffic (Absolunet, 2018). Hence, the advertising industry is rushing to gain its share of this rapidly increasing market. Mobile advertising has already been established as an important segment of the advertising market. In 2016, the global mobile advertising market was valued at 80 billion USD, which was 72% of total digital budgets (MAGNA, 2016); by 2021, it is estimated to reach 215 billion USD. Many other industries, such as healthcare (Luxton et al., 2011; Rao et al., 2010), banking (Laukkanen, 2007; Cruz et al., 2010), and retail (Groß, 2015; Holmes, Byrne and Rowley, 2013), have already established their foothold in the mobile platforms. In terms of smartphone manufacturers, the competition has increased over the last few years, with many newcomers and start-ups, such as Huawei, OnePlus, OPPO, VIVO, Jolla, etc., entering the field. Telecommunications companies are also enjoying a growing demand for products and services that are compatible with smartphones. Companies have reshaped their commercial operations to fulfil these demands, and most now offer high-speed data packages, entertainment channels, and various services.

When considering the abovementioned trends and statistics, a smartphone could be perceived as a must-have gadget in everyone´s life. Yet, despite exciting sales figures and rapidly increasing smartphone popularity, the world median for smartphone penetration is only 43% (Pew Research Center, 2016) but notably ongoing. Moreover, rates of smartphone usage may be significantly different, even among countries that are considered similar to one another. Per the Pew Research Center´s 2016 report, smartphone usage rates in Japan and South Korea were 39% and 88%, respectively. One might assume that these two countries are quite similar, with similar cultures, geographic locations, and technological advancements. However, reported figures do not support such assumptions because technology adoption is a complex process that involves both intrinsic and extrinsic factors, which should be examined carefully.

The academic literature has advanced in the field of technology adoption; hence, there are many published studies (Davis, Bagozzi and Warshaw, 1989; Sanakulov and Karjaluoto, 2015) that are dedicated to understanding adoption and the determinants that affect the adoption process. These advancements have resulted in theoretical frameworks that explain technology adoption and provide valuable practical implications and directions for future research. In

addition, many years of research have provided various antecedents of technology adoption, such as personal innovativeness, job relevance, convenience, performance, etc., which were developed for various contexts and settings.

The examination of technology adoption from a cultural perspective is one of many approaches. Studying phenomena from a cultural perspective has proven to be vital to providing guidelines on how the development of products and services should be organized and maintained and how to structure business operations in different parts of the world to make them compatible with different cultures. Interest in exploring the impacts of cultural factors on technology acceptance was triggered by the emergence of corporate multi-nationalism, when growing numbers of companies became interested in gaining a presence in new locations (D. W. Straub, 1994). This trend resulted in many important contributions that explained the role of culture in technology acceptance and paved the way for further research. Since then, the role of culture in technology acceptance has been long studied and well documented in the literature, including a significant amount of theoretical work (Olasina and Mutula, 2015; Veiga, Floyd and Dechant, 2001; Jung, Hur and Kim, 2015). Of extreme importance are Gilbert Hofstede´s (1980; 1983) contributions to the development of this field, especially his most notable contribution of cultural dimensions, which have been utilized by research community in many studies (Blodgett, Bakir and Rose, 2008; Ford, Connelly and Meister, 2003) ever since. While his original cultural dimensions remain the same, the framework has been under continuous development and has resulted in the inclusion of dimensions that improve our understanding of culture.

Despite progress in the field and an increasing number of mobile technology adoption studies in recent years, there is still a need for further research on technology adoption in general and regarding cultural factors in particular for two main reasons. First, technological developments are changing consumer behaviors and the purposes of technology usage, which have increased the complexity of adoption processes and changed the adoption determinants and their effects. Mobile technologies are rapidly becoming technologically sophisticated, with the list of new features and services regularly growing. In turn, these factors are contributing to changing consumer behaviors. Various issues, such as privacy (mobile social media), security (mobile banking, financial services), and health (possible health risks from using gadgets), are considered in mobile technology usage and purchase decisions. Reports of private data being leaked and used illegally are appearing frequently in news outlets, and exploding Samsung handsets (Wired, 2017) attracted wide media attention. Such devices were banned by many airlines (BBC, 2016). As a result of these reports, many users became aware of possible security and health risks, which may affect their future purchase decisions.

Second, ever increasing number of firms are participating in a globalized economy and these firms may face various problems, such as logistics, storage, and legal hurdles, which are specific to each country in which it conducts

business. One such problem is caused by cultural factors that determine consumer behavior in terms of technology adoption and usage. Having knowledge of the effects of culture, such as knowledge of products and services that are exclusively developed for certain regions, and the ability to use it to a firm´s advantage is critical to navigating in a global economy. Another example is television ads, whose stories and messages concerning attributes of products and services may differ significantly from country to country. For example, when McDonald´s TV commercials for the US and China are compared, the Chinese versions emphasize family ties, long-lasting relationships, and food quality, whereas the US versions emphasize fun and quantity (Youtube, 2012).

Since the early days of research on culture and its effects, researchers have examined many countries and cultures around the world. However, priority was given to countries where big companies had business interests. As sponsors of such research, some companies provided financial support and made work places and employees accessible for studies. For example, Gilbirt Hofstede´s study on cultural dimensions was based on the responses of IBM employees around the world (Hofstede, 1984). Without certain privileges, a study of this scale would not have been possible. By contrast, some countries remain largely unexplored due to political-economic situations. This causes many issues, such as a lack of accumulated knowledge, citable research, and recommendations concerning that area. The extended literature review that was conducted for this thesis revealed that Central Asian countries are prime examples of this issue. Much less attention was given to these countries; thus, studies on this region that are dedicated to either technology adoption or cultural comparison are almost non-existent. In addition to the aforementioned political-economic reasons, this void might be due to either language barriers, which prevent access to accumulated knowledge by the local academic community, or a lack of resources. After the Soviet Union´s breakdown, some countries became self-governing states and began building new economies to replace obsolete Soviet-era economic principles and mechanisms. This led to increased interest in the region and the exploration of commercial potential. After borders were opened to foreign investment, many multinational companies and organizations rushed to create a presence in the region. Today, many world brands and commercial and non-commercial organizations have a presence in most Central Asian countries. Managers try to make the best possible decisions via a careful analytical approach, including the consideration of market research results, available resources, the firm's strategy, and the current market. The results of academic research and the recommendations drawn from these studies can be of great importance for such decision making and I believe that the studies included in this dissertation will make contributions to the field and may serve as an inspiration for future studies.

To study technology adoption and usage, a smartphone and mobile sales customization tool (MSCT) was developed for a heavy machinery production company, which was chosen as a study context for the three empirical studies included in this dissertation.

A smartphone is a mobile phone that has many highly advanced functions, which are similar to those in computers. Typically, smartphones have high-resolution touchscreen displays, sensors, and various connections, such as Wi-Fi, cellular, Bluetooth, and near field communication. Because it is equipped with an operating system (Android OS, iOS, Blackberry OS, or Windows Mobile OS), a smartphone is capable of running applications that have been specially developed for it. The hardware used in smartphones is also similar to that of computers.

An MSCT is a mobile device (smartphone, tablet PC, laptop) that provides sales force automation (SFA) solutions with dedicated software. Its functions and features may vary per the nature of work done and may include tasks as simple as billing and as complicated as customizing machinery with illustrations for presentations.

Based on the information presented, the main purposes of this thesis are as follows:

- to study tehcnology adoption and cultural effects, which play an important role in adoption
- to study MSCT adoption by company employees

To achieve these goals, the current dissertation will focus on the following research questions:

a. What are the main drivers of consumers' adoption of smartphones?
b. Do cultural factors matter in smartphone adoption, and do they have varying effects on adoption in different countries?
c. How do adoption and usage of MCSTs work, and what areas should be further developed to meet salespersons' needs and increase productivity?

This article-based thesis consists of four individual research papers, which focus on technology acceptance from different perspectives, as shown in Table 1. Paper one is a literature review of the adoption of mobile technologies, and the remaining three empirical papers address the research questions as well as provide explanations and implications in two contexts (smartphone and MSCT).

TABLE 1 Papers included in the dissertation

Paper	Main research question	Context	Published year
Paper 1	Literature review of past mobile technology studies	Mobile technologies	2015
Paper 2	What are the main drivers of consumers' adoption of smartphones?	Smartphone adoption	2017
Paper 3	Do cultural factors affect smartphone adoption, and do drivers have varying effects on adoption in different countries?	Smartphone adoption	2017
Paper 4	How do the adoption and usage of MSCTs work, and what areas should be further developed to meet salespersons' needs?	MSCT adoption by salespersons	2018

1.2 Emerging trends in mobile technologies

At the beginning of the mobile technology craze, most manufacturers focused on developments that were mainly based on technology convergence. For example, initially, not all mobile phones had FM radio function, which later became the norm. The same can be said of other functions, such as cameras, touchscreens, powerful speakers, navigation, and various sensors. Technology convergence served as a trend in mobile technology development, and it continues to a certain degree. The convergence of various technologies later became a common practice for most manufacturers, from the experienced to newcomers, such as Huawei, Oppo, Jolla, and One Plus. Over time, manufacturers continued working on and improving existing features. For example, touchscreen resolution, camera quality, battery capacity, and speed became and continue to be highly competitive areas. Manufacturers are now developing smartphones that help users lead healthy lifestyles by incorporating special features, such as those that count calories, measure heartbeat, track activities, measure distances covered, and make suggestions based on the monitored activity level.

The latest trend in mobile technology development is gadgets with artificial intelligence (AI) capabilities. Ove the last few years, technology leaders, politicians, and firms have been sharing their views, concerns, and positions regarding the future of AI and its development. Despite an ongoing and heated debate on AI applications, including the possible consequences and ethical issues related to the development and usage of AI, many manufacturers are already offering products that have AI capabilities. For example, Google, Apple, Amazon, and many other manufacturers have their own versions of virtual assistants and/or features incorporated in their products that work with AI (Business Insider, 2018).

1.3 Research approach and methodology

The purpose of this dissertation is to contribute to the understanding of consumer and employee adoptions of mobile technology, the effects of cultural factors, and the implications derived from its adoption. The nature of each paper included in this dissertation varies. Paper 1 is an extensive literature review of the accumulated knowledge to date, including theoretical and methodological contributions from past mobile technology adoption studies. Based on the findings, the paper lists both the theoretical and practical implications, including recommendations for future research. The remaining part of the dissertation is covered by three empirical papers. Papers 2 and 3 examine smartphone adoption in general and compare adoption among groups with varying cultural dimensions in particular. Both these papers base their findings on the collection and analysis of quantitative survey data. Paper 4 examines MSCT adoption among salespersons who are employed by a heavy machinery manufacturer in Finland, and the findings are based on a qualitative analysis approach. For papers 2 and 3, data were collected via an online survey for each group included in the study. For the qualitative case study (Study 4), the salespersons working for an international heavy machinery manufacturer were selected, and intensity sampling was applied because the respondent group consisted of information-rich cases (Patton, 2002).

1.4 Key concepts

1.4.1 Marketing

The term "marketing" is understood in one of three concepts: "pan-company" marketing, which is a company-level marketing activity that is aimed at securing customer preferences and achieving higher returns, "functional" marketing, which includes department-level marketing activities that are aimed at different purposes at different given times, and "budgetary" marketing, which includes marketing expenditures, such as advertising and promotion (Ambler, 2000). A combination of perspectives from these three concepts represents how this dissertation is structured

The studies included focus on processes that are conducted on all three marketing levels. For example, the development of products with a specific feature would require the involvement of functional marketing, whereas appealing to consumers by advertising a particular function or feature belongs to the budgetary marketing concept. This dissertation also focuses on processes involving internal actions that are aimed at improving employees' performance, efficiently utilizing tools, and educating employees, which eventually lead to customer satisfaction and higher returns on investment.

1.4.2 Technology adoption

Technology adoption is a complex process that is comprised of phases, which begin with awareness of a technology and are followed by accepting and utilizing it. The order of these phases may differ, depending on the usage setting. For example, in both commercial and non-commercial organizations, employees are often told to use a given technology, but this process varies significantly in consumer adoption, which usually starts with a general awareness of technology.

Adoption also depends on various intrinsic and extrinsic reasons, and it may be fast, slow, or even unsuccessful. To both understand this process and prevent failures, technology adoption has been of great interest to both researchers and practitioners, and this interest has resulted in the accumulation of much theoretical and practical knowledge over the past few decades. For example, various factors may determine whether technology is adopted, and the strengths of these factors may vary by the type of technology being introduced or the dominant values and beliefs in a culture. The most important factor in determining personal computer adoption can be utilitarian, whereas, for smart TV adoption, hedonic factors can be stronger

1.4.3 Cultural factors

As mentioned above, various reasons may affect how one perceives a technology. It is well established that technology acceptance is a complex process that has been studied continuously, and our understanding of it is still being improved. Among many factors that influence technology adoption, cultural factors play an important role, and the shaping of perceptions regarding technology acceptance and usage varies among cultures. Cultural factors are based on the values and ideologies of a community or a group. An individual´s behavior is based on these factors, and it influences every aspect of that individual's life. This is more obvious when members of cultures with distinct differences are compared. For example, in Uzbekistan, children live with their parents until they get married; by contrast, Finnish children mostly live independently once they start earning money for themselves or after graduating high school. Uzbeks value being close to parents and relatives, which dictates their behavior. In Western cultures, more importance is placed on productivity, usefulness, and efficiency when considering new technology, while consumers with a collectivistic mindset in countries like China or Korea might make decision based on social influence (SI), including others´ opinions and peers' perception of a technology.

1.4.4 Hofstede´s cultural framework

Based on thousands of survey questionnaires that were administrated to IBM employees in 72 countries, Gilbert Hofstede (1980) proposed a cultural framework that consists of the following cultural dimensions: power distance

(PD), uncertainty avoidance (UA), individualism, and masculinity. He argued that national differences could be explained via a statistical association to four main cultural dimensions. His definition of culture is the "collective programming of the mind, which distinguishes the members of one human group from another" (Hofstede, 1980, p. 260). With this framework, one can identify cultures per their scores in each dimension and make predictions. His work is an important milestone in understanding cultures, especially for cross-cultural studies, where this framework provides a practical approach to comparisons and the analysis of differences. Since its introduction, Hofstede´s work has been used widely and has inspired researchers to further extend and test it in various research settings (Minkov and Hofstede, 2011).

1.4.5 Kano Model

Developed by Noriaki Kano, the Kano model is used to categorize product and service attributes that are related to customer satisfaction (Kano et al., 1984). Kano argued that not all product or service attributes have a linear relationship with customer satisfaction, and he proposed the categorization of product and service attributes into five different categories: must-be, attractive, one-dimensional, indifferent, and reverse. Since its introduction, this model has been used continuously in various contexts to determine which quality attributes appeal most to customers (Sanakulov and Karjaluoto, 2017a).

1.5 Outline of the dissertation

This dissertation consists of two parts. The first part is dedicated to both theoretical and methodological discussions of previously published papers. The second part presents four separate published articles on the study's subject.

Part 1: This part includes five chapters. Chapter 2 provides a detailed literature review of mobile technology adoption by presenting theoretical advancements that have been achieved in the field and various factors, including cultural factors, which determine adoption. In the same chapter, the Kano Model and its implications are reviewed, and emerging trends in mobile technologies and SFA adoption are discussed. In Chapter 3, the research design, data collection methods, measurements, and data analysis for each study are discussed along with justifications for opting for certain methodologies. Chapter 4 summarizes the dissertation articles provided, including the main findings from each study. Chapter 5 presents a summary of discussions from previously published papers regarding research theoretical contributions, managerial implications, limitations, and avenues for future studies.

Part 2: Four previously published papers are included in this dissertation, as described in Table 1. All four papers were co-authored with the thesis

supervisor Professor Heikki Karjaluoto, and one paper (Paper 3) was co-authored with fellow researcher Sami Kaliomaa from Jyväskylä University of Applied Science. Notably, for all the papers, the author of this dissertation was both the primary and corresponding author, with contributions to each study varying between 70–90%.

Study 1: The author of this dissertation was responsible for initiating the research, collecting data, data analysis, and composing a draft, while the co-author contributed by reviewing the manuscript and sharing comments/suggestions that were aimed at improving the paper's quality.

Study 2: The author of this dissertation was responsible for the research idea, initiating the research, collecting data, data analysis, and writing the paper. The co-author was involved in the entire process, and his contributions improved the final outcome.

Study 3: The author of this dissertation was responsible for planning the research, collecting data, data analysis, and writing the paper, while the co-author reviewed the manuscript and shared valuable suggestions, which were included in the paper.

Study 4: The author of this dissertation was responsible for writing the draft, while the co-authors were responsible for conducting interviews and the initial analysis. The thesis supervisor provided feedback on how to efficiently present the research findings.

2 THEORETICAL FOUNDATION

2.1 Technology acceptance

Information technology development has gained strong momentum over the past few decades, and it is currently advancing at an incredible rate. The main motivation for any technological development is to serve mankind by decreasing human effort, increasing efficiency, improving productivity, decreasing energy consumption, and offering new possibilities. The results of such technological advancements are evident in every aspect of our lives, from wearable gadgets, consumer electronics, and healthcare products to cars. It is a common assumption that every time a certain product or technology is replaced by a newer and more advanced one, the latter is superior and does a better job than the former. In most cases, this assumption has proven to be true, which has driven the acquisition of such technologies and products at various levels of consumption. Although commercial firms and governments usually implement new technologies in workplaces to increase productivity and efficiency, not all adoption goes smoothly in real-world scenarios (Speier and Venkatesh, 2002; Bush, Moore and Rocco, 2005). To ensure favorable results from heavy investments in technologies and personnel training, firms have turned to academia to seek guidelines and instructions. In addition, a general need to understand why technology was either accepted or rejected emerged. This led to explosive interest in the field of technology acceptance. Thanks to the many theoretical and practical contributions made over the years, the field of technology acceptance has become an important area of information systems (IS) research. As a result, many theories and models have been developed to explain technology acceptance and usage, including the technology acceptance model (TAM), the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the unified theory of acceptance and use of technology (UTAUT).

2.1.1 TAM

Introduced by Davis (Davis, 1989; Davis et al., 1989), the TAM, with a theoretical basis that was derived from the TRA (Fishbein and Ajzen, 1975), is a tool for predicting an individual´s acceptance, adoption, and usage of information technologies by determining the effects of external variables on that individual's beliefs, attitudes, and intention to either accept or reject information and communication technologies (Figure 1).

Per the TAM, an individual´s behavioral intention (BI) is determined by two variables: perceived usefulness (PU) and perceived ease of use (PEOU). Additionally, PEOU acts as an antecedent of PU, and intention determines actual system use. PU is defined as the degree to which a person believes that using a particular system will enhance his/her job performance, and PEOU is defined as the degree to which the person believes that using a particular system will require little to no effort (Davis, 1989), p. 320). PU and PEOU also mediate the effects of external variables, such as a system´s technical characteristics, on BI.

FIGURE 1 Original Technology Acceptance Model

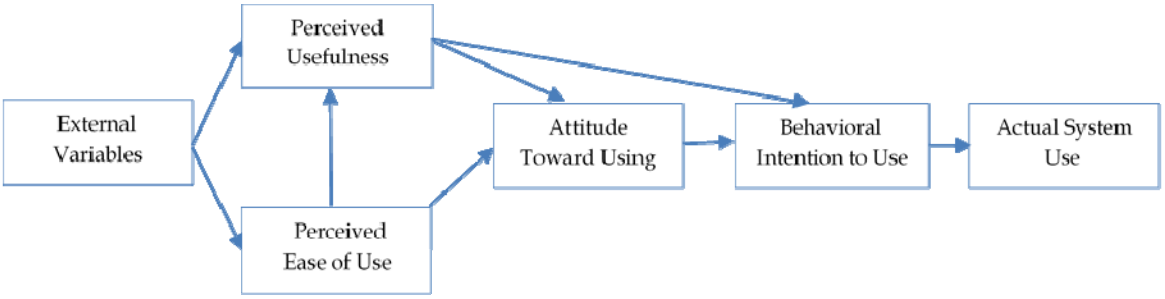
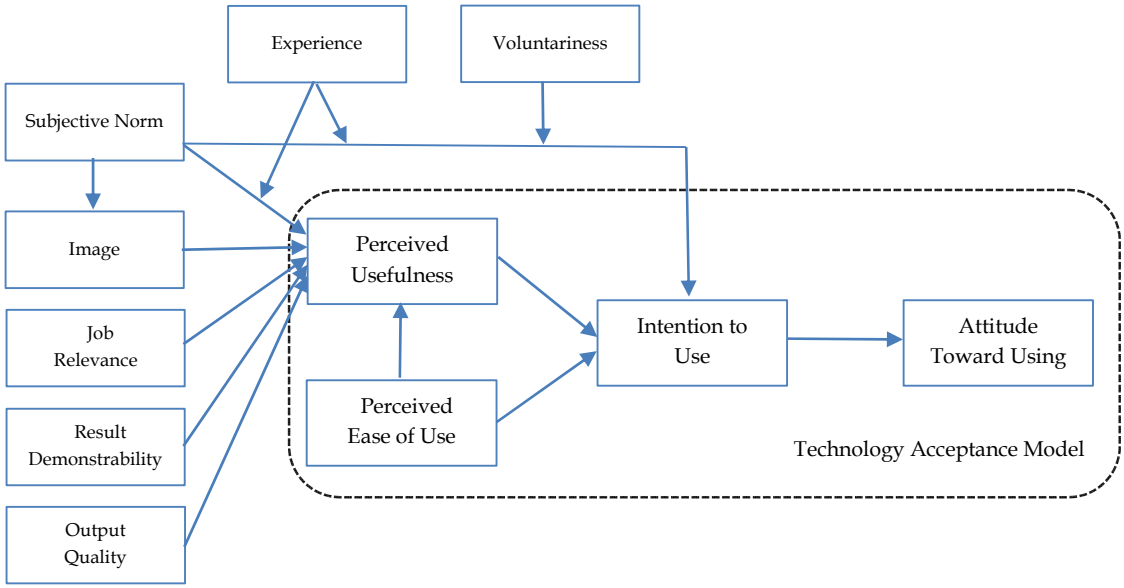


FIGURE 2 Technology Acceptance Model 2



At this stage of development, the TAM´s explanation power over an individual's intention to use new technology was at 40% of the variance (Venkatesh and Bala, 2008). Further developments of the TAM continued, which resulted in significant changes and revisions. Among other acceptance theories, the TAM is the most commonly used in determining individual technology acceptance (Lee, Kozar and Larsen, 2003). As of August 2018, per Google Scholar, the articles by Davis (1989) and Davis et al. (1989) were cited more than 60,000 times.

2.1.2 TAM2

Although numerous developments extended the TAM after its introduction, few became widely used or acknowledged by the research community. Proposed by Davis and Venkatesh (2000), the TAM2 (Figure 2) is important development of the original TAM. In this extended model, they proposed that the main determinants of PU are subjective norms, image, job relevance, output quality, and result demonstrability, while the determinants of subjective norms are experience and voluntariness. The main reason for focusing on the determinants of PU was the relationship between PU and intention to use, which—in most previous studies—was overwhelmingly positive (Marangunić and Granić, 2015; Venkatesh and Davis, 2000).

2.1.3 TAM3

Another major development of the TAM followed when Venkatesh and Bala (Venkatesh and Bala, 2008) introduced the TAM 3 (Figure 3). It is an integration of two models: the model of determinants of PEOU, which was developed by Venkatesh (Venkatesh, 2000), and the TAM2 of Venkatesh and Davis (Venkatesh and Davis, 2000). Because these two models focus on the determinants of PU and PEOU, the resulting proposed model is a combination of these determinants. Per the TAM3, the determinants of PEOU do not significantly affect PU, while the relationship between PEOU and PU is moderated by experience. Based on this, the authors claimed that the TAM3 is a more comprehensive and integrated model than either the TAM or the TAM2 (Venkatesh and Bala, 2008).

2.1.4 Further extensions/developments

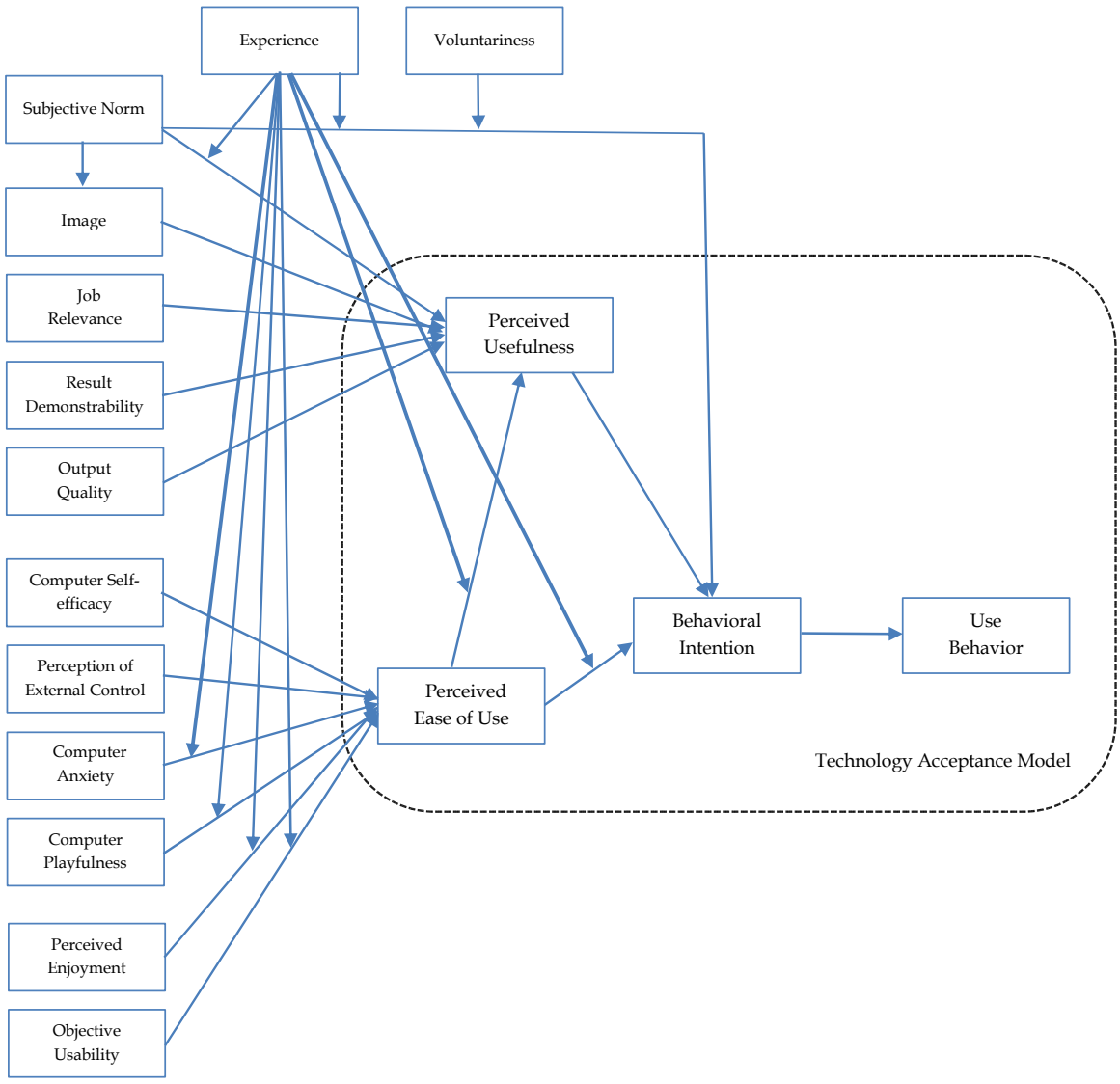
The TAM was of great interest to many researchers who built their studies on the original TAM in various contexts and settings, while other researchers proposed modifications, which included new variables and new determinants of PU and PEOU and/or tested various paths between the constructs. These new variables ranged from context-specific constructs, such as perceived risk and perceived cost in mobile security services adoption (Li and Bai, 2011), to perceived enjoyment in personal digital assistant phone adoption (Teng and Lu,

2010) and determinants (monetary value, connectivity, personal innovativeness, and task fit) of PU and PEOU in mobile financial services adoption (Lee et al., 2012) as well as compatibility and perceived risk in mobile banking adoption (Kalaiarasi and Srividya, 2013). In addition, some studies integrated the TAM with other existing models, such as the TPB (Tsai, 2010), the task technology fit theory (Shih and Chen, 2013; Zhou, Lu and Wang, 2010), and the innovation diffusion theory (IDT) (Mallat et al., 2009). Per Marangunić and Granić (2015), p. 87), the extensions of the TAM can be categorized into three major areas:

- *Factors from related models, such as subjective norm, perceived behavioral control, and self-efficacy*
- *Additional belief factors, such as trialability, visibility, results demonstrability, and content richness.*
- *External variables, such as personality traits, demographic characteristics, and computer self-efficacy construct*

As mentioned above, the TAM has been tested in many adoption studies (Lee et al., 2003; King and He, 2006; Marangunić and Granić, 2015), which focused on various contexts, including mobile adoption. Per Sanakulov and Karjaluoto (2015), the TAM has been the most frequently used theory in mobile adoption studies on banking, learning, commerce, data services, smartphones, and financial services.

FIGURE 3 Technology Acceptance Model 3



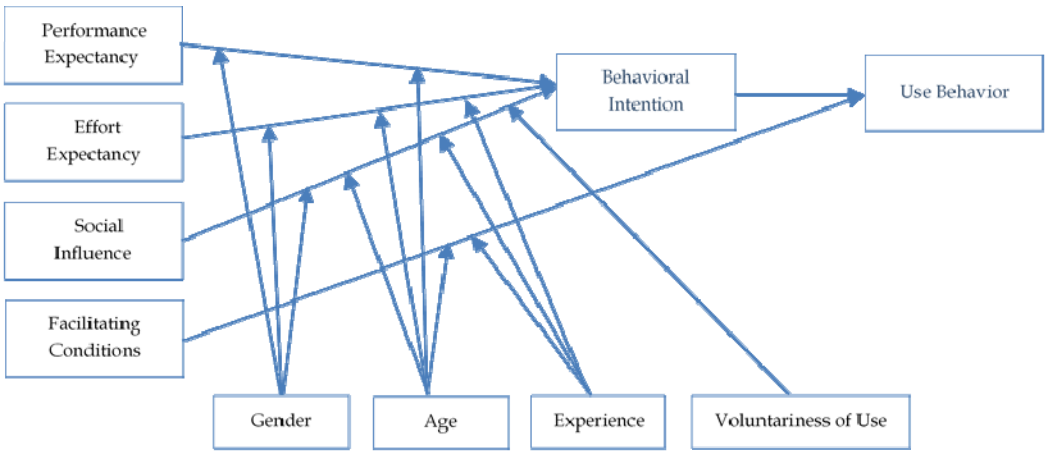
2.2 Unified theory of acceptance and use of technology

Over the past few decades, there has been increasing interest in technology adoption research. During this period, a vast number of studies were conducted for various purposes and in many contexts, which resulted in the development of numerous models, theories, and variables. To simplify and improve the prediction of technology adoption, Venkatesh et al. (2003) proposed a unified model by combining all the major existing technology adoption models and theories into one—the UTAUT (Figure 4)—which includes the TAM, the TRA, the IDT, the TPB, the motivational model, the combined TBP/TAM, the model of PC utilization (MPCU), and social cognitive theory. Per Venkatesh et al.

(2003), the development of the UTAUT was based on a study that was conducted in 4 organizations, and the explanation power of the included models ranged from 17–53% of variance, while the resulting unified model´s explanation power reached 70% (adjusted R2), which was remarkably higher than any other existing model. The UTAUT is based on four main constructs: performance expectancy (PE), effort expectancy (EE), (SI), and facilitating conditions (FC), which are the direct determinants of BI and behavior; these relationships are moderated by age, gender, experience, and voluntariness (Venkatesh et al., 2003).

PE is defined as the degree to which an individual believes that using a system will help him/her attain gains in job performance (Venkatesh et al., 2003). In the UTAUT, the utilitarian value is emphasized as the main determinant of behavior, and the PE is the strongest determinant of intention to use; notably, this similarity was observed within each individual model tested (Venkatesh et al., 2003). These claims were supported by numerous studies, all of which reported these relationships to be the strongest (Taiwo and DOWNE, 2013; Sanakulov and Karjaluoto, 2015).

FIGURE 4 Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)



EE is defined as the degree of ease that is associated with the use of a system. Three constructs from other models capture this idea: PEOU (TAM/TAM2), complexity (MPCU), and ease of use (IDT) (Venkatesh et al., 2003).

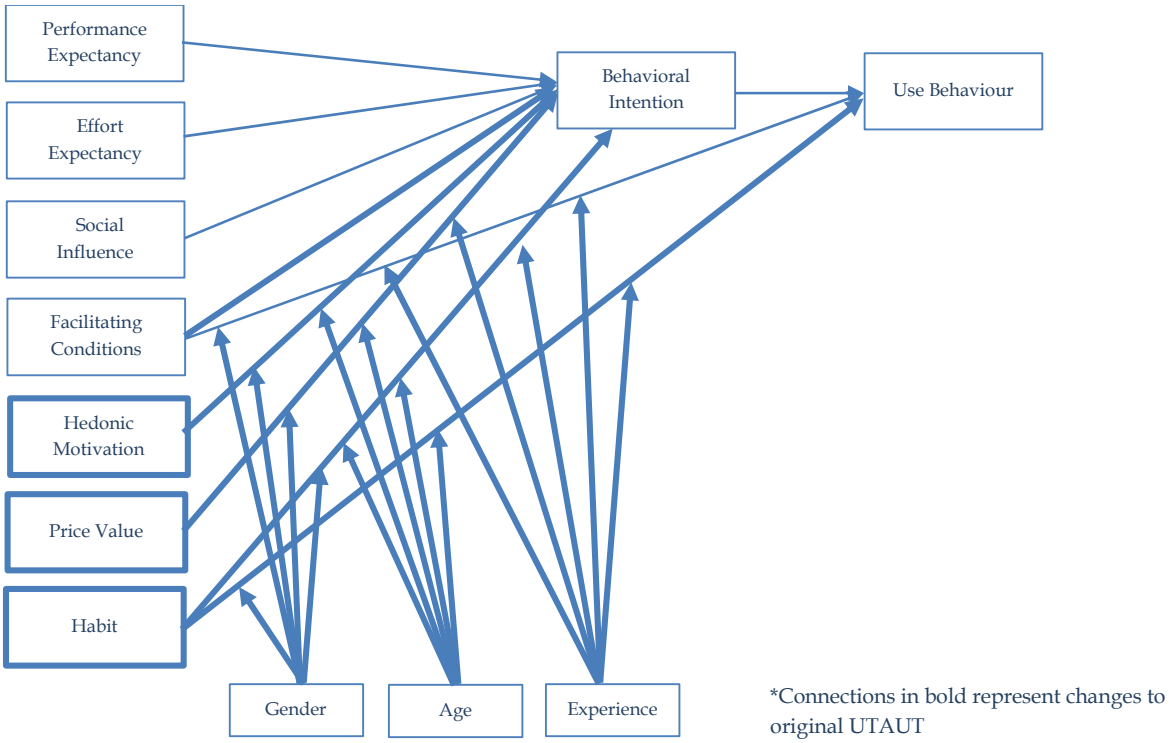
SI is defined as the degree to which an individual perceives importance in others believing that he/she should use a new system. The subjective norms in TRA, TAM2, and TPB, the social factor in MPCU, and image in IDT pertain to SI (Venkatesh et al., 2003).

FC is defined as the degree to which an individual believes that organizational and technical infrastructures exist to support use of a system. It is comprised of three constructs from different models: perceived behavioral control (TPB/decomposed theory of planned behavior, combined-TAM-TPB), FC (MPCU), and compatibility (IDT).

Since its inception in 2003, the UTAUT has become an important model, and it is widely used in technology adoption as well as diffusion research, which focuses on various technologies. The original article in which the UTAUT (Venkatesh et al., 2003) was introduced has been cited more than 21,000 times (last checked: August 2018). Williams et al. (2015) conducted a literature review based on 174 articles and reported that, of 98 types of technologies studied, mobile technology was the most widely examined in the communication systems category. Per a literature review by Sanakulov and Karjaluoto (2015), the UTAUT is the second most used model in mobile adoption studies, including mobile data services, mobile wallets, mobile gaming, and mobile banking. Like most theories and models, the UTAUT has been extended through examination in new contexts, the incorporation of new constructs/moderators, by integration with other existing models, and by testing in various user populations and cultural settings.

2.2.1 UTAUT2

FIGURE 5 UTAUT2 (Venkatesh, Thong and Xu, 2012)



Since its introduction, the UTAUT has been primarily tested in organizational settings (Venkatesh et al., 2012). After almost a decade, Venkatesh et al. (2012) proposed an extended version of the UTAUT by integrating additional constructs and relationships that were tailored to create an effective acceptance model in the consumer use context. Different than the original UTAUT, the extended version includes three new constructs: hedonic motivation, price value, and habit. Like the original model, in the UTAUT2, age, gender, and experience moderate the effects of these newly incorporated constructs on BI

(Figure 5). Hedonic motivation is defined as the fun or pleasure that is derived from using a technology; based on theoretical support that was drawn from past studies, it was added as a predictor of a consumer´s BI to use a technology (Venkatesh et al., 2012). Unlike organizational adoption, in consumer adoption, the consumer usually bears the monetary cost, which may significantly impact usage. Based on these ideas, the new construct of price value was added, which is defined as a consumer's cognitive trade-off between the perceived benefits of the applications and the monetary cost of using them (Venkatesh et al., 2012). Habit is defined as the extent to which people tend to perform behaviors automatically because of learning. The authors claimed that the UTAUT2 produced a substantial improvement in the variance explained in BI (56–74%) and technology use (40–52%) (Venkatesh et al., 2012).

After the UTAUT2´s introduction, the proposed paths with new constructs were tested in various contexts, which attested to their predictive power. For example, in mobile TV adoption, the study authors reported that EE, SI, FC, hedonic motivation, and habit had significant effects on BI (Wong et al., 2014), while in a study on the BI to use mobile apps, all the UTAUT2 constructs except price value and SI had a significant relationship with BI (Hew et al., 2015).

2.3 Cultural factors and technology acceptance

The effect of cultural factors on technology utilization is well established in the literature (D. W. Straub, 1994; Srite and Karahanna, 2006; Kappos and Rivard, 2008; Soh, Kien and Tay-Yap, 2000; Leidner and Kayworth, 2006) and it has been an important area of study which attracted widespread interest from both researchers and practitioners alike for many years. It began when firms started establishing their presence in new markets by either building or relocating production plants and offices in foreign countries. Thus, it became important for managers to gain knowledge about the possible impact of culture on technology acceptance (D. W. Straub, 1994) because challenges ranged from legal requirements to monetary policies.

National cultural values affect human behavior (Srite and Karahanna, 2006) and this can be observed in every aspect of human life, including decision making regarding technology acceptance and usage. Therefore, understanding cultural norms and values is vital; these factors must be studied beforehand to ensure that they are addressed in an appropriate manner to achieve the desired results from an investment. A better understanding of how to use cultural factors to improve technology adoption and reduce resistance can be achieved by examining how cultural values relate to behavioral factors that affect technology adoption (Venkatesh and Zhang, 2010). We live in a world where corporate multiculturalism has become the norm and is growing; hence, technology acceptance remains relevant and continues to attract interest from researchers and practitioners alike. As such, a significant amount of theoretical work exists in the literature that has contributed to the development of this field,

including the impacts of cultural factors on technology acceptance (D. W. Straub, 1994; Veiga et al., 2001; Choi and Totten, 2012; Dai and Palvi, 2009; Olasina and Mutula, 2015; Im, Hong and Kang, 2011).

2.3.1 Culture

Having a clear understanding of culture while conducting cross-cultural research is vital to any study. However, it has hindered empirical research because culture is notoriously difficult to define and delimit (Clark, 1990). Kluckhohn (1951), p. 86) defined culture as "patterned ways of thinking, feeling, and reacting that are acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values." There are various definitions of national culture, all of which state that a kind of meaning or behavior is being shared among the members of a group (Huettinger, 2008). However, Hofstede´s is the most used in research (Srite and Karahanna, 2006) and reads as follows: a "collective programming of the mind, which distinguishes the members in one group from another" (p. 25). This "collective programming of the mind" directly affects an individual's behavior (D. Straub et al., 2002; Roth, 1995; Hofstede, 1980). Hofstede argued that each individual is influenced by three non-interaction and durable cultures: the national, the corporate, and the occupational (Huettinger, 2008). While working on his conceptualization, Hofstede's assumption was that all IBM programmers had the same programming culture (IBM´s organizational culture). Under these conditions, the only factor that accounts for systematic and consistent differences between national groups is nationality (Hofstede, Hofstede and Minkov, 1991). Importantly, Hofstede´s framework was developed for use as a country-level analysis only; therefore, individual level behaviors cannot be predicted (Hofstede, 1980).

Different levels of culture exist, such as national, organizational, and ethnic. Individuals may or may not identify themselves with national culture, and they may reflect different cultural orientations, despite being in the same country (D. Straub et al., 2002). The abovementioned levels of culture are salient to individuals at certain times, and individuals identify themselves as having multiple cultures at various levels (Ford et al., 2003). For example, an ethnic Japanese engineer from Finland could have four distinct cultures (ethnic, national, programmer, and organizational).

In the technology adoption field, cross-cultural studies have primarily either examined national culture in the context of a particular country or conducted a comparison between countries to determine differences. The cultural dimensions of each country are examined carefully and compared because they guide individuals´ behavior in that particular country and can be used to determine behavior.

2.3.2 National culture and Hofstede´s cultural dimensions

The literature contains various frameworks that were developed for distinguishing and understanding cultural values to help managers conduct business operations better in different cultures. These frameworks, which are based on various cultural dimensions that aim to highlight the differences among groups, may differ by the number of value dimensions included, but they are consistent in identifying underlying cultural values, such as individualism, emotionality, masculinity, and time orientation (Lippert and Volkmar, 2007). Hofstede´s conceptualization of national culture, which has been the most popular taxonomy (Leidner and Kayworth, 2006; Ford et al., 2003; Blodgett et al., 2008), has five dimensions: PD, uncertainly avoidance (UA), long-term orientation (LO), individualism-collectivism (IC), and masculinity-femininity (MF) (Table 2). Long-term vs. short-term orientation was added later as fifth dimension (Hofstede and Bond, 1988). Hofstede's work is based on a large-scale study of culture, which utilized data from IBM employees in 66 different national subsidiaries between 1967 and 1973 (Huettinger, 2008). Following the publication of his monograph Culture's Consequences: International Differences in Work-Related Values, his work became well known in the research community (Minkov and Hofstede, 2011). According to a literature review by Leidner and Kayworth (2006), over 60% of 51 national studies have used one or more of Hofstede´s cultural dimensions.

PD refers to the extent to which members of a society accept that institutional/organizational power is distributed unequally (i.e., human inequality is reflected in wealth, power, and justice) (Hofstede et al., 1991). Members of societies with high a PD accept this inequality and consider it normal. A power hierarchy, tight control, vertical top-down communication, discrimination by gender, education level, and race are accepted in societies with high PDs; they rely on authority centralization and tolerate a lack of autonomy, which facilitates inequality (Huettinger, 2008).

UA is the extent to which the members of a group or society feel threatened by unknown situations (Hofstede, 1984). In societies with high UA, people avoid taking risks; they instead seek formal rules and regulations to help eliminate uncertain situations. A strict code of behavior is observed, and breaking certain rules for "the greater good" is not considered. Conversely, people who exhibit low UA deal with such situations well by taking personal risks; they do not feel the need to control situations.

Individualism pertains to societies in which ties between individuals are loose, and everyone is expected to look after himself/herself and his/her immediate family. By contrast, in collectivistic societies, people belong to groups that look after one another in exchange for loyalty. In individualistic societies, people prefer acting as individuals, and their actions are oriented toward personal gains. Members of collectivistic societies expect their peers to look after them, and they do the same for others. Their performance is directed toward achieving group goals and objectives.

TABLE 2 Hofstede's national culture dimensions (adapted from De Mooij & Hofstede, 2002)

Dimension	Definition
Power distance (PD)	PD is the extent to which less powerful members of a society accept that power is distributed unequally.
Individualism vs. collectivism	In individualist cultures, people look after themselves and their immediate family only. In collectivist cultures, people belong to groups that look after one another in exchange for loyalty.
Masculinity vs. femininity	In masculine cultures, the dominant values are achievement and success, while the dominant values in feminine cultures are caring for others and quality of life.
Uncertainty avoidance (UA)	UA is the extent to which people feel threatened by uncertainty and ambiguity, which they try to avoid. In cultures with strong UA, there is a need for rules and formality to structure life, and competence is a strong value, which results in the belief in experts.
Long-term (LO) vs. short-term orientation	LO is the extent to which a society exhibits a pragmatic, future-oriented perspective rather than a conventional historic or short-term perspective.

Masculinity refers to cultures that rank high in masculinity and in which success, promotions, and assertiveness are emphasized. Individuals, especially men, are encouraged to be ambitious, competitive, and to strive for material success (Vitell, Nwachukwu and Barnes, 1993). In cultures that rank high in femininity, caring for others and quality of life are emphasized, and both men and women are encouraged to pursue success and excel. For example, Sweden and Norway are classified as feminine cultures because defined roles for males and females are overlapping, while it is quite the opposite in Japan.

The influence of cultural norms and values on technology usage behavior has been established for many years. Most previous studies in the IS literature were conducted either on a national or organization level (Leidner and Kayworth, 2006). Hofstede (1980) stated that his framework can be used as a research tool only for tests that are conducted on a national and not on an individual level. Thanks to its ease of use in research, it has been widely used in various fields, including new technology adoption. By using Hofstede´s conceptualization as a foundation, nationality can be used as a surrogate for culture when groups from different countries are compared. Differences are detected by comparing groups, and these differences are credited as the main factors that are reflected in national behavior. Notably, Hofstede´s work has been criticized for various reasons, including internal validity of the dimensions, interpretation, and implemented methodology scales (Huettinger, 2008).

2.4 Kano Model

Inspired by Herzberg et al.'s motivation-hygiene theory (Herzberg, Mausner and Snyderman, 1959), Noriaki Kano and his colleagues developed the Kano Model to categorize product and service quality attributes that are related to customer satisfaction (Kano et al., 1984). Per Kano, customer satisfaction is complex, advanced, and multidimensional; therefore, it demands a sophisticated approach (Figure 6). Product attributes can be divided into five different categories:

- **Must-be attributes** do not necessarily increase customer satisfaction yet can cause dissatisfaction when absent. These attributes are expected to be basic features/functions in a product; therefore, they should be present. For example, a mobile phone charger falls in this category and should be included in the box with a new phone purchase.

- **Attractive attributes** elicit delight and surprise, which translate into customer satisfaction. Their absence does not affect customer satisfaction. For example, some telecom firms send out free notification messages when a call is missed.

- **One-dimensional** attributes are proportionally related to customer satisfaction. Customer satisfaction increases as do one-dimensional attributes, while their absence or poor performance result in dissatisfaction. Most firms compete among themselves and seek solutions to perform better in one-dimensional attributes. Currently, smartphone makers are competing to make gadgets with a longer battery life, better screen resolution, design, etc.

- **Indifferent attributes** affect neither customer satisfaction nor dissatisfaction. These attributes are so insignificant or unimportant to the customer that they do not even notice when such attributes are either present or absent. For example, baking pizza in a stone oven does not have obvious differences that most customers notice unless this information is used for marketing purposes.

- **Reverse attributes** can be characterized as having the opposite function of must-be attributes. Their absence is preferred by customers; thus, their presence can cause dissatisfaction. For

example, having too many functions on a gadget may make it seem difficult to use for those who prefer simple gadgets.

The Kano model is dynamic in nature, and its attributes are perceived differently by customers over time (Kano, 2001). An attribute known as "attractive" will eventually be perceived as a "must-be." In the case of smartphones, this happens with technological advancements. For example, the touchscreen function on mobile phones was attractive when it was first introduced. After the number of mobile phone models with touchscreens increased, it became a "must-be" quality to consumers. Other similar examples include color TVs, TV remote controls, and tubeless tires in vehicles. It is now hard to imagine watching a TV with a black and white picture.

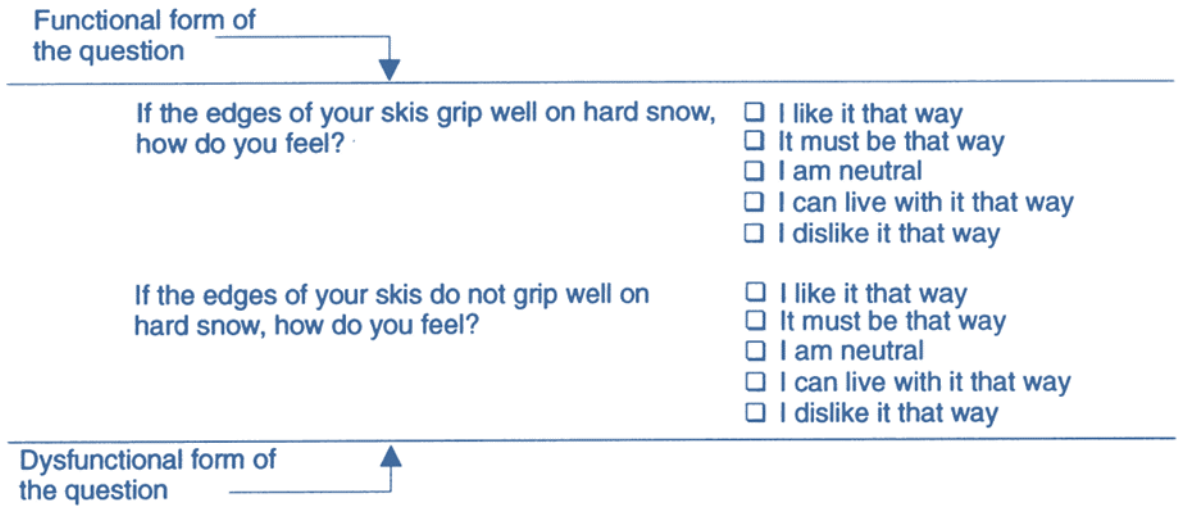
FIGURE 6 Kano Model

Kano developed both a structured questionnaire and an evaluation table to categorize an attribute. The questionnaire contains pairs of questions—one functional and one dysfunctional—for each tested attribute. These questions ask what a respondent's reaction would be if a certain attribute was present and absent in a product or service, as illustrated in Figure 7. After each question, respondents are asked to choose one answer from five choices:

1) I like it that way
2) It must be that way
3) I am neutral
4) I can live with it that way
5) I dislike it that way

The obtained responses are tabulated jointly using Kano's evaluation table (Table 3) to identify the category to which the answer belongs. For example, a pair of questions (functional and dysfunctional) ask what a respondent´s reaction would be if a fingerprint sensor function was available and not available on a smartphone. If the responses were, for example, "I like it that way" and "I am neutral," respectively, these responses point toward the "attractive" category. Therefore, having a fingerprint sensor function on a smartphone was perceived as an attractive attribute by this particular respondent. This action is repeated for each completed response in a dataset for a particular attribute. The final step is to count the frequency of each category; the one with highest number is considered the mostly positively perceived attribute category.

FIGURE 7 Functional and dysfunctional questions on the Kano questionnaire (Matzler and Hinterhuber, 1998)



This easy method is convenient for determining customers´ perceptions regarding product and service attributes. Since its introduction, Kano's model has been used in various contexts, ranging from hospitality (Gregory and Parsa, 2013) and tourism to packaging (Löfgren and Witell, 2005). Such information is also vital for many development and marketing stages of products because it helps firms effectively build strategies, develop marketing programs, and allocate resources.

TABLE 3 Kano evaluation table

		Dysfunctional question				
		I like it that way	It must be that way	I am neutral	I can live with it that way	I dislike it that way
Functional question	I like it that way	Q	A	A	A	O
	It must be that way	R	I	I	I	M
	I am neutral	R	I	I	I	M
	I can live with it that way	R	I	I	I	M
	I dislike it that way	R	R	R	R	Q

Key: A = attractive, O = one-dimensional, M = must-be, I = indifferent, R = reverse, Q = questionable

3 METHODOLOGY

3.1 Research design

A critical step in research is determining the optimal research design, which is essential to data collection processes, interpretation, and subsequent answering of the research questions. This is done by understanding the research questions and having knowledge of accepted research practices and norms in the discipline in particular and the research paradigm in general. Once a design is chosen, the research can be structured accordingly.

A research design can be distinguished per the type of reasoning used, such as either deductive, inductive, or abductive (a combination of deductive and inductive) reasoning. Deductive reasoning is defined as working from more general to more specific issues, while inductive reasoning represents a working principle that begins with a specific observation and expands toward the general.

Deductive reasoning is considered a narrower research strategy than inductive reasoning. A theory serves as a departing point for deductive research, and it is used for testing and/or confirming specific hypotheses. The final result of any deductive research is either the confirmation or rejection of the theory. Because inductive reasoning starts with a specific observation and works outward, it can be viewed as open ended in nature and broad. When departing from specific observations, a researcher focuses on finding possible patterns that can lead to developing a theory. Abductive reasoning occurs when the researcher bases the research on both deductive and inductive reasoning. A guiding principle based on previous studies serves as a departing point in abductive reasoning, and explanatory hypotheses are formed and tested.

Another way of distinguishing research is based on the type of phenomenon studied. From this perspective, research can be categorized as having exploratory, descriptive, and causal research approaches. In exploratory research, the researcher may conduct basic exploration of a new and unexplored phenomenon or area. The main objective of this initial stage is

gathering as much information as possible to help the researcher develop ideas and a greater understanding of the subject. In descriptive research, a researcher studies a known phenomenon by focusing on providing answers to questions starting with "what," "why," and "how." Such studies are usually based on findings from previous studies and on hypotheses that have been extensively tested. In causal research, the main focus is on determining both the cause and the result in relationships among two or more variables. For example, a change in variable A may cause a change in variable B.

The purposes of this dissertation are to contribute to the understanding of mobile technology adoption and to study the effects of cultural factors that play important roles in adoption. The methods that suit these research purposes are abductive reasoning and the causal research approach. In most studies in the social research literature, both deductive and inductive reasoning are used within the same study. The current dissertation is based on both methods because part of the study is dedicated to studying mobile sales customization tool adoption and usage by business-to-business (B2B) salespersons, which has rarely been explored and lacks a well-established, widely accepted theoretical model. Although both methods are used in this dissertation, deductive reasoning remains as the main theoretical basis throughout. In addition, the questions asked in this dissertation can be addressed by determining the relationships between independent and dependent variables and their "cause-effects"—a causal research issue. Because mobile technology adoption is addressed here, the focus will be on determining which variables affect adoption and their significance.

3.2 Data collection and analysis

Both quantitative and qualitative methods were used to answer the questions posed. Three different data sets were collected for three studies. Studies 2 and 3 were based on quantitative data (299 and 318 respondents, respectively), while Study 4 was based on a qualitative analysis (9 interviews); Study 1 is a literature review article (67 research papers). In this section, detailed accounts of both the data collection and analysis will be discussed.

3.2.1 Quantitative studies

Empirical questionnaire data were collected via an online survey that was administrated by Google Inc. for Study 2 and by a market research company for Study 3. During the design of the questionnaires, all relevant literature was closely followed, and recommendations from authors of previous studies were applied. Moreover, during this process, several colleagues and the academic advisor were consulted for their valuable expertise and recommendations. Once the preliminary questionnaire was ready, it was pre-tested to detect any irregularities in meaning of sentences or logical flow. Afterward, minor

adjustments and revisions were made. Because each study included at least two national groups, the questionnaire was translated from English to Uzbek, Korean, and Turkish. To ensure translation quality, the questions were back translated before final approval was given. An online survey was designed so that each respondent could choose his/her desired language for the questionnaire. Links to the final version were emailed to respondents and shared in popular online forums and social media groups with large memberships. The survey remained active until the target sample size was reached. The final sample contained respondents with various ages and professions and both mobile technology users and nonusers. A small number of completed responses were discarded because the pattern of the answers suggested that they were of no use for the analysis.

Study 2 examined smartphone adoption in three countries: Uzbekistan, South Korea, and Turkey. Most respondents were 30 years old or below (74%), while only 26% were above 30 years old. Gender allocation was 59% for males and 41% for females. The percentage of those who owned smartphones was 83%, while 90% mentioned that they had used a smartphone.

Study 3 was also cross-national in nature, examined smartphone adoption in general, compared adoption in Uzbekistan and South Korea, and categorized adoption drivers. Among the respondents, those aged 30 and below accounted for 66%, 94% were smartphone users, and 64% were male.

3.2.2 Qualitative study

Empirical qualitative data were collected for Study 4, which examined mobile sales customization tool usage by salespersons who were working for an international tractor manufacturer in Finland. This company had been using MSCT and allocating resources for further improvement of its functionality and performance. A purposive sampling technique was used to select participants with several years of experience in using MSCT. The selected participants were from 9 different cities in Finland, and their work experience ranged from 8–27 years (Table 4).

All interviews were conducted between November and December of 2015. Due to salespersons´ busy schedules and constant movement, the interviews were conducted using the Skype for Business application. The interviews ranged from 20 to 35 minutes (M = 25 min) and were transcribed by a professional service provider (78 pages of single-spaced text). At the beginning of each interview, the respondents were assured of the confidentiality of their personal information. The semi-structured interview method was chosen because it contains open-ended questions that help researchers gain more detailed data. Moreover, it is the preferred approach in the social sciences (Scott, 2000; Pomeroy, 1999), and it is excellent for building two-way communication without the need for pre-determined questions as it offers participants' flexibility in discussions.

TABLE 4 Participant details

Salespersons		Sales experience in current company (yrs.)	Total sales experience (yrs.)	Sales area
1	George	27	27	Central Finland
2	Sam	13	13	West Finland
3	Ted	8	8	South- West Finland
4	John	18	25	South- East Finland
5	William	10	15	South- West Finland
6	Noel	8	9	North- East Finland
7	Elton	8	17	East Finland
8	Harry	15	15	North Finland
9	Cliff	13	13	North- East Finland

Issues concerning PE, EE, personal innovativeness, and the risks of MSCT usage were discussed in detail. In addition, the influence of peers, managers, and members of social groups regarding MSCT usage was discussed. It was interesting to hear ideas and suggestions on how MSCT can be developed and improved further from experienced users. During the data analysis, few respondents were contacted to ask follow-up questions and gain additional information that was important for completing the data analysis.

3.2.3 Measures

Several measurements were employed for Studies 2 and 3. A questionnaire for Study 2 consisted of three part: demographics, the UTAUT, and IC. The UTAUT contained four main variables: PE, EE, SI, and BI, which were measured with 3–4 statements each. Some original statements from Venkatesh et al. (2003) were used, with partial adaptation added to make them relevant in the smartphone context. For example, the word "system" in the original statement was replaced with "smartphone," as shown below:

> *People who influence my behavior think that I should use a **system**.*
> *People who influence my behavior think that I should use a **smartphone**.*

The research model included an additional variable to test the effect of perceived sacrifice (PS) on BI. To test this item, three statements from previous studies were included in the questionnaire. The IC characteristics of the respondents were measured with six original statements from Hofstede's framework. The respondents were asked to rate statements via a 7-point Likert scale, ranging from 1-strongly disagree to 7-strongly agree.

In terms of used measurements and the questionnaire's structure, Study 3 was similar to Study 2. The questionnaire consisted of three parts: demographics, the UTAUT, and the Kano questionnaire. Different than the previous study, all statements that were related to the five main UTAUT

variables (PE, EE, SI, FC, and BI) were included. The next part was dedicated to the Kano questionnaire, with a slight adjustment of the original questions. Each UTAUT variable was evaluated by asking a pair of questions—one functional and one dysfunctional. A short description of an attribute was provided before asking the pair of questions. This helped the respondents evaluate it by using the given examples. To prevent any confusion that may have arisen from a similarity in question pairs, the word "NOT" was used to denote the dysfunctional question, as shown below:

How do you feel if a smartphone offers performance and productivity?
How do you feel if a smartphone does NOT offer performance and productivity?

3.2.4 Data analysis

Three (Studies 2, 3, and 4) of four studies that were included in this dissertation used data analyses to achieve the study goals. Studies 2 and 3 used a statistical analysis of the quantitative survey data. In both quantitative studies, a reliability test was conducted for each item of every construct. Only those that scored at least 0.6 were kept for further analysis because the Cronbach's α was greater than 0.6, which is acceptable (Nunnally and Bernstein, 1978). Basic descriptive statistical calculations of average age, gender, and smartphone ownership were also completed. Testing of the proposed hypotheses and research model were done via linear regression. Based on the assessments of the paths' significance between the independent and dependent variables and the amount of variation R2, the research model was tested. Analyzing the Kano results consisted of tabulating the responses, allocating the responses based on the frequencies, and determining their categories. SPSS and PLS statistics software were used to perform the abovementioned statistical operations.

In Study 3, the interview data were analyzed for thematic content by applying Tuomi and Sarajärvi's (2003) content analysis complemented with Braun and Clarke's (2013) stages of thematic analysis as follows:

1) transcription
2) reading and familiarization
3) finding codes (simplified expressions)
4) listing all codes
5) searching for similarities and differences
6) combining codes and formulating lower-end themes (categories)
7) combining lower-end themes and formulating higher-end themes; reviewing themes
8) combining higher-end themes and defining, naming, and formulating the main concept themes
9) checking the thematic analysis
10) writing the report.

To identify possible patterns and differences in salespersons' innovativeness in adoption, typology was used to classify the data. Table 5 summarizes the data and analysis details of the included studies.

TABLE 5 Summary of studies included in the dissertation

Study	Study type	Respondents	Analysis
Consumer adoption of mobile technologies: a literature review	Literature review	67 studies published in peer viewed journals	- Descriptive statistics
A cultural comparison study of smartphone adoption in Uzbekistan, South Korea and Turkey	Quantitative cross- cultural study	299 respondents representing three countries	- Descriptive statistics - Linear regression analysis
A Cross-Cultural Study of Smartphone Adoption in Uzbekistan and South Korea	Quantitative cross- cultural study	318 respondents form Uzbekistan and South Korea	- Descriptive statistics - Linear regression analysis
Salesperson Adoption and Usage of Mobile Sales Configuration Tools	Qualitative study	9 salespersons working for international tractor manufacturer	- Qualitative content analysis

4 SUMMARY OF DISSERTATION ARTICLES

This chapter describes the research process and summarizes the findings of each study.

4.1 Literature review: Consumer adoption of mobile technologies

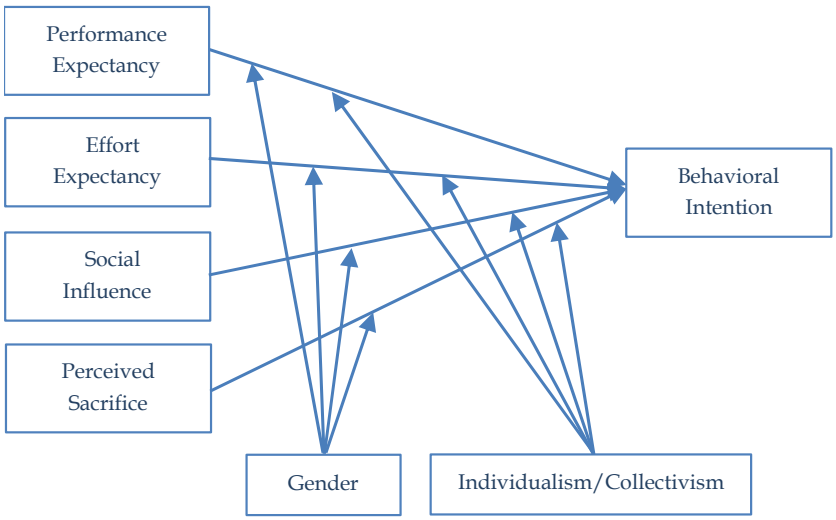
The purpose of this literature review was to summarize the theoretical and methodological contributions made and to discuss publications on mobile technology adoption. To do so, 67 academic papers from peer-reviewed journals that were published between 2005 and 2013 were analyzed. The analysis revealed many interesting facts, including that the TAM was the most frequently (47 out of 67 studies) used model, followed by the UTAUT (15 out of 67 studies). The three most studied areas were mobile data services, mobile banking, and mobile learning. Various path relationships were also analyzed. The most tested relationship was between PU and BI, which was not surprising when considering the number of studies that were based on the TAM. Only 76% of those studies reported it to be significant. In addition, based on the findings, suggestions for future research were provided, including that future studies should focus on technology and service constructs, such as trust in mobile banking adoption or price/cost variable in mobile voice over internet protocol adoption. Other important suggestions were to explore understudied issues, such as the connection between BI and actual use, and the effect of mobile technology use on behavioral outcomes of customer relationships, such as loyalty, word of mouth, and satisfaction.

4.2 A cultural comparison of smartphone adoption in Uzbekistan, South Korea, and Turkey

The aims of Study 2 were to examine smartphone acceptance in three different groups and to determine cultural factors that affect adoption by comparing these groups. The lack of studies on mobile technology adoption that address this particular issue was the main motivation for the focus on this topic. Uzbekistan, South Korea, and Turkey were chosen for this study as they have distinct cultural differences and no cross-cultural study involving these countries were conducted before. The research model was built on the original UTAUT and included the additional variable of PS to address potential sacrifices, such as monetary costs and time and effort needed to use the technology (Figure 8). The data analysis was done via simple descriptive analysis after conducting reliability tests and by testing each proposed hypothesis with linear regression.

The findings of this study were different than those of Venkatesh et al. (2003) in that the results indicated that the original UTAUT variables had differing influences on technology acceptance in different countries. Per Venkatesh et al. (2003), PE is considered the strongest predictor of intention. However, it was not a significant variable in both the total sample and the individual groups, while EE had significant predictive power in the total sample and among Uzbek users. SI was statistically significant for the total sample and Koreans, while the results for PS were significant only among Turkish users. To determine the cultural effects on technology adoption, Hofstede´s IC dimension measurements were employed. The main proposed paths were tested with these two variables as moderators and compared.

FIGURE 8 Research model for Study 2 (Sanakulov and Karjaluoto, 2017b)



This study contributes to the literature by extending the UTAUT model via an additional construct. Although the influence of PS on BI was only partially proven, there is reason to believe that sacrifice will increase as gadgets become more sophisticated due to new technologies, increasing numbers of services for smartphones (banking, insurance, health, data storing), and growing privacy concerns. Notably, the results indicate that smartphone adoption cannot be generalized to other countries, and each country may have differing priorities regarding technology acceptance.

4.3 A cross-cultural study of smartphone adoption in Uzbekistan and South Korea

The purposes of Study 3 were to examine smartphone adoption in Uzbekistan and South Korea based on the UTAUT and to categorize its constructs per the Kano model. These two countries were chosen for several reasons: both represent Asian culture yet differ significantly from each other culturally, geographically, and economically; compared with South Korea, Uzbekistan is a less industrialized yet developing country; Uzbekistan, which is a multicultural and multilingual nation with collectivistic values, has been under Soviet rule for decades, which influenced the development of cultural values and traditions. Unlike South Korea, no prior research has examined Uzbekistan´s cultural dimensions, and the only characterization available in the literature is that of Spyridakis (2007), as shown in Table 6. Smartphone usage rates differ greatly across these countries, and the adoption process is still ongoing in both. Uzbekistan is unexplored in this context; therefore, a comparison study allowed us to explore individual adoption in each country and make comparisons.

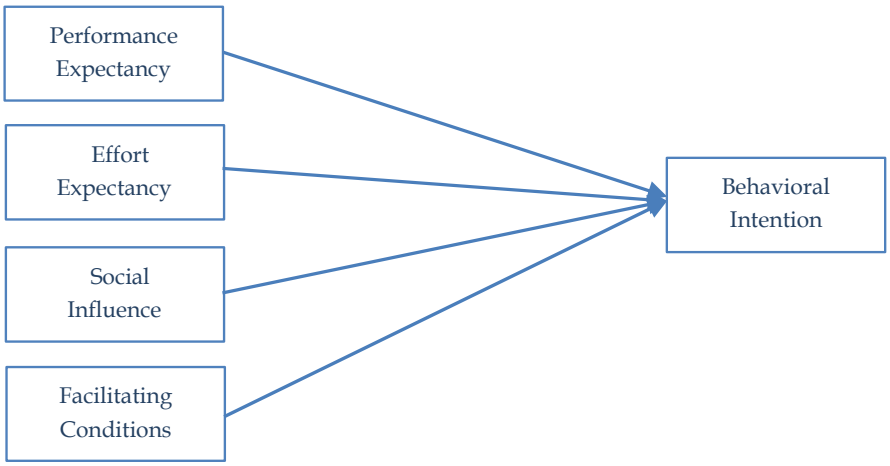
TABLE 6 Comparison of cultural dimensions: Uzbekistan and South Korea

Dimension	Uzbekistan	South Korea
Power Distance	high	high
Collectivism	high	high
Masculinity	medium to high	high
Uncertainty Avoidance	medium to high	high
Long-term Orientation	high	high

To achieve the set goals, examining technology adoption in these countries was conducted via the UTAUT model (Figure 9), and categorizing individual constructs was completed per the Kano model to determine how each construct was perceived in the two groups. Testing the proposed hypotheses involved conducting reliability tests and a linear regression analysis. Whole data were firstly tested, followed by individual data sets.

The analysis yielded interesting findings, while the research model was significant at the $p \leq 0.001$ level. All paths, except those between EE and BI, were significant. The individual datasets revealed that PE and FC were significant predictors for both countries, while SI and EE were significant among Uzbeks and South Koreans, respectively. A later multi-group comparison based on the Chi-square difference test was conducted, and it showed that the difference was significant only in the SI variable. The Kano evaluation indicated that each variable was perceived differently in each group.

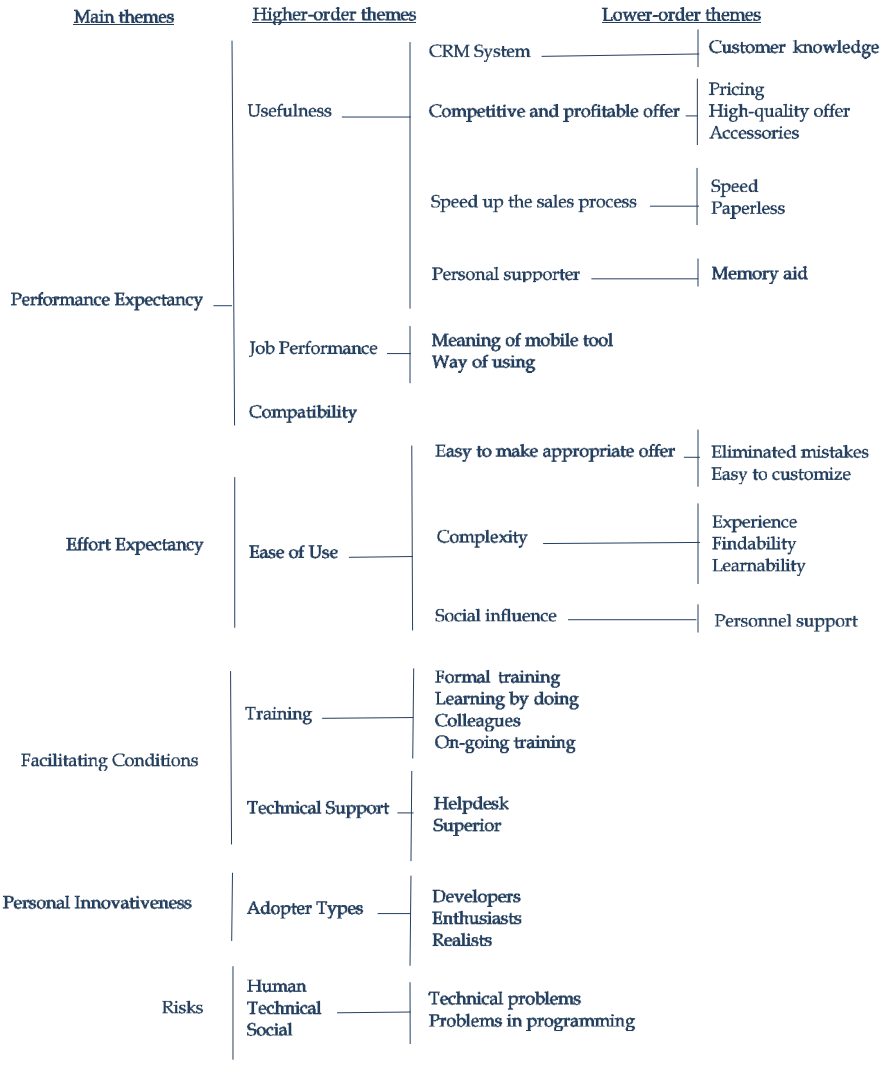
FIGURE 9 Research model for Study 3 (Sanakulov and Karjaluoto, 2017a)



4.4 Salespersons' adoption and usage of mobile sales configuration tools

The purpose of Study 4 was twofold: (1) examining mobile sales configuration tool adoption and usage among B2B salespersons and (2) offering MSCT acceptance conceptualization. In this study, MSCT was defined as a tool that is used in mobile devices as part of the mobile SFA system. For this purpose, qualitative data were collected, and a purposive sampling technique was used to select participants with MSCT experience among Finnish salespersons who were working for an international tractor manufacturer. The data analysis revealed many interesting findings: 1) MSCT is useful and easy to use; 2) the tool is excellent for customizing the end product; 3) the tool makes it easy to make competitive and profitable offers; 4) the tool has relevant performance; 5) training is important for adoption; 6) there are different types of salespersons that are reflected by personal innovativeness; 7) risks were minor and mainly technical; 8) there was a need to change the mobile device to a tablet.

FIGURE 10 Main determinants of MSCT adoption and usage (Sanakulov, Kalliomaa and Karjaluoto, 2018)



Interestingly, our findings indicate that the ways of using MSCT differ among salespersons, and there is no commonly practiced sales routine. For example, there were salespersons who used the tool extensively and provided an offer immediately after discussing customization with clients on the site. These salespersons achieved the highest sales, which suggests an effect of sales tool usage on performance. Based on the findings, the determinants of MSCT adoption and usage were suggested, as illustrated in Figure 10.

5 DISCUSSION

This dissertation contributes to the technology adoption literature from three different perspectives: general adoption, cultural, and B2B. As previously mentioned, the main purposes of this dissertation were to study tehcnology adoption and cultural effects and to study mobile sales customization tool (MSCT) adoption by company employees. In this section, both the theoretical and managerial contributions from the studies will be summarized, and the findings related to the research questions will be discussed.

5.1 Theoretical contributions

The theoretical contributions of this dissertation are explained by reviewing the results of the research questions.

5.1.1 What are the main drivers of consumers' adoption of smartphones?

The results of Studies 1, 2, and 3 are relevant to this question. In these studies, the main drivers that determine consumers' adoption of smartphones were examined. A literature review (Study 1) was conducted on mobile technology adoption, which provided knowledge on current research trends and accumulated theoretical knowledge. This step is important in any research because it helps define the methods, theories, and phenomenon on which to focus. Moreover, a simple statistical literature review also offered knowledge on the most significant drivers of mobile adoption. The data were organized to include all the tested paths (between dependent and independent variables), including frequency of the research models from past mobile adoption studies, and classified as either significant or insignificant. This provided an additional perspective to examine for each tested path´s acceptance rates. For example, in all the reviewed studies, the number of cases in the testing path between PU and BI was 37, but only 28 in this path were statistically significant, which makes the acceptance rate 76%. During the period covered in the literature

review, the TAM was the dominant theory, followed by the UTAUT. Because most past mobile adoption studies based their findings on the TAM, either fully or partially, the frequency of paths involving the TAM's constructs were the highest. The results are illustrated in Table 7.

Study 2 was a cross-cultural study that included a research model based partly on the UTAUT and an additional variable of PS that is relevant to smartphone usage. The collected data were analyzed together firstly and then separately for each country (Uzbekistan, South Korea, and Turkey) to detect any possible differences in the effects of the levels of each construct. Contrary to the general perception of PE´s strong influence on BI, the analysis of the total sample proved otherwise. The effect of PE on BI was not statistically significant, while EE and SI were strong determinants of BI. These results were even more interesting when each group was analyzed separately, and it was found that each group´s result was different. While PE´s effect on BI was insignificant in each group, EE and SI were statistically significant in the Uzbek group and the Korean group respectively. For the Turkish group, EE and PS were statistically significant (Table 8).

TABLE 7 Frequently tested paths with acceptance rates (Sanakulov and Karjaluoto, 2015)

Tested paths	Proposed cases	Accepted cases	Acceptance rate
PU → BI	37	28	76%
PEOU → BI	28	20	71%
A → BI	27	26	96%
PE → BI	9	9	100%
EE → BI	8	5	63%
SI → BI	15	13	87%
FC → BI	7	6	86%
PEOU → Attitude	21	17	81%
PU → Attitude	21	21	100%
PE → Attitude	4	4	100%
EE → Attitude	4	4	100%
SI → Attitude	4	4	100%
FC → Attitude	3	2	67%
PEOU → PU	30	26	87%
SI → PU	3	3	100%
SI → PEOU	3	3	100%

One of the purposes of Study 3 was to determine the main drivers of smartphone adoption in a whole sample and for each group. The results for the total sample indicated that only PE, SI, and FC influenced BI significantly, while a correlation between EE and BI was insignificant. The same test was run for each country separately for comparison and the detection of possible differences. The results support the stated hypotheses that PE and FC would

affect BI positively in both countries. The positive effects of SI and EE on BI were supported only in the Uzbek and Korean groups, respectively. This study was confirmatory in nature, and the results were in line with similar past studies.

TABLE 8 Analysis results for Study 2 (Sanakulov and Karjaluoto, 2017b)

Path	Total Sample		Uzbekistan		South Korea		Turkey	
	β	t-value	β	t-value	β	t-value	β	t-value
PE → BI	-.003	-.049	.162	1.490	.049	0.518	.049	.447
EE → BI	.202***	3.368	.217*	1.931	.095	0.895	.193*	1.850
SI → BI	.180***	3.089	.191	1.895	.236*	2.232	-.107	-.990
PS → BI	-.037	-.657	.045	0.460	.109	-1.144	-.219*	-2.135

***p ≤ 0.001, ** p ≤ 0.01, *p ≤ 0.05

5.1.2 Do cultural factors matter in smartphone adoption, and do they have varying effects on adoption in different countries?

To address the thesis questions, Studies 2 and 3 were dedicated to determining such effects by conducting a cross-cultural analysis of technology adoption in three countries: Uzbekistan, South Korea, and Turkey. The results obtained for each study indicated the importance of cultural factors in smartphone adoption and their effects on each country. In Study 2, we tested the hypotheses by moderating the effects of cultural factors. Only the Individualism vs Collectivism dimension of national culture was included in the study questionnaire, which was measured into two separate analysis items. These two items were used as moderators in the linear regression analysis along with the non-moderated path analysis. The obtained path coefficients were later compared with each other for possible significant differences. This was repeated for each group.

In Study 3, the effects of cultural factors on adoption were determined by comparing the results of the linear regression for each hypothesis in each group. As stated previously, there were clear differences in the results. To check the statistical significance of these differences, a multi-group comparison that was based on the Chi-square difference test was conducted. Among all four paths, only the relationship between SI and BI was supported, as shown in Table 9.

TABLE 9 Test results for Study 3 (Sanakulov and Karjaluoto, 2017a)

Path	Total Sample		Uzbekistan		South Korea		χ^2 Threshold
	β	t-value	β	t-value	β	t-value	
PE → BI	.169**	2.979	.208**	2.734	.252**	2.899	0.262
EE → BI	0.082	1.305	0.032	0.392	.230*	2.368	1.027
SI → BI	.197***	3.504	.205**	2.667	-0.127	-1.336	2.282**
FC → BI	.171**	2.765	.166*	2.111	.272*	2.592	0.519

***p ≤ 0.001, ** p ≤ 0.01, *p ≤ 0.05

Studies 2 and Study 3 were similar in that both had the main goals of studying smartphone adoption in general and comparing each group to draw conclusions in particular. In both studies, the UTAUT was employed with the three variables (PE, EE, and SI) that were present in both cases. Because the data were collected during different years, this allowed us to compare and detect any changes that may have occurred over time. One explanation for why SI was the only significant determinant of BI could be the rapidly increasing popularity of using smartphones at that time. In collectivistic cultures, such as South Korea, the opinions of others are highly regarded. Within the results from recent data (Study 3), clear change is evident. Variables other than SI (e.g., PE and EE) have taken over as determinants of BI. Interestingly, around the same time, South Korea´s smartphone ownership reached the highest in the world at 88% (Pew Research Center, 2016). For Uzbekistan, EE was the only significant determinant; however, in Study 3, PE and SI became the main determinants of BI. In early 2016, the number of mobile phone users in Uzbekistan stood at 24 million (BuddeComm, 2017), and mobile broadband subscribers reached over 16 million (UNDP, 2017). These numbers are much lower than those for South Korea, which helps explain the differences that were found. A review of the numbers leads us to assume that adoption in Uzbekistan is still ongoing, while owning a smartphone in South Korea has become the norm; notably, social factors might have become less important, while PE, EE, and FC are considered more important.

5.1.3 How do the adoption and usage of mobile sales configuration tools work, and what areas should be further developed to meet salespersons' needs and increase work productivity?

To answer the above question, Study 4 examined and conceptualized MSCT adoption and usage by B2B salespersons who were employed by a machinery manufacturer in Finland. Based on the case study approach, valuable insight was obtained for both greater understanding and conceptualization of B2B technology adoption and usage. As mentioned previously, there is a difference between consumer technology adoption and adoption in the workplace because motivations and costs vary in most cases. For instance, unlike private consumers, the respondents included in this study did not bear the financial cost of MSCT usage. Their motivations were purely based on improving their sales and productivity and thus profit margins by using a tool that is easy to operate. This was supported by the findings of this study, which clearly pointed toward the performance and effort aspects of MSCT usage.

5.1.3.1 Performance expectancy/usefulness

This attribute consists of several higher- (competitive and profitable offers, sales process) and lower- (pricing, customer knowledge, increased speed, paperless) order themes, which fully cover all performance aspects. Competitive and profitable offers were the most important determinants of performance. Such feedback was directly related to the fact that the tool enables professional

pricing, high-quality offers, and improvements in accessories´ sales. Pricing in real time and making offers that include all accessory and equipment descriptions are perceived as high-quality offers; this helps build trust toward the salesperson. For example, one of the respondents stated the following:

> *Mainly, I use it as a pricing tool so that we'll see the total price right away and what equipment and accessories it includes (Ted).*

In addition, tool characteristics, such as being part of a customer relationship management system, making the sales process quick, and offering personnel support tools, were identified as determinants of PE/usefulness. As mentioned previously, all the main determinants consisted of lower-order themes (see Figure 3, Study 4).

5.1.3.2 Effort expectancy/perceived ease of use

Both EE and PEOU consist of three higher-order themes (easy to make the proper offer, complexity, and SI) and seven lower-order themes (eliminate mistakes, easy to customize, experienced salesperson, new salesperson, learnability, findability, and colleagues' support). In this section, salespersons shared their feedback related to learning about and using the tool. One important feature of the tool was making a product offer without either overlapping choices or making mistakes:

> *In the old days, it was possible to sell features or accessories that did not match each other or would not work in combination. Now, it is not possible to make such mistakes (John).*

Most of the respondents thought that the tool was easy to learn and use. They also mentioned that it was much easier if the person had product knowledge, computer skills, and experience with the machines that they sell. For them, social support from their colleagues was available when they faced difficulties:

> *I always immediately ask a colleague if he has encountered the same problem (John).*

Apart from the abovementioned two determinants, relative advantage, compatibility, job performance, FC, and risks were determined to be important drivers in MCST adoption, and each was discussed in Study 4. The findings are summarized in Table 10.

TABLE 10 Determinants of MCST adoption

Relative Advantage	Compatibility	Job Performance	Facilitating Conditions	Risks
-A quick process of providing a quotation according to a customer's requirements - Quality tailoring that is free of mistakes	All respondents thought that it was compatible with their work. The results were categorized into three groups: - the tool was extremely compatible - compatibility was good - the tool was compatible, but the respondent was also somewhat critical	Based on the salespersons' experience, the relevancy of the tool regarding their own performances was categorized into three groups: - the tool has no relevance - the tool has a small effect - the tool makes a difference his matched with their sales performance.	Formal training offered by the company was considered the most effective, while learning by doing and colleague support were also important. Participants also mentioned the need for training after each new release or update.	No major risks were identified. Minor issues included the following: - technical breakdowns - connection problems - not including the value added tax - changes were not saved - printer problems These risks were categorized into three higher-order themes: - social - human - technical

5.1.3.3 Further development of MSCT

The salespersons who were interviewed had been using the company-provided MSCT. They believed that their MSCT usage affected their performance, it was excellent for customizing end products, and the tool made it is easy to make competitive and profitable offers. Based on their experience, they also provided valuable feedback on general usage, offered pros and cons of using the tool, and shared ideas for further development of the MSCT and mobile social media tool. All suggestions were coded through the higher-order themes of PE and EE. Lower-order themes included new mobile devices, sales support within the tool, new features in the software, and learning beforehand. Similarly, suggestions for the social media tool were divided into two lower-order themes: new social media channels and ease of communications. Regarding the gadget itself, most respondents suggested a tablet as a new mobile device.

> *When we think about using only the configurator, email, and so on, maybe either a tablet or something similar could be a better solution that is smarter and quicker to use, especially when you want to present the product brochures. A laptop is a little bit [. . .] let's say that it was once probably a pretty good idea, but it seems that this is starting to be a little bit old (Ted).*

Software suggestions included improving visualization with photos, automatic text, and changing the basic model without losing already entered information. For the social media tool, salespersons suggested establishing dedicated social media channels (Facebook groups, YouTube channels, discussion groups) to both enhance information exchange and accommodate learning and sharing experiences with colleagues.

5.2 Managerial implications

This dissertation provides a number of managerial implications, which were drawn from the included studies. These studies covered three different areas: a literature review of mobile technology adoption, a smartphone adoption comparison, and mobile sales customization tool adoption. Below, all recommendations from these three areas will be discussed.

Development process
Let it be mobile services or technologies adoption, all relevant factor(s) important in particular context should be recognized and considered by firms while resources should be allocated in order to enhance them which play important role in adoption. A service or technology may require more than one attibutes to be enhanced or developed upto certain level to meet consumers´ demands which means that during development process all parties involved should work together to make the abovementioned qualities present in the offered service and products. To achieve this a communication channel among relevant departments should be effective and synchronized.

Enhanceing customer awareness and confidence
Firms should constantly explore ways to enhance customers´ awareness of available services, products and their usages. For example, in mobile banking, this can be achieved by having employees, customer service, and manuals that encourage trials and convey the value of mobile banking. By keeping high awareness and confidence among customers firms can increase adoption of particular service and products. Also, having continious communicaiton with customers will help firms to offer services and products that are compatible with customer´s age and lifestyle. Such approach particularly becomes important when considering cost especially for those younger than 30 and over 50 (REFERANCE).

Social factors not to be ignored
Firms should consider social factors along with other important factors that affect adoption and usage. This is especially important in contexts that involve interaction with other users or exchange of information is conducted. For example, some studies (Ho, Chou and O'Neill, 2010; Park, Nam and Cha, 2012) have underlined the importance of social factors in the formation of intention to

use mobile learning. Similarly, result of smartphone adoption study included dissertaion also indicate the important of social factors.

Country specific and cultural factors change over time

A comparison of smartphone adoption between three different groups provided unique insight, and important managerial implications were drawn. The results confirmed that all players, from those in development to sales, should be aware of country-specific and cultural factors when planning business activities and making decisions. For this reason, some products are either developed for specific countries only or they include significant differences, depending on the region.

Two separate surveys (Studies 2 and 3) indicated that variables that determine technology adoption may vary in strength not only among groups but within the same group as time passes. When Study 2 was conducted for South Koreans, SI was the only significant predictor of BI. One possible reason was the rapidly growing popularity of smartphones and the role of the nation's collectivistic nature. However, this changed by the time Study 3 was conducted; PE, EE, and FC then had a high correlation with BI, while the effects of SI were insignificant. One possible explanation for such a major change was the huge increase in smartphone ownership (Pew Research Center, 2016) since Study 2's completion. In addition to underlining the importance of country-specific factors, this result also indicated that such factors may change over time. Therefore, it is imporant that firms are aware of such changes which may result from various factors in that particular group and such possible changes shold be taken into an account while developing marketing strategies for given market.

Salespersons need firms´ attention and guidance

MSCT´s usefulness has been supported with strong evidence, and firms should consider that implementation and usage require regular attention from relevant departments of firms to keep productivity and sales on the rise. Firms should establish communication channels in which their personnel can interact with one another, learn about and share sales information, and facilitate Q&A sessions. Promotions, special offers, and programs can be developed by firms to keep salespersons motivated in participating in such channels.

Management should also consider different personalities and levels of innovativeness of salespersons when running such programs. Firms should view salespersons with innovative personalities and their social media groups as idea pools for further developing the tool. Training, technical support, and special sessions after each major software or hardware update should be maintained on a regular basis. The respondents stressed the importance of providing mentoring by an experienced salesperson to enable effective learning of tool use and to provide access to valuable experience and knowledge.

During the interviews, it became clear that there was no specific sales routine that was applied during their sales process. Salespersons´ personal

routines were compared with sales figures, and some assumptions were reached. For example, a sales deal is more likely to be successful when an offer is made immediately after discussing the sales details with the client. In addition, product configuration should be conducted and presented only after discussing the client's needs and requirements in detail with him/her. Therefore, it is suggested that firms develop routines to instruct salespersons on how to proceed with sales. This will set a standard among salespersons, increase successful sales, and form positive impressions on customers.

5.3 Limitations and avenues for further studies

The current research has some limitations, which emerged for various reasons, such as limited resources or other situations that were beyond the researchers´ control. One limitation was access to a random respondent pool. In Studies 2 and 3, only respondents who had internet access were included because both involved online surveys. This prevented us from reaching random respondents and left out those who lacked internet access but were otherwise qualified. During the data analysis of Study 2, it became clear that respondents were mostly students and young employed people, who cannot be deemed as national representatives. Thus, the results cannot be generalized to a wider population. Although this improved in Study 3 for the Korean sample, the same cannot be said of the Uzbek group. Per the World Bank´s estimates, the percentage of internet users among Uzbeks was 47% in 2016 (The World Bank, 2018). Therefore, future studies should consider ways to overcome this limitation by conducting either face-to-face or telephone surveys and by applying strict national population quotas.

Conducting the abovementioned modes of the survey may also help obtain better results for the Kano questionnaire, which was another limitation faced in Study 3. In the Kano evaluation, the frequency of "indifferent" as an answer was at 36%, which is considered high (Ek and Çıkış, 2015). One possible explanation for this is confusion caused by the use of a non-traditional questionnaire, which may have led the respondents to neutral responses. Explaining how the Kano questionnaire works during the survey might help prevent such confusion.

When comparing countries in terms of cultural differences, Hofstede´s cultural dimension scales are quite useful for gaining a clear idea of how and to what extent countries differ. However, in our case, such a comparison was not possible purely on Hofstede´s cultural dimension scores because neither Uzbekistan nor any other Central Asian country has been measured previously. Hence, this study relied on the country characterization of Uzbekistan that was provided by Gygi and Spyridakis (2007). In future projects, measuring cultural dimensions of Central Asian countries should be conducted. This would benefit not only the research community but also various commercial and non-

commercial organizations because this region holds great commercial and geopolitical importance due to its population, which exceeds 70 million people.

In the MSCT study, two limitations could not be avoided, and future studies should consider ways to prevent them. The main limitation was a low number of participants (9). This was due to reasons beyond the researchers' control, such as availability of salespersons willing to participate in the survey. In addition, the criteria of participants having experience in using the customization tool and being employed by the same company effectively limited the number of people who could be included. Even though the study's objectives were reached with the given participants, findings from a larger group would be preferred. Another limitation was related to social desirability, which may have affected the results. Heavy machinery sales were significantly lower than usual during the period when the interviews were conducted, which could have tempted the respondents to be positive about MSCT, although they were sometimes critical, as their responses and suggestions show.

Despite the limitations faced in Study 4, it contributes to our understanding of the adoption and usage of MCST and provides a foundation on which further research can be built. For example, it can be inferred to a larger population by either a quantitative or a cross-cultural study to determine the effects of cultural factors on MSCT adoption and usage.

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ORIGINAL PAPERS

I

CONSUMER ADOPTION OF MOBILE TECHNOLOGIES: A LITERATURE REVIEW

by

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Consumer Adoption of Mobile Technologies- A Literature Review

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Abstract

Although the total number of mobile subscriptions reached 6.8 billion worldwide (ITU, 2013) confirming in the process that mobile technology is widespread, academic literature has so far focused only on explaining adoption of mobile technology and services. This literature review analyses 67 studies from the period 2005–2013 and finds the following: a) most studies are quantitative in nature and come from Asia, b) the Technology Acceptance Model is the most used theory, and c) future research should also utilize qualitative methods and examine the behavioural outcomes of mobile adoption instead of simply adoption in consumer markets.

Keywords: consumer acceptance; mobile adoption; technology acceptance; literature review; mobile communications.

1. Introduction

Today it is not hard to see that mobile technology has become a part of our lives (Liaw, Hatala and Huang, 2010) be it in the form of equipment or mobile services such as mobile banking (Lin, 2011; Kim, Shin and Lee, 2009), mobile learning (Keegan, 2002; Tan et al., 2012), mobile commerce (Roach, 2009), mobile-news (Chan-Olmsted, Rim and Zerba, 2013) and SMS marketing (Muk, 2007). Users of mobile phones now can access the internet, search for information, play games, watch videos, check stocks online and more. All these developments have resulted from technological advances (Okazaki and Mendez, 2012) enabling mobile phones to perform sophisticated tasks. In addition, handset manufacturers are lowering device costs while telecom companies are providing better voice and internet connections. Driven by such technological advancements and lower costs the number of mobile phone users is increasing. According to Gartner (2013) 1.75 billion units of mobile phones were sold to end-users in 2012 worldwide and the International Telecommunication Union reported that the total number of mobile subscriptions reached 6.8 billion (ITU, 2013).

The increasing number of mobile users has affected the size of the mobile market worldwide. IBM reported that mobile purchases soared with 24 % of consumers using a mobile device to visit a retailer's web site, up from 14.3 % in 2011 and mobile sales exceeded 16 %, up from 9.8 % in 2011 (IBM, 2012). Gartner forecasts that the expenditure on mobile advertising will double every year to reach $20.6 billion in 2015 from an estimated base of $3.3 billion in 2011(Gartner, 2011). Currently,

many players are jumping on the bandwagon hoping to establish their stakes in such a rapidly growing market. For example, popular video game makers such as Ubisoft and EA that have traditionally focused on Xbox, PSP, and PC platforms for their games are now developing games for mobile platforms. Internet giant Google is also offering most of its applications in mobile format. One of the brightest examples of this trend is the Finnish software company, Rovio, whose mobile game "Angry Birds" was the best-selling Apple application for many months (Financial Times, 2012).

However, to generate revenue from the mobile business, end-users must adopt the technology. Having a brand new piece of equipment to hand does not mean that the owner will use the available mobile services immediately (Verkasalo et al., 2010). On the other hand, equipment manufacturers are constantly developing newer handsets that are capable of handling technically demanding services such as live HD TV, stereo sound, fast steaming and more. Despite the above-mentioned advances, consumers use their mobile devices mainly for simple services such as voice calls and messaging (Nysveen, Pedersen and Thorbjørnsen, 2005). It seems that these technological advances are either loved or ignored by consumers.

The above-mentioned issue was observed at the level of the organization as well. An organization's main reason for incorporating technological advances is to reduce the amount of time required to complete a job (Aiello and Kolb, 1995). Obviously, the wise thing to do is to act fast and acquire the technology because it will enhance efficiency and productivity. However, when individuals are reluctant to act, making them accept something is never easy. Venkatesh et al. (2003) found that 50% of organizations reported employee resistance when new technology was introduced. Users may or may not adopt a technology for a range of intrinsic and extrinsic reasons. For example, m-banking (Zhou, Lu and Wang, 2010), m-TV (Choi and Totten, 2012), m-marketing (Persaud and Azhar, 2012), and m-learning (Park, 2011) are still in their infancy and adoption is advancing slowly.

The acceptance of technology has been a very important subject for the last 20 years or more. A considerable body of research has sought to understand the adoption process and the antecedents affecting it, and much of that research has made significant contributions to modern information systems (IS) research both theoretically and practically.

Our knowledge of what governs the acceptance of technology has been advanced by several seminal works. Fishbein and Ajzen (1975) proposed the Theory of Reasoned Action (TRA). Ajzen (1991) proposed the Theory of Planned Behavior (TPB). Davis (1989) proposed the Technology Acceptance Model (TAM). Liang and Wei (2004) proposed the Fit-viability Model (FVM). The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al. (2003). Rogers (1995) proposed the concept of Diffusion of Innovation (DOI).

In the study of mobile technology adoption, researchers have been extending and utilizing existing theories and models to understand acceptance according to the technology and services they were focused upon. For example, TAM has been widely used for studying acceptance of e-learning (Park, 2009), web-shopping (Pavlou, 2003), m-gaming (Liu and Li, 2011), and m-TV (Jung, Perez-Mira and Wiley-Patton, 2009); UTAUT (Unified Theory of Acceptance and Use of Technology) (Venkatesh et al., 2003) for studying acceptance of mobile data services (Lu, Yu and Liu, 2009), internet banking (Im, Hong and Kang, 2011), m-banking (Yu, 2012a), tablet PCs (Anderson, Schwager and Kerns R.L., 2006), Information and Communication Technologies (Thong et al., 2011), Location-Based Services (Zhou, 2012); and TPB has been used for studying acceptance of m-learning (Cheon et al., 2012) and more.

One of the important responsibilities of all researchers is to remain abreast of developments in their area of interest. The popularity of mobile technology drove a rapid growth in interest in mobile adoption among academicians and practitioners seeking to explain the adoption process. When we look at the figures of published academic studies by country and year we can track that increased interest. However, the rapid increase in research complicates matters for researchers seeking to follow the developments and stay current. In concentrated environments, literature reviews are very useful for such purposes, serving to skim the most important information from previous studies and provide concise findings. There have been few literature reviews published in the IS study area and even fewer on mobile adoption at the individual level. Therefore, we felt such a review summarizing the papers published on mobile adoption was merited. This paper reviews studies on consumer adoption of mobile technology and analyses the findings, the models they applied, and determines the significant constructs affecting adoption of mobile technologies. At the conclusion of the study, we

will be able to report which model or theory is more often used as a predictor of a certain technology. An effective review creates a firm foundation for advancing knowledge (Webster and Watson, 2002). Therefore, we will recommend constructs, theories, and specific details that we consider will be valuable for future research on consumer adoption of mobile technologies.

2. Method

To organize the review, the literature review papers were analysed thoroughly and all the recommendations made in previous research were considered. Before starting the literature review, a detailed plan was prepared and included instructions for each step with methods to be followed, the search method for publications, and details of the data extraction.

2.1. Strategy for publication search

The most important step in any literature review is searching for publications that cover the researcher's interests. In this particular review we are interested in mobile adoption studies available online. The search strategy consisted of five steps:

(a) Selection of keywords

In order to find relevant literature on mobile adoption it is important to identify keywords that help identify the required publication more efficiently. Therefore, a structured literature search was conducted and the search words used most often in the context of mobile adoption in the technology acceptance domain were identified. In addition, we canvassed the opinions of experienced researchers in this field. It is worth mentioning our efforts to identify synonyms, to account for differences in spelling (British English vs. American English). The keywords resulting from the process are shown in Table 1. Both words "acceptance" and "adoption" were combined with "technology" and "mobile" to generate more results, although we were careful to restrict the results so as not to become overburdened with irrelevant material.

Search words			
mobile adoption	*mobile acceptance*	*technology acceptance*	*technology adoption*
technology usage	*mobile usage*	*adoption model*	*acceptance model*

Table 1. Search words for articles relevant to mobile adoption and acceptance

A further restriction placed on the search results related to year of publication, which was largely limited to 2010–2013, the restriction ensured the results were topical and also preserved our limited resources.

(b) Identification of internet resources available for search

All major resources such as *Science Direct (Elsevier), Academic Search Elite (EBSCO), Electronic Journals Service (EBSCO), SCOPUS (Elsevier), Web of Science, ebrary, SpringerLink, Primo Central Index,* and *ProQuest Central (ProQuest)* were used in the search for relevant articles. The literature review intends to include only those studies published in journals that are popular platforms for mobile technology studies. These journals are acknowledged publishers of distinguished work by people eminent in their field. The list of journals is provided in Appendix B.

(c) Additional search criteria

In addition to the articles yielded by the search, we analysed the articles that were recommended as further reading or cited in the research papers discovered. As a result, the final set of selected articles includes some published before 2010.

(d) Criteria for inclusion

Having been identified by the search engine, each item's full description was screened to assist further selection. There were around 210 items chosen at that stage, and they were then subjected to selection criteria to ensure the study:

- was fully reported
- was an empirical study
- was a study of relevant mobile adoption
- included measures for independent and dependent variables
- had a sample size of at least 100 for analysis
- provided detailed results of data analysis

In addition, as mentioned earlier, in this literature review we focused on mobile adoption at the consumer level only. Ultimately, 67 publications were included in the final review (Appendix A).

There were some articles excluded from the final list during individual analysis of them, on the grounds that the same data had been used for more than one study report. There are cases where one study involved conducting a survey in two countries and comparing the results to determine the

differences. For the purposes of this review, such cases were considered as two separate studies because the data were analysed separately.

2.2. Strategy for data extraction

Once the publications were chosen, each was studied thoroughly and researchers took notes on important points and then completed a data extraction form. Apart from basic information on the study, the data extraction form included sections such as models used, proposed paths between variables, accepted paths, technologies studied, if technology use was voluntarily or not, if users had prior experience or not, original sample sizes, sample sizes used for analysis, response rates, whether the sample population was homogeneous or heterogeneous, survey mode (online/offline), and location of the study. The data extraction file also included any special notes the researchers made to facilitate future research. Each data extraction file was rechecked against the others to compare each section to identify any similarities, and those that shared the same data were excluded.

2.3. Data extraction

Each study included in the final review list was read and the required data extracted by filling out a data form. During this process important points and unique information mentioned in the articles were separately recorded for possible future reference. Since only one person was responsible for this process, on occasion, data checking was performed by a colleague of the authors. The check involved randomly picking a study to read and extracting data from it. The data were then compared by two different people to ensure the data were substantially the same as in the original record. Once reading and data extraction were complete, the resulting dataset was reviewed by academic supervisor, who offered practical suggestions to improve the usability of data extracted.

3. Results

Webster and Watson (2002) have suggested a concept-centric approach to researchers structuring a review, and that approach has been adopted here. All the articles included in final list were categorized according to the model and theory used to study mobile adoption.

The majority of studies (48 of 67 or 72%) included in this review were published between 2010 and 2013, and the remainder were included because they were cited in the papers of that majority group. Figure 1 illustrates the detailed publishing timeline of the studies included.

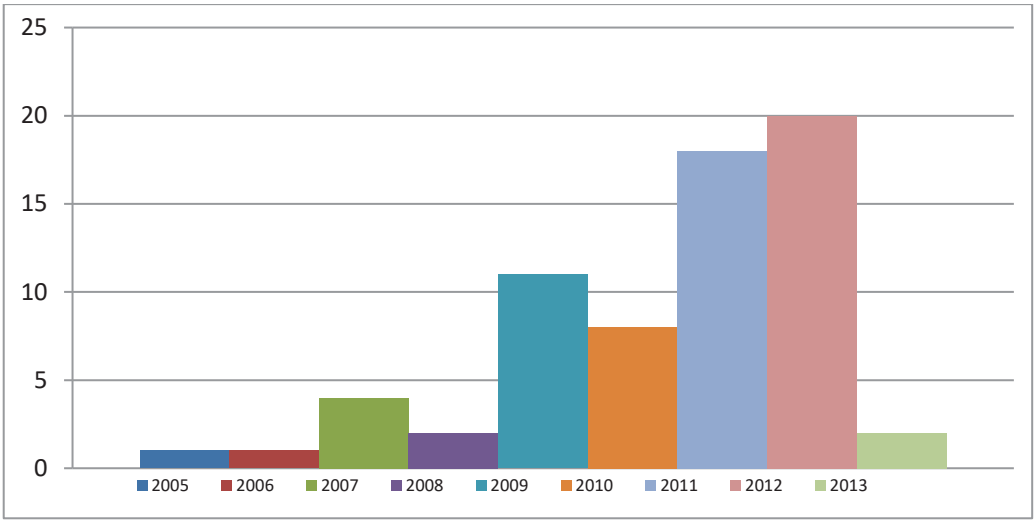

Figure 1. Allocation of reviewed studies according to year of publication

Each of the studies reviewed used a survey instrument to collect empirical data. It is also worth mentioning that a significant number of studies (25 of the 67) used online data collection methods, while 32 studies conducted solely a face-to-face survey. In only five cases were both online and face-to-face methods used, while five studies neglected to detail which approach had been used.

Overall, studies were conducted in 18 different countries throughout Asia, the Middle East, Europe, and North America. When categorized by location, China tops the list with 14 studies (21%), followed by Taiwan with 11 (16%), and they are followed by the USA with 10 (15%). The allocation of studies by geographic distribution is shown in Table 2. There were also studies that conducted surveys in two different countries to compare the acceptance factors. However, as mentioned in the section on the method of data extraction, we counted those as two different studies, because the survey results were not dependent on each other.

A simple statistical analysis of the IS adoption models and theories used in the studies confirmed TAM to be the most frequently used (in 47 of 67 studies) followed by UTAUT in 15 studies. Other theories/models such as TPB, Brehm's Reactance Theory, Task Technology Fit (TTF), and IDT (Innovation Diffusion Theory) also contributed.

It is important to note that while a few studies were wholly based on one theory, in many cases these models were integrated with other models or incorporated specific constructs of other theories and models to extend TAM and UTAUT. One study broke with the convention of using established

theories and models, deploying Microsoft Usability Guideline (MUG) dimensions to explain the factors that determine a consumer's intention to make mobile payments (Liu, Wang and Wang, 2011).

Country	Studies conducted	%	Country	Studies conducted	%
Canada	1	1%	Netherlands	1	1%
China	14	21%	Nigeria	1	1%
Finland	1	1%	Pakistan	1	1%
Germany	1	1%	Singapore	1	1%
Greece	2	3%	Taiwan	11	16%
Hong Kong	2	3%	Turkey	1	1%
India	1	1%	UAE	1	1%
Korea	9	13%	USA	10	15%
Kuwait	1	1%			
Malaysia	8	12%	Total	67	

Table 2. Studies allocated according to geographic distribution

There are a few conceptual models proposed in mobile adoption studies that we reviewed (Kim, Chan and Gupta, 2007; Cheon et al., 2012), and a full list of models and theories supporting the studies reviewed is presented in Table 3.

Theories and models	Authors
Technology Acceptance Model (TAM)	Davis, 1989
Technology Acceptance Model 2: (TAM2)	Venkatesh and Davis, 2000
Unified Theory of Acceptance and Use of Technology (UTAUT)	Venkatesh et al. 2003
Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)	Venkatesh et al. 2012
Theory of Planned Behavior (TPB)	Ajzen, 1991
Task Technology Fit (TTF)	Goodhue and Thompson, 1995
Customer Experience Management (CEM)	Schmitt, 1999
Triandis' Model	Triandis, 1977
Model of Innovation Resistance (MIR)	Ram, 1987
Innovation Diffusion Theory (IDT)	Rogers, 1995
Theory of Reasoned Action (TRA)	Fishbein and Ajzen, 1975

Table 3. Models and theories used in the reviewed studies

When we analysed the data extracted according to the theories, models and frameworks used, the studies were categorized as follows:

a) Those that extended TAM and/or UTAUT either with existing theories and models, or by including constructs from existing theories, or by including additional constructs and moderators. This category comprises 40 studies.

b) Those that integrated TAM either with other established theories and models or by including constructs from existing theories, or by including constructs relevant to the technology studied. This category comprises 12 studies.

c) Those that based their research design on original theories and models. In this category only TAM and UTAUT were used. Only four studies were included in this category.

d) Those that developed new conceptual frameworks and models based either on existing theories or by including specific constructs related to the technology studied and constructs from established theories and models, or by developing brand new constructs. There were 11 such studies.

The TAM has been most frequently used in studies to examine mobile adoption behaviour, which includes m-banking (Amin et al., 2008; Kalaiarasi and Srividya, 2013; Teo et al., 2012), m-learning (Shin, 2011), m-commerce (Zhang, 2009; Bhatti, 2007), m-data services (Karaiskos et al., 2012), smartphones (Teng and Lu, 2010), and m-financial services (Lee et al., 2012).

3.1 Technology Acceptance Model

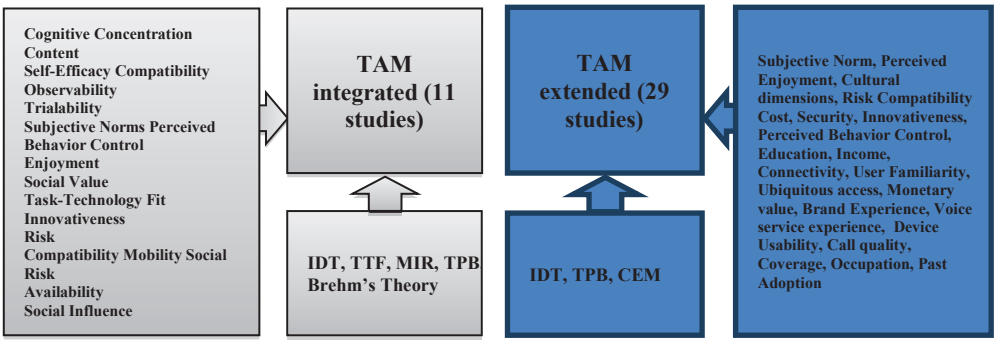

Figure 2. Theories and constructs used in integrating and extending TAM

TAM was proposed by Davis (1989) as an appropriate mechanism for predicting adoption of new technology within a group and organization. It is based on TRA (Fishbein and Ajzen, 1975) and it hypothesizes that technology adoption is based on the user's attitude and intentions. Perceived

usefulness (PU), perceived ease of use (PEOU), attitude towards use, and behavioural intention (BI) were proposed as internal variables affecting technology usage.

Our sample includes some studies that extended the existing TAM by including additional constructs (Figure 2). TAM was also integrated with other theories and models such as IDT (Mallat et al., 2009), TPB (Tsai, 2010), TTF (Shih and Chen, 2013; Zhou, Lu and Wang, 2010), and Brehm's theory (Lee, Chung and Kim, 2013). There are a few studies that have included TAM constructs in their conceptual models (El-Gayar, Moran and Hawkes, 2011).

3.2 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology is the second most used approach in mobile adoption studies such as those on mobile data services (Lu, Yu and Liu, 2009), mobile wallets (Shin, 2009), mobile online gaming (Chen and Kuan, 2012), and mobile banking (Tan et al., 2010; Zhou, Lu and Wang, 2010).

The major advantage of UTAUT is that it includes the integration of the constructs of eight theoretical models of user behaviour: TAM, TRA, the motivational model, TPB, a model combining the TAM and TPB, the model of PC utilization, IDT, and the social cognitive theory (Venkatesh et al., 2003). It consists of four direct determinants of usage intention and behaviour: performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC). There are also four moderators: gender, age, experience, and voluntariness of usage posited to mediate the impact of the four key constructs on usage intention and behaviour. UTAUT tries to explain a user's intention to use an information system and user behaviour (Venkatesh et al., 2003).

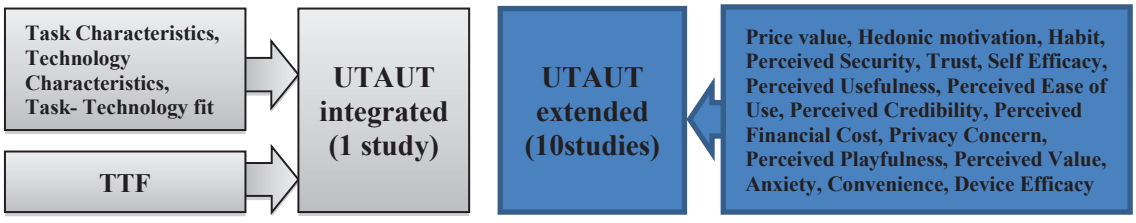

Figure 3. Theories and constructs used in integrating and extending UTAUT

Like TAM, UTAUT was extended with new additional constructs or moderators and integrated with other existing theories (Zhou, Lu and Wang, 2010; Wang and Wang, 2010) or original variables were

replaced (Tan et al., 2010) (Figure 3). In addition, UTAUT constructs were used in one conceptual model.

3.1 The Triandis Model

In addition to the frequently used models and theories, the Triandis model (Karaiskos et al., 2012) was studied individually. Karaiskos et al. used the Triandis Model by incorporating PU, PEOU, Perceived Enjoyment (Van der Heijden, 2003) and Perceived Value to study predictions of the adoption of mobile data services.

3.2 Conceptual frameworks

The database has records of 11 studies that proposed conceptual frameworks to study adoption of mobile learning (Iqbal and Qureshi, 2012), mobile commerce (Dai and Palvi, 2009), mobile-news (Okazaki and Mendez, 2012), 3G services (Chong et al., 2010), and tablet PCs (El-Gayar, Moran and Hawkes, 2011). Most of these studies included constructs from established theories and models while a few others utilized determinants such as utilitarian value, social value, interpersonal influence, trust, enjoyment, technicality, perceived fee.

3.3 TRA, TPB, TTF, IDT, Brehm's reactance theory, CEM, MIR.

Even though these theories and models were not studied individually, they were integrated with other models and theories, or their constructs were borrowed to explain mobile adoption and develop conceptual frameworks.

3.4 The most significant variables affecting mobile adoption

During the data extraction process, the information on proposed paths between independent and dependent variables leading to adoption of mobile technologies and services was included. In addition, paths between dependent and independent variables, and the determinants of independent variables were recorded. The statistically significant paths were indicated separately to estimate the prediction power of the analysed variables based on simple statistics. Since the current review includes all mobile adoption related studies, the number of proposed paths was considerable. Therefore, the authors decided to analyse only those used in more than two studies. For example, in a study of students' acceptance of tablet PCs, El-Gayar et al. (2011) analysed the many available paths including those between SI and PE, EE and PE, and these two last paths were acknowledged to be

significant ones. However, apart from El-Gayar et al. there were no other researchers studying these same paths in our dataset. For this reason, the aforementioned paths were dropped from further analysis. The paths that were frequently tested and their acceptance rates are illustrated in Table 4.

3.4.1 Determinants of Perceived Usefulness and its effects

According to TAM, an individual's behavioural intention to use a technology depends on two determinants, PU and PEOU. PU is defined as the extent to which a person believes that using the technology will enhance his or her job performance (Davis, 1989). PU directly affects the intention to use, if users believe that using the technology will benefit them and serve whatever purpose they have set for using the technology. Furthermore, PU is considered to be affected by PEOU (Figure 3). Since the introduction of PU, it has been studied by researchers interested in its external variables and extended in various contexts (Rouibah, Abbas and Rouibah, 2011; Lin, 2011). However, PU has been criticized for being broad based (Moore and Benbasat, 1991) and for being treated as a black box, with study after study reiterating its importance, while little effort has been applied to investigating what actually makes a system useful (Benbasat and Barki, 2007).

In terms of study frequency, the relationship between PU and intention to use the technology was the most frequently studied path. In our dataset, 37 of 67 (76%) studies investigated this relationship in various contexts, and in 28 of 37 (76%) studies this relationship was reported to be statistically significant.

TAM proposes that PEOU indirectly affects BI by influencing PU. This is assumed because the ease of technology usage may also cause its users to accept its usefulness, and this connection has been established in some studies (Liao, Tsou and Huang, 2007). This relationship was the second most investigated one in our dataset. Of our 67 studies, 30 (45%) investigated this path and 26 (87%) of those reported it to be a significant one.

According to Davis (1989) PU has a positive effect on user attitudes. A user believing that using a technology will enhance job performance will form a positive attitude to that technology. This relationship has been proven in numerous studies. Moreover, among the works reviewed are 21 (31%) that investigated this path: all of them (100%) reported this relationship to be significant.

There are some cases that tried to determine the external variables of PU. Bhatti (2007) incorporated a path in which subjective norms (SN) affect PU positively; Lu et al. (2005) studied the effect of SI in the form of SN and image on PU; López-Nicolás et al.(2008) tested the effect of SI on PU. These relationships were reported to be significant in all three studies.

3.4.2 Determinants of Perceived Ease of Use and its effects

PEOU is defined as the degree to which a person believes that using the system is free of effort (Davis, 1989). It is considered to be the main determinant of the intention to use a technology. The relationship between PEOU and many other variables was tested in numerous previous IS studies in various contexts. In terms of the effects of PEOU on other variables, some of the studies that were analysed tested three different relationships: PEOU-PU (reported above), PEOU-BI, and PEOU-Attitude. In 28 studies (42%) the relationship between PEOU and BI was tested and in 20 of those 28 cases (71%) this path was deemed significant. The relationship between PEOU and Attitude was tested in 21 studies (31%) and 17 of them (81%) reported the path to be significant, leaving only four studies deeming it insignificant.

The three studies mentioned above that focused on determining the external variables of PU did the same for PEOU. Moreover, the results obtained were identical and indicated SN and SI have a positive impact on PEOU.

3.4.3 Attitude and Behavioural Intention

According to TRA (Fishbein and Ajzen, 1975) BI is affected by an individual's attitude and SN. Consequently, attitude towards IS determines the BI. This path between attitude and BI was included in the TAM by Davis (1989) and has been tested many times. Our dataset of 67 cases includes 27 such cases (40%) and only one study found it insignificant; the significance rate is therefore 96%.

3.4.4 Social factors

The social factor is not incorporated in TAM, while in UTAUT it has been recognized as one of four main determinants of BI. SI is the extent to which a person perceives that important others believe he or she should use a new information system (Venkatesh et al., 2003). Prior research has confirmed its importance as a determinant of BI (Venkatesh and Davis, 2000; Wu, Tao and YangJ, 2007). In the literature reviewed, 15 studies (22%) tested the effects of SI on BI and in 13 of those 15 (87%) its

influence was confirmed to be significant. Interestingly, while all UTAUT based studies positively confirmed this path, it was rejected in an extended TAM (Lu, Yao and Yu, 2005) and in a conceptual framework (Iqbal and Qureshi, 2012).

In addition, four studies (6%) tested the effects of social factors on users' attitude and in all cases this path was confirmed to be significant.

3.4.5 Performance expectance, effort expectancy and facilitating conditions

According to the UTAUT, PE, EE, and FC are the main determinants of BI. These constructs are frequently used to extend other models and theories in various contexts. The papers analysed include examples that tested these constructs as independent variables positively affecting relationships with attitude and BI.

PE is similar to the PU of TAM and the relative advantage of IDT and it refers to the degree to which an individual believes that using the system will enhance his or her job performance (Venkatesh et al., 2003). The effect of PE on BI was tested in nine studies (13%) and all of them confirmed it as the main determinant of BI. Furthermore, four studies (6%) tested the PE effect on attitude, and found it significant.

EE is similar to the PEOU of TAM and the complexity of IDT and is the degree of ease associated with technology usage (Venkatesh et al., 2003). In our dataset, eight studies (12%) tested the relationship between EE and BI. In five cases from the total of sixty-seven (7%) this positive path was statistically proven. Similarly, the path between EE and attitude was tested and confirmed in four of the total publications reviewed (6%).

FC is similar to perceived behavioural control of TPB and reflects the effect of a user's knowledge, ability, and resources. It is defined as the degree to which a person believes that the organizational and technical infrastructure exists to support system usage (Venkatesh et al., 2003). According to UTAUT, BI and FC determine technology use. In UTAUT2, Venkatesh et al. (2012) proposed that FC has a direct effect on BI moderated by age, gender, and experience. However, this path was tested prior to the proposed UTAUT2 in various contexts and seven such studies (10%) were included in our dataset. Only in one study was this path rejected. The effect of FC on attitude was tested in three studies (4%) and confirmed in only two.

Tested paths	Proposed cases	Accepted cases	Acceptance rate
PU->BI	37	28	76%
PEOU->BI	28	20	71%
A->BI	27	26	96%
PE->BI	9	9	100%
EE->BI	8	5	63%
SI->BI	15	13	87%
FC->BI	7	6	86%
PEOU->Attitude	21	17	81%
PU->Attitude	21	21	100%
PE->Attitude	4	4	100%
EE->Attitude	4	4	100%
SI->Attitude	4	4	100%
FC->Attitude	3	2	67%
PEOU->PU	30	26	87%
SI->PU	3	3	100%
SI->PEOU	3	3	100%

Table 4. Frequently tested paths with acceptance rates

3.5 Top three areas studied in mobile adoption

The literature on mobile adoption reviewed included many topics such as mobile data services, mobile banking, mobile learning, mobile devices, mobile commerce, mobile gaming, mobile financial services, mobile wallets, mobile ticketing, mobile marketing, location-based services, and more. The top three areas studied are mobile data services (9 studies), mobile banking (7 studies), and mobile learning (7 studies).

3.5.1 Mobile data services

In the nine studies attempting to explain adoption of mobile data services, the authors mostly extended existing theories (TAM and UTAUT) by focusing on mobile data service-specific determinants such as PE, perceived value, SI, perceived enjoyment, voice service experience, flow experience, perceived availability, the variety of services, and perceived advantage that had a significant effect on adoption. In the majority of the studies PU is the strongest influencer of adoption (see Table 5). Along with the original variables, social factors (Karaiskos et al., 2012), enjoyment (Kim, Chan and Gupta, 2007) and perceived value (Wang and Wang, 2010) were shown to be important variables. Those studies that determined the strength of the attitude to using a system (Suki, 2011; Kuo and Yen, 2009) have confirmed it to be the best predictor of use.

3.5.2 Mobile banking

Results derived from the mobile banking papers were not very different than those from the mobile data services studies, which included PU and PEOU. As in other areas, TAM was the most often used theory and combined analysis showed that PEOU was the most important factor affecting both intention and perceived usefulness (Table 5).

In studying mobile banking adoption, the main focus was on the risk, financial costs, credibility, security, usefulness, and ease of use of using mobile banking. The study findings show the strong significance of the above-mentioned factors in the adoption of mobile banking. In this group of mobile adoption studies, TAM, UTAUT, and TTF were employed alongside additional constructs to explain adoption.

3.5.3 Mobile learning

Analysing the dataset extracted from mobile learning adoption literature showed that the main determinants of mobile learning adoption were PU, PEOU, SN, and FC (Table 5). Quality, past experience, and system accessibility were also statistically proven to be significant determinants of adoption. Studies on mobile learning also bore similarities to previous areas in terms of theories used and variable classification according to their strengths. The integrated variables that proved to be significant factors included cultural aspects, service quality (Chong et al., 2011), and subjective norms (Tan et al., 2012). Furthermore, according to Cheon et al. (2012), perceived behavioural control is a key factor in explaining intention to use mobile learning, and outweighs the effects of attitude and social norms.

In all areas, PU is the most influential factor on attitude, followed by PE, PEOU, and EE (Table 5). The effect of PU on attitude was strongest in mobile data services studies (on average 0.535). On average, attitude was the strongest predictor of intention to use, followed by the effect of PU and SI/subjective norms. The effect of attitude on intention was extremely strong in mobile data services studies (0.818). FC was found to be a stronger predictor of use than intention.

4. Discussion

This study presents a systematic literature review of mobile adoption studies. In conducting the current review, the authors followed the recommendations made by Webster and Watson (2002). The

current review covers studies addressing mobile adoption published between 2005 and 2013. The studies selected were 66 journal articles and one conference paper. Of the total of 67, 48 were published between 2010 and 2013. The rise in interest in this area is particularly evident since 2011.

Variables	Attitude	Intention	Use
Attitude	-	0.599 (0.818[1]) (0.391[3])	-
Intention	-	-	0.307
PU	0.450 (0.535[1]) (0.474[3])	0.318 (0.409[1]) (0.281[2]) (0.248[3])	-
PEOU	0.300 (0.362[3])	0.201 (0.240[1]) (0.241[2]) (0.156[3])	-
PE	0.306	0.231	-
EE	0.299	0.164	-
SI / Subjective norms	0.275	0.298 (0.330[1]) (0.422[3])	-
FC	0.288	0.238 (0.205[3])	0.527 (0.400[2])
Value	-	0.196 (0.258[1])	-
Enjoyment	-	0.220 (0.237[1])	-
Perceived financial cost	-0.062	-0.192 (-0.103[1])	-
Perceived self-efficacy / PBC	-	0.135	-

Table 5. Meta- analysis of the average (mean) path coefficients of mostly tested paths in all reviewed studies

[1] Mobile data service studies, [2] Mobile banking studies, [3] Mobile learning studies

4.1 Implications for theory and practice

The results of this literature review indicate that in most studies the research models were based on either TAM or UTAUT. Apart from constructs specific to the area under study included in the models, most constructs were borrowed from established theories and models, the list of which can be found in Figures 2 and 3. Some studies developed conceptual models (Kim, Chan and Gupta, 2007) and frameworks incorporating constructs and paths from existing theories.

The paths between various variables used in the models and their significance were also analysed separately. The frequency of paths was proportional to the models and theories used in the reviewed studies. Therefore the most tested paths were between TAM constructs. For example, the effect of PU on BI was tested in 37 studies and accepted in 28, an acceptance rate of 76%. Interestingly, social factors were highly influential on both BI and Attitude in all countries, with the lowest acceptance rate being 87%. In addition, the acceptance rates of the paths proposed between UTAUT constructs and attitude and BI were high. Analysing the significance of various paths gave us a good opportunity to compare the strengths of the assorted variables.

Common practical implications suggested by the studies on mobile data services mainly included factors relevant to the area, such as quality, security, and trust. For example, for Chinese users' intention to use was greatly influenced by voice service quality (Qi et al., 2009). In addition, factors shown to strengthen well-established variables like PEOU, PU, social influence, perceived advantage should be considered seriously as they play significant roles in forming intention. Scholars stress the importance of fun, enjoyment of data services, along with user-friendly applications with straightforward interfaces. Delivering those attributes would require all parties involved in data services, such as gadget makers, programmers, service providers, to work together. Uncertainty in accessibility and slow data transaction will lead to a perception of unreliable services.

In terms of the adoption of mobile banking, Yu (2012b) suggests that all managerial activities should target social influence, credibility, perceived financial cost, and performance expectancy. The majority of the studies reviewed suggest managers, service providers, and banks develop user-friendly and easy to use software, websites, and services. In addition, increasing customers' awareness of mobile banking services, the usefulness of mobile banking and enhancing customer confidence about mobile banking were also suggested. For this purpose, banks should take advantage of employees, customer service, and manuals in order to encourage trials, to boost confidence and to convey the value of mobile banking. The unique implementation included in Yu's work (2012b) that suggested enhancing compatibility between services and lifestyles of users like students and businessmen and the perceived financial cost should be carefully considered, especially, as the research results suggest, for subjects younger than 30 and those over 50. Some research results showed that social factors play an important role in forming intention to use mobile banking. Therefore, we would suggest managers to consider this factor.

The practical implications of mobile learning studies focus on service and technical factors, and social factors along with PEOU, PU, and PE, which were classified as robust factors forming intention. Moreover, some of the factors stressed, were mobile learning specific. For example, learning content should be at least equally well prepared as materials obtained during face-to-face interaction; awareness among potential users should be enhanced; and universities should provide high-speed Wi-Fi zones and inexpensive devices. Special attention should be paid to the role of social factors in

forming awareness and positive attitude, suggesting mobile learning should be promoted in social networks. Cheon et al. (2012) argue that perceived behavioural control is the key factor affecting adoption and recommend enhancing it and trying to improve students' attitudes by providing opportunities to learn the various functions of devices enabling mobile learning.

When we compare the implications mentioned in the above areas, we see that regardless of the area of study, ease of use, the user friendliness of an interface/software/website, the service quality, PU, and social factors played important role in forming intention to use. Moreover, the majority of studies suggested that all players involved in these services should work together in order to satisfy user needs and requirements because they are interdependent on devices, service providers, and telecommunication operators.

4.2 Future research directions

Against this backdrop, the following future research directions in the realm of mobile adoption can be identified. Our recommendations are based on the suggestions made by the authors of the studies we reviewed and some are based on our own observations on the 67 works.

4.2.1 Constructs

In terms of constructs, future studies should incorporate more technology-specific and service-specific constructs. For example, for mobile banking adoption some researchers have suggested a focus on cost and a trust or price/cost variable for mobile VOIP (voice over internet protocol) adoption. We believe that as technological developments advance there will be a need to address adoption with new constructs. These recommendations were echoed in the works we reviewed.

4.2.2 Relationships between variables

Another issue we noticed in the studies was that very few researchers were interested in studying the determinants of major independent variables such as PEOU and PU, both of which are considered important factors in technology acceptance. In most cases, models were created on the basis of widely accepted paths such as the relationship between PEOU and Intention, PU and Intention, PE and BI, EE and BI. There is already a sufficient body of work confirming these relationships while more research focus would be merited on other determinants and the relationships between them. For example, no significant contribution to understanding the connections between habit and actual use or

intention and actual use was recorded. Finally, adoption studies should start to emphasize the outcomes of adoption. The mobile sector includes very few studies looking at how the use of mobile technology affects behavioural outcomes of customer relationships such as customer loyalty, satisfaction, share-of-wallet or positive word-of-mouth.

4.2.3 Cultural factors

We also noticed that quite a number of studies examined the effects of cultural factors on mobile adoption. Those that did so illustrated the importance of cultural factors by presenting statistical evidence (Choi and Totten, 2012). It follows that in order to understand adoption across cultures, more cross-cultural studies should be conducted.

4.2.4 Longitudinal research

We live in an era of technological advances that are shaping our lifestyles and behaviours. With these advances, exposure to new technologies and usage habits change and it is inevitable that individual perceptions change over time. Therefore, longitudinal research should be conducted to reveal the changes in how people perceive technology.

4.2.5 Qualitative research

The search for material that informs the current paper rarely unearthed studies based on qualitative methodology. Qualitative research on user behaviour would improve the quality of predictions relating to adoption. The review strongly indicates that research quality improves significantly when both qualitative and quantitative approaches are available.

4.2.6 Heterogeneous, larger sample

When we analysed the dataset, 31 out of 67 studies used a homogenous sample, mainly comprising university students and faculty members, to support their analysis. A homogenous sample presents a major barrier to findings being generalizable. Furthermore, sample size was something of a concern among the studies reviewed, as many did not exceed 200 respondents and very few exceeded 500. The sample size determines the significance of findings and having large sample improves the credibility and supports the generalization of the results. Therefore, study samples should be heterogeneous in nature and large in number; a recommendation echoed in many studies.

4.2.7 Older users

The area of study being mobile adoption caused the researchers to focus on young users who are considered to be more interested in fashionable technology, and in many studies, older users were ignored despite this group forming a significant proportion of any country's population. Sample distribution should be representative of the actual demographic in order to support the generalization of findings.

4.2.8 Experienced users

In technology and service adoption studies, the survey respondents should include individuals with experience of using the technology in question. Tsai (2010) illustrated the importance of following this method when studying the usage intentions relating to mobile travel guide systems, by distributing such systems to the respondents to use for a period before capturing their experiences through a questionnaire.

4.2.9 Mature communities

Another concern encountered in the studies relating to certain technologies and services was the maturity of communities. The frequency of services studied in each country is also to some extent an indicator of maturity. For example, mobile ticketing has been widely used in some European counties and the current review included a mobile ticketing acceptance study conducted in Finland (Mallat et al., 2009). However, we could not find any similar study conducted in other counties. On the other hand, conducting a study in a country with an immature user community casts doubt on how generalizable the results obtained are. Zhou et al. (2010) argue mobile banking in China is still in its infancy, suggesting the results they obtained cannot be generalized to other countries.

4.2.10 Wider geographies

The recommendation most frequently made in the reviewed studies was to conduct similar research in other countries in order to generalize the findings. Until that is done, it is not wise to depend on the results obtained in other countries, where acceptance may be affected by many elements including cultural, economic, and technical factors.

4.2.11 Focus on software

A mobile device is of no use without the operating system and software to run it. The recent reports of investments in the software industry show the importance of that aspect. For example, Google Maps and Gmail mobile applications are becoming part of mobile technology. Another example is mobile VOIP enabling a user to make good quality international phone calls at cheaper rates than are offered by telephone companies and sometimes to make free calls. Cost is a major main driver of the popularity of VOIP. Our sample contains a study by Shin (2012), which researches VOIP use over mobile phones in South Korea. On the other hand, it has now become normal to hear arguments over the comparative merits of operating systems for mobile phones and potential customers may base their purchase decision on that aspect. Accordingly, studies examining the adoption of software and operating systems would be welcome.

4.3 Limitations

The current research inevitably has some limitations. The first arises from the failure of an initial plan to measure relations between dependent and independent variables of the reviewed studies and to provide prediction strengths for each one. However, in most studies the data analysis part only included tests of those paths that the authors had investigated, making it impossible to conduct the further analysis required to achieve the planned purpose. In future literature reviews, authors should consider this issue during their screening process if they wish to perform an extended meta analysis.

Second, we covered the studies that focus on mobile adoption by customers and not in groups and organizations. The review results indicate that the most frequently used model was the TAM, and we know that TAM was developed to predict the acceptance of new technology within groups or in organizational settings (Davis, 1989). Owing to the limited number of studies of mobile acceptance in organizations, we decided not to include that topic. However, future studies should include research that focuses on acceptance in both settings to offer results of a wider scope.

Third, this review focuses on mobile adoption only and does not extend to reviewing works on post-adoption, re-use or continuance of mobile technologies. Future literature reviews should also incorporate such publications.

Finally, a shortage of resources dictated that the literature review could essentially cover only material published since 2010. The final review does include some studies conducted before 2010 that were chosen either because they were repeatedly cited by authors or were suggested to be relevant by colleagues. Many mobile adoption studies were conducted and published prior to 2010 that contributed to shaping this research area, and in fact, the introduction of mobile technologies predates the 1990s, and it must be considered a limitation of the current study that it was unable to include such earlier studies within its purview.

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Appendix A

N	Author	Title	Journal	Year	Technology studied	Sample size	Heterogeneous sample?	Survey mode	FW location
1	Venkatesh et al.	Consumer acceptance and use of information Technology: extending the unified theory of acceptance and use of technology	MIS Quarterly	2012	Mobile Internet	4127 1512	Yes	Online	Hong Kong
2	Kim et al.	Value-based Adoption of Mobile Internet: An empirical investigation	Decision Support Systems	2007	Mobile Internet	161	Yes	Online	Singapore
3	D.-H. Shin	Towards an understanding of the consumer acceptance of mobile wallet	Computers in Human Behavior	2009	Mobile wallet	296	Yes	Online	US
4	Park et al	Adoption of Mobile Technologies for Chinese Consumers	Journal of Electronic Commerce Research	2007	Mobile technologies	221	Yes	Online	China
5	L. S-L Chen and C.J. Kuan	Customer acceptance of playing online game on mobile phones	International Journal of Mobile Communications	2012	Mobile online gaming	610	Yes	Online	Taiwan
6	T. Zhou et al.	Integrating TTF and UTAUT to explain mobile banking user adoption	Computers in Human Behavior	2010	Mobile banking	250	Yes	Offline	China
7	C.-S. Yu	Factors Affecting Individuals to Adopt Mobile Banking: Empirical Evidence from The UTAUT Model	Journal of Electronic Commerce Research	2012	Mobile banking	441	Yes	Online	Taiwan
8	Tao Zhou	Examining LBS usage from the perspectives of UTAUT and Privacy Risk	Journal of Electronic Commerce Research	2012	Location based services	191	Yes	Offline	China
9	Thong, Venkatesh, Xu, Hong, Tam	Consumer Acceptance of Personal Information and Communication Technology Services	IEEE Transactions on Engineering Management	2011	Information Communication services	4777	Yes	Online	Hong Kong
10	Gayar, Moran, Hawkes	Students' Acceptance of Tablet PCs and Implications for Educational Institutions	Educational Technology & Society	2011	Tablet PC	232	Students	Online	US
11	Lu June, Yu Chun-Sheng, Liu Change	Mobile data service demographics in urban China	Journal of computer information systems	2009	Mobile data services	1320	Yes	Offline	China
12	Y. Jung et al.	Consumer adoption of mobile TV: Examining psychological flow and media content	Computers in Human Behavior	2009	Mobile TV	208	Yes	Online	Korea
13	J. Cheon et al.	An investigation of mobile learning readiness in higher education based on the theory of planned behavior	Computers and Education	2012	Mobile learning	177	Students	Offline	US
14	D. C. Karaiskos et al.	Affective and social determinants of mobile data service adoption	Behaviour & Information Technology	2012	Mobile data services	219	Yes	Online	Greece
15	Y. Liu, H. Li	Exploring the impact of use context on mobile hedonic services adoption: An empirical study on mobile gaming in China	Computers in Human Behavior	2011	Mobile gaming	267	Students	Offline	China
16	K. Rouibah et al.	Factors affecting camera mobile phone adoption before e-shopping in the Arab world	Technology in Society	2011	Mobile camera phone	151	Students	Offline	Kuwait
17	Y. Park, J.V. Chen	Acceptance and adoption of the innovative use of smartphone	Industrial Management & Data Systems	2007	Smartphone	133	Doctors and nurses	Offline	US
18	H. Dai, P.C. Palvia	Mobile Commerce Adoption in China and the United States	The DATA BASE for Advances in Information Systems	2009	Mobile commerce	106	University students	Offline	China
19	H. Dai, P.C. Palvia	Mobile Commerce Adoption in China and the United States	The DATA BASE for Advances in Information Systems	2009	Mobile commerce	84	University students	Offline	US
20	Iqbal and Qureshi	M-Learning Adoption: A Perspective from a Developing Country	The International review of research in open and distance learning	2012	Mobile learning	250	University students	Offline	Pakistan
21	A. Persaud and I. Azhar	Innovative mobile marketing via smartphones Are consumers ready?	Marketing Intelligence & Planning	2012	Mobile marketing	428	Yes	Online	Canada
22	R. Faullant, J. Fuller, K. Matzer	Mobile Audience Interaction- Explaining the adoption of new mobile service applications in socially enriched environments	Engineering Management Research	2012	Mobile voting	136	Yes	Online	Germany
23	Y.K.Choi, J.W.Totten	Self-construal's role in mobile TV acceptance: Extension of TAM across cultures	Journal of Business Research	2012	Mobile TV	817	University students	Offline	Korea
24	Y.K.Choi, J.W.Totten	Self-construal's role in mobile TV acceptance: Extension of TAM across cultures	Journal of Business Research	2012	Mobile TV	401	University students	Offline	US
25	H.Y. Wang, S.H. Wang	User Acceptance of Mobile Internet Based on UTAUT: Investigating the Determinants and Gender Differences	Social behavior and personality	2010	Mobile Internet	343	Yes	Online	Taiwan

26	Y.Y. Shin, C.Y. Chen	The study of behavioral intention for mobile commerce: via integrated model of TAM and TTF	Qual Quant	2011	Mobile commerce	421	Real Estate agents	NA	Taiwan
27	S.Y. Park, M.W. Nam, S.B. Cha	University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model	British Journal of Educational Technology	2011	Mobile learning	288	University students	Offline	Korea
28	B. Kim, I. Han	What drives the adoption of mobile data services? An approach from a value perspective	Journal of Information Technology	2009	Mobile data services	287	University students	Offline	Korea
29	D.-H. Shin	What makes consumers use VoIP over mobile phones? Free riding or consumerization of new service	Telecommunications Policy	2012	Mobile voip	329	Yes	Online	Korea
30	G.W. Tan et al.	Determinants of mobile learning adoption: an empirical analysis	Journal of computer information systems	2012	Mobile learning	401	University students	Offline	Malaysia
31	D. Lee et al.	Text me when it becomes dangerous: Exploring the determinants of college students' adoption of mobile-based text alerts short message service	Computers in Human Behavior	2013	Mobile text message alert	285	University students	Online	US
32	S. Lee	An integrated adoption model for e-books in a mobile environment: Evidence from South Korea	Telematics and Informatics	2013	Mobile e books	400	Yes	Online	Korea
33	Chan-Olmsted et al.	Mobile News Adoption among Young Adults: Examining the Roles of Perceptions, News Consumption, and Media Usage	Journalism & Mass Communication Quarterly	2012	Mobile news	384	University students	Online	US
34	T. Zarmpou et al.	Modeling users' acceptance of mobile services	Electronic Commerce Research	2012	Mobile services	445	Yes	Both	Greece
35	U. Akturan, N. Tezcan	Mobile banking adoption of the youth market Perceptions and intentions	Marketing Intelligence & Planning	2012	Mobile banking	435	University students	Offline	Turkey
36	R. Peng, L. Xiong, Z. Yang	Exploring Tourist Adoption of Tourism Mobile Payment: An Empirical Analysis	Journal of Theoretical and Applied Electronic Commerce Research	2012	Mobile payment (tourism)	421	Tourist in China	Offline	China
37	N.M. Suki	Factors Affecting Third Generation Mobile Service Acceptance: Evidence from Malaysia	Journal of Internet Banking and Commerce	2011	3G services	100	NA	NA	Malaysia
38	Z. Li, X. Bai	An Empirical Study of the Influencing Factors of User Adoption on Mobile Securities Services	Journal of Software	2011	Mobile securities	174	Yes	Offline	China
39	Z. Liu et al.	A Study of Mobile Instant Messaging adoption: within-culture variation	International Journal of Mobile Communications	2011	Mobile instant messaging	837	Yes	Online	China
40	N. Mallat et al.	The impact of use context on mobile services acceptance: The case of mobile ticketing	Information and Management	2009	Mobile ticketing	360	Yes	Offline	Finland
41	J. Zhang	Exploring drivers in the adoption of mobile commerce in China	Journal of American Academy of Business	2009	Mobile commerce	2160	Yes	Offline	China
42	C-T.B. Ho et al.	Technology adoption of mobile learning: a study of podcasting	International Journal of Mobile Communications	2010	Mobile learning: podcasting	246	Yes	Online	Taiwan
43	W. Teng, H-P. Lu	Consumer adoption of PDA phones in Taiwan	International Journal of Mobile Communications	2010	Smartphone (PDA)	326	University students	Offline	Taiwan
44	L. Qi, L. Li, Y. Li, H. Shu	An Extension of Technology Acceptance Model: Analysis of the Adoption of Mobile Data Services in China	Systems Research and Behavioral Science	2009	Mobile data services	802	Yes	Offline	China
45	Oye, Lahad, Rahim	Acceptance and Usage of ICT by University Academicians Using UTAUT Model: A Case Study of University of Port Harcourt, Nigeria	Journal of Emerging Trends in Computing and Information Sciences	2012	Information Communication services	100	Department staff	Offline	Nigeria
46	Chen et al.	Applicability of the UTAUT Model in Playing Online Game through Mobile Phones: Moderating Effects of User Experience	IEEE Int'l Technology Management Conference	2011	Mobile online gaming	610	Yes	Online	Taiwan
47	Y.-K Lee et al.	A unified perspective on the factors influencing usage intention toward mobile financial services	Journal of Business Research	2012	Mobile financial services	240	Yes	Online	Korea
48	H. Kalaiarasi, Dr. V. Srividya	A study on Wireless Banking Services - the case of mobile banking with integrated Technology Acceptance Model	Journal of Contemporary Research in Management	2012	Mobile banking	209	Yes	Offline	India
49	Liu et al.	A usability-centred perspective on intention to use mobile payment	International Journal of Mobile Communications	2011	Mobile payment	202	University students	Both	China
50	G. Jiang and W. Deng	An empirical analysis of factors influencing the adoption of Mobile Instant Messaging in China	International Journal of Mobile Communications	2011	Mobile instant messaging	364	Yes	Both	China
51	H. Amin, M.R.A. Hamid, S. Lada, Z. Anis	The Adoption of mobile banking in Malaysia: the case of Bank Islam Malaysia Berhad (BIMB)	International Journal of Business and Society	2008	Mobile banking	158	Yes	Offline	Malaysia
52	Y. Liu et al.	Factors driving the adoption of m-learning: An empirical study	Computers and Education	2010	Mobile learning	209	University students	Offline	China
53	C. Lopez-Nicolas et al.	An assessment of advanced mobile services acceptance: Contributions from TAM and diffusion theory models	Information and Management	2008	Mobile services (advanced)	542	Yes	Online	Netherlands
54	T.R. Lee et al.	Adoption of mobile Location-Based Services with Zaltman Metaphor Elicitation Techniques	International Journal of Mobile Communications	2009	Location based services	196	Yes	NA	Taiwan
55	C.-Y. Tsai	An analysis of usage intentions for mobile travel guide systems	African Journal of Business Management	2010	Mobile travel guide systems	175	Yes	Offline	Taiwan
56	S. Lee et al.	An integrated adoption model for mobile services	International Journal of Mobile Communications	2012	Mobile services	777	Yes	Online	Korea

57	J-L. Chong et al.	An empirical analysis of the adoption of m-learning in Malaysia	International Journal of Mobile Communications	2011	Mobile learning	181	Students, lecturers	Offline	Malaysia
58	A-C. Teo et al.	Can the demographic and subjective norms influence the adoption of mobile banking?	International Journal of Mobile Communications	2012	Mobile banking	193	NA	Both	Malaysia
59	D-H. Shin	The influence of perceived characteristics of innovating on 4G mobile adoption	International Journal of Mobile Communications	2011	4G	NA	NA	NA	Korea
60	J. Lu et al.	Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology	Journal of Strategic Information Systems	2005	Wireless Internet Services	357	University students	Both	US
61	T. Bhatti	Exploring Factors Influencing the Adoption of Mobile Commerce	Journal of Internet Banking and Commerce	2007	Mobile commerce	NA	Yes (uni people)	NA	UAE
62	Mahatanan koon, Wen, Lim	Evaluating the technological characteristics and trust affecting mobile device usage	International Journal of Mobile Communications	2006	Mobile device	212	University students	Online	US
63	L-Y. Leong et al.	Influence of individual characteristics, perceived usefulness and ease of use on mobile entertainment adoption	International Journal of Mobile Communications	2011	Mobile entertainment	423	University students	Offline	Malaysia
64	C-L. Hsu et al.	Investigating customer adoption behaviours in Mobile Financial Services	International Journal of Mobile Communications	2011	Mobile financial services	275	Yes	Online	Taiwan
65	Y.-F. Kuo, S.-N. Yen	Towards an understanding of the behavioral intention to use 3G mobile value-added services	Computers in Human Behavior	2009	3G services	269	Students	Offline	Taiwan
66	A.Y-L. Chong et al.	Adoption of 3G services among Malaysian consumers: an empirical analysis	International Journal of Mobile Communications	2010	3G services	278	Yes	Offline	Malaysia
67	K.S. Tan et al.	An evaluation of e-banking and m-banking adoption factors and preference in Malaysia: a case study	International Journal of Mobile Communications	2010	Mobile banking	184	University students	Offline	Malaysia

Appendix B

N	Journal
1	MIS Quarterly
2	Marketing Intelligence & Planning
3	Information and Management
4	International Journal of Business and Society
5	International Journal of Mobile Communications
6	Behavior & Information Technology
7	Computers & Education
8	Computers in Human Behavior
9	Decision Support Systems
10	Engineering Management Research
11	IEEE Int'l Technology Management Conference
12	IEEE Transactions on Engineering Management
13	Journal of American Academy of Business
14	Journal of Business Research
15	Journal of computer information systems
16	Journal of Contemporary Research in Management
17	Journal of Electronic Commerce Research
18	Journal of Internet Banking and Commerce
19	Journal of Software
20	Social behavior and personality
21	Systems Research and Behavioral Science
22	Telecommunications Policy
23	Telematics and Informatics
24	African Journal of Business Management

Appendix C

Acronyms	Definition
UTAUT	Unified Theory of Acceptance and Use of Technology
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
FVM	Fit-viability Model
TPB	Theory of Planned Behavior
DOI	Diffusion of Innovation
IBM	International Business Machines
IDT	Innovation Diffusion Theory
TTF	Task Technology Fit
PEOU	Perceived ease of use
BI	Behavioral intention
PE	Performance expectancy
EE	Effort expectancy
SI	Social influence
FC	Facilitating conditions
SN	Social norms
PU	Perceived usefulness

II

A CULTURAL COMPARISON STUDY OF SMARTPHONE ADOPTION IN UZBEKISTAN, SOUTH KOREA AND TURKEY

by

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A cultural comparison study of smartphone adoption in Uzbekistan, South Korea and Turkey

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Abstract

Smartphone popularity is increasing due to technological advances that mean manufacturers can make more sophisticated devices and telecommunication companies can provide better connections. Gartner (2016) reported that 403 million smartphones were sold in the fourth quarter of 2015, a 9.7 % increase over the same period in 2014. It is a common perception that users tend to utilize advanced technology to increase productivity. However, there are studies indicating quite the opposite or alternatively, slow rates of adoption. To avoid this, companies invest in studying consumer behavior. The current study's purpose is to examine the effects of drivers and cultural differences on smartphone acceptance in three representative groups from Uzbekistan, South Korea, and Turkey. Past cross-cultural studies suggest that the main factor differentiating the formation of intention among groups would be cultural differences. The results showed that cultural differences did indeed play an important role in intention formation. The significance of constructs affecting behavioral intention varied in each group and collectivism/individualism moderated these relationships. When obtaining unified results from UTAUT and the cultural perspective it is easier to compare group behaviors and analyze the differences. This is a good guide for managers to consider business activities for each group they target.

Keywords: technology adoption, mobile, smartphone, cross-culture, UTAUT.

1. Introduction

Owing to technological developments in both manufacture of smartphones and connection quality (3G, 4G) the modern mobile phones can perform more and more sophisticated tasks. Apart from simple voice calls, today smartphones can be used for a wide range of purposes such as simple messaging, banking, browsing the Internet, making internet calls, watching videos, listening to music, editing Microsoft Office files, watching TV, playing mobile games, and learning.

Due to the intense competition among handset manufacturers, device prices are continuously falling and telecom operators are rolling out a wide range of mobile services, and attractive voice and data packages. And these factors have boosted the popularity of the smartphone and the adoption process is rapidly ongoing globally. Gartner (2016) reported that 403 million smartphones were sold to end users in the fourth quarter of 2015, a 9.7 % increase over the same period in 2014. In addition, the International Telecommunication Union reported that the total number of mobile subscriptions reached 7 billion (ITU 2015).

It is a common perception that new technology always has advantage(s) over its predecessor and thus that performance and productivity improves with each upgrade. Reducing the amount of time to complete a job is the main reason why organizations tend to embrace new technologies (Aiello, Kolb 1995). However, before they can enjoy the advantages of a technology, it must first be accepted by individuals and members of organizations. There are numerous studies reporting slow adoption of various technologies and services on consumer and organizational levels (Choi, Totten 2012; Persaud, Azhar 2012). Reasons for shying away from new technologies can be intrinsic and extrinsic, and uncertainty is often the reason for reluctance in relation to a new technology (Edison, Geissler 2003).

The current research examines technology acceptance in the smartphone context because the smartphone is relatively new technology and its acceptance process is ongoing. Although the smartphone has been popular among users in many countries, the literature review carried out for this study reveals that only a few prior studies have investigated smartphone adoption (Sanakulov, Karjaluoto 2015). This study aims to explain smartphone adoption in three different groups (Uzbeks, South Koreans, and Turks); to understand the differences and similarities in their perceptions of smartphones; and to analyze cultural effects on the adoption process. The main reasons for studying smartphone adoption in these three countries are that Uzbekistan, South Korea and Turkey have distinct

cultural differences and no such cross cultural study involving these countries has been conducted in the past. Also, authors of this research have local resources needed for the project.

For this purpose, the study adopts as a base model Venkatesh et al.'s (2003) Unified Theory of Acceptance and Use of Technology (UTAUT). The main reason for choosing UTAUT is its prominence and good explanatory power in information technology studies. Also, recent literature review results by Sanakulov and Karjaluoto (2015) show that acceptance rates of paths between UTAUT constructs and intention are the highest.

In many previous studies, authors have focused on constructs relevant to that specific context such as perceived fees on the mobile Internet (Kim, Chan et al. 2007) and trust in smartphone adoption study (Jung, Hur et al. 2015). If a conventional mobile phone user wants to move to a smartphone, he/she will have to make some form of sacrifice, which might be monetary or non-monetary (Baker, Parasuraman et al. 2002). In consumer behavior studies, sacrifices are viewed as a negative influence on forming an intention to use or purchase (Monroe, Krishnan 1985). Since current smartphones are considered to be complex mobile gadgets that offer various computer-like functions, new users need to learn how to use them. Moreover, smartphones are more expensive and larger with a shorter battery life than conventional mobile phones. To explore how users perceive sacrifice and its effect, in this study, perceived sacrifice will be incorporated in the main model as an additional construct.

The cultural effects in technology acceptance have been studied for a long time. Many past studies examined its importance in various cultures and contexts by applying existing theories and frameworks. Their findings contributed to understanding the importance of cultural effects. This cross-cultural study investigates users from Uzbekistan, South Korea, and Turkey and adopts Hofstede's cultural dimensions theory to determine differences in their perceptions and the factors influencing each group's smartphone adoption. Due to limited resources and research conditions, in the current study only the individualism and collectivism dimensions are used as moderators affecting intention formation in each

group. Smartphone adoption analysis of three different groups from a cultural perspective is the main contribution of this study.

The rest if the paper is organized in five sections. In section 2, the theoretical background is discussed. In section 3, the research model is explained and hypotheses developed. Methods, results, and conclusions are discussed in sections 4, 5, and 6 respectively.

2. Theoretical Background

2.1 Technology acceptance

Modern technological advancements encourage manufacturers to introduce new products from home appliances to mobile devices. The recently introduced new generation products include 3D TVs, Smart TVs, tablet PCs, and smartphones. Since they are manufactured with superior technology and materials they are believed to be of higher quality, more productive and more efficient than their predecessors. Making hi-tech products does not guarantee consumer adoption. New technology adoption may be fast, slow, or unsuccessful for various intrinsic and extrinsic reasons.

In understanding and explaining adoption, technology acceptance has been a very important area of IS study for many years. Many adoption studies have been conducted and have made theoretical and practical contributions. Furthermore, numerous theories and models have been developed to help understand and predict technology acceptance, including the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), UTAUT, and Diffusion of Innovation (DOI) (Sanakulov, Karjaluoto 2015). Most of the studies conducted to date have been based on the abovementioned models and theories. Some researchers have focused on confirmatory studies (Park, Yang et al. 2007, Chen, Kuan 2012) based on existing theories and models, while others have extended TAM (Choi, Totten 2012), UTAUT (Wang, Wang 2010, Jung, Hur et al. 2015), and TTF (Shih, Chen 2013) by incorporating various context-specific constructs or integrating these models with theories. Moreover, some studies have investigated the determinants of the main variables of well-

established theories. For example, Shin (2012) reported that mobility and coverage are significant determinants of perceived ease of use (PEOU) in using VOIP and Tan et al. (2012) reported that past experience is a significant determinant of perceived usefulness (PU) in mobile learning.

Furthermore, many studies have examined the adoption of mobile devices. For example, Gayar et al. (2011) investigated students' acceptance of tablet PCs; Rouibah et al. (2011) studied the adoption of camera mobile phones. All these studies investigated determinants of adoption based on both hedonic and utilitarian purposes. The hedonic purpose of usage is focused on gaining pleasure while using technology. Therefore, factors such as entertainment and perceived enjoyment play important roles in forming consumer behavior. The utilitarian purpose of usage is performance focused, and all performance-related variables such as performance expectancy (PE), PU, and PEOU are considered key determinants of behavior.

2.2 UTAUT

Currently, many models of technology acceptance are available to help researchers address adoption questions. Most of these models offer some advantages over the others and relevant constructs in various contexts. Therefore, researchers must consider which model and constructs best suit their research. The solution to the dilemma proposed by Venkatesh et al. (2003) is UTAUT, which integrates eight existing models and theories: IDT, TRA, TPB, Social Cognitive Theory (SCT), TAM, Model of PC Utilization (MPCU), Motivational Model (MM) and Combined TAM and TPB (C-TAM-TPB). UTAUT attempts to explain user intention to use an information system and user behavior (Venkatesh, Morris et al. 2003) with four main variables: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC). These variables are based on 32 constructs of the eight abovementioned models. Behavioral intention and FC are considered the main determinants of usage behavior, while PE, EE, and SI are the main determinants of Behavioral Intention (BI). Similar to TAM, UTAUT emphasizes the utilitarian value of technology use, and PE is the strongest predictor of

behavioral intention (Venkatesh, Morris et al. 2003). The definitions of main UTAUT constructs are provided in Table 1. The four variables are affected by gender, age, experience and voluntariness of use (Figure 1). UTAUT reached a prediction efficiency score of 70% (Venkatesh, Morris et al. 2003), which is considered a major improvement in acceptance prediction.

Although it has not been used as widely as TAM, UTAUT has continually gained researchers' attention. Since its introduction, UTAUT has been tested and utilized to study technology acceptance in various contexts such as mobile Internet (Wang, Wang 2010), mobile online gaming (Chen, Kuan 2012), and rural tourism (San Martín, Herrero 2012). A review of past studies based on UTAUT reveals that few studies have extended it (Wang, Wang 2010) or applied it cross-culturally (Im, Hong et al. 2011).

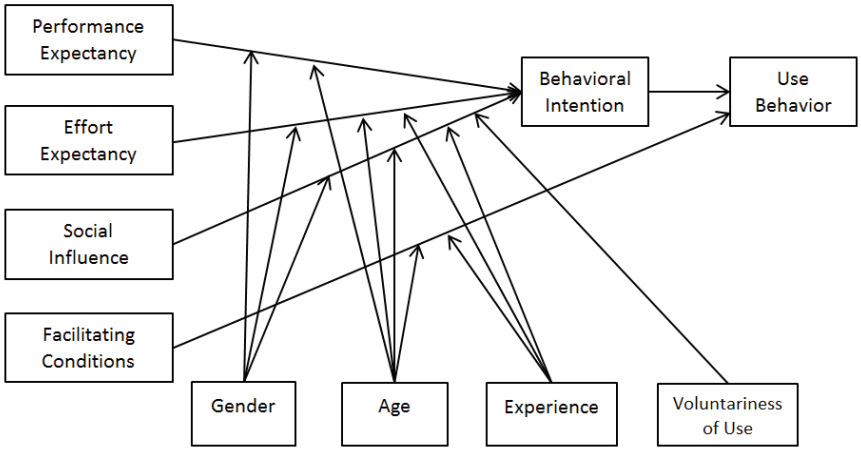

Figure 1. UTAUT model

Construct	Definition
Performance expectancy	Degree to which an individual believes that using the system will help him or her attain gains in job performance.
Effort expectancy	The degree of ease associated with the use of the system.
Social influence	The degree to which an individual perceives that important others believe that he or she should use the new system.
Facilitating conditions	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

Table 1. UTAUT construct definitions (Venkatesh, Morris et al. 2003)

2.3 Role of culture in technology acceptance

The importance of culture and country in technology acceptance has been established for some time (Straub 1994, Veiga, Floyd et al. 2001). Cultural values are an important guiding principle in people's lives and affect the formation of behavior and attitudes (Homer, Kahle 1988) toward events surrounding objects, events, and people. Straub (1994) studied the cultural effects on adoption behaviors in a sample of employees of American and Japanese firms. He reported that the adoption of fax technology was faster than that of e-mail in Japan, while the opposite result was observed in the USA. This finding was explained by cultural differences between Japan and the USA. Specifically, Japanese people tend to prefer more socially-present and information rich channel. Some other cross-country studies were conducted in various contexts such as mobile commerce (Dai, Palvi 2009), mobile TV (Choi, Totten 2012), smartphones (Jung, Hur et al. 2015). The results of those studies indicated that culture affects the adoption process. For example, in a study of mobile commerce adoption, Dai and Palvia (2009) reported that PEOU, subjective norms, perceived value, and perceived cost did not have a significant effect on the intentions of American university students, while these paths were significant for Chinese students. Many past studies have focused on establishing a methodology to understand cultural importance and to distinguish cultural values. Such studies have practical importance for managers in terms of helping them understand the various cultures they operate in. Most of these proposed methodologies and frameworks have many similarities in terms of classification, measurements, and explanations. However, the most popular and widely used framework is Hofstede's work (1984), which defines cultures. It is considered the most important contribution to the understanding of cultural effects in technology adoption. According to Hofstede, an individual is influenced by three types of cultures: national, occupational, and corporate. Hofstede defined national culture as a mental program that exists in a country and causes its inhabitants to behave differently from those in other countries. Nationality is the only factor that differentiates members of large homogeneous populations consisting of many nationals, such as the IBM employees that informed Hofstede's study (1991). In other words, he

introduced culture groups and defined culture as a set of shared assumptions that result in a common frame of reference within a society and distinguishes members of one group from those of another group (Hofstede 1984). He studied a large number of IBM employees and initially developed four dimensions of cultural variation: Power Distance (PD), Uncertainty Avoidance (UA), Individualism versus collectivism (IC), and Masculinity versus femininity (MF). He later added the dimension of long-term versus short-term orientation (LSO), which reflects the influence of time on cultures (Hofstede 1993). The cultural dimensions and definitions are provided in Table 2.

Dimension	Definition
Power Distance (PD)	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of power distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low power distance, people strive to equalize the distribution of power and demand justification for inequalities of power.
Individualism vs. collectivism (IC)	Individualism can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of themselves and their immediate families only. Its opposite, Collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."
Masculinity vs. femininity (MF)	The masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness, and material reward for success. Society at large is more competitive. Its opposite, femininity, stands for a preference for cooperation, modesty, caring for the weak, and quality of life. Society at large is more consensus-oriented.
Uncertainty avoidance (UA)	The uncertainty avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.
Long-term vs. short-term orientation (LSO)	The long-term orientation dimension can be interpreted as dealing with society's search for virtue. Societies with a short-term orientation generally have a strong concern with establishing the absolute Truth. They are normative in their thinking. They exhibit great respect for traditions, a relatively small propensity to save for the future, and a focus on achieving quick results. In societies with a long-term orientation, people believe that truth depends very much on situation, context and time. They show an ability to adapt traditions to changed conditions, a strong propensity to save and invest, thriftiness, and perseverance in achieving results.

Table 2.Hofstede's cultural dimensions and definitions (www.geert-hofstede.com)

Since its introduction, it has become the most widely recognized measurement of cultural dimensions and has been used for both academic and practical purposes. In this study, cultural effects on technology adoption from the individualism and collectivism perspective (IC) will be examined because among Hofstede's cultural dimensions, IC is the main dimension used to easily differentiate cultures. According to the theory, higher IC scores indicate a more individualistic culture. In individualistic cultures, individual goals are prioritized over collective goals, whereas in collective cultures, goals are

established to benefit the group (Triandis 1988). This difference is also portrayed in social characteristics. For example, in collectivistic cultures, social ties among members tend to be strong and group oriented, while in individualistic cultures, social ties are very loose (Triandis 1988). Another reason to use only the IC dimension is that when Korea and Turkey are compared, the greatest difference is found for this dimension (Figure 2), while PD and MA yield a six-point difference and UA shows no difference. The comparison could not be extended to include Uzbekistan because Hofstede's cultural dimension scores are not available for that country.

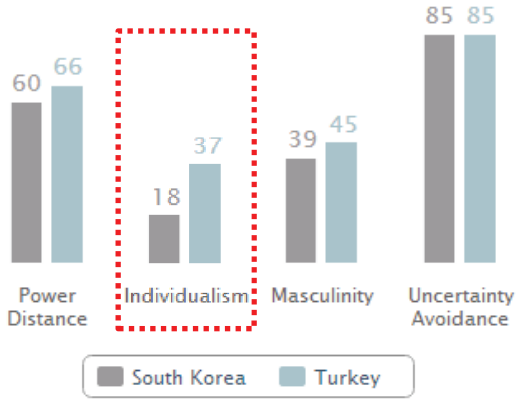

Figure 2. Comparison of cultural dimensions between South Korea and Turkey (Geert Hofstede 2016)

3. Hypothesis Development

Based on the arguments made in section 2, we proposed a model based on UTAUT to study consumers' intentions to use smartphones for several reasons. First, since its introduction, UTAUT has exhibited very good explanatory power, explaining 70% of the variance, which is much higher than any other existing well-established theory. Second, our literature review showed that even though UTAUT has good explanatory power, it has not been widely used, and only a few studies using UTAUT have focused on smartphones. Third, it has not been widely used in cross-cultural studies. A theory must be tested and consolidated in various contexts and submitted to cross-cultural comparisons. From the original model, only PE, EE, SI and gender (moderator) were retained in the study. The voluntariness of use construct was removed because our study focuses on determining the factors that influence voluntary use of smartphones. Of note, this study focuses on relationship paths between independent variables and

behavioral intention, including the moderators' effects. Therefore, the path between behavioral intention and use behavior was dropped. Figure 3 illustrates the study's research model.

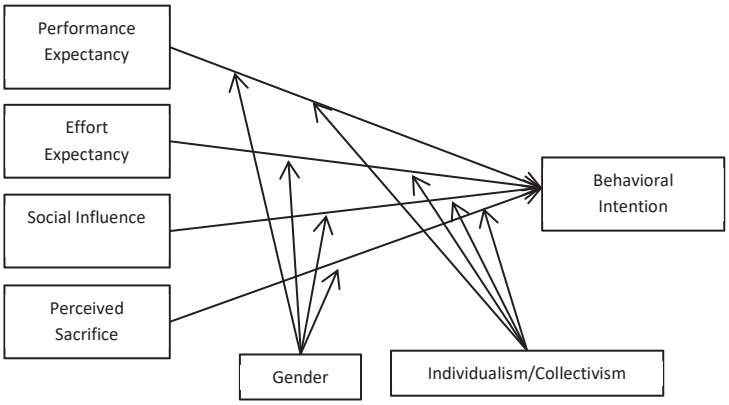

Figure 3. Research model

The current research model is unique in that it was customized for the cross-cultural smartphone adoption study. Unlike the original UTUAT model, it includes the construct of perceived sacrifice (PS). This construct is relevant to smartphone adoption mainly because smartphones are sophisticated communication devices and their use requires various sacrifices (monetary, time or effort).

3.1 Performance expectancy

PE is the degree to which an individual believes that using the system will help him or her make gains in job performance (Venkatesh, Morris et al. 2003) and was derived from TAM's PU construct. According to Venkatesh et al. (2003) and consistent with prior studies, PE is the strongest predictor of behavioral intention in information technology adoption and remains significant in all settings. In addition, our extensive review of past studies revealed that 28 (76%) of 37 cases that tested the path relationship between PU and BI reported a significant relationship, while all studies that tested paths between PE and BI (9 cases) found that the relationship was significant (Sanakulov, Karjaluoto 2015). Based on findings of past studies and the literature review, the following hypothesis is proposed:

H1. PE has a positive effect on BI to use smartphones.

3.2 Effort expectancy

EE is defined as a degree of ease associated with the use of the system and is derived from the TAM's PEOU (Venkatesh, Morris et al. 2003). According to Davis (1989), a system that is perceived to be easy to use is more likely to be accepted. When EE and PE were compared, EE was a weaker predictor than PE. When EE was analyzed separately for men and women, the influence of EE was most salient for older women with little experience (Venkatesh, Morris 2000). Our literature review results show that in 5 (of 8) cases, paths between PE and BI were statistically significant (Sanakulov, Karjaluoto 2015). Based on these arguments, the following hypothesis is proposed:

H2. EE has a positive effect on BI to use smartphones.

3.3 Social influence

SI, also known as subjective norm (Fishbein, Ajzen 1975), is the degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh, Morris et al. 2003). Past studies have demonstrated that SI is important in forming behavioral intention to use new technology (Venkatesh, Morris 2000) and that individuals rely more on others' opinions when their own opinion is not well formed (Venkatesh, Morris 2000). Various past studies have shown that SI affects individuals' BI to use system (Sanakulov, Karjaluoto 2015). However, the path between SI and BI was nonsignificant in some studies on adoption, such as those on the adoption of mobile commerce (Dai, Palvi 2009) and mobile learning (Iqbal, Qureshi 2012). Our literature review of past studies showed that in 13 cases (out of 15; 87%), this relationship was statistically significant (Sanakulov, Karjaluoto 2015). Therefore, the following hypothesis is formulated:

H3. SI has a positive effect on BI to use smartphones.

3.4 Perceived sacrifice

When UTAUT was proposed, Venkatesh et al. (2003) suggested that more research on new constructs needed to be conducted to determine the constructs that ultimately influence technology acceptance.

Moreover, researchers have suggested testing variables that have an important impact on technology acceptance. Our literature review indicated that a number of studies have integrated original well-established models with additional constructs specifically related to the context under study. For example, perceived playfulness in a study on the mobile Internet (Wang, Wang 2010) perceived credibility; trust in smartphone adoption study (Jung, Hur et al. 2015); and financial cost in a mobile banking study (Yu 2012) were tested. In the current study, PS is tested as an additional variable in UTAUT. PS is the degree to which a user perceives that a certain sacrifice is required to use the system or service. In marketing and consumer behavior studies, perceived sacrifice is considered to have a negative effect on behavior, and such sacrifice can be monetary or non-monetary (Baker, Parasuraman et al. 2002). Because smartphones are more sophisticated communication devices than conventional mobile phones and offer computer-like functions, the user is required to pay a certain cost, such as time or effort. The next hypothesis is proposed to test the relationship between perceived sacrifice and BI.

H4. PS has a negative effect on BI to use smartphones.

3.5 Gender

Gender, age, experience and voluntariness moderate relationships in UTAUT (Venkatesh, Morris et al. 2003) because they are assumed to be too weak to be direct determinants. According to Venkatesh et al. (2003), gender plays an important role as a moderator of the relationship between the main UTAUT constructs (PE, EE, SI) and behavioral intention. Males tend to be more performance oriented; therefore, their acceptance is mainly based on PE, while women's technology acceptance is mainly based on EE. Furthermore, for women, SI plays an important role in the formation of their attitude toward technology because UTAUT's gender moderating effect is based on the Gender Scheme theory, which proposes that women are concerned about others' opinions and that their attitude may be formed based on social influence. Various past studies (Venkatesh, Thong et al. 2012, Venkatesh, Morris 2000) have investigated gender effects on technology adoption and have confirmed the significance of

these effects. However, some studies have asserted that the statistical evidence is insufficient to confirm gender effects (Wang, Wang 2010). In addition to examining the constructs of UTAUT, we test the moderating effects of gender on the relationship between PS and intention. The negative effect of PS is expected to be stronger for women because women's acceptance behavior is based on EE, which can be considered the opposite of sacrifice. Therefore, this study examines whether gender moderates paths between PS and BI.

H4a.The effect of PE on BI is moderated by gender such that it is stronger for men.

H4b. The effect of EE on BI is moderated by gender such that it is stronger for women.

H4c. The effect of SI on BI is moderated by gender such that it is stronger for women.

H4d. The effect of PS on BI is moderated by gender such that it is stronger for women.

3.6 Individualism versus Collectivism (IC)

It is believed that cultural behaviors are reflected in the use of technology because cultures cannot be separated from individuals (Hofstede 1984). This belief was supported by prior research on the importance of culture in information management and IT product adoption (Dai, Palvi 2009, Choi, Totten 2012). In the current study, the effects of IC on individuals' perceptions across the UTAUT constructs are investigated. We assume that IC plays an important role in how an individual perceives PE, EE, SI and PS in smartphone adoption.

Collectivistic users are assumed to prefer rich media such as face-to-face meetings that transmit social cues better than forms such as e-mail (Straub, Keil et al. 1997). Their decisions are based on the potential benefits to a group rather than to an individual, whereas in individualistic societies, the decisions are based on benefits to individual work performance (Veiga, Floyd et al. 2001). In addition, decisions in collectivistic cultures are mainly influenced by others' views, opinions, and expectations. After considering IC scores from South Korea and Turkey, one would expect differences in attitudes

toward using technology. Because Korea is a more collectivistic society, with an Individualism score of 18 (Geert Hofstede 2016), Koreans might feel relatively more comfortable with rich media than Turks (Individualism score: 37) (Geert Hofstede 2016). In this study, we assume that IC positively affects users' perceptions about performance expectancy for smartphones. The main reason for this assumption is that smartphones offer more communication options than traditional phones such as video calls, voice messages, video messaging, live streaming and Internet calls.

H5a. Collectivism being the stronger moderator, IC positively influences the path between PE and BI.

IC does not have any influence on the formation of assumptions regarding EE because EE is highly dependent on an individual's skills and experience in using the technology or service. However, members of collectivistic groups might be motivated to attempt to use a system as a result of social influence, especially when the members of a group show a trend in using a certain technology or service.

H5b. Collectivism being the stronger moderator, IC positively influences the path between EE and BI.

Social influence is the degree to which an individual perceives that important others believe that he or she should use the new system (Venkatesh, Morris et al. 2003), and friends, relatives, and seniors around that individual will influence the individual's decision-making process on usage. This is more practiced in groups that score low on IC. In collectivistic groups, members consider others' opinions, usage behavior, and suggestions while forming behavioral intentions. The opposite practice is applicable for individualistic groups, which prioritize individual outcomes and goals. Such groups are more concerned with personal achievements than whole groups. Therefore, we assume that the relationship between social influence and BI is stronger for collectivistic groups.

H5c. Collectivism being the stronger moderator, IC positively influences the path between SI and BI.

Each individual must make a sacrifice to use a system. This sacrifice cannot be generalized based on levels of individualism and collectivism, and it has not been tested with cultural factors. However, we assume that in collectivistic groups, social influence may be so strong that the negative effect of perceived sacrifice becomes less important.

H5d. Collectivism being the stronger moderator, IC positively influences the path between PS and BI.

4. Method

4.1 Questionnaire development

To validate the above hypotheses, we conducted an online survey that included the most reliable, tested, and academically accepted measurements to ensure that the respondents could understand the questionnaire regardless of their nationality or level of literacy. Essentially, the study questionnaire contained screener, UTAUT, IC, and demographics question sets. The screener part consisted of questions about ownership of a smartphone, gender, age, and country of origin. The second section covered UTAUT questions developed by converting the original questions into equivalent questions for the smartphone domain; for instance, the word *system* was changed to *smartphone*. All the statements in the UTAUT section were measured on a 7-point Likert scale and derived from Venkatesh et al.'s (2003) items. The full list of items used in the survey is provided in Appendix A. To determine the individualism and collectivism characteristics of the respondents, Hofstede's original measurements with 7-point Likert scales were used. Before each pair of questions about a specific variable was asked, a short description was provided to aid the respondents' understanding. For example, "Performance means a smartphone is useful for your job/studies, enables you to accomplish tasks more quickly, increases productivity and can increase the chances of getting a raise/good grade." The wording of the descriptions was adopted from existing literature.

The questionnaire was translated into three languages: Uzbek, Turkish, and Korean. The Turkish version of the questionnaire was translated by a Turkish national who is a PhD student and fluent in English. The

Korean version was translated by a Korean national who is fluent in English and was checked by a marketing professor. Because the main questionnaire was developed using measurements written in English, we followed the recommendation of Brislin (1970) and checked all versions through back translation to ensure that the meanings of questions remained unchanged by the translation process.

4.2 Data collection procedure

After minor revisions, the online questionnaire was created, and the links to all versions were emailed to friends, classmates, and colleagues and posted on popular general online forums. All recipients were asked to share the links with their contacts. The sample population ranged from students to professionals and from smartphone users to non-users.

5. Results

The survey produced 299 usable responses from 321 initially submitted responses. The 22 excluded responses contained random and incomplete answers. The demographic background of the respondents is recorded in Table 3. The majority of the respondents were students and aged between 21 and 30 years (72%). Only 26% of the respondents were 31–60+ years old. In terms of gender, 59% of respondents were male and 41% were female. Of the respondents, 90% had experience in using smartphones and 83% owned smartphones.

Description		Frequency	%
Gender	Males	177	59%
	Females	122	41%
Experience	Yes	269	90%
	No	30	10%
Ownership	Yes	249	83%
	No	50	17%
Age	16-25	122	41%
	26-35	145	49%
	36-45	30	19
	46-55	2	1
Country	Uzbekistan	94	31%
	Korea	113	38%
	Turkey	92	31%

Table 3. Frequency figures

Each item of every construct was checked for reliability using confirmatory analysis. Those that scored greater than 0.7 are considered to be highly reliable because a Cronbach's α greater than 0.6 is acceptable (Nunnally 1978). A social influence (SI) item was removed from further analysis due to low loadings, ensuring good reliability. Table 4 shows that each construct's Cronbach's alpha value is higher than 0.6.

For further analysis, a linear regression analysis was conducted to test the proposed hypotheses and research model. The research model was tested according to the significance of the path coefficient, which indicates the relationship between the dependent (performance expectancy (PE), effort expectancy (EE), social influence (SI) and perceived sacrifice (PS)) and independent variables (behavioral intention (BI)), and the R^2 value, which represents the amount of variance explained.

Constructs	Cronbach's α
Performance Expectancy	.672
Effort Expectancy	.628
Social Influence	.751
Perceived Sacrifice	.672
Behavioral Intention	.862

Table 4. Construct reliability test

H1 stated that PE positively affects BI. The hypothesis was not supported for the total population or the individual countries, contradicting many past studies that reported a significant relationship. H2 stated that EE positively affects BI, and this was supported only for the total sample and for Uzbek users. The path coefficient for the total sample was β= .202***, t= 3.368. H3 stated that SI positively affects BI to use a smartphone. This path proved statistically significant for the total sample and for Koreans (β= .236*, t= 2.232). Hypothesis 4 predicted that PS negatively affects BI to use smartphones. This was not supported for the total population, β=-.037, t= -.657. However, it was supported for Turkish users, β= -.219* and t= -2.135 (Table 5).

Path	Total Sample	Uzbekistan	Korea	Turkey

	Path Coef	t-value	Path Coef	t-value	Path Coef	t-value	Path Coef	t-value
PE->BI	-.003	-.049	.162	1.490	.049	0.518	.049	.447
EE>BI	.202***	3.368	.217*	1.931	.095	0.895	.193*	1.850
SI>BI	.180***	3.089	.191	1.895	.236*	2.232	-.107	-.990
PS>BI	-.037	-.657	.045	0.460	.109	-1.144	-.219*	-2.135

***p≤.001 **p≤.01 *p≤.05

Table 5. Verification of research hypotheses

H4a–d stated that gender moderates the effects of PE, EE, SI and PS on BI. To test the moderating effects, we divided the data into male and female groups, and path coefficients for each group and variables were obtained by linear regression. The beta difference was inserted into the *t*-test formula below (Figure 4) to check the path relation between males and females.

$$t = \frac{\beta_1 - \beta_2}{\sqrt{\frac{\sum (Y_1 - \hat{Y}_1)^2 + \sum (Y_2 - \hat{Y}_2)^2}{n_1 + n_2 - 4}} \times \frac{\sum X_1^2 + \sum X_2^2}{\sum X_1^2 \times \sum X_2^2}}$$

Figure 4. *T*-test formula for calculating gender moderation

The results presented in Table 6 indicate that gender affects the relationship between PE, EE, SI, PS and BI.

Paths	Males	Females	B1-β2	t
PE->BI	.007	.122	0.115	1.469
EE->BI	.195	.163	0.032	0.403
SI->BI	.140	.280	0.140	1.756
PS->BI	-.112	.134	0.246	3.055

Table 6. Significance of gender in technology acceptance

H5a–d stated that IC moderates the paths between PE, EE, SI, PS and BI. The moderating effects of IC were calculated by comparing the direct paths (between PE, EE, SI, PS, and BI) and the moderated paths (constructs multiplied with IC to BI). The results show mixed significance of IC on the paths between the constructs and BI. For Uzbek users, individualism proved a stronger moderator in the paths between PE, EE, SI, PS and BI. For Koreans, collectivism was a stronger moderator and amplified the paths between

EE, SI and BI. For Turkish users, no significant effect of IC was observed. Interestingly, in all cases, the effect of perceived sacrifice on behavior was influenced by moderators (Table 7).

Path	Uzbekistan		Korea		Turkey	
	β	T-value	β	T-value	β	T-value
PE → BI	.161	1.492	.049	.518	.049	.447
PE x Collectivism → BI	.243*	2.175	.076	.788	.062	.519
PE x Individualism → BI	.250*	2.459	.080	.801	.038	.302
EE → BI	.220*	1.982	.095	.895	.193	1.850
EE x Collectivism → BI	.305**	2.823	.207*	2.194	.183	1.411
EE x Individualism → BI	.399***	3.784	.141	1.438	.192	1.683
SI → BI	.190*	1.902	.236*	2.232	-.107	-.990
SI x Collectivism → BI	.287**	2.701	.268**	2.919	.162	1.136
SI x Individualism → BI	.339**	3.184	.269**	2.674	.066	.516
PS → BI	.045	.460	.109	1.144	-.219*	-2.135
PS x Collectivism → BI	.072	.654	.037	.395	-.200	-1.424
PS x Individualism → BI	.160	1.486	-.031	-.303	-.205	-1.780

Table 7. Path coefficients between constructs and moderators for each country

6. Discussion, contributions and conclusion

The amount of general empirical research conducted in the area of technology acceptance, including mobile phone technology acceptance, has been increasing. However, despite the growth in research, few studies have addressed the mobile phone acceptance process in light of cultural effects on the whole process (Sanakulov, Karjaluoto 2015). Furthermore, research has not compared technology acceptance in Korea, Turkey, and Uzbekistan. The current research attempts to explore individual differences and their role in technology acceptance. UTAUT, a strong technology acceptance model, was used to study smartphone adoption. The original UTUAT was modified by replacing facilitating conditions with the perceived sacrifice (PS) construct to address potential user sacrifices such as monetary costs, privacy, time and effort to learn how to use smartphones. The results obtained for the total population were slightly different than those originally proposed by Venkatesh et al. (2003). The current research also reveals that UTAUT constructs have a different effect on technology acceptance in different countries. Venkatesh et al. (2003) proposed that PE and EE are the strongest predictors; however, their proposal is

only partially supported by the findings of the current research. PE did not have significant predictive power either in the total population or in the individual groups, while EE positively influenced the BI of the total sample and Uzbek users. This can be explained considering the original UTAUT study performed by Venkatesh et al. (2003). Their study was conducted in an organizational context in which performance expectancy is the most important driver of technology acceptance, which differs from the consumer context. The path between SI and BI was statistically significant for the total sample and Koreans, while PS was a negative predictor only in the Turkish group.

In addition, this study sought to determine cultural effects on the adoption process by employing Hofstede's individualism and collectivism dimension. The results were in line with previous results and Hofstede's cultural dimensions scale. The results of this study are in accordance with most prior adoption studies.

6.1 Theoretical contribution

The main contributions of current study are that it modified the original UTAUT by including an additional construct (perceived sacrifice) and tested it in the consumer smartphone acceptance context in a cross-cultural setting. In addition, the current study reveals interesting results that further our understanding of consumer technology acceptance and the moderating effects of cultural factors and gender.

The perceived sacrifice construct was integrated into the UTAUT model to address the possible sacrifices related to using smartphones in a consumer setting. According to Baker and Parasuraman (2002), a sacrifice can be monetary or non-monetary. This is also applicable for smartphone usage because smartphones are more expensive than conventional phones and learning to use them requires time and effort. In contrast to employees' experience with workplace technologies, consumers have to bear the costs associated with the devices and services (Venkatesh, Thong et al. 2012) and do not receive training. Although the results supported the hypothesis only partially, we believe that the advancement

of smartphone technology, the increasing number of sophisticated services offered by third parties, and users' growing privacy concerns will lead to a prioritization of the issue of sacrifice.

Overall, UTAUT's predictive power is relatively higher than that of other technology adoption models. However, a review of past studies reveals some inconsistency in the individual constructs' ability to predict adoption (Sanakulov, Karjaluoto 2015), and the current study confirmed that inconsistency. When the data were analyzed, only EE and SI were statistically significant constructs, while PE did not correlate with BI. For Uzbek users, all UTAUT constructs (PE, EE, and SI) significantly affected BI. In contrast, only SI had a significant effect among Koreans, and only EE was significant among Turks. For Uzbeks, PE and EE were the strongest factors affecting BI, while for Koreans, these factors were not statistically significant. This can be explained by reference to the relative level of technological advances and standards of living. Because smartphones are expensive devices, only a small proportion of users can frequently obtain an upgrade when a newer version is released. Therefore, for Uzbek users, SI is less important.

As expected, the results obtained differed across the groups, confirming that the adoption process cannot be generalized. Each country and society may have specific priorities in regard to technology acceptance. In addition, gender and IC were studied as moderators affecting the relationships between the PE, EE, and SI constructs and BI. Overall, both factors were confirmed to be moderators of the paths. However, some variance across groups and paths was found. For Koreans, individualism proved to be a positive moderator of the EE / BI path, while it had a negative effect on SI / BI. For Turks, SI did not significantly influence BI. However, when individualism moderated this relationship, the SI / BI path was significant. Again, these results confirm the differences in technology acceptance between various groups.

6.2 Managerial implications

Current research offers important managerial implications for decision makers, product and software developers, and marketing managers. The main practical implication is that when implementing managerial decisions, country-specific factors and cultural backgrounds should be considered. The current results found that factors influencing technology acceptance varied in strength across the groups. For example, social influence was the strongest predictor of behavioral intention to use a smartphone among South Korean participants. South Korea is considered to be a highly collectivistic society, with an Individualism score of 18 (Geert Hofstede 2016), where others' views, opinions, and expectations influence decision making. When results are examined from a cultural perspective, the two results support each other because cultural behaviors are reflected in individuals' activities. Based on this knowledge, appropriate marketing communication that emphasizes the social aspects of using smartphones should be formulated. Social influence does not correlate with behavior intention in the Turkish group, and this result is supported by cultural factors. Turkey's individualism score is 37 (Geert Hofstede 2016), indicating that social influence should be less important. This implication can be applied to other countries based on individualism-collectivism levels.

Furthermore, our empirical findings indicate that behavioral intention is most influenced by effort expectancy, indicating consumers want devices and software that require less effort to use. Product and software developers should focus on making easy-to-use devices and software, and consumers' perception of effortless products should be increased through marketing communication.

6.3 Limitations and future research direction

This study has some limitations. First, data were collected only from individuals with Internet access. This was the main obstacle that prevented us from reaching random respondents, and in some sense, this limitation may have resulted in a homogeneous sample. For example, the Internet penetration rate in Uzbekistan is very low, and only those who consider it important to remain aware of technological advances or who are financially comfortable have the Internet. Furthermore, when the data were

analyzed, it became clear that most of the participants were young adults, particularly students or people working in an office. Therefore, the general profile of the respondent was a young student or employee, which precludes the generalization of the results. The second limitation is the size of the data set (n=299), which is considered low for three different groups, and most of studies based on survey instruments advocate a larger sample size to improve quality. Third, the three groups studied in this research are known to have similar traditional and cultural principles such as respect for elders, a collectivist style of living, and low power distance preferences. Therefore, the results did not show any great differences between the groups.

Future research with similar characteristics should consider the limitations mentioned above to improve the research methodology and the quality of the results. Furthermore, technological advances occur very rapidly and are becoming part of our daily lives, which is changing our perceptions of technologies. Therefore, to investigate the changes, timelines of changes, and reasons for and drivers of changes, researchers should conduct longitudinal research. Moreover, a longitudinal approach would provide an opportunity to study post-adoption behavior.

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III

A CROSS-CULTURAL STUDY OF SMARTPHONE ADOPTION IN UZBEKISTAN AND SOUTH KOREA

by

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Chapter 11
A Cross-Cultural Study of Smartphone Adoption in Uzbekistan and South Korea

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ABSTRACT

Smartphone technology has changed how mobile phones are perceived and used in daily life. In 2015, global smartphone sales reached 1.4 billion units, representing an increase of 14.4 percent from 2014. Despite this popularity, penetration rates vary significantly across countries, with a global median of 43%. The main purpose of this research is to examine smartphone adoption in Uzbekistan and South Korea based on the Unified Theory of Acceptance and Use of Technology (UTAUT) and to categorize constructs according to the Kano model. The findings indicate significant differences between South Korea and Uzbekistan in terms of technology adoption as a whole and perception of UTAUT constructs.

INTRODUCTION

Smartphone technology has changed how mobile phones are perceived and used in daily life. This technological revolution saw the convergence of mobile phone technology with functions native to consumer products such as digital video and stills cameras, personal digital assistants (PDAs), MP3 players, computers, and GPS tools. This development means that users can now access multiple functions within a single device (Okazaki & Mendez, 2013), and the range of functions is increasing rapidly. In addition to generic phone functions, the smartphone user can access Internet wirelessly, take pictures, perform financial transactions, stream or watch audiovisual content, use various tracking functions, and play high quality video games. With technological advances and an increasingly competitive market that includes newcomers such as Huawei, ZTE, Xiaomi, smartphone prices continue to fall, further increasing their popularity. According to Gartner (2016), 403 million smartphones were sold to end users in the fourth

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quarter of 2015, representing an increase of 9.7% in the same period in 2014. In 2015 as a whole, smartphone sales reached 1.4 billion units—an increase of 14.4% from 2014 (Gartner, 2016)—and the total number of mobile subscriptions reached 7 billion (ITU, 2015). Increasing demand and new possibilities affected market size worldwide, prompting interest from many related industries, including video game developers, who had traditionally focused on PC, Sony PlayStation and Xbox game consoles. Among these, Sony announced an "aggressive" push into mobile gaming following its rival Nintendo's phenomenal success with the mobile game Pokémon Go (Financial Times, 2016). The advertising industry is also rushing to gain market share; according to eMarketer (2016), there will be more than 2 billion smartphone users in the world and 101.37 billion dollars will be spent on mobile advertising, accounting for more than 50% of all digital ad expenditure. Other industries such as banking, retail, travel, and healthcare are also following suit.

Despite this popularity, smartphone penetration rates vary significantly across countries, with a global median of 43% (Pew Research Center, 2016). While one might expect high penetration in Japan as a center for innovative technologies, PewResearch Center (2016) reports actual smartphone usage rate there of around 39% of the total population as compared to 88% in South Korea. Despite general similarities in culture and technology innovativeness, these neighbors differ hugely in terms of smartphone usage. This may involve many intrinsic and extrinsic factors, such as cultural differences (Straub, 1994), usage habits (Shin & Choo, 2012), uncertainty (Edison & Geissler, 2003), and technological availability. Cultural values are a set of guiding principles that affect formation of behaviors and attitudes (Homer & Kahle, 1988), and numerous past studies have reported the influence of culture on technology acceptance and usage (Sanakulov & Karjaluoto, 2017). For example, one comparison of office workers in the US and Japan found that the Japanese tend to prefer more socially present and information-rich channels (Straub, 1994).

Smartphones represent a useful context for this technology acceptance study mainly because the technology remains subject to an ongoing process of acceptance, as confirmed statistically by a number of sources (Gartner, 2016; Pew Research Center, 2016). A literature review conducted by the authors found few cross-cultural studies comparing smartphone adoption. To contribute to the understanding of the role of cultural factors and their effects, the present study investigates smartphone adoption in two different groups: Uzbeks and South Koreans. The results obtained from each group are compared and categorized in terms of each group's perceptions of the particular determinants of adoption.

As a theoretical base, the study employs a slightly modified version of Venkatesh and Morris's (2003) Unified Theory of Acceptance and Use of Technology (UTAUT). Over the past decade, UTAUT has been used increasingly in academic research for its relatively high explanatory power and convenience in use. After measuring the strengths of UTAUT drivers and identifying differences among the two groups, the study categorizes each driver according to Kano's theory to examine group differences in perception based on each construct's level of importance.

Uzbekistan and South Korea were chosen for several reasons. First, both countries represent Asian culture in general but differ significantly from each other in cultural, geographic, and economic terms; while South Korea is a developed country, Uzbekistan can be characterized as developing. Second, smartphone usage rates vary greatly across these countries (BuddeComm, 2017; Pew Research Center, 2016), and in all cases, smartphone adoption is still growing. Finally, the resources to conduct this research in these countries were available to the authors. As compared to South Korea, Uzbekistan remains unexplored in this context, and the comparison using extended UTAUT represents an opportunity to explore differences in adoption and perceptions, as well as testing the generalizability of UTAUT.

The paper is organized in five sections. The next section outlines the study's theoretical background. The third section describes the research model and hypothesis development, and the fourth section describes the method. Finally, the fifth and sixth sections present results and conclusions.

BACKGROUND

Technology Acceptance

Over the past few decades, information and communications technology's rapid development has impacted the everyday lives of consumers and professionals alike, helping to increase efficiency, productivity, convenience, and ever-new possibilities. Today, it is hard to imagine a household or office without such technologies, which are regularly updated. Firms invest heavily in implementing new technologies in the workplace and in training employees to use them. However, despite generally positive perceptions, the implementation of new technologies may not go smoothly or as planned (Speier & Venkatesh, 2002), as for instance in the case of sales force automation implementations in firms (Bush, Moore, & Rocco, 2005; Morgan & Inks, 2001).

All of the above factors have triggered huge interest in technology acceptance, which has been the subject of widespread and high-quality research. This trend has continued as new products are developed, new ideas are born, bringing changes in consumer lifestyles and perceptions of technology. Existing frameworks and theories include the technology acceptance model (TAM), the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the unified theory of acceptance and use of technology (UTAUT). Although the newest of these was developed more than a decade ago, these approaches remain in ongoing use, extended and adapted for various contexts and settings (Sanakulov & Karjaluoto, 2017). The literature review conducted for this study showed that most studies of smartphone adoption were based on either TAM (Chun, Lee, & Kim, 2012; Jeon & Park, 2015; Wan Ismail, Kit, Chan, Buhari, & Muzaini, 2012) or UTAUT (Jung, Hur, & Kim, 2015; Sanakulov & Karjaluoto, 2017).

Unified Theory of Acceptance and Use of Technology

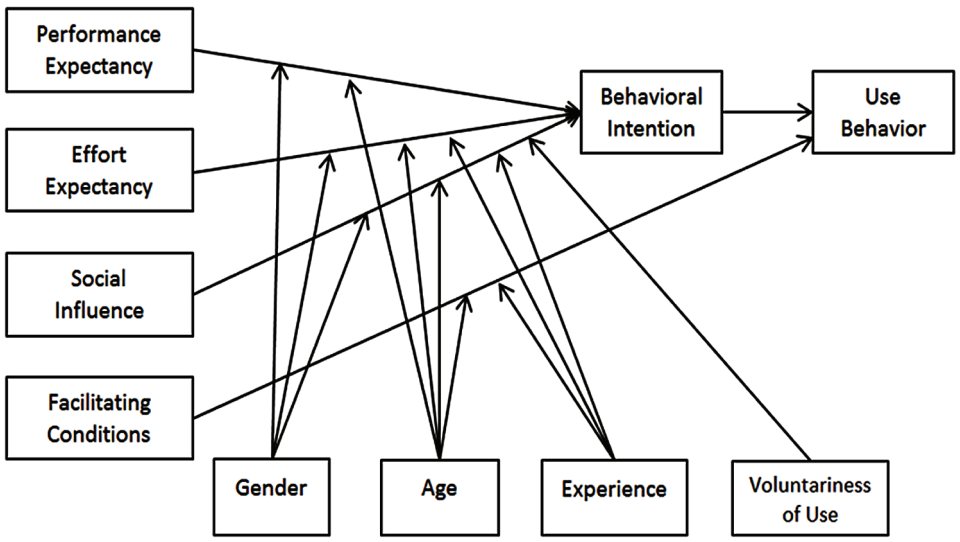
As noted above, a high level of research interest has yielded many theories and models, enhancing understanding of technology acceptance in various contexts and settings. Researchers have drawn on the theory most suited to the specific context or extended available theories to adapt them as required. All these theories and models share many similarities, such as equivalent constructs, although with different names. Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT) following their detailed analysis and integration of a number of eight existing theories and their principles for determining technology acceptance. These were TAM, TRA, TPB, information diffusion theory (IDT), social cognitive theory (SCT), the model of PC utilization (MPCU), the motivational model (MM), and the combined TAM and TPB (C-TAM-TPB).

UTAUT comprises four main constructs: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC), based on 32 variables from analyzed models. UTAUT also integrates four moderating factors: gender, age, experience, and voluntariness of use (Figure 1). The model increased predictive power for technology acceptance to 70%, which is major improvement on TAM (Venkatesh et al., 2003). Looking closely at UTAUT's main determinants, one can see that,

like TAM, it emphasizes utilitarian value as a determinant of technology acceptance. Like the TAM construct of perceived usefulness (PU), PE is defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance. This is considered to be the strongest predictor of intention to use technology (Venkatesh et al., 2003). EE is defined as degree of ease associated with the use of the system. Three constructs from other models capture this idea: perceived ease of use (TAM/TAM2), complexity (MPCU), and ease of use (IDT) (Venkatesh et al., 2003). SI is the extent to which significant others are thought to believe that one should use the new system. This idea is represented as a subjective norm in TRA, TAM2, TPB, as a social factor in MPCU, and as an image in IDT (Venkatesh et al., 2003). It implies that one's behavior is influenced by how one expects to be viewed by others as a result of using the technology. FC is the extent to which an individual believes that organizational and technical infrastructure exists to support use of the system and relates to constructs in three other models: perceived behavioral control in TBP, facilitating conditions in MPCU, and compatibility in IDT. These constructs have been confirmed by many past studies as determinants of behavioral intention (de Sena Abrahão, Moriguchi, & Andrade, 2016; Im, Hong, & Kang, 2011; McKeown, McKeown, Anderson, & Anderson, 2016; Yuvaraj & Yuvaraj, 2016).

Since its emergence, a growing number of researchers have used UTAUT in a range of contexts (Williams, Rana, & Dwivedi, 2015); for example, Martins et al. (2014) examined Internet banking adoption; Oliveira et al. (2016) and de Sena Abrahão et al. (2016) investigated mobile payments; Šumak et al. (2016) examined differences between pre- and post-adopters of interactive whiteboards; and Yuvaraj (2016) looked at adoption of social media in the recruitment of library professionals and faculty members. According to Google Scholar (January 2017), Venkatesh et al.'s original 2003 article on UTAUT has been cited more than 15,000 times.

Figure 1. UTAUT model
Source: Venkatesh et al., 2003.



Cultural Factors and Technology Acceptance

The role of cultural factors in technology acceptance has attracted widespread interest for many years, and ongoing market globalization means that this remains an important topic. When corporate multinationalism began to emerge, an increasing number of corporations sought to establish a presence in new markets by relocating factories and opening subsidiaries. In these circumstances, it was important for managers to know as much as possible in advance about the likely impact of culture on technology acceptance (Straub, 1994). While practitioners sought to understand cultural differences in order to tackle the ensuing challenges, researchers explored such differences in the interests of theory building—for instance, to enhance theory's generalizability to different cultural settings (Venkatesh & Zhang, 2010). There is by now a significant body of theoretical work that contributes to understanding at various cultural levels —national, organizational and group (Ho, Raman, & Watson, 1989; Straub, 1994)—and the impacts of culture on technology acceptance are well documented (Choi & Totten, 2012; Dai & Palvi, 2009; Jung et al., 2015; Olasina & Mutula, 2015; Veiga, Floyd, & Dechant, 2001).

Among many definitions of culture, the mostly widely used (Srite & Karahanna, 2006) is Hofstede's (1980). He defined culture as collective programming of the mind, which distinguishes one group from another. This system of collective values plays an important role in guiding a person's life and directly influences the formation of human behaviors and attitudes (Hofstede, 1980; Homer & Kahle, 1988; Roth, 1995). Hofstede proposed a conception of culture based on four dimensions: power distance, individualism-collectivism, masculinity-femininity, and uncertainty avoidance; he later added the dimension of long-term vs. short-term orientation (Appendix, Table 7). Hofstede's model has subsequently been employed in many cross-cultural studies, which have confirmed the varying influence of these cultural values on technology adoption, depending on the particular culture (Leidner & Kayworth, 2006; McCoy, Galletta, & King, 2007; Tarhini, Hone, & Liu, 2015). As one example, Straub et al. (1994) reported that uncertainty avoidance had the most direct bearing on Japanese consumers' preferences in their use of communication media.

While South Korea can be characterized as a highly industrialized developed country, Uzbekistan is a less industrialized developing country. A multilingual and multicultural nation with collectivist values, Uzbekistan was under Soviet rule for many decades, which influenced the development of cultural values and traditions. Although no prior research has examined Uzbekistan's cultural dimensions, Gygi and Spyridakis (2007) have characterized Uzbekistan as medium to high on masculinity and uncertainty avoidance, and high on collectivism, power distance, and long-term orientation. Table 1 summarizes the national characteristics of both countries.

Table 1. Comparison of cultural dimensions: Uzbekistan and South Korea

Dimensions	Uzbekistan	South Korea
Power distance	high	high
Collectivism	high	high
Masculinity	medium to high	high
Uncertainty avoidance	medium to high	high
Long-term orientation	high	high

Source: Adapted from Hofstede, (2016) Gygi & Spyridakis (2007).

Kano Model

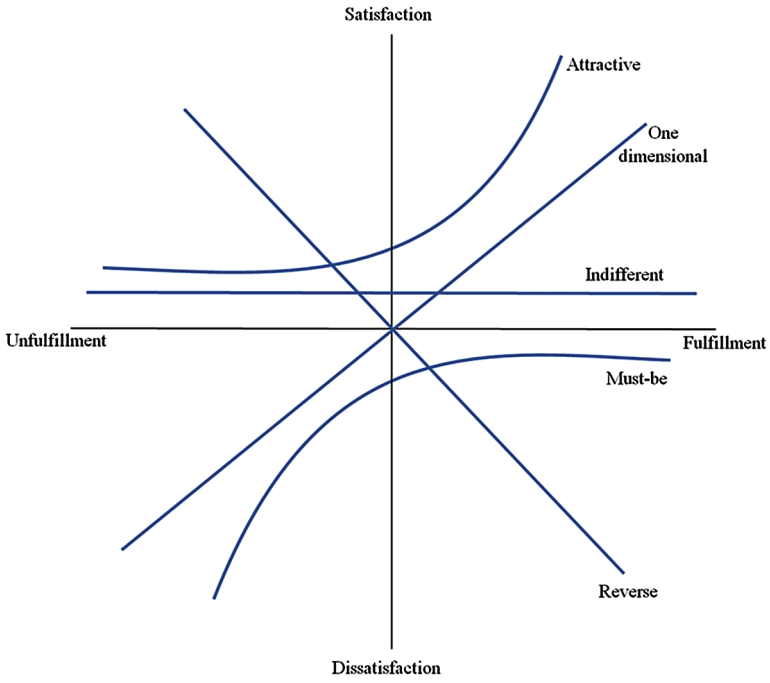
The Kano model (theory of attractive quality) was formulated by Noriaki Kano and his colleagues to categorize product or service attributes related to customer satisfaction (Kano, Seraku, Takahashi, & Tsuji, 1984). The model was inspired by Herzberg et al.'s motivation-hygiene theory (Kano et al., 1984), which articulates how factors causing job satisfaction differ from those causing job dissatisfaction (Herzberg, Mausner, & Snyderman, 1959). Similarly, Kano argued that not all product or service attributes have a linear relationship with customer satisfaction. He proposed that customer satisfaction is more complex, advanced, and multidimensional than simply satisfying performance requirements (Gregory & Parsa, 2013), demanding the more advanced approach shown in Figure 2. Kano proposed that product attributes can be divided into the following five categories.

Must-be attributes do not necessarily increase customer satisfaction when fulfilled, but their absence causes increased dissatisfaction. These attributes are considered basic requirements—for example, customers assume that a TV comes with a remote control as a basic attribute.

Attractive attributes are sources of delight and surprise that result in customer satisfaction. As these attributes are not expected by customers, their absence does not alter satisfaction negatively or positively. A good example is the availability of power sockets on intercity buses or free Wi-Fi in metro stations.

One-dimensional attributes are positively related to customer satisfaction; they increase satisfaction when provided, and their absence or poor performance causes dissatisfaction. The customer is well aware of these attributes, and firms compete on this basis—for example, greater car mileage or longer smartphone battery life translates into higher levels of customer satisfaction.

Figure 2. Kano model



Indifferent attributes have no impact on customer satisfaction or dissatisfaction whether present or absent. These qualities are of no significance, and in most cases, customers do not even notice them.

Reverse attributes are the opposite of must-be attributes; their presence triggers dissatisfaction, and their absence increases satisfaction.

The Kano model is dynamic in the sense that consumer perceptions of certain attributes change over time (Kano, 2001). An attribute considered "attractive" eventually becomes "must-be" as a generic quality or when a technology becomes easily accessible. A good example is the touchscreen mobile phone; when first introduced, the touchscreen function was an "attractive" attribute that positively influenced customer satisfaction. As this technology became more affordable, it lost some of its appeal and eventually became "must-be." Mobile phone makers are now competing by improving touch sensor sensitivity, screen size and resolution, and picture and video quality. Another example is the TV remote control, which has completed this cycle; now, it is hard to imagine a TV without a remote control because it is expected that every TV set will have one.

To categorize each attribute, Kano developed a questionnaire comprising pairs of questions for each attribute. These pairs are unique in asking for the respondent's reaction when a certain attribute is present (functional) and when it is absent (dysfunctional). As shown in Figure 3, respondents choose from five categorical responses for both functional and dysfunctional questions.

Responses related to attributes are sorted into five quality categories (Kano et al., 1984); each pair of questions is evaluated jointly, using the Kano evaluation table in Table 2.

This method is very simple and helps to establish how attributes are perceived by customers. Based on the findings of such a survey, manufacturers or service providers can focus on those areas they wish to improve, allocating resources as required. This growing field of research draws on original ideas presented by Kano and his team (Witell, Löfgren, & Dahlgaard, 2013) in various contexts such as the ski industry (Matzler & Hinterhuber, 1998), as well as retail (Zielke, 2008), hospitality and tourism (Gregory & Parsa, 2013), packaging (Löfgren & Witell, 2005), nursing homes (Yeh & Chen, 2014), and logistics customer service (Florez-Lopez & Ramon-Jeronimo, 2012).

Figure 3. Functional and dysfunctional questions in Kano questionnaire
Source: Matzler & Hinterhuber, 1998.

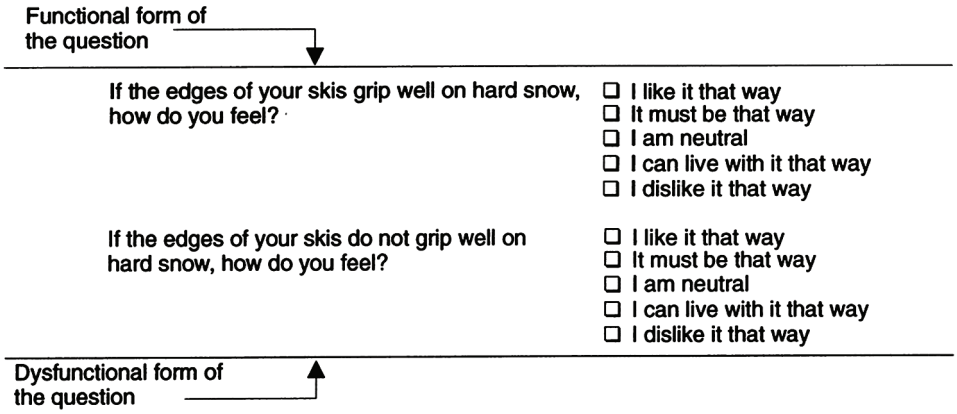


Table 2. Kano evaluation table

Product Requirement		Dysfunctional Question				
		I Like It That Way	It Must Be That Way	I Am Neutral	I Can Live with It That Way	I Dislike It That Way
Functional question	I like it that way	Q	A	A	A	O
	It must be that way	R	I	I	I	M
	I am neutral	R	I	I	I	M
	I can live with it that way	R	I	I	I	M
	I dislike it that way	R	R	R	R	Q

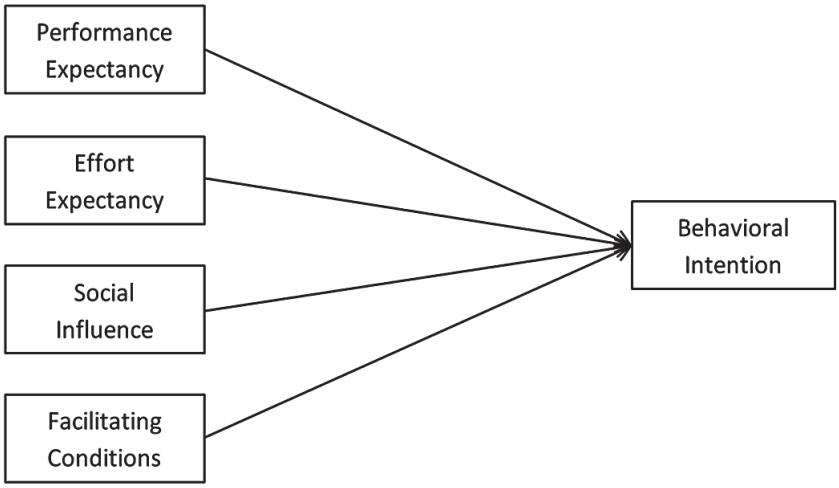
HYPOTHESIS DEVELOPMENT

Based on the literature review and comparison of the available acceptance models, UTAUT was selected as the base model for this study. The results of the literature review show that UTAUT is to date less widely used than TAM. Only a few UTAUT-based studies have examined smartphone adoption, and even fewer were cross-cultural. On introducing UTAUT, Venkatesh et al. (2003) called for further extension and testing of the model in new contexts. By way of response, this study employed the UTAUT model to compare smartphone adoption in two countries as shown in Figure 4.

Performance Expectancy

Aligning with Venkatesh et al. (2003), many past studies have reported that PE is a strong positive determinant of user intention to adopt or use a technology (de Sena Abrahão et al., 2016; Oliveira et al., 2016; Sanakulov & Karjaluoto, 2015; Yuvaraj & Yuvaraj, 2016). The present study proposes that smartphone

Figure 4. Research model



use increases job performance by virtue of the various computer-like functions that smartphones offer. The following hypothesis is therefore proposed.

H1: Performance expectancy has a positive influence on behavioral intention to use smartphones.

Effort Expectancy

EE is the perceive ease of use associated with a system; a system that is perceived as easy to use is more likely to be accepted (Davis, 1989). As smartphones are more difficult to use than conventional mobile phones, EE seems likely to positively affect behavioral intention. On that basis, the following hypothesis is proposed.

H2: Effort expectancy has a positive influence on behavioral intention to use smartphones.

Social Influence

SI is the degree to which significant others are thought to believe that one should use a new system; in other words, behavioral intention is affected by surrounding social factors such as the opinions of others (Venkatesh et al., 2003). This influence is stronger when the user is not familiar with the technology or when their opinion of the technology is not well formed. According to Sanakulov and Karjaluoto (2015), 87% of studies in their review showed SI to be a significant determinant of behavioral intention. As smartphones are regarded as an enabling factor for social interaction, it seems likely that there will be a significant path relationship between SI and BI. On that basis, the following hypothesis is proposed.

H3: Social influence has a positive influence on behavioral intention to use smartphones.

Facilitating Conditions

Facilitating conditions refer to consumers' perceptions of the resources and support available to perform a behavior (Venkatesh, Thong, & Xu, 2012). This idea is captured in three different constructs: perceived behavioral control (TPB/DTPB, C-TAM-TPB), facilitating conditions (MPCU), and compatibility (IDT) (Venkatesh et al., 2003). Unlike UTAUT, where FC is hypothesized to influence technology use directly, Venkatesh et al. (2012) suggested that, in a consumer context, FC influences both intention and use behavior because availability to consumers may depend on such factors as technology, service provider, and device. Based on this argument, the following hypothesis is proposed.

H4: Facilitating conditions have a positive influence on behavioral intention to use smartphones.

METHODOLOGY

Research Design

A questionnaire was developed encompassing demographics, UTAUT, and Kano components of the study. The literature review also identified questions used in past studies, and those of relevance to the smartphone context were included. The first part asked about smartphone ownership and the respondent's country, age, and gender. In the second part, items measuring UTAUT constructs were adopted from Venkatesh et al. (2003). The third part was a Kano questionnaire, with slight modifications of the original. All scale-based questions used a 7-point Likert scale.

In the Kano section, questions were asked as per the original instructions. Before asking the pair of questions, a brief description of the attribute was provided, enabling the respondent to evaluate it using the examples provided. To ensure that the respondent was not confused by the questions' similarity, the dysfunctional "NOT" was typed in capital letters. Paired questions (one functional and one dysfunctional) for each attributed were asked in the following order:

- **Functional Question:** What if a smartphone offers performance and productivity?
- **Dysfunctional Question:** What if a smartphone does NOT offer performance and productivity?

An initial questionnaire was compiled and peer-reviewed to detect possible mistakes, to improve quality, and to ensure that questions were logically ordered. Particular care was taken to make questions clear and understandable regardless of the respondent's educational level. The questionnaire was subsequently translated into the respective languages by native speakers fluent in English.

Data Collection

The survey was administrated online using Google survey tools. A link to the online survey was posted in popular social media groups and forums and shared with colleagues and friends, who were also asked to share the link with others for convenience sampling. The survey remained active for two weeks.

RESULTS

Data Description and Reliability Testing

For the purposes of this study, participants were targeted from the general population of Uzbekistan and South Korea. Responses containing random and incomplete answers were excluded from further analysis, and the final data consisted of 318 usable responses, of which 94% were smartphone users. Respondents aged 31–39 years accounted for 26% of the sample; 8% were aged 40–50+ years; the largest group (66% of respondents) included those aged 30 and below. As the research model consisted of multi-item constructs, it was important to check the reliability of items in each construct. The test most commonly used in similar studies was Cronbach's α; according to Nunnally (1978), a Cronbach's α greater than 0.6 is acceptable while 0.7 is highly reliable. To improve reliability, items that lowered Cronbach's α were removed from further analysis. The results are set out in Table 3.

Table 3. Construct reliability test

Constructs	Cronbach's α
Performance expectancy	0.86
Effort expectancy	0.81
Social influence	0.94
Facilitating conditions	0.78
Behavioral intention	0.95

Model Validation and Hypothesis Testing

A linear regression analysis (which estimates the coefficients of a linear equation involving one or more independent variables to predict the value of the dependent variable) was conducted to test the proposed hypotheses and research model. The research model was tested by assessing the significance of the path coefficients for relationships between the independent variables (PE, EE, SI, and FC) and the dependent variable (BI), where R^2 is the amount of variation in the dependent variable. To do this, the UTAUT model was first tested with the entire dataset. The results supported the model (R^2 of BI = 0.21); the significance of the research model was $F = 14.726$ ($p \leq 0.001$). Results for the total sample supported three out of the four hypotheses; while performance expectancy ($\beta = 0.169$, $p \leq 0.01$), social influence ($\beta = 0.197$, $p \leq 0.001$), and facilitating conditions ($\beta = 0.171$, $p \leq 0.01$) influenced behavioral intention significantly, the effect of effort expectancy on behavioral intention was not significant ($\beta =$ 0.082, ns). For comparison purposes, these tests were then conducted separately for both countries. The results showed the positive effect of performance expectancy and facilitating conditions on behavioral intention in both countries. However, the positive effect of effort expectancy on behavioral intention ($\beta = 0.230$, $p \leq 0.05$) was observed only in the Korea group, and the path between social influence and behavioral intention was significant ($\beta = 0.205$, $p \leq 0.01$) only in the Uzbek group. Once paths of research model were tested for each group, multi-group comparison based on Chi-square difference test was conducted to check significance of cultural effects on paths tested. The test results showed that it was only significant Hypothesis 3. Table 4 summarizes the combined test results.

Table 4. Estimation of the proposed model

Path	Total Sample		Uzbekistan		South Korea		$\chi 2$ Threshold
	β	*t*-Value	β	*t*-Value	β	*t*-Value	
PE→BI	.169**	2.979	.208**	2.734	.252**	2.899	ns
EE→BI	.082	1.305	.032	.392	.230*	2.368	ns
SI→BI	.197***	3.504	.205**	2.667	-.127	-1.336	2.282*
FC→BI	.171**	2.765	.166*	2.111	.272*	2.592	ns

***$p \leq 0.001$, **$p \leq 0.01$, *$p \leq 0.05$.

Kano Results

The first step in analyzing the Kano questionnaire results was to tabulate the survey responses. The second step was to allocate attributes to categories based on response frequencies. For example, for PE, the number of answer combinations categorized as "indifferent" was higher than for other categories in the total population, indicating that, for the total population, PE was perceived as an indifferent attribute. Interestingly, tested attributes were categorized as "indifferent" for the total sample and among South Koreans. For Uzbeks only, EE was categorized as "must be," and FC as "one-dimensional." The results of the Kano questionnaire are set out in Table 5.

SOLUTIONS AND RECOMMENDATIONS

The analysis yielded some interesting findings in relation to all three study objectives. The UTAUT model proved to be significant at the $p \leq 0.001$ level, and only the relationship between effort expectancy and behavioural intention was not supported in the total sample. There is reason to believe that this is a normal occurrence, as according to Sanakulov and Karjalouto (2015) and Williams et al. (2015), this relationship is least often significant among UTAUT paths. Additionally, unlike most past studies, the influence of facilitating conditions on behavioural intention was tested here. Among UTAUT relations, it was least tested in past studies (Williams et al., 2015); here, it proved to be significant in all categories, aligning with Venkatesh et al.'s (2012) suggestion that in a consumer context, facilitating conditions influence both intention and use behavior. When analyzed separately, the Uzbekistan sample produced the same outcome as the total sample. In the Korea sample, the relation between social influence and behavioral intention was negatively insignificant. This can be explained by possible differences in usage rate and perceptions in these countries. While no official statistics are available for the number of smartphone users in Uzbekistan, research and consultancy company BuddeComm (2017) reported that, in early 2016, the number of mobile phone subscribers was 24 million, and mobile broadband subscribers exceeded 16 million (in a total population of 31 million) (UNDP, 2017). These figures are lower than those in South Korea, which is a world leader in smartphone ownership (Pew Research Center, 2016). It seems likely that, as smartphone adoption in Uzbekistan is still developing, users take account of social influence when making decisions. In contrast, South Koreans do not perceive social factors as important because smartphone usage has become the norm.

The analysis categorized UTAUT constructs according to the Kano model in each group, and the results were surprisingly similar in almost all cases (Table 6). This unexpected result prompted repeated data checking and re-evaluation, but the results were unchanged. In the Uzbek sample only, there was

Table 5. Results for Kano classification of attributes

Constructs	Total Sample		Uzbekistan		South Korea	
Performance expectancy	Indifferent	45%	Indifferent	28%	Indifferent	66%
Effort expectancy	Indifferent	40%	Must-be	33%	Indifferent	64%
Social influence	Indifferent	64%	Indifferent	52%	Indifferent	80%
Facilitating conditions	Indifferent	44%	One-dimensional	35%	Indifferent	64%

a significantly different result; effort expectancy was categorized as "must-be" and facilitating conditions as "one-dimensional". Again, this can be explained by current usage rate and perceptions; because smartphone adoption is ongoing in Uzbekistan, the effort associated with using smartphones is perceived as significant. In other words, they have not yet become "experts" in using smartphones, and effortless usage appeals to them. Uzbeks consider facilitating conditions to be one-dimensional, which means that better facilitating conditions improve satisfaction while absence or poor performance cause dissatisfaction. This outcome is unsurprising in Uzbekistan because the technical infrastructure needed for smartphone use is currently at a developmental stage. For example, fast wireless broadband connections (3G and 4G) cover only some parts of the country, local mobile services such as ticketing and banking are not widely used, and Wi-Fi hotspots are not widely available.

FUTURE RESEARCH DIRECTIONS

While the present study achieved its objectives, it has limitations that may impact the findings. First, an online survey is not ideal as a means of collecting data in Uzbekistan because of the low Internet penetration rate; according to the World Bank's (2017) estimates, 43% of Uzbeks were Internet users in 2015. As a majority of respondents were males aged 30 years or younger, the results cannot be generalized to the wider population; this segment of the population are active Internet users who benefit from the connectivity provided at educational institutions and workplaces. This limitation can be overcome by conducting a postal survey and by applying strict national population quotas. Second, the Kano questionnaire yielded the same results for the Korea group as for the total sample. In the Kano evaluation, the "indifferent" category frequency of (36%) is high (Ek & Çıkış, 2015), suggesting that those confused by this unusual questionnaire might resort to non-polarized (neutral) answers that are classified as indifferent. The survey was conducted online, and the Kano questionnaire was one part of the whole questionnaire. As these factors may have affected responses, face-to-face interviews might help to ensure survey quality. Finally, there was no measurement of cultural dimensions in Uzbekistan or Central Asian countries, and the study relied on the characterization by Gygi and Spyridakis (2007). Uzbekistan is multicultural and the most populous country in Central Asia with 31 million inhabitants, accounting for approximately 42% of the region's population (UNDP, 2017). As an important market attracting great interest from foreign investors since the Soviet Union collapsed, a cultural perspective can help managers to understand and prepare for possible challenges and opportunities when operating there.

CONCLUSION

In recent decades, a multitude of technology acceptance studies in a wide range of settings and contexts have helped to advance this field of research. However, the present literature review revealed that although these studies are increasing in number, few have been cross-cultural. The contribution of the present study is threefold. First, based on UTAUT, the study examined technology adoption in Uzbekistan and South Korea. Second, the comparison showed that individual UTAUT constructs have varying effects on technology acceptance in the two countries. Finally, the main constructs used here were classified according to the Kano model to determine how each construct is perceived by each group. Most of the findings align with those of previous studies.

The UTAUT framework proved an appropriate model for testing smartphone adoption, and the results will be of interest to both groups in light of current adoption rates. The authors hope that the study will enhance this area of research in cross-cultural settings, as well as contributing to knowledge of how these groups perceive the drivers that determine technology adoption.

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KEY TERMS AND DEFINITIONS

Cronbach's Alpha: A statistical tool for assessing reliability, internal consistency of a set of scale items.

Hofstede's Cultural Dimensions: A set of dimensions for distinguishing one culture from another.

Kano Model: A theory of customer satisfaction that classifies product or service attributes into five categories.

Likert Scale: A tool commonly used in questionnaire based research to measure attitudes and opinions of respondents.

Literature Review: A scholarly paper that presents current knowledge including theoretical and methodological contributions and discusses academic publications on a particular subject.

Smartphone: A mobile phone that runs on operating system and has many functions of a computer such as accessing internet, running various applications and sensors.

Technology Acceptance Model (TAM): A theory for predicting acceptability of a technology based on perceived usability and perceived ease of use of the technology.

Technology Adoption: A process that begins with awareness of technology´s existence, mentally accepting it and utilizing it.

Unified Theory of Acceptance and Use of Technology (UTAUT): A theory for explaining user intention to use a technology and usage behaviour.

APPENDIX

Table 6. Definitions of UTAUT constructs

Construct	Definition
Performance expectancy	Degree to which an individual believes that using the system will help him or her to attain gains in job performance.
Effort expectancy	Degree of ease associated with the use of the system.
Social influence	Degree to which an individual perceives that important others believe he or she should use the new system.
Facilitating conditions	Degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

Source: Venkatesh et al., 2003.

Table 7. Hofstede's national culture dimensions

Dimension	Definition
Power distance	Power distance is the extent to which less powerful members of a society accept that power is distributed unequally.
Individualism vs. collectivism	In individualist cultures, people look after themselves and their immediate family only. In collectivist cultures, people belong to groups that look after them in exchange for loyalty.
Masculinity vs. femininity	In masculine cultures, the dominant values are achievement and success. The dominant values in feminine cultures are caring for others and quality of life.
Uncertainty avoidance	Uncertainty avoidance is the extent to which people feel threatened by uncertainty and ambiguity and try to avoid these. In cultures of strong uncertainty avoidance, there is a need for rules and formality to structure life, and competence is a strong value, resulting in belief in experts.
Long-term vs. short-term orientation	Long-term orientation is the extent to which a society exhibits a pragmatic, future-oriented perspective rather than a conventional historic or short-term perspective.

Source: Adapted from De Mooij & Hofstede, (2002).

IV

SALESPERSON ADOPTION AND USAGE OF MOBILE SALES CONFIGURATION TOOLS

by

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Salesperson adoption and usage of mobile sales configuration tools

Abstract

Purpose- The purpose of this paper is to examine salespersons' adoption and usage of mobile sales configuration tools (MSCT) and to identify areas for further development in this realm. Another objective is to offer a conceptualization of MSCT adoption.

Design/methodology/approach- For this purpose, a qualitative case study approach was selected as the research method to better understand acceptance of a mobile configuration tool used by B2B salespersons. Primary data was collected through semi-structured interviews, which included a series of open-ended questions to gain more detailed and contextual data.

Findings- The results obtained from the interviews indicated several important determinants of adoption of sales configuration tools, and three different personal innovativeness types were identified.

Research Limitations/implications- The current study has certain limitations that should be considered in future studies. First, the results of this study cannot be generalized in other contexts due to small number of participants (nine salespersons) included. Second, social desirability might have affected the results in a way that caused the salespersons to have been tempted to talk positively about MSCT.

Practical Implications- Based on the findings several suggestions for managers and software developers are made such as further technical development of MSCT, development of common sales routine for all salespersons, mentoring new salespersons, and establishing social media channels for salesperson to interact with each, share experience/knowledge.

Originality/value- Current paper can serve as pathway toward understanding of MSCT adoption and usage as it opens new avenues as a source of hypotheses for a quantitative analysis of certain phenomena such as the correlation between MSCT usage and sales performance.

Keywords: sales, sales force automation, B2B sales, mobile sales adoption, qualitative

Paper type Research paper

1. Introduction

Technological advancements in information systems and their introduction into business organizations have made sales force automation (SFA) systems important business tools, which companies are continuously investing in despite the high cost of implementation (Buttle, Ang, & Iriana, 2006; Jelinek, Ahearne, Mathieu, & Schillewaert, 2006; Parthasarathy & Sohi, 1997). As part of an organization's customer relationship management (CRM) system, which connects and integrates sales with other operations, SFA system electronically supports organizational sales activities that are performed by sales professionals (Barker, Gohmann, Guan, & Faulds, 2009). Many definitions of SFA exist in the literature. Baker and Duleep (2013) defined SFA as comprising computer-based software and relational database technologies designed to support field sales activities. Sinisalo et al. (2015) defined mobile SFA as a system that enables a salesperson to retrieve data via mobile devices to support sales while on the road. Jelinek (2013) defined it as the set of technology tools that better equip a sales and marketing organization to practice CRM. The common point to these definitions is that SFA involves the application of information technology to support the sales function (Buttle et al., 2006).

Major SFA features include providing automated sales tools for the following: (1) efficient sales activities; (2) connecting sales with the rest of the organization for better information flow; (3) offering standardized tools for more efficient sales; and (4) providing managers with the information needed for sales' monitoring and evaluation (Barker et al., 2009). Additional SFA functions include collecting, storing, analyzing, and distributing customer related data among salespersons and managers (Buttle et al., 2006) as well as appointment management, customer information management, time management, generating reports, creating quotes (Baker & Delpechitre, 2013) among many other activities. Overall, firms use SFA to make their sales

forces more efficient (Honeycutt, Thelen, Thelen, & Hodge, 2005) and productive (Sinisalo et al., 2015).

Depending on the nature of work involved firms may implement adoption of specific types of SFA technologies at various levels. Mobile SFA is one of such technologies that firms may choose to adopt. Buttle et al. (2006) suggested that mobile solutions are necessary because SFA systems must be operable out of the office for companies with geographically dispersed salespeople. A mobile sales configuration tool (MSCT) is one such solution; it is a part of the SFA system used with mobile devices (laptops, smartphones, and tablets) that help sales professionals easily configure products in their sales activities. Flexibility of communication is the most important characteristics of mobile devices in SFA context (Sinisalo et al., 2015). Rodriguez and Trainor (2016) also support this in their study of mobile CRM application adoption by stating that mCRM enables salesperson to access information and update sales activities anytime and anywhere in real time. Per Karjaluoto et al. (2014), the laptop is currently the most used mobile device for accessing a company's CRM system. With the help of MSCT, salespersons can configure products and update customer information and offers in their company's CRM system.

Because of the high cost of SFA implementation, companies are concerned with both the return on investment (ROI) (Bush, Moore, & Rocco, 2005) and the benefits of SFA in practice, while researchers are interested in providing explanations and predictions for both adoption and usage. Therefore, this area has been of great interest to researchers (Ahearne, Jelinek, & Rapp, 2005; Moutot & Bascoul, 2008). SFA research dates to the 1980s (Buttle et al., 2006; Collins, 1984; Wedell & Hempeck, 1987), and it has been an active research stream in academia ever since. Past SFA research has mainly focused on SFA system adoption (Avlonitis & Panagopoulos,

2005; Jones, Sundaram, & Chin, 2002; Morgan & Inks, 2001) and its effects on a salesperson's performance (Ahearne et al., 2005; Avlonitis & Panagopoulos, 2005; Park, Kim, Dubinsky, & Lee, 2010; Robinson, Marshall, & Stamps, 2005). Different than consumer adoption, SFA adoption is a more complicated process that progresses through two stages (Parthasarathy & Sohi, 1997). First, the decision to adopt a technology is made at the organizational level, followed by the individual salespersons' use of the technology. Therefore, the entire process is dependent on both organizations and individuals. Firms adopt SFA systems to improve efficiency and effectiveness of sales activities by computerizing routine tasks (Honeycutt et al., 2005), which can only occur when salespeople utilize SFA systems properly (Morgan & Inks, 2001). While some studies have shown that SFA systems increase sales and salespersons' productivity (Boujena, Johnston, & Merunka, 2009; Jayachandran, Sharma, Kaufman, & Raman, 2005; Keillor, Bashaw, & Pettijohn, 1997), others have reflected concerns that technology often fails to improve sales performance (Speier & Venkatesh, 2002), which was supported empirically (Ahearne, Srinivasan, & Weinstein, 2004; Avlonitis & Panagopoulos, 2005). Therefore, some past studies have focused on examining ways to influence salespersons' SFA tool adoption to improve performance (Baker & Delpechitre, 2013), while others have focused on examining reasons that led to technology implementation failures (Speier & Venkatesh, 2002). For instance, per Barker et al. (2009), changes to established sales routines, perceiving the system as a micromanagement tool, varying expectations of the sales force and management regarding the system, and perceiving that management failed to show strong commitment to implementation all contribute to low SFA acceptance.

Despite the importance of technology use in sales work, empirical research on adoption and usage of mobile SFA is quite limited (see Rangarajan, Jones, & Chin, 2005; Speier & Venkatesh,

2002). Additionally, to the best of the authors' knowledge, much of the research to date has been quantitative in nature and less research conducted on salespersons' adoption of MSCT to answer 'how' and 'why' questions. The objective of this study is two-fold. First, business to business (B2B) salespersons' experience with MSCT in sales activities with customers will be examined. Second, based on these examinations, key determinants of MSCT adoption will be theoretically identified. By achieving these objectives, the current study will contribute to further understating of both the adoption and usage of MSCT in sales activities.

This paper is organized into five parts, including the introduction chapter. In part two, the literature is reviewed and the theoretical dimensions of the study are presented. Part three includes the research design, and part four reveals the results. The final part includes a summary of the study, recommendations, a critique of the methodology, and recommendations for future research.

2. Literature review

There are many published studies available on information systems (IS) that are dedicated to examining technology adoption (Davis, Bagozzi, & Warshaw, 1989). These can be categorized into three streams: individual acceptance of technology, implementation success at the organizational level, and task-technology fit (Venkatesh, Morris, Davis, & Davis, 2003). In all three streams, studies were based on technology acceptance theories, which included competing models with a variety of determinants (Venkatesh et al., 2003). Most past studies on salespersons' SFA adoption were based on the technology acceptance model (TAM) (Davis, 1989) and its modifications (Buttle et al., 2006), while TAM and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) have been the main theories used in mobile technology adoption (Sanakulov & Karjaluoto, 2015). A literature review conducted for

this study showed that the innovation diffusion model (IDT) has also been used in many SFA studies. Past studies have indicated that all these models have been successful in examining technology adoption. For this reason, TAM/TAM2, UTAUT, and IDT were chosen as a theoretical framework for this study. Additionally, constructs that are based on various past SFA acceptance studies will be examined as part of the same theoretical framework.

2.1 Technology acceptance model

TAM, which evolved from the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) and the theory of planned behavior (TPB) (Ajzen, 1991), is the most popular and effective model used in IS research for predicting technology adoption (Avlonitis & Panagopoulos, 2005; Davis, 1989; Venkatesh & Davis, 2000). TAM posits that perceived usefulness (PU) and perceived ease of use (PEOU) are key determinants of an individual's behavioral intention to use a technology. Davis (1989, p.320) defines PU as 'the degree to which a person believes that using a particular technology will enhance her/his job performance' and PEOU as 'the degree to which a person believes that using a technology will be free from effort.' TAM has been extended to TAM2 by Venkatesh and Davis (2000), who identified and theorized determinants of PU and two moderators. TAM2 presents both the social influence process and the cognitive instrumental process to explain the effects of the various determinants of perceived usefulness and behavioral intention (Venkatesh & Bala, 2008), and per the authors, the social process is represented by a subjective norm and image, while cognitive processes include job relevance, output quality, results demonstrability, and PEOU to represent the influence of the cognitive instrumental process. Experience and voluntariness are included as moderators.

Since its development, TAM has been used by SFA studies in various contexts (Avlonitis & Panagopoulos, 2005; Robinson et al., 2005), and it has been extended with variables relevant to

the contexts of the studies (Jones et al., 2002; Lu, Yu, Liu, & Yao, 2003; Venkatesh & Davis, 2000). For example, Lu et al. (2003) examined the acceptance of wireless internet via mobile devices. Their results indicated a positive effect of PU, PEOU, social influences, a wireless trust environment, and facilitating conditions on acceptance. Also, Michael Rodriguez and Kevin Trainor (2016) proposed a conceptual model based on TAM and TPC (Technology- to-performance chain) to outline benefits of providing mobile CRM capabilities to salespersons.

2.2 Unified theory of acceptance and use of technology

Venkatesh et al. (2003) developed a unified theory of acceptance and use of technology (UTAUT) model based on eight different earlier technology acceptance models: the theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model (MM), the theory of planned behavior (TPB), a combined theory of planned behavior/technology acceptance model (TPB), the model of PC utilization (MPCU), diffusion theory (IDT), and social cognitive theory (SCT). The UTAUT, which aims to explain user intentions regarding technology, includes four determinants: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). PE is defined as the degree to which an individual believes that using the system will help him or her attain gains in job performance. EE is defined as the degree of ease associated with the use of the system. SI is defined as the degree to which an individual perceives that it is important for others to believe that they should use the new system. FC is defined as the degree to which an individual believes that organizational and technical infrastructures exist to support use of the system. The model also includes the four moderators of gender, age, experience, and voluntariness of use. Per Venkatesh et al. (2003), the proposed UTAUT model's prediction power reached 70%, which was a major improvement when compared with TAM. Since its introduction, there have been many IS studies that were

based on UTAUT in various contexts (Sanakulov & Karjaluoto, 2015). Some simply based their research on the original UTAUT model, while others extended it with new constructs by following suggestions made by Venkatesh et al. (2003), who encouraged more research on new constructs.

2.3 Innovations diffusion theory

Since 1960, IDT (Rogers, 1995) has been successfully applied and adapted in various innovation studies. Per Rogers, a person's perceptions of an innovation's attributes determine whether he/she will adopt it (S. Lee, 2013). Moore and Benbasat (1991) adapted the characteristics of innovations and formed constructs that can be used in IS research to examine individual technology acceptance (Venkatesh et al., 2003). They added three new constructs: observability, trialability, and voluntariness. IDT proposes five important attributes of innovation that affect individuals' technology adoption (Moore & Benbasat, 1991):

1) Relative advantage: 'The degree to which an innovation is perceived as being better than its precursor.'
2) Compatibility: 'The degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters.'
3) Complexity: 'The degree to which an innovation is perceived as being difficult to use.'
4) Observability: 'The degree to which the results of an innovation are observable to others.'
5) Trialability: 'The degree to which an innovation may be experimented with before adoption.'

2.4 Perceived risk

Various definitions of perceived risk are available, such as 'the expectation of losses associated with purchases' (Peter & Ryan, 1976) and 'customers' subjective expectations related to the monetary and/or non-monetary loss associated with the use' (Roy, Balaji, Kesharwani, & Sekhon, 2016). The important role that perceived risk plays in the adoption process has been indicated in past studies (Holak & Lehmann, 1990; Karjaluoto et al., 2014; Roy et al., 2016) and has been used in consumer behavior research in various contexts such as online payment (Yang, Pang, Liu, Yen, & Tarn, 2015), mobile banking (Roy et al., 2016), online banking (M. Lee, 2009) and mobile SFA (Sinisalo et al., 2015). In addition, there are varying dimensions of perceived risk proposed for different contexts. For example, Lee (2009) investigated five types of risk— security/privacy, financial, social, time/convenience, and performance related to online banking and he did not include physical risk as online banking does not cause any threat to human life.

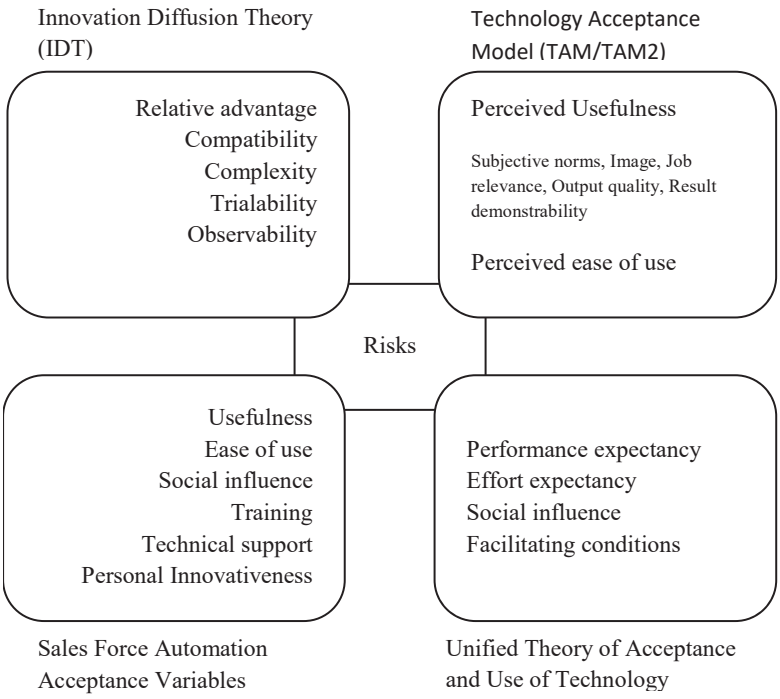
2.5 Variables from past SFA studies

Our extensive literature review of past studies revealed that SFA acceptance and usage are dependent on salespersons' perceptions of SFA's usefulness (Avlonitis & Panagopoulos, 2005; Jones et al., 2002; Robinson et al., 2005; Schillewaert, Ahearne, Frambach, & Moenaert, 2005), ease of use (T. M. Lee & Park, 2008), personal innovativeness (Avlonitis & Panagopoulos, 2005; Jones et al., 2002; Schillewaert et al., 2005), facilitation conditions as training (Ahearne et al., 2005; Jones et al., 2002; Morgan & Inks, 2001; Rangarajan et al., 2005; Schillewaert et al., 2005), social influence (peer, manager) (Buehrer, Senecal, & Pullins, 2005; Burkhardt, 1994; Homburg, Wieseke, & Kuehnl, 2010; Schillewaert et al., 2005; Venkatesh et al., 2003; Weinstein & Mullins, 2012), amount of effort they exert (Rangarajan et al., 2005), technical support

(Buehrer et al., 2005), and threat of competing salespersons or peers who use a similar sales technology (risk not to adopt) (Schillewaert et al., 2005). Mathieu et al. (2007) noted that experience is negatively related to technology adoption by salespersons. Per Buehrer et al. (2005), some salespeople do not use SFA technology, mainly due to lack of management and technical support, while training is the most effective way to increase the use of SFA technology.

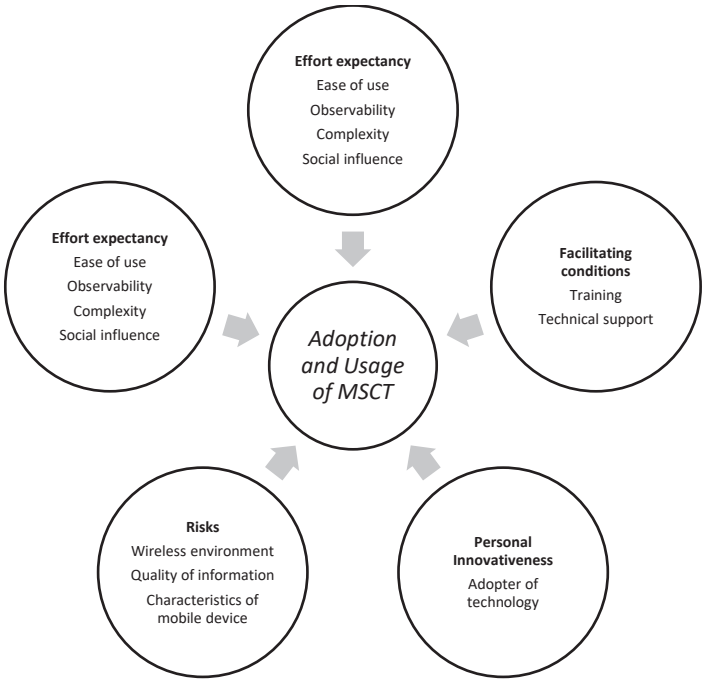
Based on the literature review, Figure 1 illustrates the theoretical links between the theories, frameworks, and variables used in SFA acceptance and usage studies.

Figure 1. Theoretical links between theories, frameworks, and variables used in SFA acceptance and usage



After synthesizing the literature, a framework for the adoption and usage of a mobile sales configuration tool can be determined, as shown in Figure 2.

Figure 2. Theoretical framework for adoption and usage of MSCT



3. Research design

3.1 Methodology

A qualitative case study approach was selected as the research method to better understand acceptance of a mobile configuration tool used by B2B salespersons. A case study is an empirical research method that examines the current phenomenon in its own environment, where the determination of the phenomenon and the context are not clearly visible (Yin, 1994). Yin (1994) emphasized that, through qualitative data, it is possible to capture the richness of the participants' experience. For this study, salespersons working for an international machine manufacturing company based in Finland were interviewed. The studied company has used MSCT, which has been under constant development that aimed to improve its features as well as its functionality, for several years. Primary data was collected through semi-structured interviews, which included a series of open-ended questions to gain more detailed and contextual

data, with salespersons. The interviews were conducted during November and December of 2015 via the Skype for Business application. Interview dates and times were agreed upon by the authors and interviewees in advance. At the beginning of each interview, the authors assured the participants that confidential and personally identifiable information would not be disclosed at any stage of the research. The main themes discussed during the interviews included performance expectancy, effort expectancy, facilitating conditions, personal innovativeness, and risks. A few follow-up questions arose during the data analysis, and participants were re-contacted to obtain that information.

3.2 Participants

To accomplish the aim of this study, a purposive sampling technique was used to solicit participants who had several years' experience with a specific mobile sales configuration tool. Intensity sampling was chosen because the target group consisted of information-rich cases that intensely manifested the phenomenon (Patton, 2002). Being a salesperson in the same machine manufacturing company and having experience with sales configuration were the criteria set for participant selection. Nine participants were chosen from nine different cities in various regions of Finland. All participants were males who had between 8 and 27 years (mean=15.8 years) of sales experience and had worked as a salesperson at their respective companies for 8–27 years (mean=13.3 years), as shown in Table 1.

Based on sales performance records, each participant was categorized as either a 'good salesperson' or one who had 'problems in selling' (Table 2). Those in the 'good salesperson' category had a positive marginal profit, and they had either sold more machines than the average or their stock was lower than average (salespersons 1, 2, 6, and 9). Although they were considered 'good,' some areas in their sales needed improvement. Those in the latter category

had either many or quite serious problems in their sales (salespersons 3, 4, 5, 7, and 8). Two salespersons in this category were ranked as 'top 4 sold items'; however, their marginal profit was negative, and their stock was higher than average.

Table 1. Participant details

Salespersons[1]		Sales experience in this company (yrs.)	Total sales experience (yrs.)	Sales area
1	George	27	27	Central Finland
2	Sam	13	13	West Finland
3	Ted	8	8	Southwest Finland
4	John	18	25	Southeast Finland
5	William	10	15	Southwest Finland
6	Noel	8	9	Northeast Finland
7	Elton	8	17	East Finland
8	Harry	15	15	North Finland
9	Cliff	13	13	Northeast Finland

[1]*All names have been changed*

Table 2. Participants' sales results and classification based on performance for 2014

Salespersons		Sold more items than average	Top four sold items	Positive marginal profit	Top profit	Market share more than average (53%)	Stock lower than average	Classification of salespersons based on results
1	George	Yes	4	Yes	2	Yes	Yes	Good salesperson
2	Sam	Yes	1	Yes	3	Yes	No	Good salesperson
3	Ted	No	-	No, very low	-	No	Yes	Problems in selling
4	John	Yes	3	No, very low	-	Yes	No	Problems in selling
5	William	Yes	2	No, very low	-	Yes	No	Problems in selling
6	Noel	No	-	Yes	1	No	Yes	Good salesperson
7	Elton	No	-	No	-	No	Yes	Problems in selling
8	Harry	No	-	No	-	No, very low	Yes	Problems in selling
9	Cliff	No	-	Yes	4	Yes	Yes	Good salesperson

4. Data analysis

All semi-structured interviews were digitally recorded. The duration of the interviews ranged from 20 to 35 minutes (mean=25 min). The interviews were transcribed *verbatim* by a professional transcriber, which resulted in 78 pages of single-spaced text.

The interviews were then analyzed using thematic content analysis. For this, Tuomi and Sarajärvi's (2003) content analysis was used and complemented with Braun and Clarke's (2013) Stages of Thematic Analysis: 1) transcription, 2) reading and familiarization, 3) finding of codes (simplified expressions), 4) listing all codes, 5) searching for similarities and differences, 6) combining codes and formulating lower-end themes (categories), 7) combining lower-end themes and formulating higher-end themes, 8) combining higher-end themes and defining, naming, and formulating the main concept themes, 9) reviewing themes, 10) checking the thematic analysis, and 11) writing the report (Tuomi & Sarajärvi, 2003).

In total, 214 codes were underlined with different colors and marks. A search for similarities and differences was conducted, based on the theoretical framework. The data were abstracted into 32 (19+13) lower-order themes and 10 higher-order themes. The higher-order themes were combined into five main themes: performance expectancy, effort expectancy, facilitating conditions, personal innovativeness, and risks.

Typology was also used to classify the data to find patterns and differences concerning salespersons' personal innovativeness in adoption of mobile sales tools. In the analysis, classificatory typology was used, in which a 'type' was a characterized case. First, the empirical data were coded as falling into either one category or another, which guided the researcher (Elman, 2005).

According to Mäkelä (1990), to evaluate rigor and trustworthiness in qualitative research, one should consider the following: 1) the significance of the data and the societal and/or cultural situation, 2) data sufficiency, 3) coverage of analysis, and 4) evaluate-ability and repeatability of the data analysis. The research was illustrated via figures, hierarchical content trees, and direct quotations, which enable the reader to either accept or reject the interpretation and findings of a salespersons' experience in both the use and adoption of a mobile sales configuration tool.

5. Results

5.1 Performance expectancy/usefulness

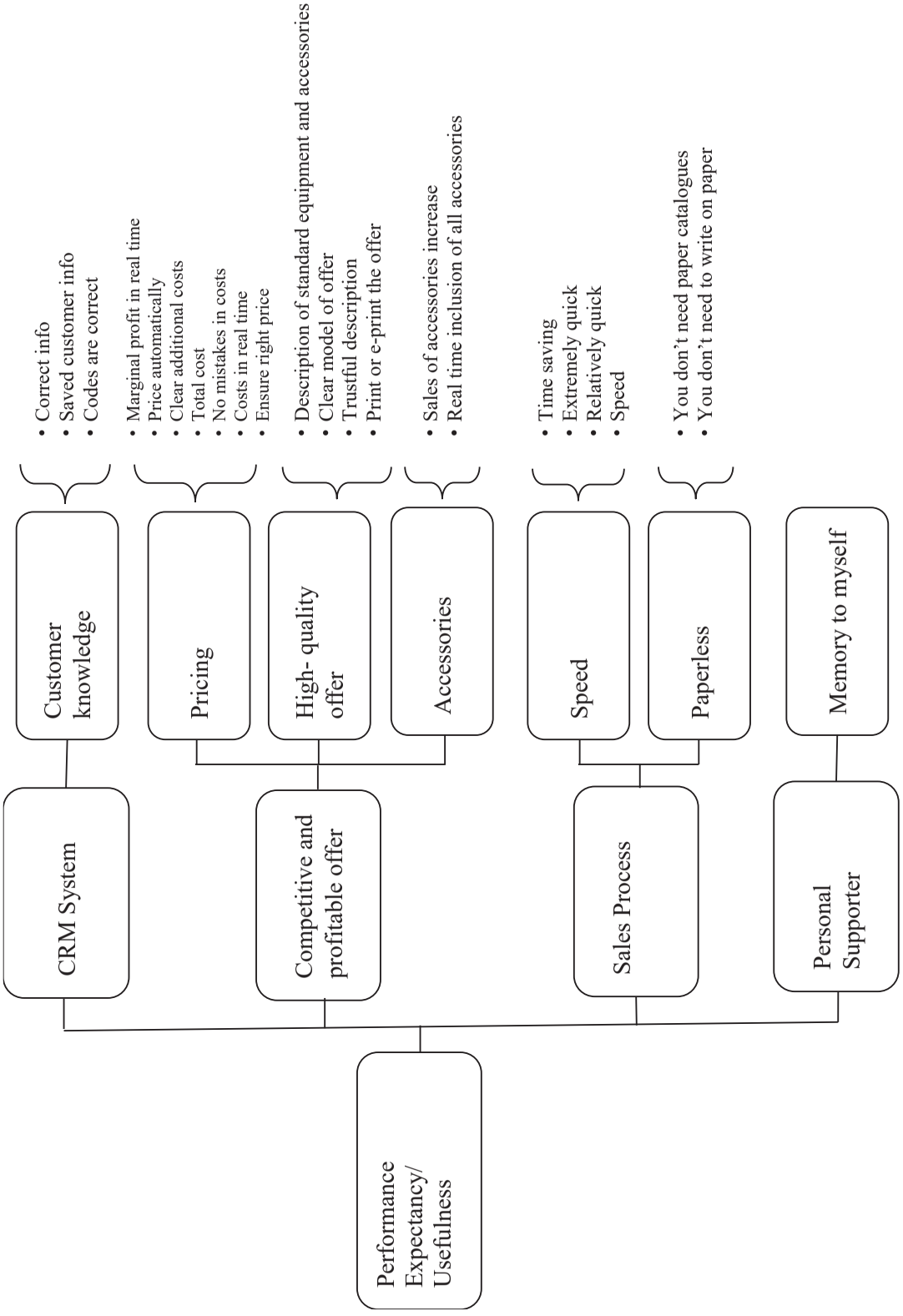
Performance expectancy/usefulness consisted of four higher-order themes (both competitive and profitable offer CRM systems, sales processes, and personal supporters) and seven lower-order themes (pricing, high-quality offers, accessories, customer knowledge, increased speed, paperless, and use as a memory card/drive), as shown in Figure 3. The most important determinants of usefulness were competitive and profitable offers. A sales tool enables professional pricing, improvements in accessories' sales, and high-quality offers. For instance, in pricing, salespeople can easily offer customers the correct costs in real time. When a customer receives an offer that includes all equipment and accessory descriptions, it is perceived as being of high quality, which builds trust toward the salesperson.

> 'Mainly, I use it as a pricing tool so that we'll see the total price right away and what equipment and accessories it includes' (Ted).

Identifying a customer's needs and creation of an offer become quick processes with mobile sales tools. Offers can be immediately sent electronically to customers and/or printed. One salesperson stated:

> 'This is definitely a time-saving tool' (George).

Figure 3. Usefulness of MSCT



Being a part of a CRM system and using the tool as a personal memory aid were also perceived benefits.

> ‘It is used as a customer data source. There is a sales program for the new and used machines . . . and once all the customer’s information is saved, you can find it from there . . . when you see the different possibilities, you can also remember those’ (George).

5.2 Relative advantages

The sales configuration tool was perceived as being better than the idea that it presents. In this study, we sought the most important relative advantage, and it consisted of two lower-order themes: giving information for the correct tailoring and speed of use. Salespersons 1, 2, 4, 6, 7, and 9 said that the system directs you toward quality tailoring, and it is not possible to make mistakes. Another important advantage of such a tool is the quick process of providing a quotation according to a customer’s requirements (salespersons 3, 5, and 8), as the following quote illustrates:

> ‘I would have to say, that it is the speed’ (Ted).

> ‘Well, when paper catalogues were used, sometimes, prices could be a little inaccurate, or it was possible to make an offer for certain characteristics and equipment that it was not possible to get. Now, there is no room for such operational errors’ (John).

> ‘The good thing is that this tool does not allow overlapping choices. In other words, it is built so that, in one unit, you can’t choose options that do not match or leave out an option that is required for the chosen option’ (George)

5.3 Compatibility

Every salesperson thought that the sales configuration tool was compatible with their work. The results were categorized into three different groups: 1) those who thought that the tool was extremely compatible, 2) those who thought that the compatibility was good, and 3) those who thought that the tool was compatible but who were also somewhat critical.

> 'I think this tool is extremely compatible. It really helps in many things' (George).
>
> 'It is specific; I will give to it good grades. It is functional. I have no ideas that could help improve it. It's good enough' (William).
>
> 'I am not using any digital brochures. I just use paper brochure, if we happen to have those . . . the laptop is a little bit clumsy . . . there could be a lighter tool, perhaps a tablet or another comparable solution' (Ted).

5.4 Job performance

Based on the salespersons' experience, the relevancy of the sales configuration tools regarding their own performances were categorized into three lower-order themes: 1) the tool has no relevance, 2) the tool has a small effect, and 3) the tool makes a difference. Interestingly, all salespersons in the group 'good salesperson' (1, 2, 6, and 9) experienced positive effects from the tool, and it furthered their success. To the contrary, those in the 'salesperson with problems' group believed that they would be successful either without any help or with limited help from a sales configuration tool. Those who had achieved a good performance rating appreciated the relevance of using a sales configuration tool in their work. The following quotes illustrate these different views:

‘Yes, of course. If we were still calculating everything manually, there would be much more room for mistakes’ (Cliff).

‘Well, I do not know whether it has much of an effect on the results’ (John).

‘I don’t believe that. It would slow you down and increase your workload, but I really don’t believe that it (sales configuration tool) has any influence on my results’ (William).

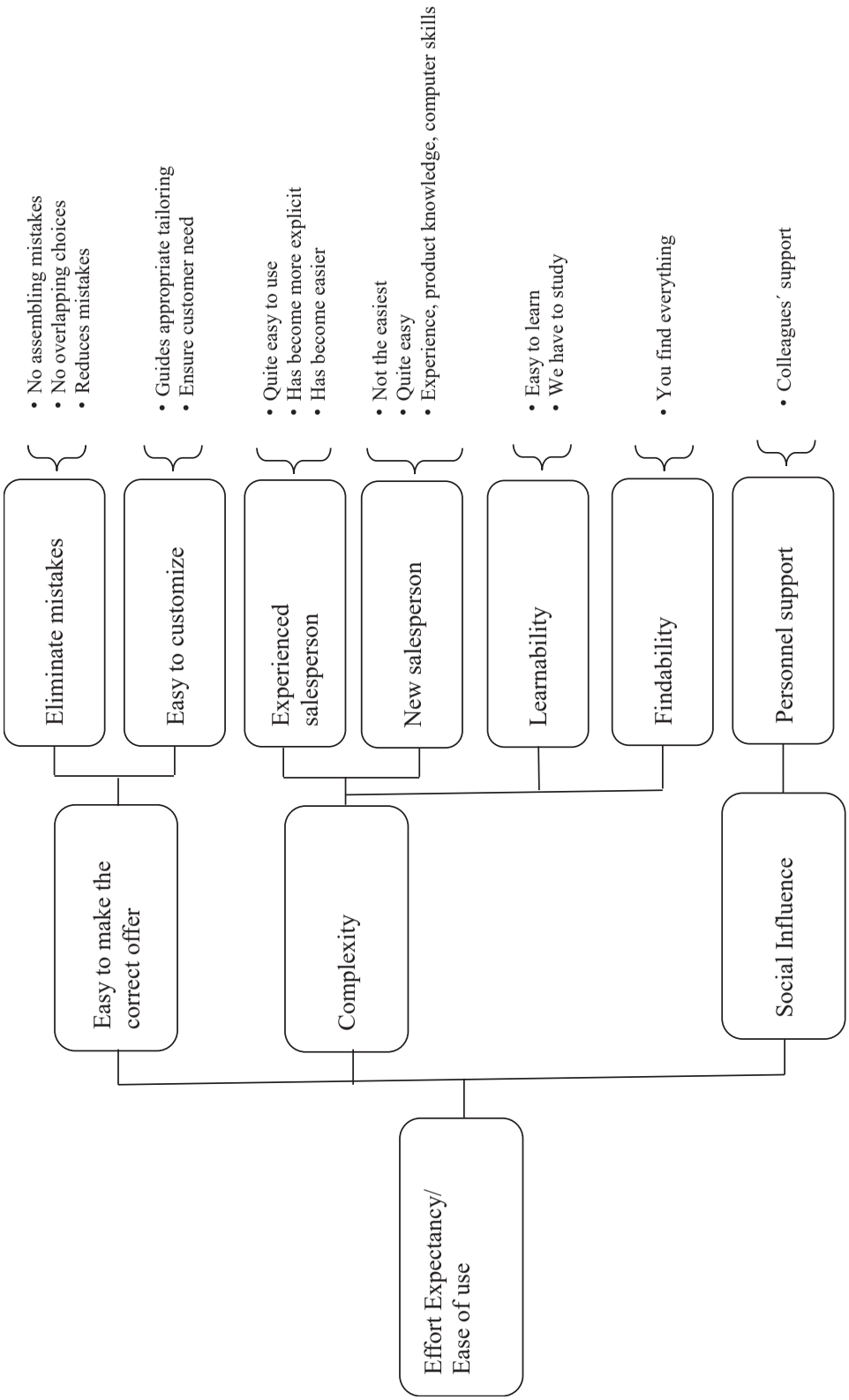
Salespersons now have years of experience in using different models of mobile sales configuration tools. In the past, they used catalogues to demonstrate products to their customers. Almost all of the interviewed (8/9) were not willing to abandon using a mobile sales tool in favor of a paper catalogue. Accordingly, salespersons were sub-categorized into either ‘Under no circumstances’ or ‘Well, why not?’ regarding their preference.

5.5 Effort expectancy/ease of use

Effort expectancy/ease of use consisted of three higher-order themes: easy to make the proper offer, complexity, and social influence as illustrated in Figure 4. These themes were divided into seven lower-order themes: eliminate mistakes, easy to customize, experienced salesperson, new salesperson, learnability, findability, and colleagues’ support. With a mobile sales configuration tool, it is easy to offer a product based on a customer’s need without either overlapping choices or making mistakes:

‘In the old days, it was possible to sell features or accessories that did not match each other or would not work in combination. Now, it is not possible to make such mistakes’ (John).

Figure 4. Effort expectancy of MSCT



Most of the salespersons found the tool quite easy to use and learn. When they considered learning the system as a new salesperson, most of them thought that it would be quite easy but felt that it would be even easier if the salesperson had experience with machines, special product knowledge, and computer skills. In addition, they found it easy to locate configuration information. The salespersons had social support from their colleagues in using the tool as well:

> 'We support, support . . . I always immediately ask a colleague if he has encountered the same problem' (John).

The salespersons expressed their ideas regarding further improvement of the specific MSCT that they have been using as shown in Figure 5. They also discussed the possibilities of improving sales activities with social media tools. Many issues were identified, and they were coded through the higher-order themes of performance and effort expectancy. Lower-order themes concerning MSCT included new mobile devices (PE), sales support within the tool (PE), new features in software (PE, EE), and learning beforehand (EE). The mobile social media tool was divided into two lower-order themes: new social media channels (PE) and ease of communications (EE). Most of the respondents suggested a tablet as a new mobile device. The salespersons also suggested several new improvements for the sales configuration tool, such as visualization with photos, automatic text, and changing the basic model without losing already entered information.

Respondents stated the following:

> 'There are accessories on the list (visible), but the system does not show the tailored machines with the chosen accessories on the screen to the customer. It would be good

idea. It could be in the color that the customer wants. Of course, it would help in the selling situation' (George).

'When we think about using only the configurator, email, and so on, maybe either a tablet or something similar could be a better solution that is smarter and quicker to use, especially when you want to present the product brochures. A laptop is a little bit . . . let's say that it was once probably a pretty good idea, but it seems that this is starting to be a little bit old' (Ted).

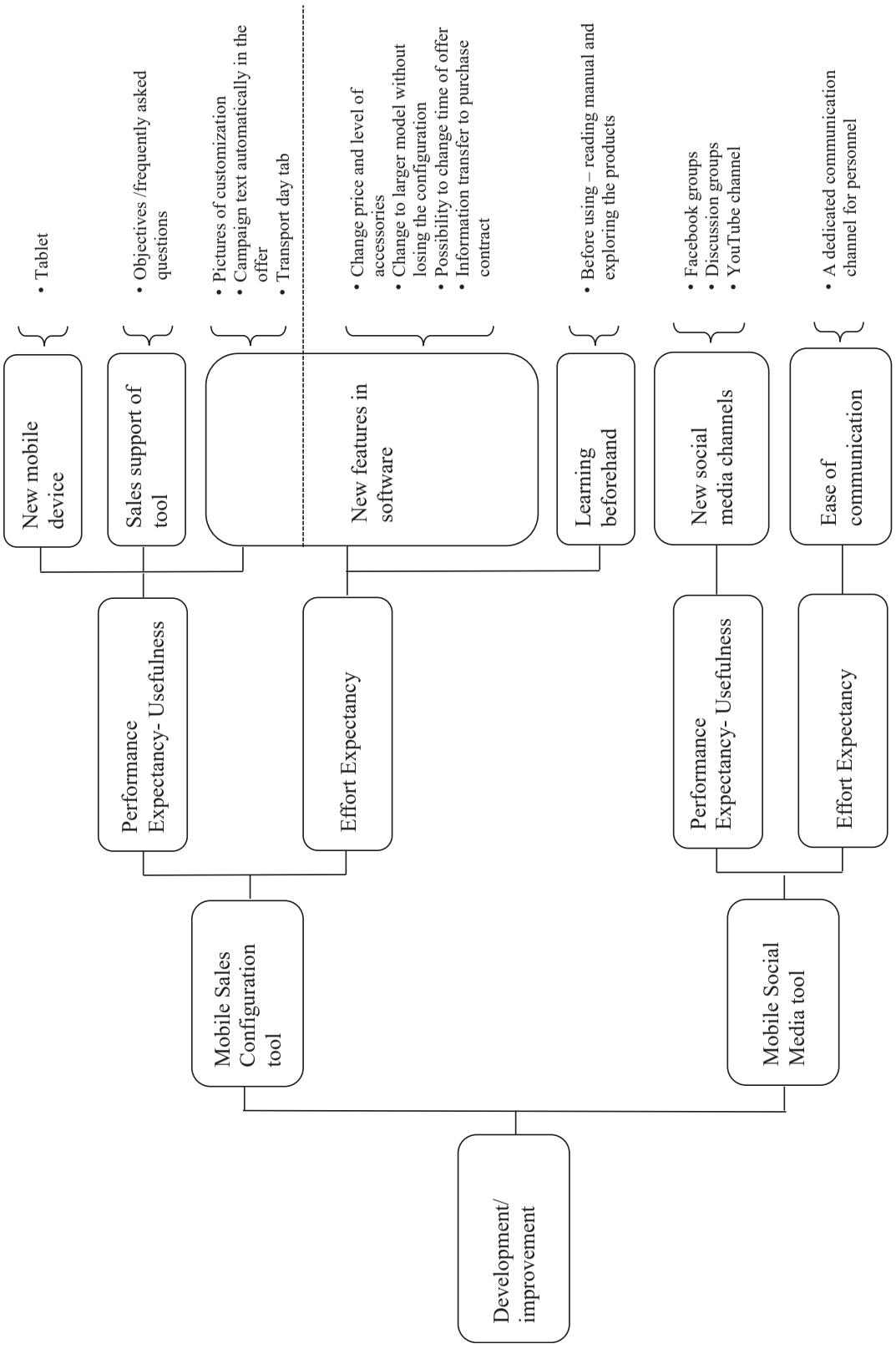
'Yes, there is a need (for social media sales tools), but it then requires a commitment and continued care. You cannot just put out some information and leave it there' (Harry).

5.6 Facilitating conditions

The company provides training for every new salesperson. According to the salespersons, the training is highly relevant to sales configuration tool adoption. The most effective training is formal and provided by the company. Similarly, *Learning by Doing* (LbD) in their work is an important driver that helps adoption, along with colleague support. The participants also mentioned that regular training is needed after either a new product release or an update because these actions change the functionality of the configuration tool. All participants agreed that technical support has been available through the helpdesk system and occasionally from superiors. It is important to obtain immediate help if problems occur in the configuration; however, these problems are rare. Regarding the need for technical support, one interviewee said the following:

'There is a little bit of need for technical support, but help is received whenever needed. Mainly through the helpdesk' (William).

Figure 5. How to further develop MSCT



5.7 Personal innovativeness

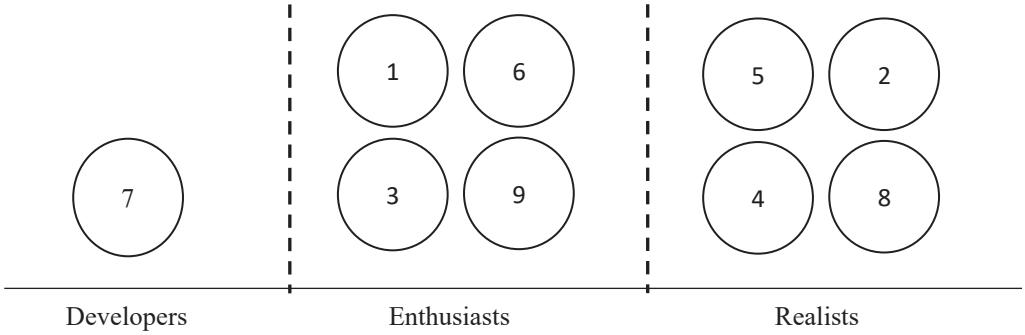
The salespersons evaluated their own personal innovativeness in adopting a new mobile sales tool in their work. Based on the research data, the salespersons were divided into three groups and were named as developers, enthusiasts, and realists, respectively as shown in Figure 6. Developers were extremely positive and interested in new tools. They also offered new ideas about how to develop sales tools and how to utilize social media in sales. Enthusiasts were quite interested in new sales tools. Their attitude toward new things was positive, and they had good self-confidence. Realists lacked interest in new mobile tools; however, they wanted to have enough understanding to be able to use the tools in their work. They adopted tools at a slower rate than their peers because they lacked confidence in using technological tools. The following quotes illustrate these types:

> 'I am very interested in new tools. I am not the most talented, but I am interested in everything. I have my own tablet with me sometimes . . . managers are a little bit old fashioned . . . and on Facebook, we talk about those machines, and I think it's very good because you can participate in discussions' (Elton, developer).

> 'Well yes. If the job is always evolving, you are pleased to use them . . . there is an e-mail function on the smartphone, and the camera is good enough for the taking a picture of the customer's old machine . . . in the evenings, I follow the machine sellers' Facebook group. It is constantly updated. I do not know if it's the best channel, but it seems so' (Noel, enthusiast).

> 'I'm not very interested in technical tools. Yes, I have figured out that it's necessary to be somewhat interested or otherwise you drop out. I'm not a friend of the computers, and I do not use social media much' (Sam, realist).

Figure 6. Personal innovativeness of participants based on self-evaluation



5.8 Risks

Salespersons do not experience any major risks from using a mobile sales configuration tool. The minor risks were divided into five lower-order themes: 1) no risks, 2) technical risks, 3) risks from outside, 4) problems in programming, and 5) the salesperson's own mistakes (Table 3). Risks were combined into three higher-order themes: social (number 3), human (number 5), and technical (numbers 2 and 4). Based on their experience, the greatest potential risks were technical faults. Notably, there were no risks with either wireless connection or quality of information. The following perceptions of risks provide insights into the salespersons' reality:

> 'It happened once when I was with a customer. The gadget got stuck, and then I had to stop the configuration' (Cliff).

> 'Yes, when a new model came out, in the configuration tool, there were a few odd things. For example, it was possible to choose an air conditioner and add another air conditioner with a heater function' (Noel).

> 'Yes, it is by far the most expensive solution, and there is a hell of a risk. The fact that we instantly changed these prices in the tool . . . purchase prices changed without including

tax. Quite often, the farmer stands beside you chatting and asking many questions, and you can get distracted and forget to add value added tax on top of the price' (Sam).

Table 3. Experience of risks in using MSCT

Lower-order themes	Higher-order themes	Risks
1	No risks	
2	Technical (tool related)	System does not save the changes
		Problems with the portable printer
		Missing data connection
		Technical breakdown
		Computer freezes
3	Social	If a customer sees a marginal profit
		Stolen passwords and computers
4	Technical (not tool related)	Tailoring an infeasible machine
		Missing information on a new machine model in the system
		Minor mistakes in pricing
5	Human	Not including the VAT in the price

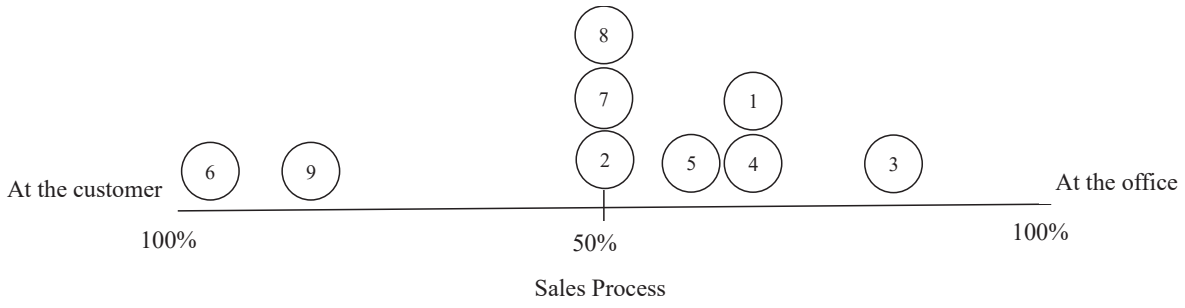
Salespersons were asked about their usual sales routines and whether they make an offer at the office after visiting with customers or instantly after configuring the product during visits to farms. If they did not follow similar routines, they were asked to explain their procedure and provide estimates. Two of the salespersons made offers either always or nearly always while at the farms (6 and 9), see Figure 7. These salespersons were the best performing sellers, which indicates that, when the MSCT mobile configuration tool was used and a tailored offer was made immediately, the customer was more likely accept the offer, as the following quotes illustrate:

'Well, sure, if we visit a customer, the offer is always made and printed out for the customer' (Noel).

‘Well, yes, it depends, and both ways are followed. Maybe fifty-fifty . . . it (tailored customer configuration) will always at some point be transferred into the system’ (Elton).

‘I prefer sending an offer via e-mail in a proper PDF format versus printing it with the portable printer. Printing is (more or less) like messing around . . . sometimes the customer has time and we configure at the farm, but usually I prepare it at my office. I would say that 80% of the configurations I make at the office without the customer’ (Ted).

Figure 7. Where to configure and offer a product to a customer in the sales process



6. Discussion and conclusion

The objective of this article was twofold: 1) to study B2B salespersons’ experiences of adoption and use of a mobile sales configuration tool (MSCT) and 2) to offer a conceptualization of its acceptance. This study provides insights into salespersons’ MSCT usage experiences in sales activities. By studying SFA literature thoroughly the determinants of SFA acceptance and usage were identified, most frequently used models, theories and constructs in SFA studies were studied. Based on the findings TAM/TAM2, UTAUT, and IDT were chosen as a theoretical framework for current study along with additional constructs from various past SFA studies. Objectives of the study have been achieved and the main findings can be summarized as follows:

1) MSCT is useful and easy to use; 2) the tool is excellent in customizing the end-product; 3) with the tool, it is easy to make competitive and profitable offers; 4) the tool affects performance; 5) training is important in adoption of the tool; 6) there are different types of salespersons, according to personal innovativeness; 7) experience of risks were minor and were mainly technical; 8) there was a need to alter the mobile device. The findings of the current study are consistent with previous similar studies. For example, Jones et al. (2002) and Robinson et al. (2005) found that usefulness is an important determinant of technology acceptance.

A surprising result was that salespersons used MSCT differently, and there was no precise determined sales routine among the salespersons. Therefore, there were those who used digital tools to the largest extent and provided an offer immediately after discussing customization while visiting customers on farms. These salespersons had the best performance, which indicated how using the tool influenced a salesperson's performance. This was in line with Boujena et al. (2009), who found that SFA systems increase sales productivity.

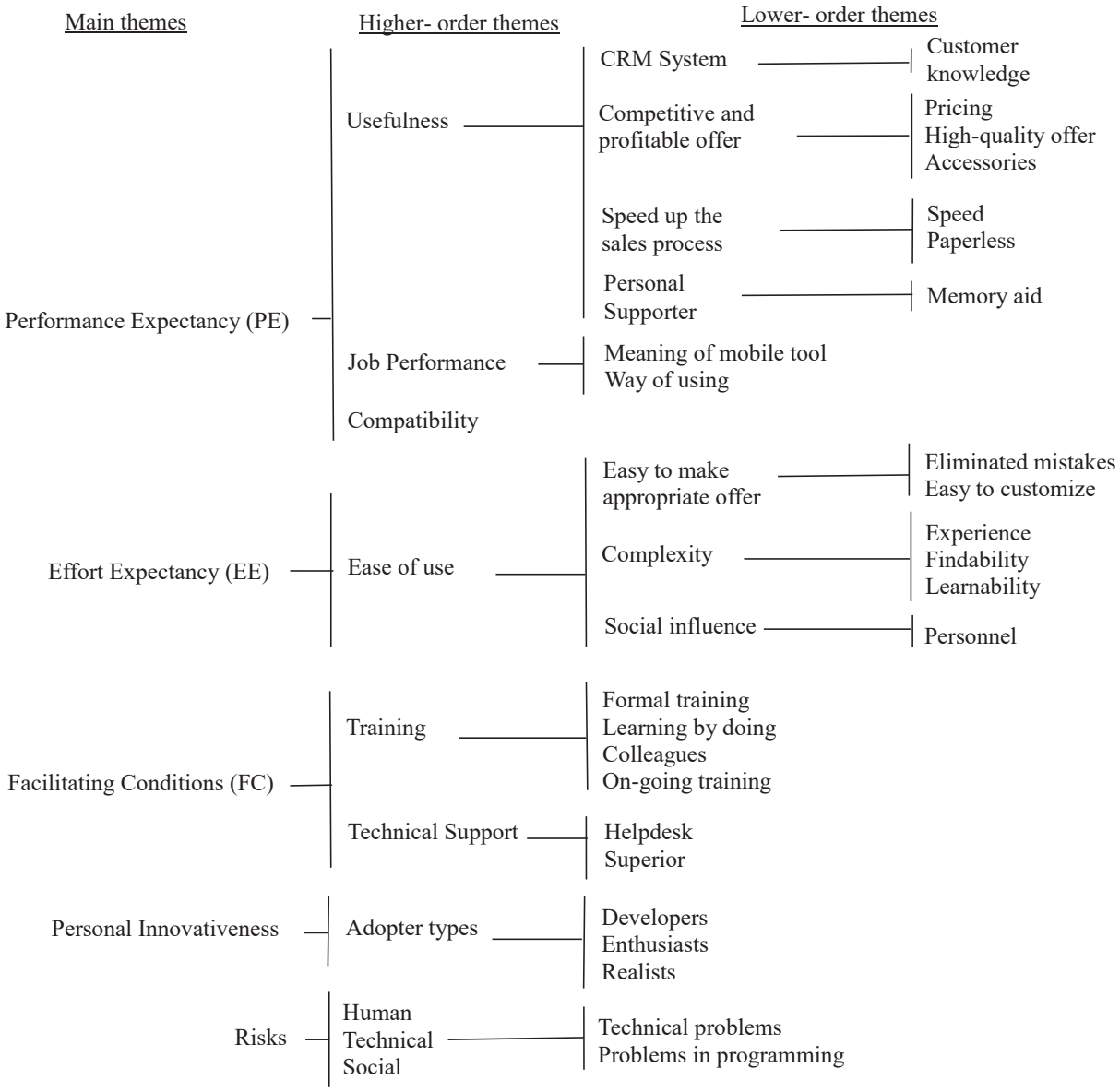
Our study makes a significant theoretical contribution to technology acceptance and mobile SFA research by suggesting possible determinants of MSCT adoption as shown in Figure 8. For example, the main determinants of usefulness (performance acceptance) are a competitive and profitable offer, a relevant CRM system, a quicker sales process, and personal support. The main determinants of ease of use are ease in correct usage (eliminate mistakes, easy to customize), complexity (experience, learnable, findability), and social influence (personnel).

6.1 Managerial implications

We suggest that the findings of this study have many important implications for managerial practice. Firstly, mobile sales configuration tools are obviously useful in sales activities and

should be further developed. For instance, the interviewed participants stated that they would like to illustrate customized machines with images.

Figure 8. Main determinants of adoption of MSCT



Secondly, sales management should develop a common sales routine for all salespersons. This routine should instruct personnel on how configuration should be used to increase sales. The

results of this study show that a successful deal is more likely when an offer is made right after discussing the details of the product with the client.

Thirdly, experienced salespersons should mentor new salespersons. This will help new salespersons learn to use the sales configuration tool effectively and gain knowledge from experienced colleagues.

Fourthly, social media channels should be established so that salespersons can interact with each other, share their experiences, provide solutions, and ask questions. This can be managed by the company, and participation can be motivated by various company promotions, offers, and programs.

Fifthly, management should consider the different personalities and levels of innovativeness of salespersons when making relevant decisions. For instance, those with innovative personalities can provide ideas for further development of mobile sales tools.

Finally, our findings indicate that it is important that product configuration is conducted only after an in-depth discussion of the customer's needs and requirements rather than basing it on a first phone call or an early idea.

6.2 Limitations and future research

The current study has certain limitations that should be considered in future studies. First, the analysis was based on a small number of participants (nine salespersons). Therefore, the results cannot be generalized in other contexts. Second, social desirability might have affected the results in a way that caused the salespersons to have been tempted to talk positively about MSCT, especially because machine and farming machinery sales were slow when interviews

were conducted. However, salespersons were also open minded and critical, as the quotations demonstrated.

This study can serve as pathway toward understanding of MSCT adoption and usage. If findings were to be inferred to a greater population, a quantitative study would need to be pursued. Many opportunities are available for future studies to build upon the current one and its findings. It has opened new avenues as a source of hypotheses for a quantitative analysis of certain phenomena, such as the correlation between using a mobile sales configuration tool and sales performance. A similar study could also be conducted in different countries to examine how culture affects sales configuration and mobile tool adoption.

6.3 Conclusion

This study aimed at examining salespersons´ experience of adoption and usage of mobile sales configuration tools at work and offering conceptualization of adoption. In the light of SFA literature theoretical framework and method for the study were developed. Data analysis was based on Tuomi and Sarajärvi's (2003) content analysis and Braun and Clarke's (2013) Stages of Thematic Analysis. Findings of the study offered insights into salespersons´ MSCT usage experiences in sales activities and main determinants of MSCT adoption were identified. This work may be further extended by conducting similar study with greater sample and in different contexts. Also, it may be conducted in a cross-cultural setting in order to examine effects of cultural factors in usage and adoption of MSCT.

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