ORGANIZATIONAL ADOPTION OF MOBILE COMMUNICATION TECHNOLOGIES

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

ORGANIZATIONAL ADOPTION OF MOBILE COMMUNICATION TECHNOLOGIES

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The purpose of this study is to identify the key adoption factors for mobile communication technologies, specifically smartphones, at private sector organizations. We have proposed a comprehensive research model based on the Diffusion of Innovation theory, Institutional theory, and Technology-Organization-Environment framework. Sequential explanatory design mixed method research strategy, which incorporates quantitative and qualitative approaches was used in this research. A Structural Equation Model was used to assess the model based on the data collected from senior and middle managers at 213 and 141 private sector organizations

in Turkey and Canada, respectively. The Constant Comparative Method was used to analyze follow-up data that resulted from transcription of the interviews. In the first part of the study, the research model was applied in Turkish organizations. The results show that expertise, security and the environmental characteristics of competitive pressure, customer expectations, and partner expectations have the most significant influence on adoption in Turkey. The qualitative findings confirmed these results. In the second part of the study, the research model has been applied in Canadian organizations. Results show that security and top management support have the most significant effect on adoption in Canada. The qualitative findings confirmed the quantitative results. As these results suggest that there are significant differences between the two countries in terms of their adoption behavior, in the third part of the study, we investigated the differences in patterns between the adoption behaviors of the two countries and identified the impact of cultural differences on adoption. The results show that national culture has a significant effect on the adoption of smartphones by organizations. The implications of these findings are discussed.

Keywords: organizational adoption, mobile communication technologies, smartphones

ÖZ

MOBİL İLETİŞİM TEKNOLOJİLERİNİN KURUMSAL KABULÜ

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Bu çalışmanın amacı, mobil iletişim teknolojilerinin, özellikle akıllı telefonların, özel sektörde kurumsal kabulünü etkileyen kilit etkenleri belirlemektir. Bu bağlamda, yeniliklerin yayılması teorisi (Diffusion of Innovation theory), kurumsal teori (Institutional theory) ve teknoloji-organizasyon-çevre çerçeve modeli (Technology-Organization-Environment framework) temel alınarak kapsamlı bir araştırma modeli önerilmiştir. Çalışmada nicel ve nitel veri toplama yöntemlerinin ve veri analizinin bir arada olduğu karma araştırma yöntemlerinden sıralı açıklamalı desen (sequential explanatory design) kullanılmıştır. Araştırmaya, Türkiye'den 213 ve Kanada'dan 141 özel sektörde faaliyet gösteren firma katılmıştır. Üst ve orta düzey yöneticilerden anket yöntemiyle toplanan veriler, yapısal eşitlik modeli (structural equation model)

kullanılarak analiz edilmiş ve böylelikle araştırma modeli test edilmiştir. Mülakat yöntemiyle toplanan veriler ise sürekli karşılaştırma metodu (constant comparative method) kullanılarak analiz edilmiştir. Çalışmanın birinci bölümünde, araştırma modeli Türkiye'de faaliyet gösteren firmalarda uygulanmıştır. Araştırma sonuçları, tecrübe, güvenlik ve rakip baskısı, müşteri beklentileri ve ortak beklentileri gibi çevresel etmenlerin Türkiye'de kurumsal kabulü etkileyen en önemli etken olduğunu göstermektedir. Elde edilen nicel bulgular bu sonuçları doğrulamaktadır. Çalışmanın ikinci bölümünde, araştırma modeli Kanada'da faaliyet gösteren firmalarda uygulanmıştır. Araştırma sonuçları, güvenlik ve üst yönetim desteğinin Kanada'da kurumsal kabulü etkileyen en önemli etken olduğunu göstermektedir. Nicel bulgular, nitel araştırma sonuçlarını desteklemektedir. Elde edilen sonuçlar, iki ülke arasında kabul davranışı bağlamında önemli farklılıklar olduğunu gösterdiğinden, çalışmanın son bölümünde iki ülkenin kabul davranışı arasındaki farklılıklar incelenmiş ve kültürel farklılıkların kabul davranışı üzerindeki etkisi araştırılmıştır. Araştırma sonuçları, ulusal kültürün akıllı telefonların kurumsal kabulü üzerinde anlamlı bir etkisi olduğunu göstermektedir. Bu bulguların yansımaları tartışılmıştır.

Anahtar Kelimeler: kurumsal kabul, mobile iletişim teknolojileri, akıllı telefonlar

DEDICATION

To My Parents

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ABBREVIATIONS

2G: Second Generation

3G: Third Generation

4G: Forth Generation

B2B: Business-to-Business

BYOD: Bring Your Own Device

CFA: Confirmatory Factor Analysis

DOI: Diffusion of Innovation

DW: Data Warehouse

EDI: Electronic Data Interchange

EIS: Executive Information Systems

ERP: Enterprise Resource Planning

EU: European Union

HRIS: Human Resources Information Systems

HRM: Human Resource Management

ICT: Information and Communications Technology

IS: Information Systems

IT: Information Technology

KMS: Knowledge Management System

MM: Motivational Model

MPCU: Model of PC Utilization

OLS: Ordinary Least Squares

PLS: Partial Least Squares

RFID: Radio Frequency Identification

SCT: Social Cognitive Theory

SEM: Structural Equation Modeling

SME: Small and Medium Enterprises

TAM: Technology Acceptance Model

TOE: Technology-Organization-Environment

TPB: Theory of Planned Behavior

TRA: Theory of Reasoned Action

TUBITAK: the Scientific and Technological Research Council of Turkey

UTAUT: Unified Theory of Acceptance and Use of Technology

XP: Extreme Programming

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Mobile phone ownership has experienced substantial growth over the first decade of the 21st century. At the end of 2011, the number of mobile telephone subscribers in the world reached an impressive 86%, up from 15.5% in 2001 (ITU, 2012). Moreover, the percentage of smartphone subscribers reached 21 percent of the population worldwide, or about 1.49 billion subscriptions by 2013 (KPCB, 2013). Consequently, mobile broadband has become the most dynamic Information and Communications Technology (ICT) service reaching a 40% annual subscription growth (ITU, 2013).

There are now 2.1 billion mobile Internet users, corresponding to 30 percent of the world population based on the latest statistics for active mobile-broadband subscriptions worldwide (ITU, 2013).

Moreover, in the US, Canada, and Western Europe, 90 percent of mobile subscribers have an Internet-ready phone (ITU, 2012). The users are rapidly transitioning from 2G to 3G platforms in both developed and developing countries. According to the ITU (2012), 45% of the world's population, in over 159 nations around the world, presently has access to 3G mobile networks. Furthermore, a number of countries such as France, Germany, Finland, Sweden, Norway, Ukraine, Canada, and the United States have started to offer services at even higher broadband speeds, moving to next generation wireless platforms (i.e. 4G, Long Term Evolution).

The significant growth in the mobile telecommunications industry has led mobile service providers and device manufacturers to develop new value-added mobile services together with the basic services such as voice mail, Short Messaging Service (SMS), fax mail, instant messaging, e-mail, and the Internet. With the introduction of these new services, including mobile payment, mobile signature, mobile tracking and security systems, Machine-to-Machine communication (M2M), mobile marketing and advertising, corporate messaging, and mobile access to corporate databases, organizational use of mobile communication technologies has been broadened. A higher adoption rate induces growth in the mobile telecommunications industry, enhances the responsiveness, and improves the competitiveness of organizations as these technologies provide more efficient and effective communication among employees, customers, and trading partners, speed up access to critical information anywhere and anytime, enable employees access to corporate databases and emails outside their office, and enhance managers' decision making capabilities providing them mobility, accessibility, flexibility, and ubiquity through "always-on" connectivity.

1.2 Purpose of the Study

The purpose of this study is to identify the key adoption factors for mobile communication technologies, specifically smartphones, at private sector organizations, and determine how and to what degree these factors influence organizational adoption. Accordingly, the study aimed to develop and validate an empirical model for the organizational adoption of smartphones.

1.3 Significance of the Study

The results of the study have implications for key stakeholders, including the organization in question, employees, customers, investors, trading partners, competitors, mobile phone manufacturers, mobile service providers, and governments. Identifying the key adoption factors and determining how and to what degree these factors influence the organizational adoption of smartphones may lead to successful adoption of mobile communication technologies.

The understanding of the influence of technology characteristics on adoption is useful in marketing and product development. For instance, the findings can help mobile phone manufacturers develop better marketing strategies in positioning their products. In addition, they can focus on the development of functionalities that are valued by their corporate customers. Better products are likely to increase sales and market share. A thorough understanding of an organizational adoption decision can help trading partners and competitors react and be prepared to this adoption decision.

This study identifies the key adoption factors of smartphones in organizations through a new organizational adoption model, and contributes to the Information Systems (IS) literature since the study of technology adoption at the organizational level is limited with no seminal study on the organizational adoption of smartphones, although they have recently experienced significant growth.

1.4 Definition of Terms

Adoption: "The decision to make full use of an innovation as the best course of action available" (Rogers, 1995, p. 21).

Communicability: "The degree to which aspects of an innovation may be conveyed to others" (Rothman, 1974, p. 441).

Communication: "A process in which participants create and share information with one another in order to reach a mutual understanding" (Rogers, 1986, p. 199).

Compatibility: "The degree to which an innovation is perceived as consistent with the social value and beliefs or the needs of potential adopters" (Rogers, 1995, p. 224).

Complexity: "The extent to which an innovation is perceived as difficult to understand and use" (Rogers, 1995, p. 242). This is the same as perceived ease of use in Technology Acceptance Model.

Cost: The expenditure has been incurred for the adoption of mobile communication devices.

Image: "The degree to which use of an innovation is perceived to enhance one's status in one's social system" (Venkatesh & Davis, 2000, p. 189).

Innovativeness: "The degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 22).

Mobile Communication Devices: Refer to mobile computers such as notebooks and netbooks, mobile phones, personal digital assistants (PDA), and PDA phones.

Mobile Communication Technologies: Refer to mobile technologies available today such as 2G, 3G, 4G, WIMAX, WI-FI, Wibro, EDGE, and GPRS.

Mobile Communication: The exchange of voice and data via a computer or a mobile device without having connected to any physical or fixed link.

Observability: "The degree to which the results of an innovation are visible to others" (Rogers, 1995, p. 244).

Organization: "A discrete, relatively stable group of individuals linked by relatively stable patterns of interaction and pursuing common objectives" (Morgan, 1986).

Organizational Adoption: The decision of an organization to a new technology to conduct business or transaction with its trading partners and customers.

Perceived Ease of Use (PEOU): "The degree to which a person believes that using a particular system would be free of effort" (Davis, Bagozzi, & Warshaw, 1989, p. 320).

Perceived Usefulness (PU): "The degree to which a person believes that using a particular system would enhance his or her job performance" (Davis et al., 1989, p. 320).

Relative Advantage: "The extent to which the potential adopter perceives an innovation is superior to alternative products, services, or concepts" (Rogers, 1995, p. 212).

Results Demonstrability: "The tangibility of the results of using the innovation, including their observability and communicability" (Moore & Benbasat, 1991, p. 203).

Smartphone: 3G (or higher) mobile phone that help the exchange of voice and data due to the mobile technologies (i.e. BlackBerry, iPhone, Android).

Trialability: "The degree to which an innovation may be experimented with on a limited basis" (Rogers, 1995, p. 243).

1.5 Limitations of the Study

The following limitations are relevant to the study. First, the study focused on smartphones; therefore, the results should be applied to other technologies with caution. Second, the study examines the adoption of smartphones by private sector organizations, and therefore, results should not be generalized to public organizations.

1.6 Organization of the Study

The study follows a sequential flow. Chapter 1 presents introduction, purpose and the significance of the study, definitions of terms, limitations, and organization of the study. Chapter 2 reviews literature on theories and models of organizational adoption to present the theoretical underpinnings of the research. Chapter 3 presents the research model for investigating the organizational adoption of smartphones. Chapter 4 presents research method, data analysis and results. Lastly, Chapter 5 presents the discussion of the research findings and implications for researchers and practitioners along with the limitations of the study.

CHAPTER 2

LITERATURE REVIEW

Review of the literature on Information and Communications Technology (ICT) adoption indicates that a majority of studies examined adoption at the individual level. These studies have been based on the adoption theories and models such as the Diffusion of Innovation Theory (DOI; Rogers, 1983), Technology Acceptance Model (TAM; Davis, 1986; Davis, 1989; Davis et al., 1989), Theory of Planned Behavior (TPB; Ajzen, 1985; Ajzen, 1991), and Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003).

For the purposes of the study, I am interested only in theories and models at the organizational level. Therefore, I mainly focus on organizational adoption theories and models such as the DOI theory that has been used for both individual and organizational adoption of technology, Technology-Organization-Environment (TOE) framework, and Institutional theory.

2.1 Diffusion of Innovation

Diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1983, p. 5). However, Rogers distinguishes diffusion from adoption by stating that adoption is "a decision to make full use of an innovation as the best course of action, whereas rejection is a decision not to adopt an available innovation" (Rogers, 1983, p. 21). In

this study, adoption is therefore defined as the decision of an organization to use smartphones to conduct business or transaction with its trading partners and customers.

Rogers (1995) identified five important attributes of innovation that influence the decision to adopt or reject an innovation. Relative advantage, compatibility, complexity, trialability, and observability. These attributes are valid for both individual and organizational adoption of technology.

Relative advantage is the degree to which an innovation is perceived as providing a better situation than competitors. Compatibility is the degree to which an innovation is perceived as being compatible with the existing values, culture, and user needs. Complexity is the degree to which an innovation is recognized as difficult to understand and use. Trialability is the degree to which an innovation is experimented. Finally, observability is the degree to which the results of an innovation are visible.

2.2 TOE Framework

Tornatzky and Fleischer (1990) developed a framework for organizational adoption based on the Contingency Theory of Organizations. This theory postulates that an effective organization should have a structure that is consistent with its environmental needs (Lawrence & Lorsch, 1967). In this framework, three key contexts that affect organizational adoption were identified: technology, organization, and environment, hence the name "TOE."

The technological context relates to technologies available to an organization. Its main focus is on how technological characteristics can influence the adoption process. The organizational context describes the characteristics of an organization such as firm size, degree of centralization, formalization, the complexity of the managerial structure, the quality of human resources, and the amount of slack resources available internally. The external environmental context is the arena in which an organization conducts its business. This includes the industry, competitors, regulations, and relationships with the government (DePietro, Wiarda, & Fleischer, 1990).

The TOE framework has been used successfully in the study of adoption within organizations. This framework can be combined with other theories to better explain

information technology (IT) adoptions. For instance, Thong (1999) developed an integrated model combining the TOE framework with DOI theory. The model specifies contextual variables such as decision-maker characteristics, IS characteristics, organizational characteristics, and environmental characteristics as primary determinants of IS adoption in small businesses. Moreover, Zhu, Kraemer, & Xu (2006a) and Wang, Wang, & Yang (2010) combined the DOI theory with TOE framework to better understand IT adoption.

2.3 Institutional Theory

Scott (1995) defines institutions as cognitive, and regulative structures and activities that provide stability and meaning to social behavior. He divides institutions into three categories as regulative, normative and cognitive, whereas North (1990) divides them into two categories as formal and informal.

The central premise of institutional theory is that organizations are affected by three external isomorphic pressures: mimetic, coercive and normative pressures (Kostova, 1999; Yiu & Makino, 2002). Mimetic pressures are observed when a firm knows that a competitor has adopted an innovation and that innovation has been a success; the firm tends to adopt the same innovation (i.e. pressures coming from competitors) (Teo, Wei, & Benbasat, 2003).

"Coercive pressures are a set of formal or informal forces exerted on organizations by other organizations upon which the former organizations depend" (i.e. pressures coming from government) (Powell & DiMaggio, 1991).

Normative pressures come from dyadic relations where companies share some information, rules, and norms. Sharing these norms through relational channels among the members of a network facilitates consensus, which in turn, increases the strength of these norms and their potential influence on organizational behavior (i.e. pressures coming from trading partners and customers) (Powell & DiMaggio, 1991).

2.4 The Systematic Review of the Empirical Literature on TOE Framework

TOE framework has been utilized by several studies to explain various IT adoptions such as e-commerce, e-business, Enterprise Resource Planning, Electronic Data Interchange, open systems, Knowledge Management Systems etc. Table 1 presents domain, variables, data sources (samples, participants, etc.), and data analysis techniques of the studies reviewed.

Table 1: The Studies that use the TOE Framework

Author(s)	Domain	Technological Factors	Organizational Factors	Environmental Factors	Data Sources	Methods
Saldanha and Krishnan (2012)	Web 2.0	**Importance to Open Standards***	**Organization Size**	**Industry Knowledge Intensity**, Industry Competitive Intensity	E-Mail Survey of 195 U.S. Firms	Chi-square and T Tests
Bordonaba-Juste et al. (2012)	E-Business	**Perceived Benefits**	**IT Expertise**, Firm Size	Pressure Suppliers, Pressure Clients, **Competitive Pressure**	E-Mail Survey of 691 retailers in 7 European Countries.	T Test
Low et al. (2011)	Cloud Computing	**Relative Advantage**, Complexity, Compatibility	**Top Management Support, Firm Size**, Technology Readiness	**Competitive Pressure, Trading Partner Pressure**	E-Mail Survey of 111 Firms in Taiwan	FA and Logistic Regression
Ifinedo (2011)	Internet/E-Business	**Perceived Benefits**	**Management Commitment & Support**, Organizational IT Competence (Control Variables; Size, Age, Industry Type, Intensity of Competition)	**External Pressure**, IS Vendor Support & Pressure, Financial Resources Availability	Questionnaire with 214 SME in Atlantic	Partial Least Squares (PLS)
Troshani et al. (2011)	HRIS	**Perceived Benefits/Costs Trade-Off, Organizational Fit**	**Technology Competency, Management Commitment, Organization Size, Degree of Centralization, Human Capability**	**Regulatory Compliance, Successful Adoptions**	16 Interviews with 11 Australian Public Sector Organizations	
Oliveira and Martins (2010)	E-Business	**Technology Readiness, Technology Integration**	Firm Size, **Expected Benefits and Obstacles of e-business**, Improved Products or Services or Internal Processes	**Internet Penetration**, Competitive Pressure	Telephone Survey of 6964 Firms across 27 UE27 Countries	T-Test, Factor Analysis (FA) and Cronbach's Alfa (CA)
Ramdani et al. (2009)	Enterprise Systems	**Relative Advantage**, Compatibility, Complexity, **Trialability**, Observability	**Top Management Support**, **Organizational Readiness**	Competitive Pressure, External IS Support	Interview with 102 Firms in England	CA and Logistic Regression

Table 1 (continued)

Author(s)	Domain	Technological Factors	Organizational Factors	Environmental Factors	Data Sources	Methods
Doolin and Al Haj Ali (2008)	Mobile Commerce	Relative Advantage, Compatibility, Complexity	Information Intensity, Leadership, Organizational Readiness	Competitive Intensity, Partner Influence, Available Support	Three Case Studies	
Lin and Lin (2008)	E-Business	**IS Infrastructure, IS Expertise**	Organizational Compatibility, **Expected Benefit of E-Business**	**Competitive Pressure**, Trading Partner Readiness	E-Mail Survey of 163 Large Firms in Taiwan	Confirmatory Factor Analysis (CFA) and SEM
Liu (2008)	E-commerce	**Support from Technology and Human Capital**	**Management Level for Information**, Firm Size (Control: Firm Property)	**User Satisfaction**, **E-Commerce Security**	E-mail, Online Survey and Telephone Interview with 156 Firms in China	FA and Ordinary Least Squares (OLS)
Pan and Jang (2008)	ERP	IT Infrastructure, **Technology Readiness**	**Size, Perceived Barriers**	**Production and Operations Improvements**, Enhancement of Products and Services, Competitive Pressure, Regulatory Policy	Face-to-Face Interview with 99 Firms in Taiwan	FA and Logistic Regression
Bellaaj et al. (2008)	Web Site	**Perceived Advantage, Perceived Compatibility**, Perceived Complexity	**Management Support, Client-Oriented Strategy**	**The pressures exerted by Clients, Competitors**, Business Partners	Case Study with 3 Firms	
Sparling et al. (2007)	E-commerce	**Relative Advantage Compatibility**	Size, Business Category **Technological Opportunism,** Technological Readiness, **Owner Characteristics, Top Management Support**	Institutional Pressure	Survey of 94 Firms in Canada	FA and CA

Table 1 (continued)

Author(s)	Domain	Technological Factors	Organizational Factors	Environmental Factors	Data Sources	Methods
Zhang et al. (2007)	IT	**IT Infrastructure**	**IT Management**	**E-Government, Government Regulation and Promotion**, Government Factors	Questionnaire Survey of 1211 Firms in Shanghai	PLS and SEM
Chang et al. (2007)	E-signature	Security Protection, System Complexity	User Involvement, **Adequate Resources**, **Hospital Size**, Internal Need	**Vendor Support, Government Policy**	Questionnaire Survey of 136 Firms in Taiwan	SEM
Hong and Zhu (2006)	E-commerce	**Technology Integration**, **Web Functionalities**, EDI Use	**Web Spending**, Perceived Obstacles	**Partner Usage** (Control: **Size**, Industry)	Telephone Survey of 838 US and 198 Canada Firms	FA, T Test and Logistic Regression
Zhu et al. (2006a)	E-business	**Technology Readiness, Technology Integration**	**Firm Size**, Global Scope, Managerial Obstacles	**Competition Intensity**, Regulatory Environment	Telephone Survey of 1857 Firms across 10 Countries	CFA and SEM
Teo et al. (2006)	B2B E-commerce	**Unresolved Technical Issues**, Lack of IT Expertise and Infrastructure, Lack of Interoperability	Difficulties in Organizational Change, Problems in Project Management, **Lack of Top Management Support**, **Lack of E-Commerce Strategy**, **Difficulties in Cost-Benefit Assessment**	Unresolved Legal Issues, Fear and Uncertainty	Survey of 249 Firms in North America and Canada	FA, Univariate t-test and Multivariate Discriminant Analysis
Raymond et al. (2005)	E-business	**Manufacturing Technology**	Strategic Orientation, **Managerial Context, Manufacturing Context**	**Networking Intensity**	Questionnaire with 108 SME in Canada	PLS
Zhu and Kraemer (2005)	E-business	**Technology Competence**	**Size**, International Scope, **Financial Commitment**	**Competitive Pressure**, **Regulatory Support**	Phone Interviews with 624 Firms across 10 Countries	CFA, Second-Order Factor Modeling, and SEM

Table 1 (continued)

Author(s)	Domain	Technological Factors	Organizational Factors	Environmental Factors	Data Sources	Methods
Zhu et al. (2004)	E-business	**Technology Readiness**	**Firm Size**, **Global Scope**, **Financial Resources**	**Competition Intensity**, **Regulatory Environment**	Survey of 612 Firms across 10 Countries	SEM and CFA
Xu et al. (2004)	Internet	**Technology Competence**	Firm Size, Global Scope; **Enterprise Integration**	**Competition Intensity**, **Regulatory Environment**	Survey of 262 US Firms and 175 Chinese Firms	Cross-Sample Comparisons and SEM
Lertwongsatien and Wongpinunwatana (2003)	E-commerce	**Perceived Benefits**, **Perceived Compatibility,** IT Experience	**Size, Top Management Support**	**Competitiveness**	Survey of Thailand Firms	
Zhu et al. (2003)	E-business	**Technology Competence**	**Firm Scope, Firm Size**	**Consumer Readiness, Competitive Pressure**, Lack of Trading Partner Readiness	Telephone Interview with 3552 Firms in Europe	CFA, Second-Order Factor
Premkumar and Roberts (1999)	IT	**Relative Advantage**, Compatibility, Complexity, Cost	**Top Management Support**, **Size**, IT Expertise	**Competitive Pressure**, **External Pressure**, External Support, Vertical Linkages	Interview with 78 Firms in US	Discriminant Analysis and CA
Chau and Tam (1997)	Open System	Perceived Benefits, **Perceived Barriers**, Perceived Importance of Compliance to Standards, Interoperability, Interconnectivity	Complexity of IT Infrastructure, **Satisfaction with Existing Systems**, Formalization on System Development and Management	Market Uncertainty	Face-to-Face Interview with 89 Firms in Hong Kong	T-Test, FA, Logistic Regression

*Significant factors are shown in bold.

2.5 The Studies that used the TOE Framework with other Theories

TOE framework has been combined with other theories to better explain IT adoption. DOI theory is one of the main theories that has been combined with TOE framework. Wang et al. (2010) used TOE and DOI to explain Radio-frequency identification (RFID) adoption based on data collected by e-mail survey of 133 firms in Taiwan. They found that complexity, compatibility, competitive pressure, trading partner pressure, information intensity, and firm size are the key determinants of adoption.

Chong et al. (2009) used TOE and DOI to explain collaborative commerce adoption based on data collected by e-mail survey of 109 firms in Malaysia. They found that external environment, information sharing culture, and organizational readiness are the key factors affecting adoption.

Hsu et al. (2006) used DOI, TOE and the model by Iacovou et al. (1995) to explain e-business adoption based on data collected by telephone survey of 294 firms in the United States. They found that external pressures, including trading partners' pressure and government pressure have a strongly significant effect on adoption.

Zhu et al. (2006) used TOE and DOI to explain e-business adoption based on data collected by telephone survey with 1415 firms across 6 European Union countries. They found that relative advantage, compatibility, costs, security concerns, technology competence, organization size, competitive pressure, and partner readiness are the key adoption factors.

Thong (1999) used TOE and DOI to explain employees' adoption of software applications based on data collected by means of survey questionnaires from 166 firms in Singapore. He found that Chief Executive Officer (CEO) characteristics, including CEO's innovativeness and IS knowledge, and innovation characteristics, including relative advantage, compatibility, and complexity have a significant effect on adoption.

Institutional theory is another theory that is combined with TOE framework to explain IT adoption within different domains. According to institutional theory, in order to make organizational decisions, social and cultural factors should also be taken in to

account. In order to survive, organizations must conform to the rules and belief systems prevailing in the environment (Scott, 2004). Institutional theory adds to the environmental context of the TOE framework external pressures, including pressure from competitors and trading partners (Oliveira & Martins, 2011).

Teo et al. (2003) used institutional theory as a lens to understand financial electronic data interchange (FEDI) adoption. It was posited in that mimetic, coercive, and normative pressures existing in an institutionalized environment may influence organizations' predisposition toward an IT-based inter organizational system. They found that normative pressures exhibit the strongest influence on organizational predisposition toward FEDI. In another study, Li (2008) identified the major factors that impact adoption of e-procurement in Chinese manufacturing enterprises using DOI and Institutional theory. Results indicate that relative advantage, top management support, external pressure and external support are determinant factors of adoption.

Soares-Aguiar and Palma-Dos-Reis (2008) used the TOE framework as well as Institutional theory to explain adoption of Electronic Procurement Systems (EPS). Results showed that technology competence, firm size, extent of adoption among competitors, trading partner readiness, and perceived success of competitor adopters provide a reasonable estimate for each firm's likelihood to adopt EPS. Similarly, Gibbs and Kraemer (2004) used institutional theory and TOE framework to investigate the determinants of e-commerce usage. They found the most significant predictors of scope of use to be technology resources, perceived strategic benefits, financial resources, legislation barriers, external pressure, and government promotion.

Iacovou et al. (1995) developed a new model for electronic data interchange (EDI) adoption at small organizations that is based on three factors; perceived benefits, organizational readiness, and external pressure. External pressure in the model includes two variables: competitive pressure and trading partner power. Later on, Oliveira and Martins (2010) used this model within the TOE framework to explain adoption of e-business. Table 2 chronologically presents some studies that combine TOE framework with other theoretical models.

Table 2: The Studies that Combine TOE Framework with other Models

Model	Author(s)	Domain	Independent Variables	Data Sources	Methods
TOE and Institutional Theory	Yoon and George (2013)	Virtual Worlds	Technological Context: Relative Advantage, Compatibility, Security Concern. Organizational Context: Top Management Support, Organization Size, **Organization Readiness***, Firm Scope. Environmental Context: **Competitors Pressure**, Customers Pressure, **Normative Pressure**, Intensity of Competition. Controls: Social Desirability, Firm Age, Industry Effect.	E-Mail Survey of 130 US-based Organizations	FA, SEM using PLS
TOE and DOI	Wang et al. (2010)	RFID	Technological Context: Relative Advantage, **Complexity**, **Compatibility.** Organizational Context: Top Management Support, **Firm Size**, Technology Competence. Environmental Context: **Competitive Pressure, Trading Partner Pressure, Information Intensity**.	E-Mail Survey of 133 Firms in Taiwan	FA and Logistic Regression
TOE and DOI	Chong et al. (2009)	Collaborative Commerce (C-commerce)	Innovation Attributes: Relative Advantage, Compatibility, Complexity. **External Environment**: Expectations of Market Trends, Competitive Pressure. **Information Sharing Culture**: Trust, Information Distribution, Information Interpretation. **Organizational Readiness**: Top Management Support, Feasibility, Project Champion Characteristics.	E-mail Survey of 109 Firms in Malaysia	FA, Correlation Analysis and Regression Analysis
TOE, DOI and Institutional Theory	Li (2008)	E-procurement	Technological Context: **Relative Advantage**, Complexity, Compatibility. Organizational Context: Financial Slacks, **Top Management Support**. Environmental Context: **External Pressure, External Support**, Government Promotion.	Telephone Survey of 120 Manufacturing Firms in China	FA, and Logistic Regression

Table 2 (continued)

Model	Author(s)	Domain	Independent Variables	Data Sources	Methods
TOE and Institutional Theory	Soares-Aguiar and Palma-Dos-Reis (2008)	E-procurement	Technological Context: **IT Infrastructure**, IT Expertise, B2B Know How. Organizational Context: **Firm Size**, Firm Scope. Environmental Context: **Trading Partner Readiness, Extent of Adoption amongst Competitors, Perceived Success of Competitor Adopters**. Controls: Industry, **Sector.**	E-Mail Survey of 240 Firms in Portugal	T-Test and Logistic Regression
DOI, TOE and Iacovou et al. (1995) Model	Hsu et al. (2006)	E-business	Perceived Benefits: Perceived of Innovations. Organizational Context: Firm Size, Technology Resources, Globalization Level. **External Pressure**: Trading Partners' Pressure, Government Pressure. Environmental Context: Regulatory Concern, Competition Intensity. Controls: Industry Effects.	Telephone Survey of 294 Firms in U.S.	CFA and SEM
TOE and DOI	Zhu et al. (2006)	E-business	Technological Context: **Relative Advantage, Compatibility, Costs** and **Security Concern** Technological Context: **Technology Competence**. Organizational Context: **Organization Size**. Environmental Context: **Competitive Pressure, Partner Readiness.**	Telephone Survey with 1415 Firms across 6 EU Countries	CFA, Second-Order Factor Modeling and SEM
TOE and DOI	Vaidya and Nandy (2004)	E-business	Perceived Benefits Organizational Environment Technology Characteristics Organizational Context: Inclination towards New Technology, EB Know-How, Information Intensity, Organizational Readiness	No Empirical Work	
TOE and Institutional Theory	Gibbs and Kraemer (2004)	E-commerce	Technological Context: **Technology Resources** Organizational Context: **Perceived Benefits**, Lack of Organizational Compatibility, **Financial Resources**, Firm Size. Environmental Context: **External Pressure, Government Promotion, Legislation Barriers** (Controls: Country, Industry).	Telephone Survey of 2139 Firms across 10 Countries	FA and OLS

Table 2 (continued)

Model	Author(s)	Domain	Independent Variables	Data Sources	Methods
TOE and Iacovou et al. (1995) Model	Kuan and Chau (2001)	EDI	Technological Context: **Perceived Direct Benefits**, Perceived Indirect Benefits Organizational Context: **Perceived Financial Cost**, **Perceived Technical Competence** Environmental Context: **Perceived Industry Pressure, Perceived Government Pressure**	Questionnaire with 575 Small Firm in Hong Kong	FA, and Logistic Regression
TOE and DOI	Thong (1999)	Software Applications	CEO Characteristics: **CEO's Innovativeness, CEO's IS Knowledge**. Innovation Characteristics: **Relative Advantage of IS, Compatibility of IS, Complexity of IS**. Organizational Characteristics: **Business Size**, **Employees' IS Knowledge**, Information Intensity. Environmental Characteristics: Competition.	Questionnaire Survey of 166 Small Firms in Singapore	T-Tests, FA, Discriminatory Analysis, and PLS
TOE and DOI	Lee (1998)	Internet-Based Financial EDI	Innovation Factors: Relative Advantage, Compatibility, Complexity, Speed and Reliability, Security Risk, Cost Organizational Factors: Top Management Support, Technology Sophistication, Innovation Champion, Firm Size External Factors: Competitive Intensity, Information Intensity, Critical Mass, Trading Partners, Competitors, Other Industry Players	No Empirical Work	
TOE and DOI	Higa et al. (1997)	Telemedicine	Innovation Factors: Relative Advantage, Complexity, Trialability, Observability, Investment Requirements Organizational Factors: Organizational Needs, Organizational Structure, Members' Attitudes towards Technology, Decision Making Practices	Case Study with Two Clinical Units in Hong Kong	

*Significant factors are shown in bold.

2.6 The Studies that used other Models and Theories

Anand et al. (2009) develop an integrated model for organizational adoption of B2C comprising organizational factors (i.e., espoused values and resources) and institutional factors (i.e., normative and mimetic pressures), as well as the moderating influence of shifting environments (i.e., early period and late period demarcated by changes in the environment). Analyses of data collected from 93 organizations show that both organizational and institutional factors influence B2C adoption; however, their effects varied with the environmental shifts.

Using a case study approach, Mangalaraj et al. (2009) propose an integrated model for the organizational acceptance of Extreme Programming (XP) considering individual, team, technological, task, and environmental factors. In another study, Basaglia et al. (2009) develop a theoretical model for understanding the drivers of VoIP adoption process and test it through Structural Equation Modeling on 620 Italian firms. Results underscore both the importance of external factors and the internal factors in shaping intention to adopt.

Strohmeier and Kabst (2009) examine the cross-national organizational adoption factors of electronic human resource management (e-HRM). They collected data surveying a sample of 2,336 organizations in 23 European countries based on logistic regression. Their findings show that e-HRM have been already adopted by two-thirds of all organizations in Europe. Major general determinants of e-HRM adoption are size, work organization, and configuration of HRM. In another study, Demirkan and Harmon (2009) offer a framework that is not validated empirically for the diffusion of IT in healthcare services. They claim that behavior beliefs (i.e. perceived usefulness, compatibility, ease of use), organizational characteristics (i.e. organizational size, communication channel, management support), and social systems (i.e. image, competitive pressure, industry regulations) are expected to have an influence on intention to adopt and actual adoption.

Liu et al. (2008) empirically test a parsimonious model based on cost-benefit analysis/transaction cost theory, institutional theory, and organizational capability-based theory to predict organizational adoption of IT-facilitated virtualization. They

conducted a survey of 203 B2B organizations in Singapore. Results indicate that an increase in the level of net perceived benefits, external influences, and organizational capabilities had a positive effect on organizational decision makers' intention to use virtualization. In particular, external influences were found to be the most important factors of intention to adopt virtualization in B2B organizations. In another study, Ramamurthy et al. (2008) attempted to determine the determinants of data warehouse (DW) adoption surveying of 196 firms in the US. Five organizational (i.e. commitment, size, absorptive capacity, scope for DW and data environment) and two technological (i.e. relative advantage and low complexity) factors were tested. Results from a logistic regression model indicate that three organizational factors (i.e. commitment, size, and absorptive capacity) and two innovation characteristics (i.e. relative advantage and low complexity) are significant determinants of DW adoption.

Huang et al. (2008) examined the adoption of the Internet electronic data interchange (I-EDI) conducting a survey of 219 organizations. They developed a research framework with four dimensions; technological (relative advantage, compatibility, and complexity), organizational (strategic use of communication technologies, trust, application knowledge, top management support, organizational size and organizational slack), environmental (competitive pressure and network externalities), and inter organizational (dependency on a partner, potential power of a partner, exercised power of a partner, trust in a partner, relationship commitment with a partner). The proposed research model was tested using Structural Equation Modeling and results showed that technology compatibility and organization size are no longer significant in explaining the adoption of I-EDI. However, different effects of inter organizational factors such as power, trust, and relationship commitment on I-EDI adoption have been revealed.

Son and Benbasat (2007) developed a model for organizational adoption and use of B2B electronic marketplaces based on transaction cost theory and institutional theory. They identified two groups of factors, efficiency and legitimacy oriented factors, that could influence organizational buyers' initial adoption of, and the level of participation in, B2B e-market places. The effects of these factors on initial adoption of and participation level in B2B e-marketplaces were empirically tested on data collected,

respectively, from 98 potential adopter and 85 current adopter organizations. Results of a partial least squares analysis of the data indicate that different patterns exist between the two groups of factors in explaining adoption intent and participation level. They found that mimetic and normative pressures have significant effects on adoption intent, but not on participation level. Asset specificity and complexity of products were found to have significant and negative effects on the level of participation in e-marketplaces, but not on adoption intent. Only demand uncertainty was found to have a significant influence on both adoption intent and participation level.

Ven and Verelst (2006) investigated the organizational adoption of open source server software by Belgian organizations conducting five case studies. They found that lower cost, high reliability and availability of external support are primary factors in explaining adoption of the use open source software. In another study, Frambach and Schillewaert (2002) proposed a framework that is not validated empirically to address the factors affecting the adoption decision at two levels, i.e. the organizational and the individual level. They integrated DOI and Technology Acceptance Model considering adopter characteristics, environmental influences, social network and supplier marketing efforts.

Chau and Tam (2000) used the "technology-push" and "need-pull" concepts to examine the key factors in the organizational adoption decision of open systems. They tested the research model by collecting data from senior IT executives in 89 organizations. They found that organization size and migration costs have an impact on the decision. They also found that the organization would be less likely to adopt the new technology, unless the existing systems appeared to be unsatisfactory. In another study, Rai and Bajwa (1997) investigated factors relating to the organizational adoption of Executive Information Systems (EIS). They tested environmental characteristics (uncertainty), organizational characteristics (top management support, organization size), and IS characteristics (IS support and ISD size) with survey of 140 not adopted organizations, 70 adopted organizations. Results of ANOVA tests show that while some variables differ between adopters and non-adopters such as environmental uncertainty some do not such as organization size.

CHAPTER 3

RESEARCH MODEL

The review of the literature reveals that the TOE framework has been used by several studies to explain various IT/IS adoptions such as Internet/E-Business (Ifinedo, 2011), human resource information systems (Troshani et al., 2011), green IT initialization (Bose & Luo, 2011), e-business (Oliveira & Martins, 2010; Lin & Lin, 2008; Zhu et al., 2006a; Raymond et al., 2005; Zhu & Kraemer, 2005; Zhu et al., 2004; Zhu et al., 2003), e-commerce (Liu, 2008; Sparling & Toleman, 2007; Hong & Zhu, 2006; Teo et al., 2006; Lertwongsatien & Wongpinunwatana, 2003), knowledge management systems (Lee et al., 2009), enterprise systems (Ramdani et al., 2009), mobile commerce (Doolin & Al Haj Ali, 2008), ERP (Pan & Jang, 2008), web site (Bellaaj et al., 2008), IT (Zhang et al., 2007; Premkumar & Roberts, 1999), e-signature (Chang et al., 2007), Internet (Xu et al., 2004), and open systems (Chau & Tam, 1997).

As in these contexts where TOE was successfully used, the study of organizational adoption of an IT/IS should consider technological, organizational and environmental contexts. Through these studies, I also observed that TOE framework is combined with other theories to better explain various IT/IS adoptions. For example, the DOI theory has been combined with TOE framework to study organizational adoption of various IS/IT systems such as RFID (Wang et al., 2010), collaborative commerce (Chong et al., 2009), e-procurement (Li, 2008), e-business (Zhu et al., 2006a; Hsu et

al., 2006; Zhu et al., 2006; Vaidya & Nandy, 2004), software applications (Thong, 1999), Internet-based financial EDI (Lee, 1998), and telemedicine (Higa et al., 1997). Similarly, institutional theory has also been combined with TOE framework to explain IT adoptions within different domains as in Gibbs and Kraemer (2004) and Soares-Aguiar and Palma-Dos-Reis (2008).

I use DOI theory (Rogers, 1983; 2003) to enhance the technological context of the TOE framework due to the following reasons. The five innovation attributes (relative advantage, compatibility, complexity, observability, and trialability) identified by Rogers (1995) have a significant effect on organizational adoption of IT/IS. These attributes have been used in studies on technology adoption to define the characteristics of the technology. In addition to these five attributes, I used the security factor to address the characteristics of smartphones.

Institutional theory suggests that organizations are affected by external isomorphic pressures, including pressures coming from competitors, trading partners, customers, and government. These external pressures may affect an organization's adoption decision of mobile communication technologies. Thus, relevant external pressures (pressures coming from competitors, trading partners, and customers) were used to address environmental characteristics within the research model.

In choosing candidate factors for the organizational context of the framework, prior studies on organizational adoption of IT/IS were reviewed. During the analysis of the studies that use the TOE framework or combination of this framework with other theoretical models, I first synthesized the technological, organizational and environmental factors as well as control variables. Then, I identified the significant organizational factors by investigating the results of these studies. However, only the factors that are relevant to the adoption of mobile communication technologies and have a direct effect on adoption decision were included in the research model represented in Figure 1.

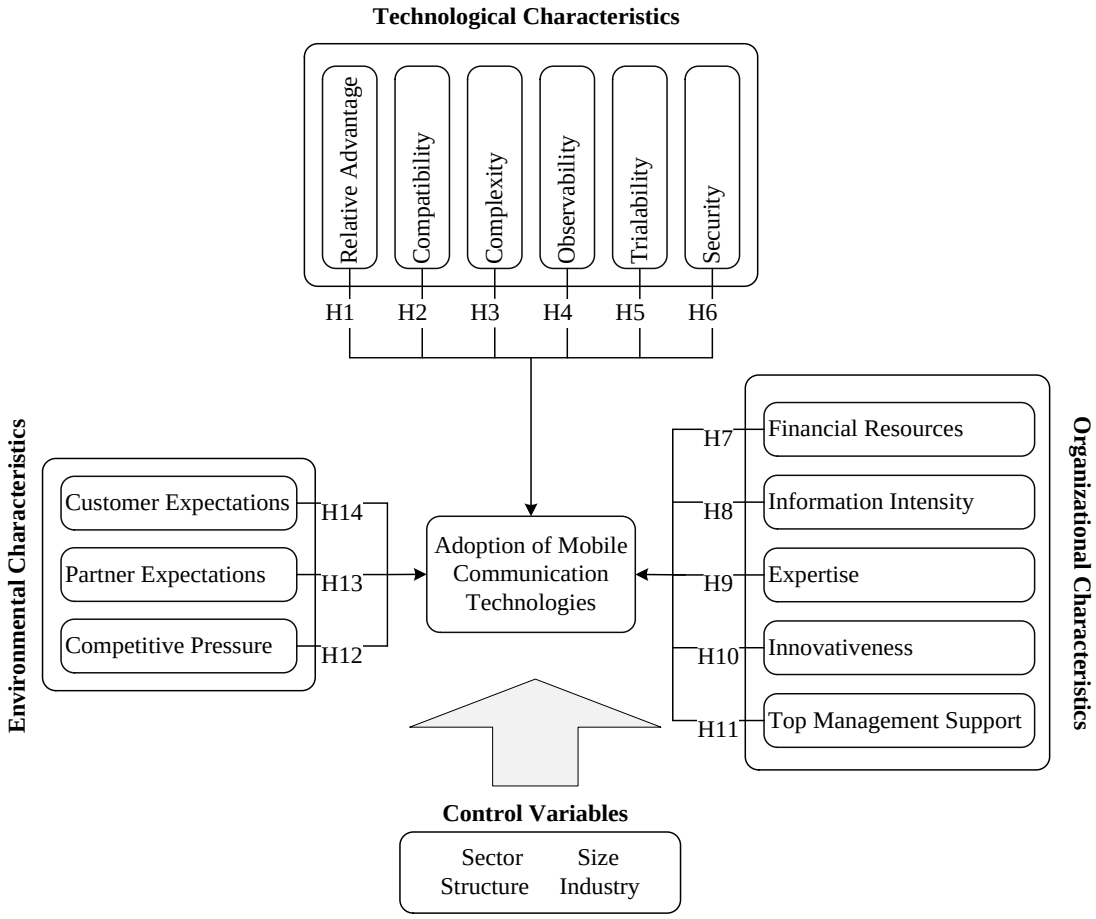

Figure 1: Research Model

3.1 Constructs and Associated Hypotheses

"The strength of organizational research is its polyglot of theories that yields a more realistic view of organizations" (Eisenhardt, 1989). Consistent with this argument and many of the empirical studies reviewed in this study, I used TOE as an underlying framework coupled with complementary theories to study organizational adoption of mobile communication technologies. Each of the theories alone provides a partial view of the organizational adoption and ignores a good bit of the complexity of organizations. Additional perspectives help capture greater complexity. For example, Diffusion of Innovation theory helped us to cover technological characteristics of the mobile communication technologies, while Institutional theory to address environmental characteristics. Additional constructs explain organizational

characteristics that have an effect on adoption decision. This section provides detailed descriptions of each construct and the propositions that theorize the relationships between these constructs and adoption. The constructs that have a potential effect on organizations' adoption decision of smartphones were categorized under technological, organizational, and environmental characteristics.

3.1.1 Technological Characteristics

Relative Advantage

Relative advantage is defined as "the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 1995, p. 250). This variable is related to the some other constructs, including perceived usefulness (TAM), performance expectancy (UTAUT), extrinsic motivation (MM), job-fit (MPCU), and outcome expectations (SCT) (Venkatesh et al., 2003). It is important to note that relative advantage has been identified as a significant predictor of adoption behavior in several studies that explain adoption of various information technologies and systems, including Internet/e-business (Ifinedo, 2011), enterprise systems (Ramdani et al., 2009), web site (Bellaaj et al., 2008), e-procurement (Li, 2008), e-commerce (Sparling & Toleman, 2007; Lertwongsatien & Wongpinunwatana, 2003), IT (Premkumar & Roberts, 1999), e-business (Zhu et al., 2006), and EDI (Kuan & Chau, 2001). The relative advantage of smartphones over "non-mobile" alternatives or earlier generation mobile technology come from their accessibility, flexibility, ubiquity, and "always-on" connectivity. These unique features of smartphones provide organizations more efficient and effective communication, speed up access to critical information anywhere and anytime, enable employees access corporate databases and emails outside their office, and enhance managers' decision making capabilities. The relative advantages provided by smartphones can increase productivity. For example, the ability to check emails anywhere and anytime allows organizations to meet urgent customer and partner expectations. The flexibility provided can be viewed as an increase in productivity and enhanced customer service. On the basis of the above theoretical background and prior empirical validations, the following hypothesis is formulated:

H1: Relative advantage of smartphones will have a positive influence on the adoption of smartphones.

Compatibility

Compatibility is defined as "the degree to which an innovation is perceived as consistent with the social value and beliefs, or the needs of potential adopters" (Rogers, 1995, p. 250). The relationship between compatibility and the adoption of information technologies and systems has been identified as significant in several studies. Wang et al. (2010) studied the adoption of RFID based on data collected by e-mail survey of 133 firms in Taiwan. They found that the compatibility construct has a significant effect on RFID adoption. Bellaaj et al. (2008) identified compatibility as a significant predictor of web site adoption. Zhu et al. (2006) explained e-business adoption based on data collected by telephone surveys with 1415 firms across 6 EU countries also indicating strong significant effects on e-business adoption. This construct has also been identified as a significant predictor of e-commerce adoption (Sparling & Toleman, 2007; Lertwongsatien & Wongpinunwatana, 2003). I consider smartphones to be compatible if communicating using these technologies would not disrupt other regular means of communication. Moreover, the high compatibility of smartphones means a minimal modification in existing IT infrastructure. This, in turn, increases the benefits by reducing the cost of implementation and makes the overall organizational adoption process easier. Hence, the following hypothesis is formulated:

H2: Compatibility of smartphones will have positive and significant influence on the adoption of smartphones.

Complexity

Complexity is defined as "the degree to which an innovation is perceived as difficult to understand and use" (Rogers, 1995, p. 250). Innovations that are perceived by its potential users as having less complexity will be adopted more rapidly than other innovations (Rogers, 1995). Complexity (similar to perceived ease of use in TAM and effort expectancy in UTAUT) has been identified in prior studies as a significant predictor of adoption behavior. Higa et al. (1997) conducted a case study with two clinical units in Hong Kong to investigate e-communication adoption. They found that

the complexity construct has a strongly significant effect on adoption. Wang et al. (2010) also found that this construct is a significant predictor of RFID adoption. In this study, the key functionalities of smartphones are access to mobile emails and the World Wide Web. Therefore, the complexity of these technologies largely depends on how easy it is to perform these tasks. The easier it is to perform these tasks, the lower the level of complexity and the easier and quicker adoption of smartphones by organizations. Deriving from the above theoretical and empirical support, the following hypothesis is formulated:

H3: Complexity of smartphones will have a negative influence on the adoption of smartphones.

Observability

Observability is defined as "the degree to which the results of an innovation are visible to others" (Rogers, 1995, p. 251). Rogers (1983) identified observability as one of the five important attributes of innovation that influence the decision to adopt or reject an innovation. Moore and Benbasat (1991) divided observability into "result demonstrability" and "visibility". This construct has been used in prior studies as a predictor of adoption of various information technologies and systems. Ramdani et al. (2009) identified the observability construct as a significant predictor of enterprise systems adoption. Higa et al. (1997) also defined this construct as a significant predictor of e-communication adoption. I suggest that the more the results of using smartphones observable by, and easy to tell to, others, the more rapidly they will be adopted. Therefore:

H4: Observability will have a positive influence on the adoption of smartphones.

Trialability

Trialability is defined as "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 1995, p. 251). Trialability has been identified as a significant predictor of adoption behavior (Ramdani et al., 2009; Higa et al., 1997). The organizations that have an opportunity to try an innovation are more likely to adopt it rather than those who do not, because they would be confident that the results of using the innovation meet their expectation (Agarwal and Prasad, 1997). Deriving

from the above theoretical and empirical support, the following hypothesis is formulated:

H5: Trialability will have a positive influence on the adoption of smartphones.

Security

Security refers to the degree to which one believes that smartphone a communication tool is secure for transmitting sensitive information such as consumer information and financial transactions. Security is relevant to introduce to our model, because when one uses smartphones outside of the office, there is a perception of risk involved in transmitting sensitive information. This construct has been found in prior studies as a significant predictor of adoption behavior. Through an online survey and telephone interviews with 156 firms in China, Liu (2008) found that the security construct is a significant predictor of e-commerce adoption. Similarly, Zhu et al. (2006) found that this construct has a strongly significant effect on e-business adoption, and Salisbury et al. (2001) found that perceived security is a strong determinant of intention to purchase online. In the case of mobile communication technologies, one key aspect that can effect adoption of these technologies is the security of mobile devices and wireless data transfer. The perception of low levels of security can increase the technological risk of adopting these technologies in organizations. Organizations with low tolerance in technological risk may defer their adoption of these technologies. Thus, the following hypothesis is proposed:

H6: Their perceived security will have a positive influence on the adoption of smartphones.

3.1.2 Organizational Characteristics

Financial resources

Resources of an organization can be financial, technological, human capital, or knowledge. However, I addressed some of these resources through some other constructs such as compatibility, size and expertise. Therefore, here I focus on financial resources, more specifically the availability of sufficient financial resources in the organization for the adoption of smartphones. These resources will be allocated

to installation costs (the purchase of smartphones) and monthly payments. The prior studies demonstrate that financial resources significantly influence the organizational adoption of innovations. Ifinedo (2011)'s study of 214 SMEs show that financial resources availability has a significant effect on adoption of Internet/e-business. Chang et al. (2007) found that this construct has also a significant effect on e-signature adoption. Zhu et al. (2004)'s study of 624 firms across 10 countries in the retail industry also show that financial commitment is one of the important antecedents of e-business use. Gibbs and Kraemer (2004) found that the financial resources construct is one of the most significant predictors of scope of e-commerce use. I suggest that financial resources have a direct influence on the smartphone adoption decision since such decisions require financial commitments. Thus, the following hypothesis is derived:

H7: The greater the financial resources, the more likely that smartphones will be adopted by organizations.

Information intensity

Information intensity refers to the degree of information that is present in the product or service of an organization (Thong, 1999). This construct has been used in prior studies. Wang et al. (2010) found that information intensity is a significant predictor of RFID adoption. Doolin and Al Haj Ali (2008) conducted a case study with three organizations to examine the adoption of mobile commerce, and found that information intensity has a significant effect on mobile commerce adoption. Through survey of 166 small firms in Singapore, Thong (1999) found that information intensity is one of the important antecedents of adoption of software applications. Since information intensive organizations require to access and exchange information fast and wherever they need, smartphones can be a vital solution for them. On the basis of above arguments the following hypothesis is generated:

H8: The greater the information intensity, the more likely that smartphones will be adopted by organizations.

Expertise

Expertise refers to the technical knowledge and skills of the existing employees gained from previous use of smartphones. This construct has been identified as a significant predictor of adoption behavior. In a survey of 163 large-sized firms in Taiwan, Lin and Lin (2008) found that expertise is one of the important antecedents of e-business adoption. Existence of employees with prior experience with mobile communication technologies may affect adoption of such technologies by the organization. If managers believe that their employees are already adept at using the key features of smartphones, they would be less concerned about the (adverse) learning curve effects. Hence, the following hypothesis is formulated:

H9: The greater the expertise available in the organizations, the more likely that smartphones will be adopted by them.

Innovativeness

Innovativeness is defined as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 22). Thong (1999) studied the adoption software applications by organizations based on data collected by a questionnaire survey of 166 small firms in Singapore. The results of PLS analysis indicated that innovativeness is one of the important antecedents of adoption. Being open to new ideas and frequently exploring new service and product development processes determines the level of innovativeness in a firm. On the other hand, higher levels of innovativeness may positively influence the possibility of an adoption. Therefore, the following hypothesis is formulated on this basis:

H10: The greater the innovativeness, the more the more likely the smartphones will be adopted.

Top management support

Top management support refers to the level of support that the top management gives to the adoption of IT/IS systems. Based on the literature review on organizational adoption, it is important to note that this construct is one of the most widely and consistently used predictors for innovation adoption at the organizational level. Top

management support has been identified as significant predictors of adoption behavior in prior studies that used the TOE (Low et al., 2011; Ifinedo, 2011; Ramdani et al., 2009; Bellaaj et al., 2008; Sparling et al., 2007; Teo et al., 2006; Lertwongsatien & Wongpinunwatana, 2003; Premkumar & Roberts, 1999; Thong & Yap, 1995) and the studies that used the TOE framework with other theories (Chong et al., 2009; Li, 2008). Management support consists of financial support as well as any commitment and involvement from the management. Higher level of top management support ensures allocation of adequate resources to adoption of mobile communication technologies. Therefore, the organizations with greater top management support would be more likely to adopt such technologies. Derived from the above theoretical arguments, the following hypothesis is formulated:

H11: The greater the top management support, the more likely the smartphones will be adopted.

3.1.3 Environmental Characteristics

Competitive pressure

Competitive pressure refers to the degree of pressure felt by the organization from competitors within the industry. Mimetic pressures originate from competitive pressure and lead an organization to become similar to other organizations in the same industry (DiMaggio & Powell 1983). Several studies show that competitive pressure is a significant predictor of information technologies and systems adoption. Premkumar and Roberts (1999) found that competitive pressure has a significant effect on IT adoption. Wang et al. (2010) found that competitive pressure is a significant predictor of RFID adoption. Some other studies show that competitive pressure is a significant predictor of e-business adoption (Lin & Lin, 2008; Zhu et al., 2006; Zhu et al., 2003). In the case where the use of a technology is very common by competitors, organizations have no choice but to adopt it in order to maintain their competitiveness. Meanwhile, organizations may choose to adopt smartphones to achieve competitive advantage over their competitors. Thus, I theorize that organizations facing higher competitive pressure are more likely to adopt smartphones. Based on this, the following hypothesis is formulated:

H12: The greater the competitive pressure, the more likely the smartphones will be adopted.

Partner expectations

Organizations may adopt an innovation to establish prospective partnerships or maintain existing partnerships. When a trading partner has adopted mobile technologies, the organization may also adopt them to show its fitness as a business partner or a dominant supplier can mandate its suppliers adopt mobile technologies as a condition of doing business with it (Wang et al., 2010). Previous studies show that the partner expectations are a significant predictor of adoption. Wang et al. (2010) found that the partner expectations have a significant effect on RFID adoption. Hsu et al. (2006) identified this construct as a significant predictor of e-business adoption. Gibbs and Kraemer (2004) found that this construct is one of the most significant predictors of scope of e-commerce usage. Teo et al. (2003) found that partner expectations exhibit the strongest influence on organizational predisposition toward financial electronic data interchange adoption. Iacovou et al. (1995) also found that this factor has a strongly significant effect on EDI adoption in small-sized organizations. A high level of responsiveness expected by partners may affect adoption of smartphones since these devices can improve the responsiveness of an organization. Furthermore, the use of a technology that is approved by the partners can result in a higher social status. Accordingly, the following hypothesis is formulated:

H13: The greater the partner expectations, the more likely the smartphones will be adopted.

Customer expectations

Organizations may adopt an innovation to meet their customer expectations. For example, adoption of mobile technologies may improve customer service or customers may demand the use of mobile technologies for doing business with a particular organization. Bellaaj et al. (2008) found that customer expectations are a significant predictor of web site adoption. Wu and Lee (2005) also found that this factor has a strong significant effect on e-communication adoption. Similar to partner expectations, a high level of responsiveness expected by customers may affect adoption of

smartphones since these devices may help organizations to be more responsive to customers' inquiries. Customers may expect an instantaneous response from certain business units such as the sales department. Therefore, the adoption of these technologies in sales departments may create better customer value. This, in turn, can improve market share and organizational image. These considerations lead to the following hypothesis:

H14: The greater the customer expectations, the more likely the smartphones will be adopted.

Control Variables

Organization size (Wang et al., 2010; Pan and Jang, 2008; Chang et al., 2007; Hong and Zhu, 2006), structure (Higa et al., 1997), sector (Li et al., 2010; Jeyaraj et al., 2006; Levenburg et al., 2006), and industry (Ifinedo, 2011; Palma-Dos-Reis, 2008; Hsu et al., 2006; Gibbs and Kraemer, 2004) have been found to directly influence the organizational adoption of information technologies. Therefore, organization size (number of employees), structure, sector, and industry are included as control variables in the study.

CHAPTER 4

METHODOLOGY

Sequential Explanatory Design mixed method research strategy was used in this research. This method focuses on collecting, analyzing, and mixing both quantitative and qualitative data in the same study. It uses both quantitative and qualitative approaches to provide a better understanding of research problems (Creswell & Plano Clark, 2007). Thus, collection and analysis of quantitative data were followed by the collection and analysis of qualitative data. During the study, collection and analysis of quantitative data have a priority and qualitative results were used to help explain the quantitative results.

4.1 Quantitative Study

4.1.1 Data Collection

The questionnaire items were carefully selected in an attempt to obtain content validity, defined as "the degree to which the score or scale being used represents the concept about which generalizations are to be made" (Bohrnstedt, 1970, p. 91) and face validity, defined as "the extent to which an instrument looks as if it measures what it is intended to measure" (Patton, 1996, p.253). A preliminary survey questionnaire was designed using questionnaire items that had been successfully used in prior studies. In preparing candidate questionnaire items, prior studies on organizational

adoption of IT/IS were reviewed. The preliminary questionnaire items were tailored to the organizational adoption of mobile devices, specifically smartphones.

A pilot study was then conducted with this questionnaire to further enhance content validity. For this pilot study, the survey questionnaire was filled out by technical and financial managers of a private sector organization, who also provided written comments. Based on the results of the pilot study, some questionnaire items that did not represent a construct's content were eliminated, and some items were rephrased to eliminate ambiguities. The main study was conducted using the questionnaire items, which were finalized based on the pilot study. Participants in the main study were asked to indicate the levels of agreement or disagreement with various statements concerning the adoption of smartphones on a five-point Likert-type scale ranging from (1) strongly disagree, to (5) strongly agree.

4.1.2 Participants

Senior and middle managers can decide whether to accept or reject a new technology in organizations. Therefore, opinions from middle and senior management are important for this study. The survey questionnaires were conducted with Chief Executive Officers (CEO), Chief Financial Officers (CFO), Chief Information Officers (CIO), firm owners, and middle level managers in different private sector organizations between August 27 and November 14, 2012 in Turkey. A total of 218 questionnaires were returned. However, 5 questionnaires were discarded due to being only partially complete. Table 3 presents the detailed information on the respondents and organizations involved in this study.

Our results show that 35.2% of the organizations (n=75) have already adopted smartphones. Table 4 shows which of the business functions and managerial levels use smartphones in adopter organizations. The results suggest that smartphones are mainly used by certain business units such as sales and marketing and production and services as well as by senior level managers in these organizations.

Table 3: Respondents and Organizations in Turkey

Title of Respondents	**Frequency**	**Percent**	**Cumulative Percent**
Owner	87	40.8	40.8
CEO	68	31.9	72.8
CFO	24	11.3	84.0
CIO	22	10.3	94.4
Middle Level Manager	12	5.6	100.0
Sector			
Service	86	40.4	40.4
Manufacturing	77	36.2	76.5
Trading/Commerce	37	17.4	93.9
R&D	7	3.3	97.2
All	6	2.8	100.0
Industry			
Information Technology	52	24.4	24.4
Machinery	44	20.7	45.1
Electrical & Electronics	18	8.5	53.6
Construction	16	7.5	61.1
Defense & Security	13	6.1	67.2
Healthcare	12	5.6	72.8
Education	12	5.6	78.4
Other*	46	21.6	100.0
Structure			
Small and Mid-size Firm	157	73.7	73.7
Entrepreneurial	41	19.2	93.0
Large-sized Firm	15	7.0	100.0
Size			
1-5	73	34.3	34.3
6-10	44	20.7	54.9
11-20	38	17.8	72.8
21-100	44	20.7	93.4
101 and over	14	6.6	100.0
Adopters/Non-adopters			
Adopters	75	35.2	35.2
Non-adopters	138	64.8	100.0
Total	213	100.0	
Behavioral Intention	**Adopter**	**Non-adopter**	**Total**
No	3	13	16
Neutral	8	36	44
Yes	64	89	153
Total	75	138	213

* Includes textile, energy, finance, chemistry, agriculture, commerce, tourism, etc.

Table 4: Use of Smartphones by Adopter Organizations

	Top level management	**Middle level management**	**Operational management**	**Total**
Production & Services	62.9%	55.4%	50.0%	**56.1%**
Sales & Marketing	63.7%	56.8%	53.3%	**57.9%**
Finance & Accounting	35.5%	29.7%	23.3%	29.5%
Human Resources	22.6%	25.7%	21.7%	23.3%
R&D	47.6%	50.0%	40.0%	45.9%
Service*	20.2%	29.7%	35.0%	28.3%
Total	**42.1%**	33.7%	29.7%	

* After-sales service

4.1.3 Data Analysis

Structural Equation Modeling (SEM) using AMOS (v.20) was employed to (a) test the hypothesized relationships, (b) identify relationships among the constructs and (c) perform CFA to test the fit of the data to the measurement model. SEM is a powerful statistical technique having "the ability to specify latent variable models that provide separate estimates of relations among latent (unobservable, unmeasured) constructs and their manifest variables (the measurement model) and of the relations among constructs (the structural model)" (Tomarken & Waller, 2005, p. 34). As a further analysis, Pearson's chi-square test was carried out to identify significant differences between adopters and non-adopters.

It is important to note that SEM is also a popular data analysis technique that has been used in most of the studies reviewed (Yoon & George, 2013; Ifinedo, 2011; Lin & Lin, 2008; Zhang et al., 2007; Chang et al., 2007; Zhu et al., 2006a; Hsu et al., 2006; Zhu et al., 2006; Raymond et al., 2005; Zhu & Kraemer, 2005; Zhu et al., 2004; Thong, 1999).

In this section, along with the results of the SEM analysis, the correlation matrix, the model fit indices, the questionnaire items and their measurement properties, including mean, standard deviation, standardized regression weights (item loadings), and the p-values of regression coefficients are provided.

Reliability Analysis

Reliability analysis (RA) evaluating the Cronbach's alpha values of the questionnaire items was conducted. The Cronbach's alpha value was 0.913, which indicates a high level of internal consistency.

Convergent and Discriminant Validity

The measurement model was assessed by examining convergent validity and discriminant validity. "Convergent validity is judged to be adequate when average variance extracted (AVE) equals or exceeds 0.50, when the variance captured by the construct exceeds the variance due to measurement error" (Hair et al., 2010). In Table 5, the AVE values for all constructs exceed 0.5, indicating that the convergent validity for the proposed constructs of the measurement model is adequate.

Discriminant validity was assessed by comparing the square root of the AVE for a given construct with the correlations between that construct and all other constructs. "Discriminant validity is adequate when the diagonal elements are greater than the off-diagonal elements in the corresponding rows and columns" (Fornell & Larcker, 1981). Table 5 shows the diagonal elements (the square roots of AVE) are greater than the off-diagonal elements. Thus, discriminant validity was satisfactory for all constructs. This indicates that the each construct shared more variance with its items than it does with other constructs, thereby ensuring that no multicollinearity exists among the constructs.

Table 5: Correlation Matrix and Validity Test Results

	AVE	**RA**	**CM**	**CX**	**OB**	**TR**	**SE**	**FR**	**II**	**EX**	**IN**	**TMS**	**CP**	**PE**	**CE**
RA	0.68	0.82													
CM	0.81	.27***	0.90												
CX	0.60	.34***	.31***	0.78											
OB	0.92	.28***	.30***	.36***	0.96										
TR	1.37	.10**	.09*	.13**	.17***	1.17									
SE	1.21	.24***	.21***	.32***	.23***	.14*	1.10								
FR	1.19	.14***	.16***	.18***	.20***	.08	.17**	1.09							
II	0.81	.31***	.30***	.35***	.32***	.07	.22***	.24***	0.90						
EX	1.03	.31***	.36***	.39***	.42***	.17**	.22***	.22***	.37***	1.02					
IN	0.85	.20***	.23***	.25***	.25***	.07	.10	.28***	.27***	.41***	0.92				
TMS	0.84	.31***	.35***	.36***	.38***	.12*	.21***	.26***	.37***	.48***	.36***	0.91			
CP	1.27	.20***	.17***	.23***	.20***	.19**	.31***	.17**	.23***	.22***	.20***	.22***	1.13		
PE	1.27	.17***	.17***	.21***	.21***	.22***	.34***	.21***	.20***	.23***	.22***	.25***	.68***	1.13	
CE	1.17	.16***	.15***	.21***	.19***	.17**	.29***	.21***	.21***	.20**	.23***	.20***	.82***	.73***	1.08

Notes: 1. RA: Relative Advantage; CM: Compatibility; CX: Complexity; OB: Observability; TR: Trialability; SE: Security; FR: Financial Resources; II: Information Intensity; EX: Expertise; IN: Innovativeness; TMS: Top Management Support; CP: Competitive Pressure; PE: Partner Expectations; CE: Customer Expectations.

2. * $p < .05$; ** $p < .01$; *** $p < .001$.

Model Fit

Based on SEM, a number of model fit indices were calculated to measure how well the model fits the data. Primarily, CMIN/DF (x^2/df) along with the Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Tucker Lewis Index (TLI) or Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), and Root Mean Squared Error of Approximation (RMSEA) were examined. Table 6 summarizes the model fit statistics. A number of questionnaire items were eliminated based on modification indices, which serve to identify cross-loading items, to improve the fit of the model.

Table 6: Model Fit Summary

CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	162	719.342	433	.000	1.661
Saturated model	595	.000	0		
Independence model	34	4481.262	561	.000	7.988
RMR. GFI					
Model	RMR	GFI	AGFI	PGFI	
Default model	.060	.840	.781	.612	
Saturated model	.000	1.000			
Independence model	.304	.211	.164	.199	
Baseline Comparisons					
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.839	.792	.929	.905	.927
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000
Parsimony-Adjusted Measures					
Model	PRATIO	PNFI	PCFI		
Default model	.772	.648	.715		
Saturated model	.000	.000	.000		
Independence model	1.000	.000	.000		
RMSEA					
Model	RMSEA	LO 90	HI 90	PCLOSE	
Default model	.056	.049	.063	.092	
Independence model	.182	.177	.187	.000	

The value of CMIN/DF (Chi-square/df) is 1.66 where a ratio of less than 1.5 is considered to be very good, and a ratio of less than two is good (Kline, 1998). The results suggest that the proposed model shows a reasonable fit to the survey data with

the following fit indices χ^2=719.34, DF=433, χ^2/DF=1.66, IFI=0.93, TLI=0.91, and CFI=0.93.

The GFI, an absolute fit index, is 0.84. The AGFI, a parsimony fit index, is 0.78. These two measures are affected by the sample size. Given the often detrimental effect of sample size on these two fit indices, it has been recommended that they are not relied upon as a standalone index (Sharma et al, 2005). The TLI or NNFI is 0.91, which exceeds the threshold ($\geq$ 0.90) for good fit. Hu and Bentler (1998, 1999) support the continued use of TLI that is relatively insensitive to sample size but it is sensitive to model misspecifications.

The CFI, an incremental fit index, is 0.93, which exceeds the threshold ($\geq$ 0.90) for good fit. The NFI has a value of 0.84. The NFI is sensitive to sample size and is thus not recommended to be solely relied on (Kline, 2005). The IFI has a good fit (0.93). Lastly, the RMSEA, an absolute fit index, is 0.06 (with a PCLOSE measure of 0.09, which is larger than 0.05). This value, which is also called a Badness of Fit index, is well below the threshold level of 0.08. The 90 percent confidence interval for the RMSEA is between a LO of 0.05 and a HI of 0.06. Thus, even the upper bound is not close to the 0.08 threshold. All together, the model fits the data reasonably well.

The Structural Model Assessment and Hypothesis Testing

Table 7 lists the questionnaire items and their measurement properties, including mean, standard deviation (SD), factor loadings (Load), standard error (S.E.), and the *p*-values.

Table 7: Questionnaire Items and Measurement Properties

Construct and Items	**Mean**	**SD**	**Load**	***P***	**S.E.**
Relative Advantage (Rogers, 1995)			0.29	***	.051
Using smartphones would enable our employees to respond to emails anytime and anywhere.	4.42	0.73	0.65	***	
Using smartphones would enhance our employees' access to information they would not get otherwise outside their office.	3.98	0.92	0.52	***	
Smartphones provide quick access to corporate emails and services.	4.15	0.75	0.71	****	
Compatibility (Rogers, 1995)			0.28	***	.070
Accessing emails using smartphones would not disrupt other regular means of accessing emails.	4.38	0.73	0.71	***	
Installation of smartphones and the related software would not require substantial modification in existing IT infrastructure.	3.70	0.96	0.56	****	
Implementing the changes caused by adoption of smartphones is compatible with our firm's values and beliefs.	3.90	0.87	0.76	***	
Complexity (Rogers, 1995)			0.42	***	.064
Using smartphones for browsing the Internet would be easy.	4.26	0.80	0.62	***	
The setup for quick access of corporate emails using smartphones would be simple.	4.02	0.79	0.82	****	
Observability (Rogers, 1995)			0.37	***	.060
We would have no difficulty telling others about the results of using smartphones.	3.63	0.98	0.67	***	
The results of using smartphones are apparent to us.	3.98	0.76	0.77	***	
Smartphones are visible in my organization.	3.97	0.79	0.73	****	
Trialability (Moore and Benbasat, 1991)			0.49	***	.127
We would be permitted to use the smartphones on a trial basis long enough to see what it could do.	2.93	1.17	0.92	***	
Before deciding to use the smartphones, I would be able to properly try it out.	2.87	1.12	0.63	****	
Security (Salisbury et al., 2001)			0.75	***	.118
Sending sensitive information across smartphones outside the office is secure.	3.45	1.05	0.80	***	
Smartphones are secure devices through which to send sensitive information.	3.35	1.02	0.86	****	
Information Intensity (Thong and Yap, 1995)			0.32	***	.071
It is very important for my organization to access information fast whenever we need the information.	4.27	0.79	0.57	***	
Effective information exchange mechanisms improve our employees' job performance.	3.92	0.87	0.65	****	

Table 7 (continued)

Construct and Items	Mean	SD	Load	P	S.E.
Financial Resources (Wang and Qualls, 2007)			0.55	***	.106
Our organization has a sufficient financial budget for the purchase of smartphones.	3.74	1.01	0.89	***	
Our organization has a sufficient financial budget for the monthly payment of smartphones.	3.70	1.09	0.94	***	
The owner or manager has allocated adequate resources to adoption of smartphones.	3.39	1.12	0.66	****	
Expertise (Lin and Lin, 2008)			0.82	***	.103
Our employees are aware of the functions of smartphones.	3.90	1.02	0.74	***	
Our employees are knowledgeable enough to use smartphones for email.	3.95	1.03	0.81	***	
Our employees are knowledgeable enough to use smartphones for Internet browsing.	3.89	1.01	0.90	****	
Top Management Support (Premkumar and Roberts, 1999)			0.39	***	.074
The owner or manager enthusiastically supports the adoption of mobile devices.	4.00	0.87	0.64	***	
Top management is aware of the benefits of mobile devices.	4.02	0.91	0.69	****	
Innovativeness (Wang and Qualls, 2007)			0.49	***	.090
Our organization frequently explores new service and product development processes.	4.02	0.85	0.76	***	
Our organization is often the first to market with new products and services.	3.61	0.95	0.74	****	
Partner Expectations (Doolin, 2008)			0.65	***	.112
Using smartphones is important in maintaining existing partnerships.	2.89	1.13	0.71	***	
Our partners require the use of smartphones to do business with them.	2.60	1.09	0.86	****	
Customer Expectations (Wu and Lee, 2005)			0.81	***	.111
Our customers are demanding the use of smartphones for doing business with them.	2.45	1.05	0.83	***	
Our relationship with our customers would have suffered if we do not adopt smartphones.	2.42	1.09	0.83	****	
Competitive Pressure (Premkumar and Roberts, 1999)			0.75	***	.110
We believe we will lose our customers to our competitors if we do not adopt smartphones.	2.37	1.05	0.73	***	
We feel it is a strategic necessity to use smartphones to compete in the marketplace.	3.01	1.14	0.77	***	
My company experienced competitive pressure to use smartphones.	2.48	1.09	0.80	****	

*** $p < .001$; **** $p < .0001$.

Consistent with the hypotheses, relative advantage, compatibility, complexity, observability, trialability, security, financial resources, information intensity, expertise, innovativeness, top management support, competitive pressure, partner expectations, and customer expectations have a significant effect on adoption at $p < .001$ level. Based on the standardized regression (beta) weights, which indicate the relative importance of each independent variable, it can be said that expertise, security, and the environmental characteristics, including customer expectations, competitive pressures, and partner expectations have a high explanatory power. On the other hand, the compatibility, relative advantage, and information intensity factors have much lower explanatory power than the rest.

The research model explains 53% of the variance in adoption intention toward smartphones in general. However, the model explains 90.4% of the variance in adoption intention of IT organizations. The proportion of total variance explained by the model is 68.5%. The high proportion of the total variance explained means that most of the variance has been explained by the variables of the model. Figure 2 provides the results of the test of the hypothesized structural model.

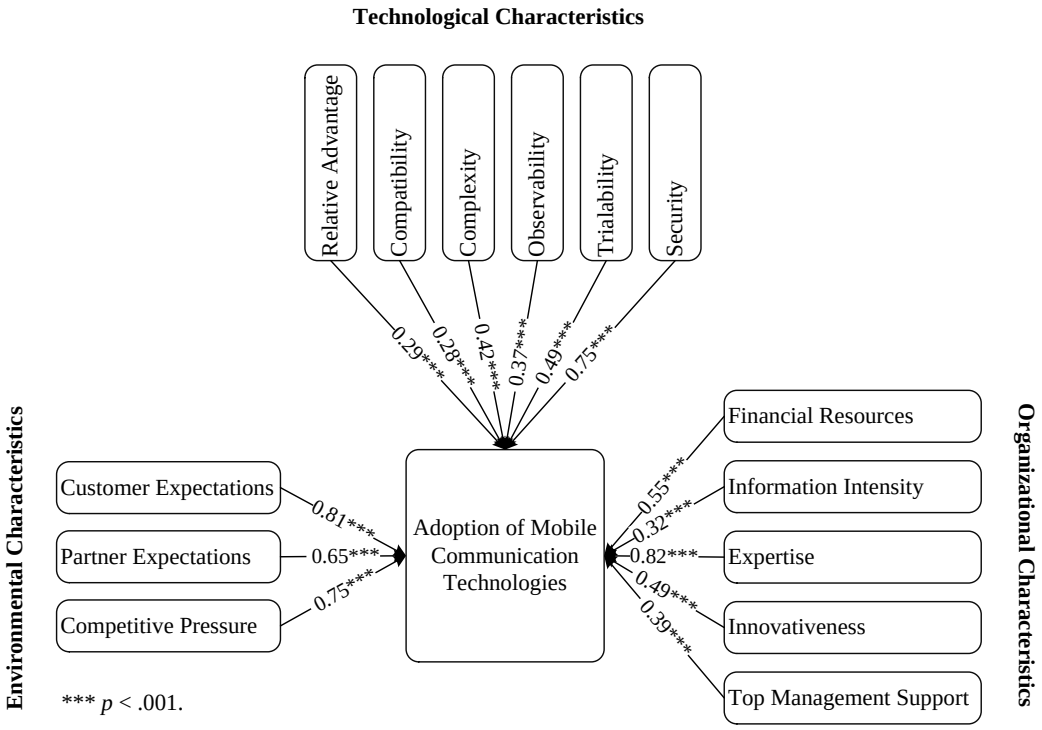

Figure 2: Research Model Results

To investigate whether there is a significant difference between adopters and non-adopters of smartphones in terms of their size, structure, sector and industry, Pearson's chi-square test (using SPSS version 20) was conducted. The results indicate that structure ($x^2 = 2.82$, $p = .29$) has no significant effect on adoption. On the other hand, size ($x^2 = 8.65$, $p = .07$), sector ($x^2 = 9.14$, $p = .06$), and the industry of the organization ($x^2 = 13.55$, $p = .06$) have a significant effect on adoption at $p < .10$ level. These findings suggest that there are no significant differences in adoption decision among organizations with different structures. However, there is a higher adoption rate in the organizations with more than a hundred employees, organizations that are in the service sector, or in the healthcare or IT industries.

An independent samples t-test was conducted to compare results between adopters and non-adopters. The results of the independent samples t-test indicated significant difference between adopters and non-adopters in all factors at $p < .001$ level except trialability. Table 8 shows the results of the independent samples t-test.

Table 8: Independent samples t-test of the variables for Turkey

	Adopters (n=75)		Non-adopters (n=138)			
Variable	**Mean**	**S.D.**	**Mean**	**S.D.**	**t**	**Sig.***
Relative Advantage	4.43	0.62	4.04	0.88	5.83	.00
Compatibility	4.23	0.79	3.86	0.93	5.03	.00
Complexity	4.38	0.62	4.04	0.83	5.42	.00
Trialability	3.24	1.14	3.07	1.15	1.88	.06^{ns}
Observability	3.93	0.83	3.63	0.94	3.95	.00
Security	3.79	0.99	3.38	1.00	4.88	.00
Expertise	4.25	0.75	3.73	1.10	6.35	.00
Innovativeness	4.34	0.72	3.85	0.94	6.72	.00
Top Management Support	4.19	0.81	3.57	1.06	7.55	.00
Financial Resources	3.76	1.03	3.30	1.07	5.33	.00
Information Intensity	4.42	0.70	4.10	0.88	4.61	.00
Competitive Pressure	2.94	1.15	2.45	1.08	5.41	.00
Partner Expectations	3.35	1.17	2.84	1.10	5.49	.00
Customer Expectations	3.08	1.13	2.58	1.10	5.39	.00

*p-value of two tailed t-test for difference of means; NS: Not significant.

4.2 Qualitative Study

4.2.1 Data Collection

A follow-up study was conducted to reassess organizations' adoption behavior and explain the quantitative results. Follow-up data were obtained from 18 organizations, which participated in the quantitative part of the study. Table 9 provides details of the organizations and interview informants.

I randomly selected interview candidates among the participants who provided their contact information during the survey. I then contacted the managers by a telephone call or email to schedule a date, time and place for the interview. During the in person or phone interview, I first explained the objectives of the study. Each interview lasted about 15 minutes and all responses were recorded during the interview. Interviews were conducted using open-ended, semi-structured questions generated from the following interview guidelines:

1. Has your organization adopted smartphones?
2. Which of the business functions and managerial levels use smartphones?
3. What are key factors affecting organizations' adoption of smartphones?
4. Why do you think that the factors that you have identified in the previous question are important?

Table 9: Interviewee Profile

Organization	Title	Sector	Industry	Size	Adopter
Organization 1	CFO	Service	Machinery	45	Yes
Organization 2	CFO	Manufacturing	Electrical & Electronics	70	Yes
Organization 3	CIO	Manufacturing	Defense & Security	45	Yes
Organization 4	Owner	Service	Transportation	35	No
Organization 5	CFO	Manufacturing	Metal	30	Yes
Organization 6	CFO	Manufacturing	Machinery	25	No
Organization 7	CFO	Manufacturing	Steel Construction	40	Yes
Organization 8	CFO	Trading/Commerce	Metal	10	No
Organization 9	CIO	Manufacturing	Agriculture	76	No
Organization 10	CIO	Service	Information Technology	25	Yes
Organization 11	CIO	Service	Automotive	48	Yes
Organization 12	CFO	Trading/Commerce	Construction	30	No
Organization 13	CEO	Trading/Commerce	Machinery	36	Yes
Organization 14	Owner	Manufacturing	Construction	25	No
Organization 15	CIO	Manufacturing	Machinery	20	No
Organization 16	CEO	Service	Information Technology	15	Yes
Organization 17	CFO	Service	Information Technology	200	Yes
Organization 18	CEO	Service	Information Technology	30	Yes

4.2.2 Data Analysis

The constant comparative method is used to develop concepts from the data that resulted from transcription of the interviews. Data analysis process, which is called coding, involves three levels of analyses: open coding, axial coding, and selective

coding (Strauss & Corbin, 2008). During the open coding process, I identified different categories within the data examining the transcription document in a systematic manner. During the axial coding process, I identified the connections between the categories to relate subcategories to a category (Strauss & Corbin, 1998). During the selective coding process, I identified the core categories to integrate our categories into a central paradigm. Following this procedure, I determined key factors that affect organizations' adoption of smartphones. Table 10 shows the codes, categories, and statements of the interviewees.

Table 10: Codes and Categories

Codes	Categories	Statements
quick, accurate, and effective communication, fast information exchange, partner organizations, feedback, satisfaction of the customers, competitors	relative advantage, partner expectations, information intensity, customer expectations, competitive pressure	Organization 1: "Using smartphones provides us **quick**, **accurate**, and **effective communication** and **fast information exchange**. We are in the service sector, and therefore, we need to communicate efficiently with our **partner organizations** such as manufacturers and distributors, we need to receive their **feedback** immediately to address the problems that our customers face. **Satisfaction of the customers** with after-sales service quality is our first priority. Thus, we need to use them to meet urgent customers' needs and outperform our **competitors**."
always on, customers, cost of data plans and devices	relative advantage, customer expectations, cost	Organization 2: "Only senior managers in sales and marketing and finance and accounting use smartphones. Especially managers in sales and marketing need to be "**always on**." They mainly use these devices to access corporate emails and response **customers**' inquiries. **Cost of data plans and devices** negatively affect use of smartphones by all level of managers and employees."
cost	cost	Organization 3: "**Cost** is one of the main factors that negatively affect a broader adoption of smartphones. Since it would be too costly to purchase a smartphone for each employee, only certain business units use these devices in most of the firms."
prior experience, complexity	expertise, complexity	Organization 4: "As a transportation company we are employing drivers with no **prior experience** with smartphones. Therefore, the **complexity** of these technologies is the most important factor in our adoption decision."
anytime and anywhere, mobility	relative advantage	Organization 5: "Our employees use smartphones to respond emails **anytime and anywhere**. You can't carry a laptop everywhere you go, however, smartphones provide several advantages including **mobility**."
quick and easy access to information, cost, advantages, ease of use, quick access	information intensity, cost, relative advantage, complexity	Organization 6: "Smartphones enable **quick and easy access to information** for our employees. **Cost** and **advantages** such as **ease of use** and **quick access** to corporate emails are important in our adoption decision."
a timely manner, competitiveness, carry, customers, on time	relative advantage, competitive pressure, customer expectations	Organization 7: "We use smartphones to access emails, manage purchase orders, and view IP camera. Using smartphones provide us to respond **customers'** inquiries in **a timely manner**, even in the middle of the night. **Competitiveness** is important for us, we can't **carry** laptops everywhere, and thus we need to use smartphones to receive **customers**' orders, check advance/payment requests, and hand over the orders to the production team **on time**."

Table 10 (continued)

Codes	Categories	Statements
Benefits, speed up business processes, enhance decision making, competitors, communicate faster, competitive pressure	Relative advantage, competitive pressure	Organization 8: "The **benefits** of smartphones are greater than the **costs**. I never think about cost since they **speed up business processes** and **enhance decision making**. Our **competitors** can get ahead of us if they **communicate faster** through smartphones. **Competitor pressure** and **benefits** are important factors in our adoption decision."
Industry, ubiquity, flexibility	Relative advantage, industry	Organization 9: "We deal with rural communities since we are in agriculture **industry**. There is a late adoption of such technologies in our **industry** compared to other industries. However, considering the advantages such as **ubiquity** and **flexibility**, if we adopt smartphones it would be better."
Data security	Security	Organization 10: "Bring your own device (BYOD) policies are not properly implemented, and thus, there is a gray area between individual and organizational use of smartphones. Since terms and conditions of use for BYOD are not well defined there is no clear difference between individual and organizational usage. Hence, there are issues of **data security**. Introduction of cloud technology brings new obstacles and requires great care in managing sensitive documents."
Top level managers, incompatibility, users' awareness, compatibility, adopt the change, services, customers, service packs, end users can't understand	Top management support, compatibility, expertise, innovativeness, services, customer expectations	Organization 11: "The vision of the firms has a lag behind the technology. **Top level managers** do not support the projects that they are not sure about results. **Incompatibility** of the organizational **users' awareness**, status quo perception, and demographic (age, gender, education level, etc.) with this technology. Even if there is such a **compatibility**, being late to **adopt the change**. Non-productive time, which is being spent analyzing market trend through wrong and faulty policies, by service providers and device manufacturers. A better marketing strategy would be to offer a varying range of **services** that provide flexibility, instead of manipulating trends. Manipulating trends is the most frequently used marketing strategy in developing markets. Therefore, firms in the telecommunications industry in Turkey could not understand the market properly. They choose to push their **services** to **customers** weakening each other in a tough competitive environment, cutting price to attract customers, and offering **service packs** that **end users can't understand**."
Ease of use, speed, cost	Cost, relative advantage, complexity	Organization 12: "Our employees use smartphones individually but we don't adopt them at the organizational level. **Ease of use**, **speed**, and **cost** would be important factors in our adoption decision."
Customers, partner organizations, competitors	Customer expectations, partner expectations, competitive pressure	Organization 13: "Considering the work accomplished, the cost of smartphones is normal. Our **customers** and **partner organizations** use smartphones. Thus, we have to use this technology to outperform our **competitors**."

Table 10 (continued)

Codes	Categories	Statements
Education, experience, see, affected by other firms	Expertise, observability, competitive pressure	Organization 14: "I think the main reasons that smartphones have not been widely used by organizations are lack of **education** and **experience**. People still prefer to use computers instead of mobile devices. Desktop computers have recently converted to laptops. Laptops have been slowly converting to tablets. In my opinion, smartphones can only be adopted after tablets are fully adopted. Firms are also **affected by other firms**, when they **see** these devices being used."
Compatible	Compatibility	Organization 15: "Smartphones should be **compatible** with software used in the firm. Each organization has different software applications and operating systems. Therefore, computers are used in place of these devices."
Management support, experience	Top management support, expertise	Organization 16: "We use smartphones for communication among employees. We think **management support** and **experience** are important factors for the adoption and use of these technologies."
Advantages over other devices	Relative advantage	Organization 17: "Considering the **advantages over other devices**, organizational use of smartphones is important for our company to maintain a corporate identity."
Accessing internet and email, always-on service anywhere anytime, customer intimacy, customer satisfaction	Relative advantage, customer expectations	Organization 18: "We use smartphones for communication as well as **accessing internet and email**. These provide us an **always-on service anywhere anytime** and **customer intimacy**, and, therefore, result in higher **customer satisfaction** and more sales."

4.2.3 Results

Analysis of the qualitative data suggested that there are four core categories that represent the categories. Table 11 lists the core categories and categories that emerged from the data analysis.

Table 11: Core Categories and Categories

Technological Characteristics	**Organizational Characteristics**	**Environmental Characteristics**	**Manufacturer and Service Provider Characteristics**
Relative advantage	Expertise	Partner expectations	Services
Compatibility	Innovativeness	Customer expectations	Cost
Complexity	Top management support	Competitive pressure	
Observability	Information intensity		
Security	Industry		

The results of the qualitative data analysis explaining the organizations' adoption of smartphones are presented in the following core categories: technological, organizational, environmental, and manufacturer and service provider characteristics. This follow-up study confirms our previous findings that the technological, organizational, and environmental characteristics have a significant effect on organizations' adoption decision.

The cost of adoption includes both cost of mobile devices and data plan prices. As in previous studies (Premkumar & Roberts, 1999; Zhu et al., 2006; Kuan & Chau, 2001; Lee, 1998), I found that the cost of adoption is a significant predictor of adoption. This implies that the lower the cost the more likely that smartphones will be adopted by organizations.

Financial resources is correlated with cost, therefore, only trialability was not mentioned by the interviewees. This can be interpreted as participant organizations have no expectations to use mobile devices on a trial basis to see what it could do for them in the workplace.

It is interesting to note that, I identified a determining factor, which is associated with relative advantage, in selecting between mobile service providers and smartphone manufacturers: services. At the decision stage, services provided by device manufacturers and service providers can help to better communicate the advantages of adopting smartphones, and to promote the images of these technologies to their customers. Furthermore, a good service reduces perceived risk of adoption. Therefore, the level of services provided by service providers and device manufacturers may positively influence organizations' adoption decision.

A service provider's infrastructure investment directly affects the services it provides to its customers. An example is the investment in upgrading infrastructure from 3G to 4G capabilities. Such upgrade can improve the rate of wireless data transfer, which plays an important role in mobile communication technologies since a slow connection requires longer time for acquiring data. Thus, service providers' infrastructure investment may improve the quality and variety of services.

Non-adopter organizations report that lack of experience and education, complexity and compatibility issues, the nature of the industry they operate in, and individual adoption level hinder the adoption of these technologies. For example, the representative of one organization argued that since the organization operates in the transportation industry, they employ drivers with no prior experience with smartphones. Therefore, the complexity of these devices is an important issue for them. Similarly, another interviewee claimed that there is a late adoption of such technologies in the agriculture industry they operate in. Another one stated that their employees use smartphones individually, and therefore, they don't need to adopt these technologies as an organization. Finally, representative from another organization complained about issues of compatibility, thus stating that they prefer to use computers in place of these devices.

Finally, it is important to note that 11 organizations out of 18 reported that they have already adopted smartphones. Figure 3 indicates which of the business functions and managerial levels use smartphones in these organizations. This suggests that smartphones are mainly used by senior level management in all business functions.

However, middle managers in sales and marketing departments also use them extensively.

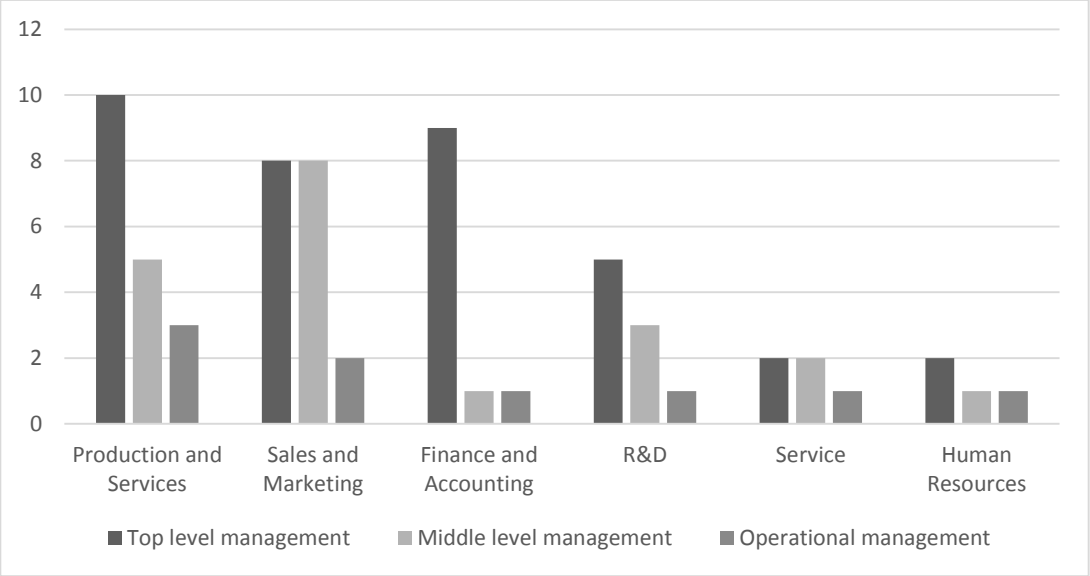

Figure 3: The Use of Smartphones by Adopters

CHAPTER 5

IMPLICATIONS AND CONCLUSION

5.1 Key findings

I hypothesized that Rogers' five technological characteristics, including relative advantage, compatibility, complexity, observability, and trialability, along with security have a positively significant influence on the organizational adoption of mobile devices, specifically smartphones. Our results, along with previous studies, support these hypotheses. This study has shown that the technological characteristics have a significant influence on adoption. Rogers' five factors and the security factor have been also identified in prior studies as a significant predictor of adoption behavior: relative advantage (Ifinedo, 2011; Ramdani et al., 2009; Bellaaj et al., 2008; Sparling & Toleman, 2007; Lertwongsatien & Wongpinunwatana, 2003; Premkumar & Roberts, 1999; Li, 2008; Zhu et al., 2006; Kuan & Chau, 2001; Adams et al., 1992; Davis et al., 1989; Davis, 1993), compatibility (Bellaaj et al., 2008; Sparling & Toleman, 2007; Lertwongsatien & Wongpinunwatana, 2003; Wang et al., 2010; Zhu et al., 2006), complexity (Wang et al., 2010; Higa et al., 1997), observability (Ramdani et al., 2009; Higa et al., 1997), trialability (Ramdani et al., 2009; Higa et al., 1997), and security (Liu, 2008; Zhu et al., 2006; Salisbury et al., 2001).

I also hypothesized that organizational characteristics, including financial resources, information intensity, expertise, innovativeness, and top management support have a significant effect on adoption. As in prior studies (Chang et al., 2007; Zhu et al., 2004; Gibbs and Kraemer, 2004), I found that financial resources have a significant effect on adoption of smartphones by private sector organizations. Moreover, information intensity has been found to have a significant effect on adoption as in (Saldanha & Krishnan, 2012; Wang et al., 2010). Expertise has been found as a significant effect on adoption as in (Lin & Lin, 2008). Innovativeness has been found as an important antecedent of adoption as in Thong (1999). Lastly, top management support has been identified as a significant predictor of adoption as in (Low et al., 2011; Ifinedo, 2011; Ramdani et al., 2009; Chong et al., 2009; Li, 2008; Bellaaj et al., 2008; Sparling et al., 2007; Teo et al., 2006; Lertwongsatien & Wongpinunwatana, 2003; Premkumar & Roberts, 1999; Thong & Yap, 1995).

I hypothesized environmental characteristics such as competitive pressure, partner expectations, and customer expectations have a significant effect on adoption. The results of the study show that the environmental characteristics have a significant influence on adoption. These characteristics have been also identified in prior studies as a significant predictor of adoption behavior: competitive pressure (Yoon & George, 2013; Bordonaba-Juste et al., 2012; Wang et al., 2010; Lin & Lin, 2008; Zhu et al., 2003; Zhu et al., 2006; Premkumar & Roberts, 1999), partner expectations (Low et al., 2011; Wang et al., 2010; Hsu et al., 2006; Gibbs & Kraemer, 2004; Teo et al., 2003; Iacovou et al., 1995), and customer expectations (Bellaaj et al., 2008; Wu & Lee, 2005).

Our follow-up study confirms these findings and, in addition, suggests manufacturer and service provider characteristics with a determining factor, which is associated with relative advantage, in selecting between manufacturers and service providers: services.

5.2 Practical Implications

Of all the tested variables, the environmental characteristics of customer expectations, competitive pressures, and partner expectations stand as one of the most influential predictors of adoption. This is in line with the phenomenon that the greater the external

pressures, the more likely it is for smartphones to be adopted by organizations. The implication of this is mainly for device manufacturers and service providers. If these stakeholders can promote smartphones and mobile services to a critical mass of organizations in an industry and make the customers aware of the potential of these adoptions along with those organizations who already adopted them, the rest of the industry may follow suit without significant further effort. Meanwhile, organizations in an industry with low adoption rates can use these findings to their benefit during negotiations with service providers as the role of early adopters seems critical for an industry wide adoption of this technology.

The fact that expertise and security factors were also found to be important determinants of adoption decision suggests that, organizations' adoption decisions are mainly derived from having employees knowledgeable enough to use smartphones. This implies that general individual level adoption is positively related to organizational adoption therefore service providers can more strongly justify promotion of these technologies for individuals at large. In addition, higher levels of mobile security positively influence the adoption decision. Therefore, mobile phone manufacturers and service providers should fortify both device and network level security in order to protect the privacy of the employees and the intellectual property of the company as smartphones collect and compile an increasing amount of sensitive information. By providing mobile devices with secure access to corporate emails and databases, mobile phone manufacturers may increase their sales and market share.

Relative advantage, compatibility, complexity, observability, and information intensity factors have a less significant effect on adoption. On the other hand, the financial resources, innovativeness, top management support, and trialability factors have a moderate significant effect. Therefore, it seems that a trial usage of smartphones, a high level of innovativeness in the organizations, and a high level of awareness of the top management positively influences the adoption decision.

The influence of trialability of smartphones on adoption provides service providers invaluable information in strategic planning. A free trial usage of smartphones would be an effective strategy for service providers to offer organizations to use smartphones

on a trial basis. Meanwhile, organizations, especially those with sufficient financial resources, can use this finding to obtain more friendly terms in their contracts with service providers that include free trial usage of the technology and services for a period of time. This way, some financial and operational risks of a large scale adoption for the organization are reduced. It is also interesting that when considering potential natural fits for smartphone technologies, the traditional notion of information intensive organization seems to have lost its significance. This suggests that a variety of organizations are considering themselves information-based, and are finding creative ways to justify investment in anytime anywhere technology.

Furthermore, customers and trading partners can also benefit from the findings indirectly. For example, the ability to check emails anywhere and anytime allows organizations to meet urgent partner expectations. In addition, the mobility provided by these technologies also helps organizations to be more responsive to their customers' needs and enhance their customer service. Customers may expect an instantaneous response from certain business units such as the sales department. Therefore, the adoption of these technologies in sales departments may create better customer value. This, in turn, can allow organizations to develop core competencies, improve market share and organizational image. As a result, these implications also add value to investors by improving their return on investment.

Organizational adoption also influences trading partners to adopt these technologies in reciprocation. In the case where the use of these technologies is very common, competitors have no choice but to adopt in order to maintain their competitiveness.

The findings can also benefit the mobile telecommunications industry. The influence of trialability of smartphones on adoption provides service providers invaluable information in strategic planning. A free trial usage of smartphones positively influences the adoption decision, and therefore, it would be an effective strategy for service providers to offer organizations to use smartphones on a trial basis. A higher adoption rate provides business opportunities for service providers in improving their profit margin and market share. In addition, knowledge in organizational adoption can help the government in formulating polices to foster the adoption of mobile

communication technologies by organizations since a higher adoption rate is desirable and helps to stimulate the national economy.

The findings can help mobile phone manufacturers to design better products providing a thorough understanding of market demand and consumer preferences. For instance, the findings show that the security of mobile devices and wireless data transfer is a key factor that has a significant effect on adoption. By providing mobile devices with secure access to corporate emails and databases, mobile phone manufacturers may increase their sales and market share. The qualitative study findings also suggest that the level of services provided by service providers and device manufacturers positively influence organizations' adoption decision. The costs of adoption, including cost of mobile devices and data plan prices have also a negative and significant effect on adoption.

The findings show that the relative advantage, which depends on both the functionality provided by smartphones and the quality of the telecommunication service, has a significant effect on adoption. Since corporate users mainly use smartphones for accessing emails and the Internet, the speed of data transfer play an important role in their adoption decision. Mobile service providers can potentially increase their market share and attract more corporate subscribers by offering faster wireless data transmission investing in 4G, Long Term Evolution.

5.3 Research Implications

This study uses both quantitative and qualitative methods and data to understand organizations' adoption behavior. The quantitative study identifies the key adoption factors for smartphones in organizations through propose a comprehensive research model to explain organizational adoption of mobile communication technologies. In this part of the study, I used the TOE framework as an underlying framework. I also used two well-established theories, Institutional theory and Diffusion of Innovations theory to enhance the environmental and technological contexts of the framework. I identified organizational factors of the framework based on the comprehensive analysis of previous studies. The proposed model has a high explanatory power, which accounts for 68.5% of total variance. The scales for measuring the variables in the

research model can be used in future research on organizational adoption of similar technologies. The follow-up study identifies the key adoption factors for smartphones in organizations through interviews to review organizations' adoption behavior and confirm the quantitative results.

The present study contributes to the Information Systems literature since the study of technology adoption at the organizational level is limited. Significant influences from external pressures such as competitor pressure, partner expectations, and customer expectations to adoption decision were found as the most significant factors for the first time, at least in smartphone adoption by organizations. On the other hand, the expertise and security factors were also found to be stronger determinants than traditional DOI constructs, including relative advantage, compatibility, complexity, observability, and trialability.

Traditional DOI constructs were not found as robust as they were in previous DOI studies. Specifically, the significance of the relative advantage factor is found to be much less on overall adoption decisions. Technological factors lose their dominant explanatory power in favor of environmental factors for the studies on organizational adoption. Taken together, these findings suggest that the key determinants of adoption decision at the organizational level are likely to be different than that of individual level. The external pressures existing in an institutionalized environment and organizational characteristics are important determinants of organizations' adoption decision. Therefore, more attention should be paid to the important role of environmental and organizational characteristics on organizational adoption.

5.4 Limitations and Directions for Future Research

This study focused on smartphones; therefore, the results should be applied to other technologies with caution. The study examines the adoption of smartphones by private sector organizations, and therefore, the results should not be generalized to public organizations.

CHAPTER 6

APPLICATION OF THE RESEARCH MODEL IN CANADA

6.1 Quantitative Study

6.1.1 Data Collection

An online survey was conducted with middle and senior managers working in different organizations in Canada between February 2nd, 2013 and April 16th, 2013. A total of 141 questionnaires were returned from 64 middle level and 77 senior level managers working in 78 small and mid-size, 46 large-sized, and 17 entrepreneurial organizations. The participant organizations operate in several industries such as information technology, consulting, construction, education, healthcare, and machinery. Table 12 presents the detailed information on the respondents and organizations involved in this study.

Our results show that 80.9% of the organizations have already adopted smartphones. Table 13 shows which of the business functions and managerial levels use smartphones in adopter organizations. The results suggest that smartphones are mainly used by senior level managers in all business units in these organizations.

Table 12: Respondents and Organizations in Canada

Title of Respondents	**Frequency**	**Percent**	**Cumulative Percent**
Owner	18	12.8	12.8
CEO	47	33.3	46.1
CFO	5	3.5	49.6
CIO	7	5.0	54.6
Middle Level Manager	64	45.4	100.0
Sector			
Service	82	58.2	58.2
Manufacturing	15	10.6	68.8
Trading/Commerce	8	5.7	74.5
R&D	28	19.9	94.4
All	8	5.7	100.0
Industry			
Information Technology	28	19.9	19.9
Consulting	20	14.2	34.1
Finance	9	6.4	40.5
Mining	9	6.4	46.9
Electrical & Electronics	8	5.7	52.6
Healthcare	7	5.0	57.6
Education	7	5.0	62.6
Energy	7	5.0	67.6
Other*	46	32.6	100.0
Structure	62	45.0	
Small and Mid-size Firm	78	55.3	55.3
Entrepreneurial	17	12.1	67.4
Large-sized Firm	46	32.6	100.0
Size			
1-5	24	17.0	17.0
6-10	13	9.2	26.2
11-20	20	14.2	40.4
21-100	28	19.9	60.3
101 and over	56	39.7	100.0
Adopters/Non-adopters			
Adopters	114	80.9	80.9
Non-adopters	27	19.1	100.0
Total	141	100.0	
Behavioral Intention	**Adopter**	**Non-adopter**	**Total**
No	2	6	8
Neutral	13	10	23
Yes	99	11	110
Total	114	27	141

* Includes agriculture (3.5%), food (2.1%), trade (1.4%), etc.

Table 13: Use of Smartphones by Adopter Organizations in Canada

	Top level management	**Middle level management**	**Operational management**	**Total**
Production & Services	87.2%	67.9%	53.2%	69.4%
Sales & Marketing	89.2%	67.6%	47.7%	68.2%
Finance & Accounting	88.2%	56.9%	37.3%	60.8%
Human Resources	86.7%	57.8%	41.1%	61.9%
R&D	84.8%	50.6%	48.1%	61.2%
Service*	84.1%	58.0%	46.4%	62.8%
Total	**86.7%**	59.8%	45.6%	

* After-sales service

6.1.2 Data Analysis

Structural Equation Modeling (SEM) using AMOS (v.20) was employed to test the hypothesized relationships and identify relationships among the constructs. As a further analysis, Pearson's chi-square test was conducted to investigate whether there is a significant difference between adopters and non-adopters.

Reliability and Validity

Reliability analysis using the Cronbach's alpha test was employed to assess the internal consistency of the questionnaire items. The Cronbach's alpha value was 0.83, which indicates an acceptable level of internal consistency.

"Convergent validity is judged to be adequate when average variance extracted (AVE) equals or exceeds 0.50" (Hair et al., 2006). Table 14 indicates that each construct had an AVE value higher than the benchmark of 0.50, thereby ensuring that the convergent validity is adequate. "Discriminant validity is adequate when the diagonal elements (the square roots of AVE) in the correlation matrix are greater than the off-diagonal elements in the corresponding rows and columns" (Fornell & Larcker, 1981). Results show that each construct shares more variance with its items than it shares with other constructs, which indicates that the discriminant validity is also adequate.

Table 14: Correlation Matrix and Validity Test Results

	AVE	RA	CM	CX	OB	TR	SE	FR	II	EX	IN	TMS	CP	PE	CE
RA	0.84	0.92													
CM	0.85	.26***	0.92												
CX	0.80	.23***	.17***	0.89											
OB	0.86	.23***	.19***	.16***	0.93										
TR	1.18	.004	.003	.003	.004	1.08									
SE	0.98	.33***	.23***	.22***	.22***	.005	0.99								
FR	1.42	.10*	.09*	.06*	.09*	.001	.13*	1.19							
II	0.65	.36***	.24***	.23***	.26***	.004	.27***	.13*	0.81						
EX	0.52	.21***	.15***	.15***	.22***	.003	.19***	.06*	.26***	0.72					
IN	0.61	.19***	.18***	.15***	.20***	.004	.24***	.11*	.29***	.25***	0.78				
TMS	0.90	.40***	.33***	.26***	.38***	.004	.49***	.23**	.42***	.33***	.40***	0.95			
CP	1.35	.29***	.21***	.21***	.22***	.004	.33***	.12*	.34***	.15***	.19***	.42***	1.16		
PE	1.26	.28***	.21***	.19***	.21***	.004	.32***	.13*	.32***	.13***	.23***	.42***	.44***	1.12	
CE	1.33	.27***	.21***	.16***	.21***	.004	.31***	.14*	.30***	.13**	.22***	.43***	.54***	.53***	1.15

* $p < .05$; ** $p < .01$; *** $p < .001$.

The Structural Model Assessment and Hypothesis Testing

Table 15 lists the questionnaire items and their measurement properties, including mean, standard deviation (SD), factor loadings (Load), and the *p*-values of regression coefficients.

Table 15 also shows test results of the hypothesized structural model providing the beta weights, standard error, and *p*-values for each construct. Consistent with the hypotheses relative advantage, security, information intensity, expertise, innovativeness, top management support, competitive pressure, partner expectations, and customer expectations have a significant effect on adoption at the 0.001 level. However, observability has a significant effect on the adoption at the 0.01 level, while compatibility, complexity, and financial resources have a significant effect on the adoption at the 0.05 level. On the other hand, trialability has no significant effect on the adoption ($p < .05$).

Based on the standardized regression (beta) weights, which indicate the relative importance of each independent variable, it can be said that security and top management support have a greater explanatory power. On the other hand, complexity and financial resources have much lower explanatory power than the rest. The research model explains 62% of the variance in adoption intention toward smartphones. However, the model explains 71.8% of total variance. The high proportion of the total variance explained means that most of the variance has been explained by the variables of the model (See Figure 4).

Pearson's chi-square test (using SPSS version 20) was conducted to investigate whether there is a significant difference between adopters and non-adopters in terms of their size, structure, sector, and industry. The results indicate that structure ($x^2 = 0.84$, $p = .66$) and sector ($x^2 = 1.26$, $p = .87$) have no significant effect on the adoption. On the other hand, size ($x^2 = 9.16$, $p = .06$) and industry ($x^2 = 19.52$, $p = .05$) have a significant effect on the adoption at the 0.10 level. These findings suggest that there is a higher adoption rate in the organizations with more than a hundred employees and/or operating in the industries such as consulting and IT.

Table 15: Questionnaire Items and Measurement Properties

Construct and Items	**Mean**	**SD**	**Load**	***P***	**β**	**S.E.**
Relative Advantage				***	0.35	.062
RA1	4.40	0.84	0.77	***		
RA2	3.91	0.96	0.63	***		
RA3	4.30	0.74	0.80	****		
Compatibility				*	0.20	.078
CM1	4.31	0.81	0.74	***		
CM2	3.71	1.05	0.42	****		
CM3	4.03	0.80	0.85	***		
Complexity				*	0.13	.053
CX1	4.36	0.72	0.72	***		
CX2	3.91	0.37	0.37	****		
CX3	3.87	0.88	0.57	***		
Observability				**	0.18	.064
OB1	4.14	0.92	0.62	***		
OB2	3.66	0.98	0.44	***		
OB3	4.03	0.80	0.74	****		
Trialability					0.00	
TR1	3.82	1.08	0.45			
TR2	3.32	1.07	0.01	****		
TR3	3.37	1.04	0.39			
Security				***	0.77	.121
SE1	4.01	1.05	0.88	***		
SE2	3.60	1.01	0.81	****		
SE3	3.50	1.02	0.98	***		
Information Intensity				***	0.53	.082
II1	4.51	0.74	0.46	***		
II2	4.16	0.80	0.89	****		
II3	3.37	0.79	0.69	***		
Financial Resources				*	0.10	.060
FR1	3.77	1.08	0.87	**		
FR3	2.72	1.10	0.32	****		
Expertise				***	0.28	.053
EX1	4.35	0.70	0.72	***		
EX2	4.34	0.77	0.92	***		
EX3	4.26	0.69	0.77	****		
Top Management Support				***	0.74	.132
TMS1	4.11	0.91	0.72	***		
TMS2	3.69	1.08	0.75	****		
TMS3	4.16	0.77	0.72	***		
Innovativeness				***	0.44	.101
IN1	4.38	0.70	0.73	***		
IN2	3.77	0.94	0.70	****		
IN3	3.31	1.00	0.60	***		
Partner Expectations				***	0.43	.105
PE1	3.54	1.03	0.64	****		
PE2	3.50	0.99	0.77	***		
PE3	2.67	1.12	0.72	***		
Customer Expectations				***	0.60	.131
CE1	3.65	0.99	0.53	***		
CE2	2.72	1.12	0.69	****		
CE3	3.16	1.15	0.81	***		
Competitive Pressure				***	0.44	.113
CP1	3.05	1.17	0.74	***		
CP2	3.57	1.09	0.85	***		
CP3	2.82	1.10	0.60	****		

* $p < .05$; ** $p < .01$; *** $p < .001$; **** $p < .0001$.

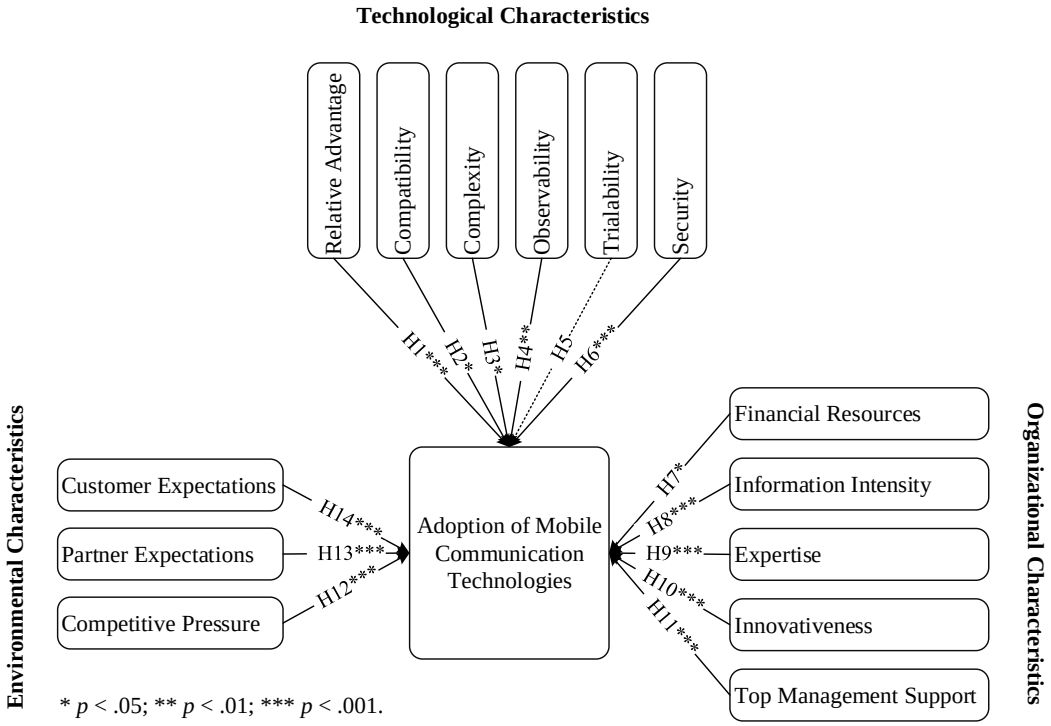

Figure 4: Hypothesis Testing Results

An independent samples t-test was conducted to compare results between adopters and non-adopters. The results of the independent samples t-test indicated significant difference between adopters and non-adopters in all factors. Table 16 shows the results of the independent samples t-test.

Table 16: Independent Samples T-Test of the Variables for Canada

	Adopters (n=114)		**Non-adopters (n=27)**			
Variable	**Mean**	**S.D.**	**Mean**	**S.D.**	**t**	**Sig.***
Relative Advantage	4.36	0.76	3.56	1.19	7.53	.00
Compatibility	4.12	0.88	3.58	0.97	4.85	.00
Complexity	4.14	0.83	3.65	1.06	4.46	.00
Trialability	3.58	1.05	3.19	1.17	2.94	.00
Observability	4.04	0.85	3.52	1.11	4.70	.00
Security	3.84	0.95	3.15	0.99	5.85	.00
Expertise	4.38	0.62	4.04	0.99	3.95	.00
Innovativeness	3.91	0.93	3.44	1.13	3.87	.00
Top Management Support	4.19	0.76	3.14	1.19	9.92	.00
Financial Resources	3.62	1.11	2.64	1.21	6.99	.00
Information Intensity	4.33	0.70	3.72	1.04	6.42	.00
Competitive Pressure	3.28	1.11	2.58	1.20	5.01	.00
Partner Expectations	3.39	1.07	2.60	1.15	5.84	.00
Customer Expectations	3.30	1.12	2.63	1.16	4.86	.00

*p-value of two tailed t-test for difference of means.

6.2 Qualitative Study

6.2.1 Data Collection

A follow-up study was conducted to better understand organizations' adoption behavior and confirm the quantitative results. Follow-up data were obtained from 16 organizations, which participated in quantitative part of the study. Table 17 provides details of the organizations and interview informants.

Table 17: Interviewee Profile

Organization	Title	Sector	Industry	Size	Adopter
Organization 1	Middle Manager	Service	IT	40	Yes
Organization 2	Quality Assurance Manager	Service	Trade	300	Yes
Organization 3	VP of Marketing	R&D	Energy	130	Yes
Organization 4	CIO	Manufacturing	Consulting	110	Yes
Organization 5	Owner	Service	Consulting	6	Yes
Organization 6	Managing Director	Service	Advertising	20	No
Organization 7	CEO	Manufacturing	Mining	25	Yes
Organization 8	Director of Corporate Services	Service	Healthcare	50	Yes
Organization 9	HR Coordinator	Trading/Commerce	Mining	405	Yes
Organization 10	Vice President	Service	Finance	500	Yes
Organization 11	CIO	Service	Consulting	3200	Yes
Organization 12	IT Director	Trading/Commerce	Energy	600	Yes
Organization 13	CFO	Service	IT	300	Yes
Organization 14	Owner	R&D	IT	25	Yes
Organization 15	Middle Manager	Trading/Commerce	Real Estate	250	Yes
Organization 16	VP of IT and Business Applications	Service	Construction	2500	Yes

I randomly selected interview candidates among the participants who provided their contact information during the survey. I then contacted the managers by a telephone call or email to schedule a date, time and place for the interview. During the in person or phone interview, I first explained the objectives of the study. Each interview lasted

about 15 minutes and all responses were recorded during the interview. Interviews were conducted using open-ended, semi-structured questions generated from the following interview guidelines:

1. Has your organization adopted smartphones?
2. Which of the business functions and managerial levels use smartphones?
3. What are key factors affecting organizations' adoption of smartphones?
4. Why do you think that the factors that you have identified in the previous question are important?

6.2.2 Data Analysis

The constant comparative method is used to develop concepts from the data that resulted from transcription of the interviews. Data analysis process, which is called as coding, involves three levels of analyses as open coding, axial coding, and selective coding (Strauss & Corbin, 2008). During the open coding process, I identified different categories within the data examining the transcription document in a systematic manner. During the axial coding process, I identified the connections between the categories to relate subcategories to a category (Strauss & Corbin, 1998). During the selective coding process, I identified the core categories to integrate our categories into a central paradigm. Following this procedure, I determined key factors that affect organizations' adoption of smartphones. Table 18 shows the codes and categories, and statements of the interviewees.

Table 18: Codes and Categories

Codes	Categories	Statements
Providing **access** to important **information** anywhere, anytime, **productivity** and team communication increases, ability to **integrate** to social networks to enable marketing of key products and services, employee **morale and satisfaction**	Relative advantage (accessibility, productivity, morale and satisfaction), information intensity, compatibility	Organization 1: "Everyone that joins us has a smartphone, it is the way young talent work and we need to adapt to accommodate this, providing access to important information anywhere, anytime, productivity & team communication increases, ability to integrate to social networks to enable marketing of key products and services, employee morale and satisfaction."
Accessibility of e-mails, accessibility to the internet, **quick** response to individuals and teams to solve time-sensitive problems, staff working away from the office, **cost**	Relative advantage (accessibility, speed, mobility), cost	Organization 2: "Accessibility of emails, accessibility to the internet, quick response to individuals and teams to solve time-sensitive problems , staff working away from the office, and cost."
Cost, lack of operational **change** management, using VPN technologies to access share point is a pain on a smartphone	Cost, innovativeness, compatibility	Organization 3: "Cost is a factor, plus operational change management has not been fully worked out yet. We also require some VPN technologies to access SharePoint which is a pain on a smartphone."
Budget, the **time sensitive** nature of the business, some departments such as client services that have to be very **responsive** to new **information**	Financial resources, relative advantage (timeliness, responsiveness), information intensity	Organization 4: "Budget, the time sensitive nature of the business. Adoption is important for some departments such as client services that have to be very responsive to new information."
Work force **mobility**, timely decisions/response to situations	Relative advantage (mobility, timeliness)	Organization 5: "Allow work force mobility. Timely decisions/response to situations."
Ability to **access information anytime and anywhere**, ability to communicate **seamlessly** in a deadline-driven **industry**	Relative advantage (accessibility, seamlessness), industry	Organization 6: "The ability to access information anytime and anywhere. The ability to communicate seamlessly in a deadline-driven industry."
Making sure the corporate email accounts are **secure** and they run through the corporate **security** system	Security, compatibility	Organization 7: "Making sure the corporate email accounts are secure and they are run through the corporate security system."
Integration with existing email and **security** of corporate information	Compatibility, security	Organization 8: "Integration with existing email and security of corporate information."

Table 18 (continued)

Codes	Categories	Statements
Key managers need to be **accessible** at all times, managers to be accessible out of their office as they may be in the Open Pit Quarry or off site	Relative advantage (accessibility)	Organization 9: "Managers/employees are given a blackberry' for work or can be paid an allowance of $50 per month to use their own cell phone for work emails, phone calls, etc. Our mine operates 24/7 with no break times, therefore key managers need to be accessible at all times. Smartphones also allow for managers to be accessible out of their office as they may be in the Open Pit Quarry or off site."
Security (ensuring safe access to emails and corporate data) and **training** (ensuring people know **how to use** smartphones)	Security, experience	Organization 10: "Security ensuring safe access to emails and corporate data and training ensuring people know how to use the smartphone."
Work from **anywhere**, **clients** expect us to be **available** whether we're in the office or on the golf course	Relative advantage (ubiquity, mobility, availability), customer expectations	Organization 11: "Our people want to work from anywhere and our clients expect us to be available whether we're in the office or on the golf course."
Employee **efficiency**, **customer** service	Relative advantage (efficiency), customer expectations	Organization 12: "Understanding the value to employee efficiency and customer service."
Consumer adoption of smartphones is pushing organizations to adopt, BYOD to work and the **security** issues that it creates	Customer expectations, security	Organization 13: "Consumer adoption of smartphones like iPhone and Android is pushing organizations to adopt them more rapidly. In professional organizations in Canada it is not really open for debate. A bigger issue is BYOD to work and the security issues that it creates."
Organization sector, **managerial acceptance**, **demographics** of employees	Sector, top management support, experience	Organization 14: "Organization sector, managerial acceptance, demographics of employees."
Instant information is important for a **larger** organization, many **executives** do not understand that	Information intensity, size, top management support	Organization 15: "Instant information is important in feeling a part of a larger organization. Many executives do not understand that."
Simple to understand, **low cost**, fixed **price** plans	Complexity, cost	Organization 16: "Simple to understand, low cost and fixed price plans from cellular providers."

6.2.3 Results

Analysis of the qualitative data suggested that there are three core categories that represents the categories. Table 19 lists the core categories and categories that emerged from the data analysis.

Table 19: Core Categories and Categories

Technological Characteristics	**Organizational Characteristics**	**Environmental Characteristics**
Relative advantage	Experience	Partner expectations*
Compatibility	Financial Resources	Customer expectations
Complexity	Innovativeness	Competitive pressure*
Observability*	Information intensity	
Security	Industry	
Cost	Top management support	
	Sector	
	Size	

* Not mentioned by the interviewees from Canada.

The results of the qualitative data analysis explaining the organizations' adoption of smartphones are presented in the following core categories: technological, organizational, and environmental characteristics. This follow-up study confirms our previous findings and suggest that sector and size have a significant effect on organizations' adoption decision. However, it is important to note that of these factors observability, partner expectations, and competitive pressure were not mentioned by the interviewees from Canada.

CHAPTER 7

THE EFFECT OF CULTURAL DIFFERENCES ON THE ADOPTION

7.1 INTRODUCTION

Culture shapes the environment in which organizations operate potentially influencing organizational behavior and managerial decision making. Triandis (1994, p.22) defines culture as "a set of objective and subjective perceptions". According to (Hall, 1983), culture is a "subconscious mechanism" while, Hofstede et al. (2010, p.3) defines culture as "the collective programming of the mind that distinguishing the members of a group or category of people from others".

Understanding the influence of culture in organizational behaviors and managerial decision making requires explaining the differences between cultures. Several taxonomies and models of culture have emerged to suggest a comparable frame of reference. Hall (1976) introduced a cultural taxonomy establishing low and high context cultures. In high context (compared to low context) cultures, communication is less explicit and more dependent on nonverbal cues. Hofstede (1980) developed a cultural model comprising four cultural dimensions, including power distance, individualism-collectivism, uncertainty avoidance, and masculinity-femininity. More recently, Trompenaars and Hampden-Turner (1993) presented a cultural model with seven dimensions, including universalism vs. particularism, individualism vs.

communitarianism, affective vs. neutral cultures, specific vs. diffuse cultures, achievement vs. ascription, time perception, and relation to nature.

To date, Hofstede's cultural taxonomy (1980) is the most cited framework, and his cultural dimensions have been the most popular conceptualization of national culture. Myers and Tan (2002) argue that these dimensions are too simplistic to capture complexities and multi-level influences of culture on IS. Accordingly, the original model was expanded with two additional dimensions; short term vs. long-term orientation (Hofstede & Bond, 1988) and indulgence vs. restraint (Hofstede et al., 2010).

Past research implies that culture has a significant effect on the adoption and use of information and communication technologies. Thus, key adoption factors may show differences from country to country due to cultural differences. These differences should be taken into account by service providers, device manufacturers during the development and marketing of these technologies. Therefore, the motivation of this research is a thorough understanding of the impact of cultural differences on organizations' technology adoption behavior. More specifically, I aim to investigate the impact of cultural differences on organizational adoption of smartphones in Canada and Turkey.

Canada and Turkey are two typical examples of countries where mobile telecommunications industry has recently experienced rapid growth. In Turkey, the number of mobile subscribers and penetration rate was 67.9 million and 89.8% respectively as of March 2013 while 37% of the subscribers have a smartphone (ICTA, 2013). Meanwhile, the number of 3G (third generation) subscribers surpassed 43.9 million (ICTA, 2013). In Canada, the number of mobile subscribers reached 27.4 million with 32% smartphone proportion (CRTC, 2012). Furthermore, Canada has adopted the new 4G technology, LTE (long term evolution), and started to offer services at higher broadband speeds.

The organization of this study is as follows. In the following section, I review the literature on cross-cultural studies of technology adoption and usage. Then I leverage existing theory to develop a series of research hypotheses. I then describe our research

methodology and present the results of our data analyses. I conclude with a summary of findings and a discussion of the implications and limitations of this research.

7.2 LITERATURE REVIEW

The impact of culture in adoption and use of technology has been a frequent theme of recent research. Park and Jun (2003) identified the factors effecting Internet buying behavior based on data collected by an email survey of 133 US and 150 Taiwan respondents. They attempted to explain Internet buying behavior by Internet usage, perceived risks, and innovativeness on a cross-cultural basis. They found that there were significant differences in Internet usage, perceived risks, and innovativeness, but no significant differences in online shopping experience and Internet buying intention between Korean and American Internet users.

Krasnova et al. (2012) examined the role of individualism and uncertainty avoidance dimensions of culture in individual self-disclosure decisions based on survey responses of 193 U.S. and 138 German Facebook users. They found that individualism and uncertainty avoidance moderate the impact of privacy concerns and trusting beliefs respectively. The results showed that trusting beliefs play a key role in the self-disclosure decisions of users in individualistic cultures and higher level of individualism facilitates the development of trusting beliefs. On the other hand, uncertainty avoidance determines the impact of privacy concerns and low level of uncertainty avoidance leads users to ignore their privacy concerns.

Shin (2012) investigated the relations between usability and aesthetic values to understand what value users as individuals place on aesthetic design as compared to usability focusing on the cultural differences in the USA and Korea. The findings showed that usability, aesthetics, quality, and enjoyment are significant determinants of smartphone use intentions and Hofstede's cultural dimensions differentially moderate the paths in these countries. In another study, Shin and Choo (2012) explored cross-cultural value structures with smartphones in the U.S. and Korea, and determined country-specific differences in product value perceptions as well as intention and adoption patterns. The results illustrate that although usability and aesthetic values are important for both countries, individuals show different value preferences as well as

intention and adoption patterns. For example, high uncertainty avoidance in Korea reduces the user intention toward actual use whereas low uncertainty avoidance in the U.S. enhances the intention and thus increasing actual usage.

Hwang (2012) investigated enterprise systems adoption in Japan and the U.S. based on the diffusion of innovation theory, the self-determinant theory, and Hofstede's cultural dimensions. The results indicated clear cultural implications. Among those, personal innovativeness and intrinsic motivation are the most important factors in Japan and the U.S. respectively.

Zhao (2011) conducted a study to understand to what extent, and how, culture impacts e-government development based on Hofstede's cultural dimensions. The results show that out of five dimensions, only power distance, individualism, and long-term orientation are significantly correlated with e-government development. In another study, Sherer et al. (2011) investigated the effects of cultural differences in IT implementation and they found that cultural differences impact the rollout life cycle for Collaborative Planning, Forecasting and Replenishment (CPFR).

Genis-Gruber and Tas (2011) explored the cultural factors that affect participation to online procurement auctions and identified cultural barriers for adoption of e-procurement. In another study, Baker et al. (2010) investigated the cultural impacts on acceptance and adoption of information technology in Saudi Arabia. The results showed that in Saudi Arabia, as a collectivistic culture, the factors influencing technology acceptance behaviors are different than those of individualistic societies. In particular, the managerial father figure has an important influence on individual performance in Saudi Arabia.

Ribière et al. (2010) attempted to understand the influence of culture traits on the usage of Web 2.0 technologies based on data collected from 376 young adults in the USA, Thailand and Bahrain. They identified five variables being influential on the use of Web 2.0 technologies: uncertainty avoidance, expressive usage, maintaining relationships, online privacy, and perceived usefulness. In another study, Van Slyke et al. (2010) examined the influence of culture on consumers' intentions to purchase

goods or services online. The results indicated that culture seems to have a direct effect on e-commerce use intention.

Kock et al. (2009) examined the effect of power distance on information overload intensity based on data collected from 184 local managers and professionals in New Zealand, Spain and the USA. The results showed that perceived information overload intensity seems to be more strongly related to power distance than to the volume of written information or number of information transactions processed by an individual. In another study, Saadé et al. (2009) investigated the motivational differences among Chinese and Canadian online learners by analyzing the effects of intrinsic motivation on the technology acceptance model (TAM). They found that, contrary to Canadian context, the perceived usefulness concept of TAM is limited in predicting the intention to use online learning in the Chinese context.

Carter and Weerakkody (2008) compared e-government adoption in the U.K. and the U.S. They identified the cultural differences in e-government adoption between these two countries. They found that relative advantage and trust are pertinent in both countries, while Internet accessibility and skill were not significant determinants of e-government adoption in the U.K., but in the U.S. In another study, Barczak et al. (2008) examined the factors that influence IT use in the United States and the Netherlands based on an email survey of 201 U.S. practitioner members and 108 new product managers from Dutch manufacturing companies. They identified significant factors including IT infrastructure, IT embeddedness, new product development (NPD) process formalization, colocation, outsourcing of NPD projects, and length of time on the job. The results indicated that these antecedents vary in the U.S. and the Netherlands.

Teo et al. (2008) explored pre-service teachers' intention to use personal computer using TAM (Davis, 1989) on data collected by an email survey of 250 Singaporean and 245 Malaysian participants. The results showed that computer attitude, perceived usefulness, and perceived ease of use have a significant effect on behavioral intention in both countries. In another study, Kim (2008) examined the impact of culture on trust determinants in e-commerce transactions. A theoretical model of self-perception-

based versus transference-based trust determinants in an e-commerce context was developed and tested using cross-cultural data collected from the U.S. and Korea. The results showed that national culture affects the trust determinants through which trust is built.

Lippert and Volkmar et al. (2007) examined effects of national culture and gender on technology use evaluating similarities and differences across technology users in Canada and the U.S. The results suggested that gender plays a larger role in the U.S. than it does in Canada with respect to utilizing new technologies. There is a greater similarity between Canadian men and women than between U.S. men and women, where U.S. women were found to be significantly more aware of the normative pressures than U.S. men. In another study, Stafford et al. (2004) investigated cross-cultural influences on online shopping behavior in the United States, Finland and Turkey. They identified the role of gender and age in online shopping activities between these countries. Their results show that there are no differences between men and women for involvement with online shopping across the nations. Moreover, 25-34 year olds have the highest involvement mean, but all other group means are statically similar to each other.

7.3 THEORY AND HYPOTHESES

To study the effect of cultural differences on organizational adoption, it is necessary to consider technological, organizational, environmental, and cultural contexts. We, therefore, base our research hypotheses on a synthesis of several theories including the Hofstede's cultural theory, Diffusion of Innovation theory, and Institutional theory.

The cultural theory developed by Hofstede (1980, 2001) has five distinctly different dimensions: "power distance, individualism-collectivism, uncertainty avoidance, masculinity-femininity, and long term-short term orientation." These dimensions have become the de facto standard in cross-cultural studies and validated by many other researchers (Krasnova et al., 2012; Shin, 2012; Hwang, 2012; Zhao, 2011; Genis-Gruber & Tas, 2011; Kock et al. 2009; Barczak et al., 2008). Among these five dimensions, Turkey and Canada have significantly different scores in individualism-collectivism and uncertainty avoidance.

The effect of these two dimensions on the adoption factors and adoption behavior is investigated throughout this study (See Figure 5). "Individualism on the one side versus its opposite, collectivism, is the degree to which individuals are integrated into groups." (Hofstede, 1984, p.83). Canada and Turkey have different cultural backgrounds that have been historically shaped by different beliefs and values. For example, Turkish culture has been influenced by its religion and nationalism, whereas individualism has largely shaped Canadian culture (Hofstede, 1984). Therefore, Canadian culture is characterized as "individualistic" while Turkish culture is "collectivistic" with a strong emphasis on the group (Hofstede, 2001). Likewise, uncertainty avoidance refers to "people's tolerance of ambiguity". Turkish culture is an "uncertainty avoidance" culture while Canadian culture is an "uncertainty accepting" culture (Hofstede, 2001). Table 20 shows proposed effects of these cultural dimensions on the variables.

Table 20: Hypothesized Effects of Cultural Dimensions and Adoption Factors

Variables	**High Uncertainty Avoidance**	**Collectivism**
Relative Advantage	No Impact	No Impact
Compatibility	Positive impact	No Impact
Complexity	Positive impact	No Impact
Observability	No Impact	No Impact
Trialability	Positive impact	No Impact
Security	Positive impact	No Impact
Financial Resources	No Impact	No Impact
Information Intensity	No Impact	No Impact
Expertise	Positive impact	No Impact
Innovativeness	Negative impact	No Impact
Top Management Support	Negative impact	No Impact
Competitive Pressure	No Impact	Positive impact
Partner Expectations	No Impact	Positive impact
Competitive Pressure	No Impact	Positive impact

The Diffusion of Innovation theory (Rogers, 1983; 2003) suggests five main attributes of innovation that affect the decision to adopt or reject an innovation. The five attributes of innovations, including relative advantage, compatibility, complexity, trialability, and observability, may affect organizations' adoption decision. Of these

attributes, only the factors that have a potential to be affected by culture and the security factor to address characteristics of smartphones are used in this study. Likewise, organizational characteristics, including innovativeness, top management support, and expertise, which are relevant to the adoption of smartphones and have a potential to be affected by culture are used in the study.

Institutional theory emphasizes the role of cultural and social pressures imposed on organizations that influence organizational practices and structures (Scott, 1992). This theory suggests that managerial decisions are strongly influenced by three external isomorphic pressures: mimetic, coercive, and normative (DiMaggio & Powell, 1983).

Pressures coming from competitors is an example of mimetic pressures, which occur if an organization is aspiring to mimic a successful innovation of other organizations (Teo et al., 2003). "Coercive pressures are a set of formal or informal forces exerted on organizations by other organizations" such as governmental organizations (DiMaggio & Powell, 1983). Normative pressures refer to organizational change as a response to exchange information, rules, and norms with partner organizations and customers (Powell & DiMaggio, 1991). The external pressures, including pressures from competitors, trading partners, and customers, may affect organizations' adoption decision. These factors are used in this study to address environmental characteristics.

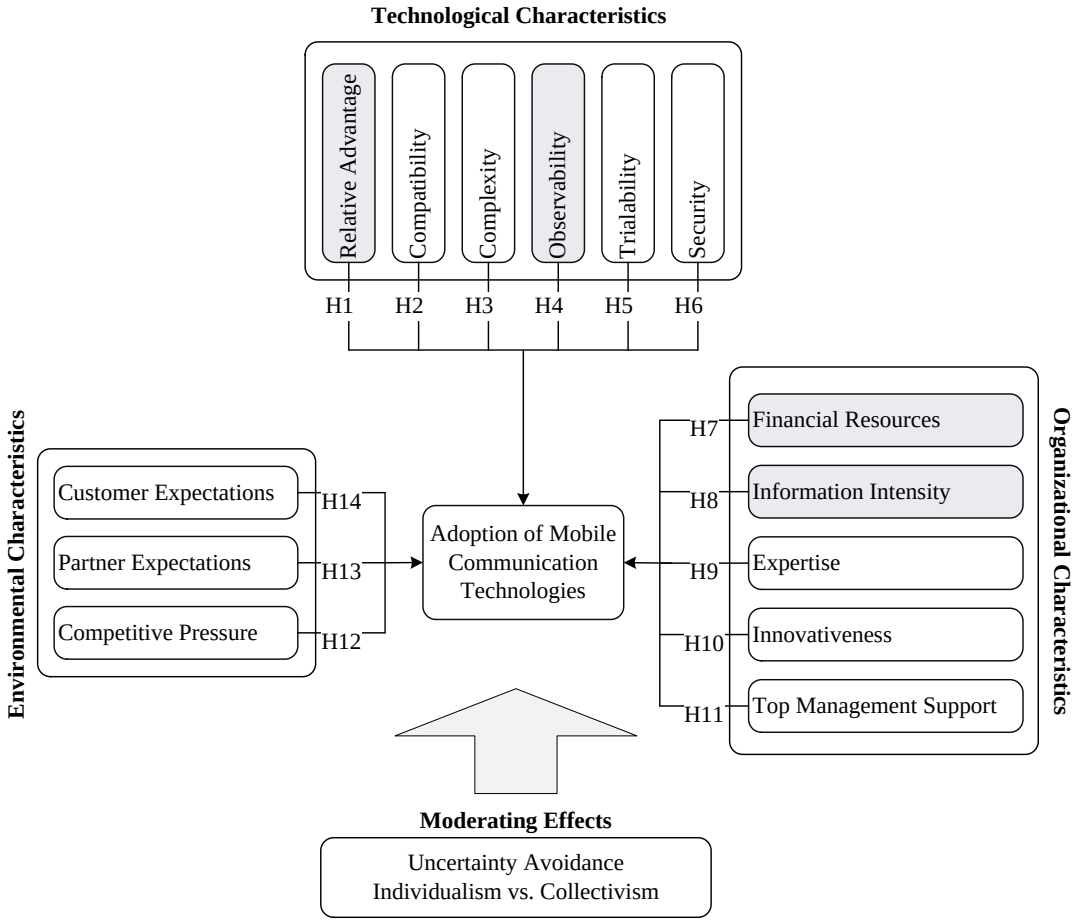

Figure 5: Proposed Effects of the Cultural Dimensions

7.3.1 Uncertainty Avoidance

Uncertainty avoidance is defined as "the degree to which members of a society feel comfortable with uncertainty and ambiguity" (Hofstede, 1980). Cultures with high uncertainty avoidance prefer less ambiguity as their perceived risk is higher than cultures with low uncertainty avoidance (Keil et al., 2000). These suggest that technological characteristics, including compatibility, complexity, trialability, and security will have a stronger effect on the adoption of smartphones by organizations in countries with high uncertainty avoidance. On the other hand, I theorize that organizational characteristics such as innovativeness and top management support will have a stronger effect on the adoption of smartphones by organizations in countries with low uncertainty avoidance.

Compatibility

Compatibility measures the level to which a new technology can assimilate into an organization's existing technology and infrastructure. The high compatibility of smartphones means a minimal modification in existing IT infrastructure. This in turn increases the perceived benefits by reducing the costs of implementation and maintenance, and thereby makes the overall adoption process easier. Organizations in high uncertainty avoidance countries avoid the ambiguity of whether the installation of these technologies requires substantial changes in existing IT infrastructure. I therefore theorize that compatibility may have a stronger effect on adoption in high uncertainty avoidance cultures than in uncertainty accepting cultures. In line with this discussion, the following hypothesis is formulated:

H1: Compatibility of smartphones will have a stronger influence on the adoption of smartphones by organizations in Turkey than those in Canada.

Complexity

Complexity is defined as "the degree to which an innovation is perceived as difficult to understand and use" (Rogers, 1995, p. 250). A complex technology usually requires a longer learning curve and hence prolongs the realization of perceived benefits. I therefore expect that organizations in high uncertainty avoidance countries are more likely to adopt technologies with a low level of complexity. I therefore theorize that complexity may have a stronger effect on the adoption in high uncertainty avoidance cultures than in low uncertainty avoidance cultures. Accordingly, the following hypothesis is formulated:

H2: Complexity of smartphones will have a stronger influence on the adoption of smartphones by organizations in Turkey than those in Canada.

Trialability

Trialability is defined as "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 1995, p. 251). Organizations in high uncertainty avoidance countries are more likely to prefer trying smartphones before they adopt them, because they would be confident that the consequences of using these technologies meet their expectations. I therefore theorize that trialability may have a stronger effect on the

adoption in high uncertainty avoidance cultures than in low uncertainty avoidance cultures. In line with this discussion, the following hypothesis is formulated:

H3: Trialability will have a stronger influence on the adoption of smartphones by organizations in Turkey than those in Canada.

Security

Security refers to the degree to which organizations believe that smartphone is a secure communication tool for transmitting sensitive data such as financial transactions and consumer records. One important aspect that can affect adoption of mobile communication technologies is the security of wireless data transfer and mobile devices. The perception of a low level of security may increase the technological risks of adopting such technologies in organizations. Organizations with low tolerance for technological risks may defer their adoption of these technologies. Krasnova et al. (2012) found that uncertainty avoidance moderate the impact of privacy concerns and trusting beliefs. Their results showed that low level of uncertainty avoidance leads users to ignore their privacy concerns. Similarly, Keil et al. (2000) found that perceived risk is lower in the countries with a low uncertainly avoidance culture. These suggest that the negative impact of privacy and security concerns are stronger in uncertainty avoiding cultures than in uncertainty accepting cultures. Deriving from the above theoretical and empirical support, the following hypothesis is formulated:

H4: Security will have a stronger influence on the adoption of smartphones by organizations in Turkey than those in Canada.

Innovativeness

Innovativeness is defined as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a system" (Rogers, 2003, p. 22). Higher levels of innovativeness may positively influence the possibility of an adoption. Hofstede's theory suggests that uncertainty accepting cultures are more prone to be accepting of new ideas and more open to try new products (Hofstede, 2001). Similarly, Singh (2006) suggests that the societies that have a low score of uncertainty avoidance, power distance, and masculinity are more innovative. I therefore expect that organizations located in uncertainty accepting

cultures are more innovative and, therefore, are more prone to be accepting of new ideas and more open to try different or new products. I therefore theorize that innovativeness may have a stronger effect on the adoption by organizations in uncertainty accepting cultures. In line with this discussion, the following hypothesis is formulated:

H5: Innovativeness will have a stronger influence on the adoption of smartphones by organizations in Canada than those in Turkey.

Top management support

Top management support refers to the level of support that the top management gives to the adoption of smartphones. It is important to note that top management support is one of the most widely and consistently used predictors for innovation adoption at the organizational level (Low et al., 2011; Ifinedo, 2011; Teo et al., 2006; Premkumar & Roberts, 1999; Thong & Yap, 1995). Higher level of top management support ensures allocation of adequate financial and human resources to adoption of smartphones. Yeniyurt and Townsend (2003) report that having a high score of uncertainty avoidance and power distance prevents the acceptance of new products. These suggest that organizations located in uncertainty accepting cultures are more likely to adopt new products. I therefore expect that there will be a higher adoption rate, which requires a strong top management support, in these organizations. Thus, I predict that top management support will have a stronger effect on the adoption by organizations in uncertainty accepting cultures. Derived from the above theoretical arguments, the following hypothesis is formulated:

H6: Top management support will have a stronger influence on the adoption of smartphones by organizations in Canada than those in Turkey.

Expertise

Expertise refers to knowledge and skills of employees gained over time through the interactions of mobile communication technologies. Existence of employees with prior experience with such technologies may positively affect adoption of smartphones by organizations in high uncertainty avoidance cultures. If managers of the organizations are convinced that their employees are already adept at using the capabilities of

smartphones, they would be less concerned about the adverse learning curve effects. Thus, I predict that expertise will have a stronger effect on the adoption by organizations in high uncertainty avoidance cultures than in uncertainty accepting cultures. Hence, the following hypothesis is formulated:

H7: Expertise will have a stronger influence on the adoption of smartphones by organizations in Turkey than those in Canada.

7.3.2 Collectivism

People in individualistic cultures are encouraged to make a decision on their own. On the other hand, people in collectivistic cultures are encouraged to decide as a community rather than themselves. These suggest that external influences would have a greater impact on organizations' adoption behavior in collectivistic cultures. I therefore predict that external influences, including competitive pressure, partner expectations, and customer expectations, will have a stronger positive effect on the organizational adoption of smartphones in collectivistic cultures.

Competitive pressure

Competitive pressure refers to the degree of pressure felt by an organization from competitors within the industry. Previously, Yoon and George (2013) identified the competitive pressure as a significant predictor of virtual world (3D) adoption. Low et al. (2011) suggest that this construct has a significant effect on cloud computing adoption. Wang et al. (2010) identified the competitive pressure as a significant predictor of radio-frequency identification (RFID) adoption. This construct has also a significant effect on e-business adoption (Bordonaba-Juste et al.; 2012, Lin & Lin, 2008; Zhu et al., 2003). Premkumar and Roberts (1999) identified the competitive pressure as a significant predictor of IT adoption. In the case where the use of smartphones is very widespread among competitors, organizations have no choice but to adopt these technologies in order to maintain competitiveness. I theorize that the effect of competitive pressure on the organizations in collectivistic cultures will be higher and therefore they more likely to adopt smartphones. In line with this discussion, the following hypothesis is formulated:

H8: The positive impact of competitive pressure on adoption of smartphones will be stronger in Turkey than in Canada.

Partner expectations

Organizations may adopt a new technology to maintain existing partnerships or establish prospective partnerships. When trading partners have adopted smartphones, the organization should adopt them to show its fitness as business partners. Dominant suppliers can mandate their customers adopt these technologies as a precondition of doing business with them (Wang et al., 2010). Prior studies demonstrate that partner expectations significantly influence the organizational adoption of innovations (Low et al., 2011; Teo et al., 2003; Iacovou et al., 1995). A high level of responsiveness expected by trading partners may affect adoption of smartphones since such devices can improve organizational responsiveness. Furthermore, the use of a technology that is approved by the partner organizations can result in a higher social status. I theorize that partner expectations will have a stronger effect on organizations' adoption decision in collectivistic cultures. Accordingly, the following hypothesis is formulated:

H9: The positive impact of partner expectations on adoption of smartphones will be stronger in Turkey than that in Canada.

Customer expectations

Organizations may adopt an innovation to meet their customer needs and expectations. Adoption of smartphones may improve customer service or customers may demand the use of these technologies to conduct business with a particular organization. Wu and Lee (2005) found that this factor is one of the most significant predictors of e-communication adoption. A high level of responsiveness expected by customers may influence adoption of smartphones since these devices may help an organization to be more responsive to customer inquiries. The adoption of smartphones by certain business units such as sales department may create better customer value. This, in turn, may increase market share and improve organizational image. I theorize that customer expectations will have a stronger effect on organizations' adoption decision in collectivistic cultures. These considerations lead to the following hypothesis:

H10: Customer expectations will have a stronger positive influence on the adoption of smartphones by organizations in Turkey than in Canada.

7.4 METHODOLOGY

The study employed a mixed methods sequential explanatory design, described by Creswell and Clark (2007). This method focuses on collecting, analyzing, and mixing both quantitative and qualitative data in the same study. It uses both quantitative and qualitative approaches to provide a better understanding of research problems. Collection and analysis of quantitative data were followed by the collection and analysis of qualitative data. During the study, collection and analysis of quantitative data have a priority and qualitative results were used to help explain and confirm the quantitative results.

7.4.1 Quantitative Study

Data Collection

As discussed above, Canada and Turkey have substantially different cultures, particularly in the dimensions of "individualism-collectivism" and "uncertainty avoidance". An online survey was conducted with private sector organizations in Turkey between August 27 and November 14, 2012 and a total of 213 usable questionnaires were returned. Following that, the survey was conducted in Canada between February 2 and April 16, 2013 and a total of 141 usable questionnaires were returned. Middle and senior level managers participated in the study. The demographics on the managers and their organizations participated in this study are presented in Table 21. The respondents were asked whether they agreed or disagreed with several statements using a five-point likert scale ranging from "strongly disagree" to "strongly agree."

Table 21: Sample Demographics

	Turkey (n=213)		Canada (n=141)	
Title of Respondents	**Frequency**	**Percent**	**Frequency**	**Percent**
Owner	87	40.8	18	12.8
CEO	68	31.9	47	33.3
CFO	24	11.3	5	3.5
CIO	22	10.3	7	5.0
Middle Level Manager	12	5.6	64	45.4
Sector				
Service	86	40.4	82	58.2
Manufacturing	77	36.2	15	10.6
Trading/Commerce	37	17.4	8	5.7
R&D	7	3.3	28	19.9
All	6	2.8	8	5.7
Industry				
Information Technology	52	24.4	28	19.9
Machinery	44	20.7	2	1.4
Electrical & Electronics	18	8.5	8	5.7
Construction	16	7.5	3	2.1
Defense & Security	13	6.1	4	2.8
Healthcare	12	5.6	7	5.0
Education	12	5.6	7	5.0
Consulting	2	1.0	20	14.2
Other*	44	21.0	62	45.0
Structure				
Small and Mid-size Firm	157	73.7	78	55.3
Entrepreneurial	41	19.2	17	12.1
Large-sized Firm	15	7.0	46	32.6
Size				
1-5	73	34.3	24	17.0
6-10	44	20.7	13	9.2
11-20	38	17.8	20	14.2
21-100	44	20.7	28	19.9
101 and more	14	6.6	56	39.7
Adopters/Non-adopters				
Adopters	75	35.2	114	80.9
Non-adopters	138	64.8	27	19.1
Total	213	100.0	141	100.0
Behavioral Intention	**Adopter**	**Non-adopter**	**Adopter**	**Non-adopter**
No	3	13	2	6
Neutral	8	36	13	10
Yes	64	89	99	11
Total	75	138	114	27

* Includes mining, finance, energy, agriculture, food, etc.

Data Analysis

A multi-group analysis in AMOS (v.20) was employed to test the hypothesized relationships and identify relationships among the constructs. The analysis results as well as the measurement properties of the questionnaire items and the correlation matrix are provided next. As a further analysis, Pearson's chi-square test was carried out to identify significant differences between the countries.

Reliability, Convergent and Discriminant Validity

The reliability analysis results indicated a high level of internal consistency. The Cronbach's alpha values of the questionnaire items were 0.93 for both Turkey and Canada.

The AVE values for each construct demonstrate that the convergent validity for all constructs of the measurement model is adequate as convergent validity is judged to be adequate when average variance extracted (AVE) equals or exceeds 0.50 (Hair et al., 2010).

As seen in Table 22, the square root of the shared variance between the constructs and their measures are greater than the correlations between constructs. This suggests that discriminant validity was satisfactory at the construct level in the case of all constructs (Fornell & Larcker, 1981), thereby ensuring that multicollinearity problem does not exists among the constructs.

Table 22: Correlation Matrix and Validity Assessment Results

Turkey	**AVE**	**CM**	**CX**	**TR**	**SE**	**EX**	**IN**	**TMS**	**CP**	**PE**	**CE**
Compatibility	0.81	0.90									
Complexity	0.60	.31***	0.78								
Trialability	1.37	.09*	.13**	1.17							
Security	1.21	.21***	.32***	.14*	1.10						
Expertise	1.03	.36***	.39***	.17**	.22***	1.02					
Innovativeness	0.85	.23***	.25***	.07	.10	.41***	0.92				
Top Management Support	0.84	.35***	.36***	.12*	.21***	.48***	.36***	0.91			
Competitive Pressure	1.27	.17***	.23***	.19**	.31***	.22***	.20***	.22***	1.13		
Partner Expectations	1.27	.17***	.21***	.22***	.34***	.23***	.22***	.25***	.68***	1.13	
Competitive Pressure	1.17	.15***	.21***	.17**	.29***	.20**	.23***	.20***	.82***	.73***	1.08
Canada	**AVE**	**CM**	**CX**	**TR**	**SE**	**EX**	**IN**	**TMS**	**CP**	**PE**	**CE**
Compatibility	0.85	0.92									
Complexity	0.80	.17***	0.89								
Trialability	1.18	.003	.003	1.08							
Security	0.98	.23***	.22***	.005	0.99						
Expertise	0.52	.15***	.15***	.003	.19***	0.72					
Innovativeness	0.61	.18***	.15***	.004	.24***	.25***	0.78				
Top Management Support	0.90	.33***	.26***	.004	.49***	.33***	.40***	0.95			
Competitive Pressure	1.35	.21***	.21***	.004	.33***	.15***	.19***	.42***	1.16		
Partner Expectations	1.26	.21***	.19***	.004	.32***	.13***	.23***	.42***	.44***	1.12	
Competitive Pressure	1.33	.21***	.16***	.004	.31***	.13**	.22***	.43***	.54***	.53***	1.15

* $p < .05$; ** $p < .01$; *** $p < .001$.

Hypotheses Testing

A multi-group analysis is conducted in AMOS (v.20) to understand the impact of cultural differences on adoption. I first tested the path coefficient differences for both countries to explore country differences on each relationship. I then conducted a Chi-square test to determine whether the responses across the variables differ based on the country of the respondent. Results of the Chi-square test along with the results of the multi-group analysis are presented in Table 23. Path coefficients (Load) and Chi-square values are reported along with their significance levels.

Table 23: Hypothesis Testing Results

	Turkey		**Canada**			
Construct	**Load**	**T**	**Load**	**T**	**Chi-square**	**Results**
Compatibility	0.26***	4.38	0.27***	4.03	4.70^{ns}	H1: Rejected
Complexity	0.24***	5.63	0.18***	4.07	20.96***	H2: Supported
Trialability	0.44***	4.64	0.23***	3.18	46.52***	H3: Supported
Security	0.71***	7.57	0.81***	6.85	8.87^{ns}	H4: Rejected
Innovativeness	0.44***	6.67	0.45***	5.27	22.78***	H5: Supported
Top Management Support	0.52***	5.72	0.68***	5.88	15.45**	H6: Supported
Expertise	0.72***	8.02	0.36***	6.47	51.72***	H7: Supported
Competitive Pressure	0.64***	6.82	0.63***	5.61	79.11***	H8: Supported
Partner Expectations	0.37***	5.26	0.33***	4.70	22.53***	H9: Supported
Customer Expectations	0.72***	7.51	0.68***	5.69	40.13***	H10: Supported
Relative Advantage	0.24***	5.93	0.38***	6.06	8.97 ^{ns}	NA
Observability	0.28***	4.94	0.27***	4.22	24.19***	NA
Information Intensity	0.32***	5.67	0.45***	6.28	4.98 ^{ns}	NA
Financial Resources	0.06*	2.14	0.05*	2.11	8.36 ^{ns}	NA

* $p < .05$; ** $p < .01$; *** $p < .001$; ns: Not significant; NA = Not applicable.

The results of multi-group analysis for Turkey show that compatibility, complexity, trialability, security, innovativeness, top management support, expertise, competitive pressure, partner expectations, and customer expectations have a statistically significant effect on adoption at the 0.001 level. Likewise, the results for Canada show that all factors, except trialability ($p < 0.01$), have a statistically significant effect on adoption at the 0.001 level. The proportion of total variance explained by the factors

is 64.5% for Turkey, and 65.8% for Canada. These suggest that the tested factors have a high explanatory power for predicting adoption.

The Chi-square test results show a significant difference between the overall means of responses in complexity, trialability, innovativeness, expertise, competitive pressure, partner expectations, and customer expectations ($p < 0.001$). On the other hand, the results show a significant difference between the countries in top management support at the 0.01 level, while there is no significant overall difference in compatibility and security at the 0.05 level. Therefore, H1 and H4 are rejected.

The results suggest that complexity, trialability, and expertise have greater explanatory power in Turkey than in Canada, thus, H2, H3, and H7 are supported. Additionally, in parallel to our expectations, competitive pressure, partner expectations, and customer expectations have a greater explanatory power in Turkey than in Canada, and therefore, H8, H9, and H10 are also supported. Meanwhile, innovativeness and top management support have greater explanatory power in Canada than in Turkey, therefore, H5 and H6 are supported.

Further analysis was conducted to test whether there is a significant difference between the countries in the adoption decision. Pearson's chi-square test results indicate that there is a higher adoption rate in the organizations located in Canada than the organizations located in Turkey ($x^2 = 71.01$, $p < 0.0001$).

Distribution of data was analyzed by the Kolmogorov-Smirnov test; normally distributed data was compared using an independent samples t-test. The results of the independent samples t-test indicated significant difference between adopters and non-adopters in all factors ($p < 0.0001$). Table 24 shows the results of the independent samples t-test.

Table 24: Independent Samples T-Test of the Variables

	Adopters (n=189)		Non-adopters (n=165)			
Variable	**Mean**	**S.D.**	**Mean**	**S.D.**	**T**	**Sig.***
Relative Advantage	4.39	0.71	3.96	0.96	8.22	.000
Compatibility	4.16	0.85	3.82	0.94	6.32	.000
Complexity	4.23	0.76	3.98	0.88	5.13	.000
Trialability	3.44	1.10	3.08	1.16	5.19	.000
Observability	4.00	0.84	3.61	0.97	6.90	.000
Security	3.82	0.96	3.35	1.00	7.84	.000
Expertise	4.33	0.68	3.78	1.08	10.03	.000
Innovativeness	4.08	0.88	3.79	0.99	5.13	.000
Top Management Support	4.19	0.78	3.50	1.10	11.84	.000
Financial Resources	3.68	1.08	3.19	1.12	7.18	.000
Information Intensity	4.37	0.70	4.04	0.92	6.52	.000
Competitive Pressure	3.15	1.14	2.47	1.10	9.82	.000
Partner Expectations	3.37	1.11	2.80	1.11	8.37	.000
Customer Expectations	3.22	1.13	2.59	1.11	9.08	.000

*p-value of two tailed t-test for difference of means.

7.4.2 Qualitative Study

Data Collection

A follow-up study was conducted to reassess organizations' adoption behavior and explain the quantitative results. Follow-up data were obtained from total 34 organizations in Canada (16) and Turkey (18). I randomly selected interview candidates among the participants who provided their contact information during the survey. I then contacted the participants by a telephone call or email to schedule a date, time and place for the interview. During the interview, I first explained the objectives of the study. Interviews were conducted using open-ended, semi-structured questions generated from the following interview guidelines:

1. Has your organization adopted smartphones?
2. Which of the business functions and managerial levels use smartphones?
3. What are key factors affecting organizations' adoption of smartphones?
4. Why do you think that the factors that you have identified in the previous question are important?

Each interview lasted about 15 minutes and all responses were recorded during the interview.

Data Analysis

The constant comparative method is used to develop concepts from the data that resulted from transcription of the interviews. The coding of data involved three levels of analyses: open coding, axial coding, and selective coding (Strauss & Corbin, 2008). During the open coding process, I identified different categories within the data examining the transcription document in a systematic manner. During the axial coding process, I identified the connections between the categories to relate subcategories to a category (Strauss & Corbin, 1998). During the selective coding process, I identified the core categories to integrate our categories into a central paradigm. Following this procedure, I determined key factors that affect organizations' adoption of smartphones. Table 25 shows the codes and categories.

Table 25: Codes and Categories

Canada		Turkey	
Codes	**Categories**	**Codes**	**Categories**
Providing **access** to important **information** anywhere, anytime, **productivity** and team communication increases, ability to **integrate** to social networks to enable marketing of key products and services, employee **morale and satisfaction**	Relative advantage (accessibility, productivity, morale and satisfaction), information intensity, compatibility	**Quick**, **accurate**, and **effective communication** and **fast information exchange**, communicate efficiently with our **partner organizations**, need to receive their **feedback** immediately, **satisfaction of the customers** with after-sales service quality, **meet urgent customers' needs** and **outperform our competitors**	Relative advantage (speed, accurateness, effectiveness), information intensity, partner and customer expectations, competitive pressure
Accessibility of e-mails, accessibility to the internet, **quick** response to individuals and teams to solve time-sensitive problems, staff working away from the office, **cost**	Relative advantage (accessibility, speed, mobility), cost	Managers in sales and marketing need to be **always on**, access corporate emails, and response **customers**' inquiries, **cost of data plans and devices** negatively impact use of smartphones	Relative advantage (accessibility), customer expectations, cost
Cost, lack of operational **change** management, using VPN technologies to access share point is a pain on a smartphone	Cost, innovativeness, compatibility	**Quick** and **easy access to information, cost** and **advantages** such as **ease of use** and **quick access** to corporate emails	Information intensity, cost, complexity, relative advantage (speed)
Budget, the **time sensitive** nature of the business, some departments such as client services that have to be very **responsive** to new **information**	Financial resources, relative advantage (timeliness/responsiveness), information intensity	Respond customers' inquiries in **a timely manner**, **competitiveness**, we can't **carry** laptops everywhere, we need to use smartphones to receive **customers**' orders	Relative advantage (timeliness, mobility), competitive pressure, customer expectations
Work force **mobility**, timely decisions/response to situations	Relative advantage (mobility, timeliness)	**Speed up business processes** and **enhance decision making**, **competitors** can get ahead of us if they **communicate faster** through smartphones	Relative advantage (speediness, agility), competitive pressure
Ability to **access information anytime and anywhere**, ability to communicate **seamlessly** in a deadline-driven **industry**	Relative advantage (accessibility, seamlessness), industry	There is a late adoption of such technologies in our **industry** compared to other industries, the advantages such as **ubiquity** and **flexibility**	Industry, relative advantage (ubiquity, flexibility)
Making sure the corporate email accounts are **secure** and they run through the corporate **security** system	Security, compatibility	**Top level managers** do not support the projects that they are not sure about results, **incompatibility** of the organizational **users' awareness**, status quo perception, and demographic (age, gender, education level, etc.) with this technology, being late to **adopt the change**, **mobile services** to **customers**	Top management support, compatibility, experience, innovativeness, customer expectations

Table 25 (continued)

Codes (Canada)	Categories	Codes (Turkey)	Categories
Integration with existing email and **security** of corporate information	Compatibility, security	**Ease of use**, **speed**, and **cost** would be important factors	Relative advantage (speed), complexity, cost
Key managers need to be **accessible** at all times, managers to be accessible out of their office as they may be in the Open Pit Quarry or off site	Relative advantage (accessibility)	Our **customers** and **partner organizations** use smartphones, we have to use this technology to outperform our **competitors**	Customer expectations, partner expectations, competitive pressure
Security (ensuring safe access to emails and corporate data) and **training** (ensuring people know **how to use** smartphones)	Security, experience	As a transportation company we are employing drivers with no **prior experience** with smartphones. Therefore, the **complexity** of these technologies is the most important factor in our adoption decision	Experience, complexity
Work from **anywhere**, **clients** expect us to be **available** whether we're in the office or on the golf course	Relative advantage (ubiquity, mobility, availability), customer expectations	Our employees use smartphones to respond emails **anytime and anywhere**, we can't **carry** a laptop everywhere you go, however, smartphones provide several advantages, including **mobility**	Relative advantage (ubiquity, mobility)
Employee **efficiency**, **customer** service	Relative advantage (efficiency), customer expectations	Always-on service anywhere anytime, customer intimacy, customer satisfaction	Relative advantage, customer expectations
Consumer adoption of smartphones is pushing organizations to adopt, BYOD to work and the **security** issues that it creates	Customer expectations, security	Lack of **education** and **experience**, firms are affected by other firms, when they **see** these devices being used	Experience, observability
Organization sector, **managerial acceptance**, **demographics** of employees	Sector, top management support, experience	**Management support** and **experience** are important factors for the adoption	Top management support, experience
Instant information is important for a **larger** organization, many **executives** do not understand that	Information intensity, size, top management support	**Advantages** over other devices, organizational use of smartphones is important for our company to maintain a corporate identity	Relative advantage
Simple to understand, **low cost**, fixed **price** plans	Complexity, cost	**Always-on service anywhere anytime, customer intimacy**, higher **customer satisfaction** and more sales	Relative advantage (availability, ubiquity), customer expectations

Results

Analysis of the qualitative data suggested that there are three core categories that unify all the adoption factors. Table 26 lists the factors that emerged from the data analysis along with these core categories.

Table 26: Core Categories and Categories

Technological Characteristics	**Organizational Characteristics**	**Environmental Characteristics**
Relative advantage	Experience	Partner expectations*
Compatibility	Financial Resources	Customer expectations
Complexity	Innovativeness	Competitive pressure*
Observability*	Information intensity	
Security	Industry	
Cost	Top management support	
	Sector**	
	Size**	

* Not mentioned by the interviewees from Canada
** Not mentioned by the interviewees from Turkey

This follow-up study confirms our previous findings and helps us better understand organizations' adoption behavior identifying other factors that have a significant effect on organizations' adoption decision. These findings suggest that technological characteristics of relative advantage, compatibility, complexity, observability, security, and cost; organizational characteristics of experience, financial resources, innovativeness, information intensity, industry, size, sector, and top management support; and environmental characteristics of partner expectations, customer expectations, and competitive pressure have a significant effect on the adoption of smartphones by organizations.

It is important to note that of these factors observability, partner expectations, and competitive pressure were not mentioned by the interviewees from Canada. On the other hand, sector and size were not mentioned by the interviewees from Turkey. This suggests that, consistent with our previous findings, the effect of environmental characteristics is stronger in Turkey than in Canada.

7.5 DISCUSSION

I hypothesized that compatibility and security will have a stronger effect on adoption in Turkey as a high uncertainty avoidance country. The results show that these are significant determinants of adoption in both countries. However, there was no significant overall difference between the countries in compatibility and security, and therefore, do not provide support for these hypotheses. Contrary to our expectations, security has a high explanatory power in Canada. One explanation of such a contradiction is that Canadians are more concern about privacy, and therefore, sense of security is high. As an example, Blackberry, a Canadian telecommunications company, offers security oriented smartphones mainly for corporate users. The findings also imply that the expectation of compatibility in Canadian organizations is as high as the organizations in Turkey.

People in low uncertainty avoidance cultures are more likely to adopt new products. Thus, I predict that there will be a strong top management support in the organizations located in Canada. The results show that top management support have a stronger positive effect on the adoption by organizations in Canada than in Turkey. This suggests that service providers and device manufacturers must convince managers that smartphones will have positive performance impacts. In addition, innovativeness has a greater explanatory power in Canada than in Turkey. This implies that organizations with higher level of innovativeness have more positive perceptions, and therefore, have higher intentions towards use of smartphones.

The findings show that there is a higher adoption rate in the organizations located in Canada, which is an individualistic and uncertainty accepting culture than the organizations located in Turkey, which is a collectivistic and uncertainty avoiding culture. Taken together, these results suggest that national culture has a significant effect on the adoption of smartphones by organizations.

In this sense, an effective strategy for device manufacturers and service providers would be to take into account cultural differences while developing and marketing mobile services and devices. For example, technological characteristics have a stronger effect on the adoption of smartphones by organizations in Turkey, which is

an uncertainty avoiding culture. One implication of this is that device manufacturers and service providers may offer interoperable, less complex, trialable, and privacy-aware products and services for these organizations.

The fact that environmental characteristics of customer expectations, partner expectations, and competitive pressure have a stronger effect on adoption by the organizations in Turkey implies that service providers and device manufacturers may promote mobile services and smartphones to a critical mass of organizations and make the customers aware of the potential of these technologies along with those organizations who have already adopted them. Once this is done, the rest of the industry also is likely to follow suit without significant further effort. Meanwhile, organizations with a low adoption rate may use the findings to their benefits while in negotiations with service providers as the role of early adopters seems to be critical for an industry-wide adoption of this technology.

Limitations and Directions for Future Research

Focusing only on the managers and neglecting the employees' adoption mind-set is a limitation, as individual's readiness is a vital point in organizational adoption. It would be interesting to investigate how individuals think about the real process of integrating mobile technologies into the organization, as organizational adoption needs to be addressed with regard to various aspects such as organizational readiness, employee competencies, and long-term financing. To handle such drastic changes in organizations, not only managers are expected to be supportive of new technologies, but the employees also need to be equipped with the acquired skills and literacy regarding the new technology.

Hofstede's cultural framework, while having contributed an important aspect of culture, has been used extensively across disciplines. However, there are other alternatives in the prior literature with regard to culture, which would provide a different view of cultural differences and provide new insights.

CONCLUSION

This study identified the key adoption factors for mobile communication technologies at private sector organizations. I have proposed a comprehensive research model based on the Technology-Organization-Environment framework, Diffusion of Innovation theory, and Institutional theory. In contrast to a vast body of literature on individual technology adoption, to date, there has been limited research on the organizational technology adoption, specifically smartphones, although these services have recently experienced significant growth. This study aimed to advance a new organizational adoption model for this understudied domain.

Five attributes of the DOI theory (relative advantage, compatibility, complexity, observability, and trialability) extended with security is used in the research model to address technological characteristics. External pressures from the Institutional theory (pressures coming from competitors, trading partners, and customers) were used to address environmental characteristics within the research model. In determining organizational characteristics (financial resources, information intensity, expertise, innovativeness, and top management support), prior studies on organizational adoption of IT/IS were reviewed using meta-analytic techniques.

I used the mixed-methods sequential explanatory design, which focuses on collecting, analyzing, and mixing both quantitative and qualitative data in the same study. During the study, collection and analysis of quantitative data had a priority and qualitative results were used to help explain the quantitative results. A preliminary survey questionnaire was designed using questionnaire items that had been successfully used

in prior studies. A pilot study was then conducted with this questionnaire to further enhance content validity. The main study was conducted using the questionnaire items, which were finalized based on the pilot study.

As middle and senior managers can decide whether to accept or reject a new technology in organizations, opinions from senior management were elicited for this study. The survey was conducted with senior and middle level managers in different private sector organizations between August 27 and November 14, 2012 in Turkey. A total of 213 usable questionnaires were returned from the organizations with only one manager representing each organization.

Structural Equation Modeling (SEM) using AMOS (v.20) was employed to test the hypothesized relationships, identify relationships among the constructs, and perform a Confirmatory Factor Analysis (CFA) to test the fit of the data to the measurement model. The Cronbach's alpha value was 0.913, which indicates a high level of internal consistency. Moreover, convergent validity and discriminant validity for the proposed constructs of the measurement model were adequate. The results suggested that the proposed model shows a reasonable fit to the survey data with the following fit indices χ^2/DF=1.66, IFI=0.93, TLI=0.91, and CFI=0.93.

Consistent with the hypotheses, relative advantage, compatibility, complexity, observability, trialability, security, financial resources, information intensity, expertise, innovativeness, top management support, competitive pressure, partner expectations, and customer expectations have significant effects on adoption at the 0.001 level. The results show that expertise, security and the environmental characteristics of competitive pressure, customer expectations, and partner expectations have a high explanatory power in Turkey. The proportion of total variance explained by the model is 68.5%. The high proportion of the total variance explained indicates that the model includes a significant portion of factors that might affect adoption.

A follow-up study was conducted to reassess organizations' adoption behavior and explain the quantitative results. The constant comparative method was used to analyze follow-up data obtained from 18 organizations in Turkey. The results of the qualitative

data analysis confirmed our previous findings. Non-adopter organizations reported that the nature of the industry they operate in, complexity and compatibility issues, lack of experience and education, and individual adoption level of their employees hinder the adoption of these technologies.

In the second part of the study, an online survey was conducted with middle and senior managers working in different organizations in Canada between February 2nd, 2013 and April 16th, 2013. A total of 141 usable questionnaires were returned. The SEM using AMOS (v.20) was employed to test the hypothesized relationships and identify relationships among the constructs. The Cronbach's alpha value was 0.83, which indicates an acceptable level of internal consistency. Convergent validity and discriminant validity were also adequate.

Consistent with the hypotheses, relative advantage, security, information intensity, expertise, innovativeness, top management support, competitive pressure, partner expectations, and customer expectations have a significant effect on adoption at the 0.001 level. Observability has a significant effect on the adoption at the 0.01 level, while compatibility, complexity, and financial resources have a significant effect on the adoption at the 0.05 level. On the other hand, trialability has no significant effect on the adoption at the 0.05 level. The results showed that security and top management support have a high explanatory power in Canada. The model explains 71.8% of total variance.

A follow-up study was conducted in 16 organizations in Canada which participated in quantitative part of the study. The follow-up study confirmed our previous findings and suggested that sector (i.e. IT) and size (i.e. large) also have a significant effect on organizations' adoption decision. However, it is important to note that of the factors included in the model observability, competitive pressure, and partner expectations were not mentioned by the interviewees from Canada.

In the third part of the study, I investigated the differences in patterns between the adoption behaviors of the two countries. Following Hofstede's work in 2001, the Turkish culture is characterized as a collectivist and high uncertainty avoidance culture whereas the Canadian culture is an individualistic and low uncertainty avoidance

culture. Organizations in high uncertainty avoidance countries are often less tolerant of ambiguity than do those in low uncertainty avoidance countries. I therefore hypothesized that compatibility, complexity, trialability, security, and expertise will have a stronger effect on adoption in Turkey. The results showed that complexity, trialability, and expertise have greater explanatory power in Turkey, and therefore, provided support for these hypotheses. On the other hand, the results indicated that there was no significant overall difference between the countries in compatibility and security, and therefore, did not provide support for these hypotheses.

Hofstede's cultural theory suggests that uncertainty accepting cultures are expected to be more innovative. Therefore, they are more prone to accept new ideas and more willing to try new or different products. Thus, I hypothesized that innovativeness and top management support will have a stronger influence on the adoption of smartphones by organizations in Canada. The findings indicated that the innovativeness and top management support have a statistically significant effect on the adoption in both countries. However, it has a greater explanatory power in Canada than in Turkey, and therefore, our findings provided support for these hypotheses.

I also hypothesized that environmental characteristics, including customer expectations, partner expectations, and competitive pressure will have a stronger effect on adoption in Turkey. The results showed that the environmental characteristics have a greater explanatory power in Turkey than in Canada, and therefore, provided support for these hypotheses. These findings suggested that the Turkish organizations' adoption decisions are mainly driven by external pressures coming from the environment in which the organizations operate.

In summary, the findings show that there is a higher adoption rate in the organizations located in Canada, which is an individualistic and low uncertainty avoidance culture than the organizations located in Turkey, which is a collectivistic and high uncertainty avoidance culture. Taken together, these results suggest that national culture has a significant effect on the adoption of smartphones by organizations.

Since environmental characteristics, including customer expectations, partner expectations, and competitive pressure have a stronger effect on adoption by the

organizations in Turkey, service providers and device manufacturers may promote mobile services and smartphones to a critical mass of organizations and make the customers aware of the potential of these technologies along with those organizations who have already adopted them. Meanwhile, organizations in an industry with a low adoption rate may claim they could set an example to the rest of the industry and use the findings of this research to their benefits while in negotiations with service providers as the role of early adopters seems to be critical for an industry-wide adoption of this technology.

The fact that expertise and security have also a strongly significant effect on adoption by organizations in Turkey, suggests that organizations' adoption decisions are mainly derived from having employees with prior knowledge and experience with smartphones. This implies that individual adoption level is positively related to organizational adoption. Therefore, service providers may more strongly justify promotion of these technologies among individuals at large. Furthermore, higher levels of security positively affect the adoption decision. Therefore, service providers and mobile phone manufacturers should fortify both network level and device security in order to protect the intellectual property of the company and the privacy of the employees as smartphones access and process an increasing amount of private information. By providing smartphones with secure access to corporate databases and emails, mobile phone manufacturers may increase their competitiveness and market share.

The results showed that security and top management support have a strong effect on adoption by organizations in Canada. To meet expectations of security, Blackberry, a Canadian telecommunications company, offers security oriented smartphones mainly for corporate users. In addition, attitudes of managers towards smartphones are important as they can decide whether to accept or reject a new technology in organizations. Therefore, service providers and device manufacturers should convince managers that organizational use of smartphones will have positive performance impacts and enhance their decision making capabilities.

Several limitations of our study should be addressed by future research. First, the study focused on smartphones; therefore, the results should be applied to other technologies with caution. Second, the proposed model is tested in Turkey and Canada, and therefore, generalizability of the findings can be limited. Additional studies in different countries would be required to increase generalizability of the findings. Third, sample size can be increased to investigate adoption patterns across organizations with similar characteristics regarding industry, sector, size, etc.

Focusing only on the managers and neglecting the employees' adoption mind-set is also a limitation, as individual's readiness is a vital point in organizational adoption. It would be interesting to investigate how individuals think about the real process of integrating mobile technologies into the organization, as organizational adoption needs to be addressed with regard to various aspects such as organizational readiness, employee competencies, and long-term financing. To handle such drastic changes in organizations, not only managers are expected to be supportive of new technologies, but the employees also need to be equipped with the acquired skills and literacy regarding the new technology.

Hofstede's cultural framework has been used extensively across disciplines. However, there are other alternatives in the prior literature with regard to culture, which would provide a different view of cultural differences and provide new insights.

REFERENCES

Adams, D. A, Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly, 16*(2), 227-247.

Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences, 28*(3), 557-582.

Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior*. Berlin, Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Anand J., Deborah B. B., Charles C., & Gary M. G. (2009). Organizational and institutional determinants of B2C adoption under shifting environments. *Journal of Information Technology, Volume 24*(3), 219-230.

Baker, E. W., Al-Gahtani, S. S., & Hubona, G. S. (2010). Cultural impacts on acceptance and adoption of information technology in a developing country. *Journal of Global Information Management (JGIM), 18*(3), 35-58.

Barczak, G., Hultink, E. J., & Sultan, F. (2008). Antecedents and consequences of information technology usage in NPD: A comparison of Dutch and U.S. companies. *Journal of Product Innovation Management, 25*(6), 620-631.

Basaglia, S., Caporarello L., Magni M., & Pennarola F. (2009). Environmental and organizational drivers influencing the adoption of VoIP. *Information Systems and E-Business Management, 7*(1), 103-118.

Bellaaj, M., Bernard, P., Pecquet, P., & Plaisent, M. (2008). Organizational, environmental, and technological factors relating to benefits of web site adoption. *International Journal of Global Business, 1*(1), 44-64.

Bohrnstedt, G. W. (1970). Reliability and validity assessment in attitude research. In G. F. Summers (Eds.). *Attitude measurement*. (pp. 80-99). Chicago: Rand-McNally.

Bordonaba-Juste, V., Lucia-Palacios, L., & Polo-Redondo, Y. (2012). Antecedents and consequences of e-business adoption for European retailers. *Internet Research, 22*(5), 532-550.

Bose, R., & Luo, X. (2011). Integrative framework for assessing firms' potential to undertake green it initiatives via virtualization - A theoretical perspective. *Journal of Strategic Information Systems, 20*(1), 38-54.

Carter, L., & Weerakkody, V. (2008). E-government adoption: A cultural comparison. *Information Systems Frontiers, 10*(4), 473-482.

Chang, I. C., Hwang, H. G., Hung, M. C., Lin, M. H., & Yen, D. C. (2007). Factors affecting the adoption of electronic signature: Executives' perspective of hospital information department. *Decision Support Systems, 44*(1), 350-359.

Chau, P. Y. K., & Tam, K. Y. (1997). Factors affecting the adoption of open systems: An exploratory study. *MIS Quarterly, 21*(1), 1-24.

Chau, P. Y. K., & Tam, K. Y. (2000). Organizational adoption of open systems: A "technology-push, need-pull" perspective. *Information & Management, 37*(5), 229-239.

Chong, A. Y. L., Ooi, K. B., Lin, B. S., & Raman, M. (2009). Factors affecting the adoption level of c-commerce: An empirical study. *Journal of Computer Information Systems, 50*(2), 13-22.

Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

CRTC. (2012). Communications monitoring report. Ottawa: Canadian Government.

Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Doctoral Dissertation, Sloan School of Management, Massachusetts Institute of Technology.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Davis, F. D. (1993). User acceptance of information technology: Systems characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies, 38*(3), 475-487.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Demirkan, H., & Harmon R. R. (2009). Service oriented technology in healthcare services: A research framework for studying the computerized physician order entry system. PICMET 2009 Proceedings, August 2-6, Portland, Oregon, USA.

DePietro, R., Wiarda, E., & Fleischer, M. (1990). The context for change: organization, technology, and environmental. In Tornatzky, L. G., & Fleischer, M. (Eds.). *The process of technological innovation.* (p. 151-175). Lexington, MA: Lexington Books.

DiMaggio, P. J., & Powell, W. (1983). The iron cage revisited - Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147-160.

Doolin, B., & Al Haj Ali, E. (2008). Adoption of mobile technology in the supply chain: An exploratory cross-case analysis. *International Journal of E-Business Research, 4*(4), 1-15.

Eisenhardt, M, K. (1989). Agency theory: An assessment and review. *Academy of Management Review, 14*(1), 57-74.

Fornell, C., & D. F. Larcker. (1981). Evaluating structural equations models with unobservable variables and measurement error. *Journal of Marketing Research, 18(1),* 39-50.

Frambach, R. T., & Schillewaert, N. (2002). Organizational innovation adoption: A multi-level framework of determinants and opportunities for future research. *Journal of Business Research, 55*(2), 163-176.

Genis-Gruber, A., & Tas, B. K. (2011). Does national culture affect e-procurement implementations?: Analysis of differences through a unified model. *Journal of Electronic Commerce in Organizations (JECO), 9*(3), 20-38.

Gibbs, J. L., & Kraemer, K. L. (2004). A cross-country investigation of the determinants of scope of e-commerce use: An institutional approach. *Electronic Markets, 14*(2), 124-137.

Hair, J. F., Jr., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (7th Ed.). Upper Saddle River, NJ: Pearson.

Hall, E. (1976). *Beyond culture*. New York: Anchor Press.

Hall, E. (1983). *The dance of life: The other dimension of time*. Garden City: Anchor Press/Doubleday.

Higa, K., Sheng, O. R. L., Hu, P. J.H., & Au, G. (1997). Organizational adoption and diffusion of technological innovation: A comparative case study on telemedicine in Hong Kong. Thirtieth Hawaii International Conference on System Sciences.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills CA: Sage Publications.

Hofstede, G. (1984). *Culture's consequences: International differences in work-related values (2nd Ed.)*. Newbury Park, CA: Sage.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*. Thousand Oaks, CA: Sage.

Hofstede, G., & Bond, M. H. (1988). The Confucius connection from cultural roots to economic growth. *Organizational Dynamism, 16*(4), 4-18.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: software for the mind* (3rd Ed.). McGraw-Hill Prof Med/Tech.

Hong, W., & Zhu, K. (2006). Migrating to Internet-based e-commerce: Factors affecting e-commerce adoption and migration at the firm level. *Information & Management, 43*(2), 204-221.

Hsu, P. F., Kraemer, K. L., & Dunkle, D. (2006). Determinants of e-business use in US firms. *International Journal of Electronic Commerce, 10*(4), 9-45.

Hu, L. T. & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to sensitivity to under parameterized model misspecification. *Psychological Methods, 3*(4), 424-453.

Hu, L. T. & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis. Convention-al criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.

Huang, Z., Janz, B. D., & Frolick, M. N. (2008). A comprehensive examination of Internet-EDI adoption. *Information Systems Management, 25*(3), 273-286.

Hwang, Y. (2012). End user adoption of enterprise systems in Eastern and Western cultures. *Journal of Organizational and End User Computing (JOEUC), 24*(4), 1-17.

Iacovou, C., Benbasat, I., & Dexter, A. (1995). Electronic data interchange and small organisations: Adoption and impact of technology. *MIS Quarterly, 19*(4), 465-485.

ICTA. (2013). Information and Communication Technology Authority. Ankara, Turkey.

Ifinedo, P. (2011). Internet/e-business technologies acceptance in Canada's SMEs: An exploratory investigation. *Internet Research, 21*(3), 255-281.

ITU. (2012). International Telecommunication Union: Measuring the Information Society. Retrieved from http://www.itu.int/ITU-D/ict/publications/idi/material/2012/MIS2012_without_Annex_4.pdf.

ITU. (2013). The World in 2013: ICT Facts and Figures, retrieved June 1, 2013, from http://www.itu.int/ITU-D/ict/facts/material/ICTFactsFigures2013.pdf.

Kaiser Family Foundation. (2013). Population Reference Bureau. World Population Data Sheet. Retrieved from http://kff.org/global-indicator/population-under-age-15/

Kim, D., J. (2008). Self-perception-based versus transference-based trust determinants in computer-mediated transactions: A cross-cultural comparison study. *Journal of Management Information Systems, 24*(4), 13-45.

Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: The Guilford Press.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd Ed.). New York: The Guilford Press.

Kock, N., Del Aguila-Obra, A. R., & Padilla-Meléndez, A. (2009). The information overload paradox: A structural equation modeling analysis of data from New Zealand, Spain, and the USA. *Journal of Global Information Management (JGIM), 17*(3), 1-19.

Kostova, T. (1999). Transnational transfer of strategic organizational practices: A contextual perspective. *Academy of Management Review, 24*(2), 308-324.

KPCB. (2013). Morgan Stanley Research: Internet Trends 2013 Report.

Krasnova, H., Veltri, N. F., & Günther, O. (2012). Self-disclosure and privacy calculus on social networking sites: The role of culture. *Business & Information Systems Engineering, 4*(3), 127-135.

Kuan, K. K. Y., & Chau, P.Y. K. (2001). A perception-based model for EDI adoption in small businesses using a Technology-Organization-Environment framework. *Information & Management 38*(8), 507-521.

Lawrence, P., & Lorsch J. (1967). *Organization and environment: Managing differentiation and integration*. Boston: Harvard University, Graduate School of Business Administration, Division of Research.

Lee, M. K. O. (1998). Internet-based financial EDI: Towards a theory of its organizational adoption. *Computer Networks and ISDN Systems, 30*(16-18), 1579-1588.

Lee, O. K., Wang, M., Lim, K. H., & Peng, Z. (2009). Knowledge management systems diffusion in Chinese enterprises: A multistage approach using the technology-organization-environment framework. *Journal of Global Information Management, 17*(1), 70-84.

Lertwongsatien, C., & Wongpinunwatana, N. (2003). E-commerce adoption in Thailand: An empirical study of small and medium enterprises (SMEs). *Journal of Global Information Technology Management, 6*(3), 67-83.

Li, Y. H. (2008). *An empirical investigation on the determinants of e-procurement adoption in Chinese manufacturing enterprises*. 15th International Conference on Management Science & Engineering, California, USA, 32-37.

Lin, H. F., & Lin, S. M. (2008). Determinants of e-business diffusion: A test of the technology diffusion perspective. *Technovation, 28*(3), 135-145.

Lippert, S. K., & Volkmar, J. A. (2007). Cultural effects on technology performance and utilization: A comparison of U.S. and Canadian users. *Journal of Global Information Management, 15*(2), 56-90.

Liu, C., Sia, L., & Wei, K. K. (2008). Adopting organizational virtualization in B2B firms: An empirical study in Singapore. *Information & Management, 45*(7), 429-437.

Liu, M. (2008). *Determinants of e-commerce development: an empirical study by firms in Shaanxi, China*. 4th International Conference on Wireless Communications, Networking and Mobile Computing, Dalian, China, October, 1-31, 9177-9180.

Low, C., Chen, Y. & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems, 111*(7), 1006- 1023.

Mangalaraj, G., Mahapatra, R., & Nerur, S. (2009). Acceptance of software process innovations - The case of extreme programming. *European Journal of Information Systems, 18*(4), 344-354.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information System Research, 2*(3), 192-222.

Morgan, G. (1986). *Images of organization*. London: Sage.

Myers, M. D., & Tan, F. B. (2002). Beyond models of national culture in information systems research. *Journal of Global Information Management, 10*(1), 24-32.

North, D. C. (1990). *Institutions, institutional change and economic preference*. Cambridge: Cambridge University Press.

Oliveira, T. & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation, 14*(1), 110-121.

Oliveira, T., & Martins, M. F. (2010). Firms patterns of e-business adoption: Evidence for the European Union-27. *The Electronic Journal Information Systems Evaluation, 13*(1), 47-56.

Pan, M. J., & Jang, W.Y. (2008). Determinants of the adoption of enterprise resource planning within the technology-organization-environment framework: Taiwan's communications. *Journal of Computer Information Systems, 48*(3), 94-102.

Park, C., & Jun, J.-K. (2003). A cross-cultural comparison of Internet buying behavior. Effects of Internet usage, perceived risks, and innovativeness. *International Marketing Review, 20*(5), 534-553.

Patton, M. (1996). *Utilization-focused Evaluation*. Thousand Oaks, CA: Sage.

Powell, W. & DiMaggio, P. (1991). *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.

Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega: The International Journal of Management Science, 27*(4), 467-84.

Rai, A., & Bajwa, D. S. (1997). An empirical investigation into factors relating to the adoption of executive information systems: An analysis of EIS for collaborating and decision support. *Decision Sciences, 28*(4), 939-975.

Ramamurthy, K., Sen, A., & Sinha, A. P. (2008). An empirical investigation of the key determinants of data warehouse adoption. *Decision Support Systems, 44*(4), 817-841.

Ramdani, B., Kawalek, P., & Lorenzo, O. (2009). Predicting SMEs' adoption of enterprise systems. *Journal of Enterprise Information Management, 22*(1/2), 10-24.

Raymond, L., Bergeron, F. O., & Blili, S. (2005). The assimilation of e-business in manufacturing SMEs: Determinants and effects on growth and internationalization. *Electronic Markets, 15*(2), 106-118.

Ribière, V. M. & Haddad, M., & Wiele, P., V. (2010). The impact of national culture traits on the usage of Web 2.0 technologies. *VINE, 40*(3/4), 334-361.

Rogers, E. M. (1983). *Diffusion of innovations (3rd Ed.)*. New York: The Free Press.

Rogers, E. M. (1986). *Communication technology: The new media in society*. New York: The Free Press.

Rogers, E. M. (1995). *Diffusion of innovations* (4th Ed.). New York, NY: The Free Press.

Rogers, E. M. (2003). *Diffusion of innovations* (5th Ed.). New York: Free Press.

Rothman, J. (1974). *Planning and organizing for social change: Action principles from social science research*. New York, Columbia University Press.

Saadé, R. G., Nebebe, F., & Mak, T. (2009). The role of intrinsic motivation in system adoption: A cross-cultural perspective. *Journal of Information, Information Technology, and Organizations, 4*(2009). 107-126.

Saldanha, T. J. V., & Krishnan, M. S. (2012). Organizational adoption of Web 2.0 technologies: An empirical analysis. *Journal of Organizational Computing and Electronic Commerce, 22*(4), 301-333.

Salisbury, W. D., Pearson, R. A., Pearson, A. W. & Miller, D. W. (2001). Perceived security and World Wide Web purchase intention. *Industrial Management & Data Systems, 101*(4), 165-177.

Scott, W. R. (1992). *Organizations: Rational, natural, and open systems* (3rd Ed.). Englewood Cliffs N.J.: Prentice Hall.

Scott, W. R. (1995). *Institutions and organizations*. Thousand Oaks, CA: Sage Publications.

Scott, W. R. (2004). Institutional theory. In *Encyclopedia of social theory*, George Ritzer, ed. Thousand Oaks, CA: Sage Publications.

Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W. R. (2005). A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. *Journal of Business Research, 58*(1), 935-943.

Sherer, S. A., Kohli, R., Yao, Y., & Cederlund, J. (2011). Do cultural differences matter in IT implementation?: A multinational's experience with collaborative technology. *Journal of Global Information Management (JGIM), 19*(4), 1-17.

Shin, D., & Choo, H. (2012). Exploring cross-cultural value structures with smartphones. *Journal of Global Information Management (JGIM), 20*(2), 67-93.

Shin, D.-H. (2012). Cross-analysis of usability and aesthetic in smart devices: What influences users' preferences? *Cross Cultural Management, 19*(4), 563-587.

Singh, S. (2006). Cultural differences in, and influences on, consumers' propensity to adopt innovations. *International Marketing Review, 23*(2), 173-191.

Soares-Aguiar, A., & Palma-Dos-Reis, A. (2008). Why do firms adopt e-procurement systems? Using logistic regression to empirically test a conceptual model. *IEEE Transactions on Engineering Management, 55*(1), 120-133.

Son, J. Y., & Benbasat I. (2007). Organizational buyers' adoption and use of B2B electronic marketplaces: efficiency -and legitimacy- oriented perspectives. *Journal of Management Information Systems, 24*(1), 55-99.

Sparling, L. C. A., & Toleman, M. (2007). SME adoption of e-commerce in the central Okanagan region of Canada. 18th Australasian Conference on Information Systems, Toowoomba.

Stafford, T. F., Turan, A., & Raisinghani, M. S. (2004). International and cross-cultural influences on online shopping behavior. *Journal of Global Information Management, 7*(2), 70-87.

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research. Techniques and procedures for developing grounded theory*. London: Sage.

Strauss, A., & Corbin, J. (2008). *Basics of qualitative research: Grounded theory procedures and techniques* (3rd Ed.). Newbury Park, CA: Sage.

Strohmeier, S., & Kabst, R. (2009). Organizational adoption of e-HRM in Europe: An empirical exploration of major adoption factors. *Journal of Managerial Psychology, 24*(6), 482-501.

Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting intention to adopt interorganizational linkages: An institutional perspective. *MIS Quarterly, 27*(1), 19-49.

Teo, T. S. H., Ranganathan, C., & Dhaliwal, J. (2006). Key dimensions of inhibitors for the deployment of web-based business-to-business electronic commerce. *IEEE Transactions on Engineering Management, 53*(3), 395-411.

Teo, T., Su Luan, W., & Sing, C. C. (2008). A cross-cultural examination of the intention to use technology between Singaporean and Malaysian pre-service teachers: An application of the Technology Acceptance Model (TAM). *Educational Technology & Society, 11*(4), 265-280.

Thong, J. (1999). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems, 15*(4), 27-31.

Thong, J. Y. L., & Yap, C. S. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega: The International Journal of Management Science, 23*(4), 429-442.

Tomarken, A. J., & Waller, N. G. (2005). Structural equation modeling: Strengths, limitations, and misconceptions. *Annual Review of Clinical Psychology, 1*(1), 31-65.

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington, MA: Lexington Books.

Triandis, H. (1972). *The analysis of subjective culture*. New York: John Wiley.

Trompenaars, A., & Hampden-Turner, C. (1993). *Riding the waves of culture: understanding cultural diversity in business*. London: Nicholas Brealey.

Troshani, I. (2011). Exploring the public sector adoption of HRIS. *Industrial Management & Data Systems, 111*(3), 470-488.

Vaidya, S. D., & Nandy, M. (2004). The Internet and the organizational adoption of electronic business: A research agenda. The Fourth International Conference on Electronic Business.

Van Slyke, C., Lou, H., Belanger, F., & Sridhar, V. (2010). The influence of culture on consumer-oriented electronic commerce adoption. *Journal of Electronic Commerce Research, 11*(1), 30-40.

Ven, K., & Verelst, J. (2006). The organizational adoption of open source server software by Belgian organizations. *International Federation for Information Processing, 203,* 111-122.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

Venkatesh, V., Morris, M. G., Davis, G B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Wang, Y. C., & Qualls, W. (2007). Towards a theoretical model of technology adoption in hospitality organizations. *International Journal of Hospitality Management, 26*(3), 560-573.

Wang, Y. M., Wang, Y. S., & Yang, Y. F. (2010). Understanding the determinants of RFID adoption in the manufacturing industry. *Technological Forecasting and Social Change, 77*(2010), 803-815.

Wu, F., & Lee, Y. K. (2005). Determinants of e-communication adoption: The internal push versus external pull factors. *Marketing Theory, 5*(1), 7-31.

Xu, S., Zhu, K., & Gibbs, J. L. (2004). Global technology, local adoption: A cross-country investigation of Internet adoption by companies in the United States and China. *Electronic Markets, 14*(1), 13-24.

Yeniyurt, S., & Townsend, J. D. (2003). Does culture explain acceptance of new products in a country? An empirical investigation. *International Marketing Review, 20*(4), 377-396.

Yiu, D., & Makino, S. (2002). The choice between joint venture and wholly owned subsidiary: An institutional perspective. *Organization Science, 13*(6), 667-683.

Yoon, T. E., & George, J. F. (2013). Why aren't organizations adopting virtual worlds? *Computers in Human Behavior, 29*(3), 772-790.

Zhang, C., Cui, L., Huang, L., & Zhang, C. (2007). *Exploring the role of government in information technology diffusion an empirical study of it usage in Shanghai firms*, In: Organizational dynamics of technology-based innovation: Diversifying the research agenda, T. McMaster, D. Wastell, E. Ferneley, & J. DeGross (Eds.), pp. 393-407. Springer, Boston.

Zhao, F. (2011). Impact of national culture on e-government development: A global study. *Internet Research, 21*(3), 362-380.

Zhu, K., & Kraemer, K. L. (2005). Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry. *Information Systems Research, 16*(1), 61-84.

Zhu, K., Dong, S., Xu, S., & Kraemer, K. L. (2006). Innovation diffusion in global contexts: Determinants of post-adoption digital transformation of European companies. *European Journal of Information Systems, 15*(6), 601-616.

Zhu, K., Kraemer, K. L., & Xu, S. (2003). Electronic business adoption by European firms: A cross-country assessment of the facilitators and inhibitors. *European Journal of Information Systems, 12*(4), 251-268.

Zhu, K., Kraemer, K. L., & Xu, S. (2006a). The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business. *Management Science, 52*(10), 1557-1576.

Zhu, K., Kraemer, K. L., Xu, S., & Dedrick, J. (2004). Information technology payoff in e-business environment: An international perspective on value creation of e-business in financial services industry. *Journal of Management Information Systems, 21*(1), 17-54.

APPENDICES

APPENDIX A: QUESTIONNAIRE ITEMS

Relative Advantage

Using smartphones would enable our employees to respond to emails anytime and anywhere.

Using smartphones would enhance our employees' access to information they would not get otherwise outside their office.

Smartphones provide quick access to corporate emails and services.

Compatibility

Accessing emails using smartphones would not disrupt other regular means of accessing emails.

Installation of smartphones and the related software would not require substantial modification in existing IT infrastructure.

Implementing the changes caused by adoption of smartphones is compatible with our firm's values and beliefs.

Complexity

Using smartphones to check email would be easy.

Using smartphones for browsing the Internet would be easy.

The setup for quick access of corporate emails using smartphones would be simple.

Observability

We would have no difficulty telling others about the results of using smartphones.

The results of using smartphones are apparent to us.

Smartphones are visible in my organization.

Trialability

We would be permitted to use the smartphones on a trial basis long enough to see what it could do.

Before deciding to use the smartphones, I would be able to properly try it out.

We would use smartphones if the service providers offered free trial usage.

Information Intensity

It is very important for my organization to have access to reliable, relevant, and accurate information.

It is very important for my organization to access information fast whenever we need the information.

Effective information exchange mechanisms improve our employees' job performance.

Financial Resources

Our organization has a sufficient financial budget for the purchase of smartphones.

Our organization has a sufficient financial budget for the monthly payment of smartphones.

The owner or manager has allocated adequate resources to adoption of smartphones.

Expertise

Our employees are aware of the functions of smartphones.

Our employees are knowledgeable enough to use smartphones for email.

Our employees are knowledgeable enough to use smartphones for Internet browsing.

Security

Smartphones provide secure access to corporate emails and services.

Sending sensitive information across smartphones outside the office is secure.

Smartphones are secure devices through which to send sensitive information.

Partner Expectations

Using smartphones is important in establishing prospective partnerships.

Using smartphones is important in maintaining existing partnerships.

Our partners require the use of smartphones to do business with them.

Customer Expectations

Our customers believe the use of smartphones will improve our customer service.

Our customers are demanding the use of smartphones for doing business with them.

Our relationship with our customers would have suffered if we do not adopt smartphones.

Competitive Pressure

We believe we will lose our customers to our competitors if we do not adopt smartphones.

We feel it is a strategic necessity to use smartphones to compete in the marketplace.

My company experienced competitive pressure to use smartphones.

Behavioral Intention

Our organization intends to use smartphones in the future.

Demographics

My organization's sector is:

• R&D • Services • Manufacturing • Trading/Commerce • Other: ……

My organization's industry is:

• IT • Defense & Security • Machine • Textile • Other: ……

My organization's structure is:

□ Entrepreneurial (<1 year) □ Small and medium-sized (<250 employees) □ Large-scale (>250 employees) □ Other: ……

My job title is:

□ CEO □ CIO □ CFO □ Owner □ Other: ……

My organization has: …… employees

My organization has already adopted smartphones? □ Yes □ No

If No, number of employees who use smartphones individually: ……

If Yes, which of the business functions and managerial levels use smartphones?

According to you, what are the key adoption factors of smartphones by organizations: ……

If you would like to take a part in a short 15 min in person or phone interview, please provide your contact information here: ……

APPENDIX B: CURRICULUM VITAE

İbrahim Arpacı holds a BS in Computer Education and Instructional Technology (from Anadolu University - Eskisehir, Turkey) and a M.Sc. in Information Systems (Middle East Technical University - Ankara, Turkey). His current research interests are acceptance and adoption of technology, e-learning systems, and e-government systems. He has published in international journals and presented work at international conferences, including the selected publications listed below.

Journal Publications and Book Chapters

Arpaci, I. (2010). E-government and technological innovation in Turkey: Case studies on governmental organizations. *Transforming Government: People, Process and Policy, 4*(1), 37-53.

Arpaci, I. (2011). Innovation policy and technological innovation in the public organizations. *METU Studies in Development, 38*(2), 111-123.

Arpaci, I. (2011). *E-Turkey: Turkey's way to the information society*. In D. Piaggesi, K. Sund, & W. Castelnovo (Eds.), Global strategy and practice of e-governance: Examples from around the world (pp. 272-285). Hershey, PA: Information Science Reference. DOI:10.4018/978-1-60960-489-9.ch015.

Arpaci, I., & Gürbüz, T. (2011). Innovation in learning: Innovative tools and techniques for learning. *International Journal of E-Adoption, 3*(1), 29-37.

Arpaci, I., Cetin Yardimci, Y., Ozkan, S. & Turetken, O. (2012). Organizational adoption of Information Technologies: A literature review. *International Journal of eBusiness and eGovernment Studies, 4*(2), 37-50.

Arpaci, I., & Gürbüz, T. (2013). *Innovation in learning: Innovative tools and techniques for learning*. In S. Sharma (Ed.), Adoption of virtual technologies for business, educational, and governmental advancements (pp. 117-125). Hershey, PA: Information Science Reference. DOI: 10.4018/978-1-4666-2053-7. ch009.

Yarlikas, S., Arpaci, I., & Afacan, G. (2013). *User acceptance of eGovernment services: Analysis of users' satisfaction level based on technology acceptance model*. In I. Yetkiner, M. Pamukcu, & E. Erdil (Eds.), Industrial dynamics, innovation policy, and economic growth through technological advancements (pp. 348-362). Hershey, PA: Information Science Reference. DOI: 10.4018/978-1-4666-1978-4. ch018.

International Conference Papers

Arpaci, I. (2009). *Managing public innovation: Toward developing a new model for public organizations*. MCIS 2009 Proceedings. Paper 77. The 4th Mediterranean Conference on Information Systems, MCIS 2009. Athens University of Economics and Business, AUEB, Athens, Greece, 25-27 September 2009.

Arpaci, I., & Gürbüz, T. (2009). *The changing role of universities as a catalyst for innovation*. Proceedings of the International Conference on Changing Universities: Governance, Relevance, Performance (MEHEM 2009). Istanbul, Turkey, 29 September-2 October 2009.

Arpaci, I., & Ateş, H. (2010). *Organizational and cultural challenges of eGovernment*. Proceedings of the Second International Conference on eGovernment and eGovernance (ICEGEG 2010). Antalya, Turkey, 11-12 March 2010.

Arpaci, I., & Uzun, Y. (2010). *The innovation portfolio: Strategies, concepts, and methodologies*. International Eurasia Business and Economic Society Conference (EBES 2010). Istanbul, Turkey, 26-28 May 2010.

Arpaci, I., Gürbüz, T., & Yarlikaş, S. (2010). *New Technologies in eLearning: Creative tools of Web 2.0 and semantic web*. International Future-Learning Conference on Innovations in Learning for the Future 2010: e-Learning. Istanbul, Turkey, 10-14 May 2010.

Arpaci, I., Cetin Yardimci, Y., Ozkan, S., & Turetken, O. (2012). *Organizational adoption of mobile communication technologies*. European, Mediterranean & Middle Eastern Conference on Information Systems (EMCIS). Munich, Germany, 7-8 June 2012.

Arpaci, I., Cetin Yardimci, Y., & Turetken, O. (2013). *The impact of cultural differences on smartphone adoption by organizations*. International Conference on Innovative Computing Technology (INTECH 2013). London, UK, August 29-31, 2013.

TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

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YAZARIN

Soyadı : ARPACI
Adı : İbrahim
Bölümü : Bilişim Sistemleri

TEZİN ADI (İngilizce) : Organizational Adoption of Mobile Communication Technologies

TEZİN TÜRÜ: Yüksek Lisans ☐ Doktora ☐

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın. ☐
2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullanıcılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) ☐
3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) ☐

Yazarın imzası ..... Tarih .....