ELECTRONIC GOVERNMENT ADOPTION MODEL AMONG BUSINESS ORGANIZATIONS IN JORDAN

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ABSTRACT

E-government adoption involves a significant change in the way government administrative operations with its stakeholders are being conducted. Past studies have tended to view e-government adoption in terms of a dichotomous outcome; either e-government is adopted, or it is not. Such studies give little indication of the diffusion of e-government applications. The aim of this study is to address this gap in existing research by investigating both the level and extent of usage of e-government applications. In so doing, the study draws on research in the area of innovation diffusion theories. The population of this study consisted of firms listed in Amman Stock Exchange (ASE) that have adopted B2G (business-to-government) e-government. The main objective of this study is to characterize B2G e-government adoption among businesses listed in ASE. It also aims to identify factors associated with the adoption of B2G e-government and to determine the impacts of its adoption on these businesses. A total of 113 usable responses were generated for further analysis. Based on two parts, the level of e-government adoption and the extent of usage for each application, two groups of adopters were identified and labeled as basic-adopters and advanced-adopters. Technological, organizational and external factors were found to have influenced e-government adoption among businesses in ASE. It was also found that advanced-adopters had gained more significant benefits from e-government adoption than basic-adopters. In particular, advanced-adopters achieved time saving, lower cost and efficiency as well as gaining strategic benefits such as better work efficiency, lower operational cost, and reduced work-process time.

Keywords: E-Government, Adoption of Innovation, E-Business, Businesses

ABSTRAK

E-kerajaan melibatkan perubahan ketara mengenai cara dan proses operasi pentadbiran kerajaan dengan penaruh. Kajian lepas yang mengkaji penggunaan e-kerajaan oleh perniagaan lebih cenderung melihat penerimapakaian e-kerajaan dari segi penghasilan dikotomi; sama ada e-kerajaan telah digunapakai, atau tidak. Kajian sedemikian memberikan hanya sedikit petunjuk tentang difusi e-kerajaan. Tujuan kajian ini adalah untuk mengisi jurang dalam penyelidikan yang sedia ada dengan menyiasat tahap penggunaan dan sejauh mana aplikasi e-kerajaan diterimapakai. Kajian ini hádala berlandaskan kepada penyelidikan sedia ada dalam bidang teori difusi inovasi. Fokus kajian ini adalah syarikat-syarikat yang disenaraikan di Amman Stock Exchange (ASE) di Jordan, dan mengambilkira penggunaan e-kerajaan dalam aspek B2G. Objektif khusus kajian ini adalah untuk menentukan ciri-ciri penggunaan e-kerajaan oleh B2G dan sejauh mana penerimapakaiannya di kalangan perniagaan yang disenaraikan dalam ASE di Jordan. Kajian ini juga mengenalpasti faktor-faktor yang dikaitkan dengan penggunaan e-kerajaan B2G oleh perniagaan dan menentukan kesan-kesannya. Sejumlah 113 jawapan boleh guna telah kutip untuk analisis. Berdasarkan dua bahagian, iaitu status semasa menerimapakai e-kerajaan dan tahap penggunaan setiap permohonan, dua kumpulan telah dikenalpasti iaitu penerima-asas dan penerima-maju. Faktor-faktor yang didapati signifikan adalah kelebihan relatif dan infrastruktur IT, kebolehsuaian dan misi organisasi, penglibatan organisasi, kekonsistenan, dan sumber kewangan, dan persaingan dan sokongan kerajaan. Didapati bahawa penerima-maju e-kerajaan telah mendapat manfaat yang lebih jika dibanding dengan penerima-asas. Secara khusus, penerima-maju mencapai penjimatan masa, kos yang lebih rendah dan kecekapan serta mendapat manfaat strategik seperti kecekapan kerja yang lebih baik, kos operasi yang rendah, dan pengurangan masa proses kerja..

Katakunci: E-kerajaan, Adopsi innovasi , E-perniagaan, Perniagaan

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TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

CHAPTER TWO

LITERATURE REVIEW

CHAPTER THREE

RESEARCH FRAMEWORK AND METHODOLOGY

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDIXES

ACRONYMS

ASE:	Amman Stock Exchange
ASP:	Active Server Page
BC:	British Columbia
BPR:	Business Process Re-engineering
CGI:	Computer Graphics Interface
DOI:	Diffusion Of Innovation
EDI:	Electronic Data Interchange
E-G:	Electronic government
G2B	Government-to-Business
G2C:	Government-to-Citizens
G2E:	Government-to-Employees
G2G:	Government-to-Government
ICT:	Information and Communication Technology
IOS:	Interorganizational Systems
IT:	Information Technology
IS:	Information System
MoICT:	Ministry of Information and Communication Technology
OECD:	Organization for Economic Cooperation and Development
OIC:	Order Initiation and Completion
PMO:	Program Management Office
RBV:	Resource Based View
SPSS:	Statistical Package for Social Science
TAM:	Technology Acceptance Model
TOE:	Technology-Organization-External

TPB:	Theory of Planned Behavior
TRA:	Theory of Reasoned Action
UN:	United Nations
WTO:	World Trade Organization
WWW:	World Wide Web

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The revolution in Information Communication Technologies (ICT) has resulted in changes in many aspects of people's daily lives around the world. This revolution has also changed the way governments around the globe interact with their citizens, businesses, agencies, employees and other stakeholders (Lee, 2010; Rokhman, 2011). These changes and development have promoted the adoption of electronic government or e-government (Raus, Liu, & Kipp, 2010; Elsheikh, Cullen, & Hobbs, 2007). The revolution in ICT has raised the attention among researchers and the information system practitioners worldwide. The field of e-government has become an important subject around the globe (Siau & Long, 2006; Chen, Chen, Huang, & Ching, 2006).

E-government program seeks to achieve greater efficiency in government performance, by enhancing the performance of services for beneficiaries and investors from all segments of society. Ease, accuracy and efficiency, are the new hallmarks of performance of official governmental transactions. Online interactive services may include such facilities as petitioning, rate paying, licensing or information queries. There continues to be a diversity of implementation quality and levels for such services (Middleton, 2007; Almarabeh & AbuAli, 2010).

Generally, e-government is the application of ICT to improve government services (Bose, 2004). E-government has become a popular focus of government effort in many developed countries such as the United Kingdom (Beynon-Davies, 2005), Australia (Teicher & Dow, 2002) and recently, in several developing countries such as United Arab Emirates, Jordan, Qatar, and Oman (Almarabeh & AbuAli, 2010). Nevertheless, existing empirical research on e-government mainly focused on developed countries (Rokhman, 2011; Ho, 2002; Leitner, 2003; Choudrie *et al*., 2005).

Studies which focused on e-government implementation in developing countries have highlighted several issues and challenges that need to be addressed for the success in e-government implementation (Sharifi & Manian, 2010; Almarabeh & AbuAli, 2010; Atallah, 2001; Wanger *et al*., 2003; Heeks, 2007; Reffat, 2003; Ndou, 2004; Ebrahim & Irani, 2005; AL-Shehry, Rogerson, Fairweather, & Prior, 2006; Tung & Rieck, 2005; Moon, 2002; Jaeger, 2003; and Gupta & Jana, 2003). These issues can be classified into political (i.e. increasing citizen participation in political processes and building trust between citizens and their government by improving the government's image), social (i.e. better delivery of government services), technological and managerial (i.e. reforming the public sector, leading to more efficient government management with increased accountability and transparency), and economic (such as cost reductions for both the government and the adopters of e-government services).

Studies on e-government and e-government development projects have been conducted in many industrialized societies. Due to their nature and structure, e-government development projects have numerous political, social, and economic impacts on society. For instance, the uptake of e-government includes cost reductions for both the government and the adopters of e-government services. The general perception is that e-government uptake helps to reduce costs by making operations more efficient, serving citizens better and reducing complex and over-stretched bureaucratic system (Sharifi & Manian, 2010; Basu, 2004).

In terms of the most important requirements for the success of e-government implementation, Heeks (2002) highlighted the following; top leadership support, clarity of vision, goals and strategies, coordination across all sectors of government, legal frameworks, programs and education, awareness, and marketing the concept of e-government to the citizens. In fact, transformation from the traditional administrative system to e-government is an agenda undertaken by many governments today especially in developing countries (Smith, 2002). However, the awareness of existing needs, capacities, obstacles and opportunities are important issues to be considered when planning e-government strategies, with the aim of overcoming challenges in e-government implementation (Sharma & Gupta, 2003).

Government web sites or e-government sites have evolved from the pure information-sharing phase to interactive, transactional, and intelligent or integration phase. Today, many nations view e-government as an enabler of economic competitiveness and growth. For example, the European Commission referred to e-government as a key element for Europe's competitiveness agenda (European Communities, 2005). The US federal government is committed to expanding e-government to be the best in the world (Executive Office of the President of USA, 2004). The benefits of e-government are also supported by Chevallerau (2005) who pointed out that e-government has several advantages or benefits such as its ability to improve the quality of information, time and cost saving, increase service quality as well as work efficiency, which ultimately leads to customer satisfaction.

E-government includes a wide range of web-based services such as government to government (G2G), e-government to business (G2B), government to employees (G2E), and e-government to citizens (G2C). The Government state of Nebraska (e.g. Brush, 2007; State of Nebraska, 2001) claimed that their G2B sites play a strategic role in enabling businesses to find information or service they need and to complete business transactions electronically, thereby strengthening economic competitiveness and growth.

Many researchers suggested that governments tend to supply people with what governments think they should while neglecting people's actual needs. This has created a mismatch between the demand and the supply of e-government services (Sealy, 2003; Reddick 2004, 2005; Tung & Rieck, 2005). As reported by Accenture (2005), governments are making service investment decisions without a clear view of the outcomes. Numerous authors also indicated the lack of studies that examined citizen and business organization demand for e-government (Doong *et al*., 2010; Gauld *et al*., 2010; Helbig *et al*., 2009; Verdegem & Verleye, 2009; Reddick, 2005).

Many studies are supply, and technology focused when investigating e-government development and delivery issues (Gauld *et al*., 2010; Joseph & Jeffers, 2009; Liou, 2008; Navarro *et al*, 2007; Yang & Rho, 2007; Heeks & Bailur, 2007; Reddick, 2005; Abanumy *et al*., 2003; Ebrahim *et al*., 2003; Ezz, 2003; Ghaziri, 2001; Holden *et al*., 2003; Lau, 2003; Li, 2003; Melitski, 2003; Prattipati, 2003; Davidrajuh, 2004). This includes examining provision of web-based information and internet-based transactions, capacity to utilize e-government services, including the number of public internet connections and internet penetration (West 2004, 2006; Layne & Lee, 2001; Norris & Moon, 2005).

Joseph (2009) highlighted the importance of the interaction between government and businesses through the web environment which he referred to as G2B. Past literature highlighted several advantages of business organizations' adoption of e-government. For example, reducing the amount of time and money that businesses must spend to comply with rules and regulations (Awan, 2007). According to DeBenedictis *et al*. (2002); this can be done in five ways namely providing information in one easy-to-access location; simplifying and streamlining reporting requirements; reducing the number of forms; making transactions easier (paying fees, obtaining permits); and helping businesses understand what regulations apply to them and how to comply with them. Together, these capabilities can have a significant impact on a business's bottom line. Another significant advantage of e-government is attracting Foreign Direct Investment (FDI). E-government service uptake by the business organization helps in creating an attractive atmosphere for FDI. As reported by Kostopoulos (2006), some Arab countries, including Jordan wanted to use e-government services to attract FDI through transparency, accountability, and efficient public service towards the basic needs of individuals and businesses.

In addition, the Jordanian government realized the need to implement e-government in order to take advantage of the opportunities offered by international trade. Jordan would need more efficient, market-oriented custom's regime to comply with World Trade Organization (WTO) requirements, capable of handling increased traffic at the borders while at the same time preventing the entry of pirated software (Tadros & Assem, 2006). As such, the Jordanian government has invested heavily in e-government initiatives for the last 10 years. However, there seems to be a lack of empirical evidence regarding the current stage of e-government adoption and what influences business organizations in Jordan to adopt e-government from the demand-side perspective.

E-government represents a pervasive notion that leads to changes in the way business is being conducted (Zhao *et al*., 2008) and businesses have an important role to play in a nation's economy (Awan, 2007; Almahamid, Mcadams, Kalaldeh, & Al-Sa'eed, 2010). Sizable investments are being made by the Jordanian government and by firms, including businesses, to initiate the adoption of e-government. However, many Jordanian firms which are reported to have e-government capability in general, are not using e-government for a large proportion of their transactions (MoICT, 2008). Furthermore, the knowledge on the stage of e-government penetration, firms' e-government adoption pattern, and the impact of e-government on performance among Jordanian firms have also been lacking due to the limited studies conducted on the issues of e-government adoption in Jordan.

1.2 Problem Statement

In order to reduce the technological gap between developing and developed countries, many developing countries including Jordan have launched several e-initiatives such as e-government (Siau & Long, 2006). The Jordanian government realized the benefits of e-government as it is a pervasive global phenomenon in both industrialized and developing nations (Pacific Council on International Policy, 2002). Jordan implemented e-government initiative in year 2006 with the aim of transforming the country to e-Jordan (Ciborra & Nevarra, 2006). Various programs have been implemented to promote the adoption of e-government especially among businesses (Mofleh & Wanous, 2008; Mohammad, Almarabeh, & Ali, 2009). However, little knowledge is available of e-government adoption model for businesses in Jordan.

In the globalization era, understanding the adoption of ICT, including e-government by developing countries is becoming important to improve its adoption success (Shareef, Kumarb, Kumarb, & Dwivedic, 2011). Among others, this will enable developed countries to trade with developing countries more efficiently. At this stage, there are only a limited number of studies on the adoption of e-government by developing countries (Shareef *et al*., 2011).

Pudjianto and Hangjung (2011) and Almarabeh and AbuAli (2010) found that not all e-government implementation is accomplished successfully. Approximately 60 percent of the e-government implementation fails or cannot reach the expected outcomes. Heeks (2003) observed and analyzed more than 40 e-government development projects in developing countries and found that around 35 percent from these projects totally failed, while 50 percent partially failed, and only 15 percent were successful. This figure gives an indication that the failure rate in developing countries is high and becomes more risky compared to developed countries. This phenomenon is the motivation for our exploratory research on e-government.

Keeping Ciborra's (2005) views in mind as a background to the subject, we can consider a contrasting and more objective ontological approach to the failure of e-government in developing countries by examining research undertaken by Heeks (1998; 2002; 2003), that provides clear-cut situations that often result in failures. By examining numerous cases of Information System (IS) and e-government failure in developing countries, Heeks (2002; 2003) stated that a major reason for these failures is the mismatch between the current reality and the design of the future e-government system. The chances of failure increase as the gap grows.

Although the government of Jordan has invested heavily on e-government, it is still facing problems in e-government adoption and implementation. These challenges encompass infrastructure, identifying e-services applications, back-office and management, registration and community education (Mofteh & Wanous, 2008; Al-Omari, 2006). The Dubai School of Government (2008) reported that the Middle East countries face common barriers in their e-government initiatives in terms of design and development of e-government. Several authors suggested possible reasons behind such failures in developing countries in general, and in the Middle Eastern nations, in particular.

Kanat and Özkan (2009) and DESA (2008) attributed the reasons of the failure of e-government development to infrastructural issues, social and cultural issues, usefulness, accessibility, lack of trust, lack of understanding of citizen and business needs, lack of confidentiality, and lack of marketing. This finding is in line with the previous works in e-government adoption literature which already highlighted these reasons under such titles as; 'ICT Divide or Digital Divide' (Carter & Weerakkody, 2008; Oxendine, Borgida, Sullivan & Jackson, 2003), 'Risk and Trust' (Gefen, Warkentin, Pavlou & Rose, 2002; Belanger & Carter, 2008), 'Cultural and Social Issues' (Carter & Weerakkody, 2008), 'Organization Culture' (Shaukat & Zafar, 2010), as factors influencing adoption.

It is imperative to bear in mind that the most important issue is not the classification of the reasons for failure into different categories, but to understand the potential failings, thereby being more equipped to deal with such problems if they were to arise (Dada, 2006). Hence, there is a need for further study to narrow the knowledge gap that exists (due to the scarcity of studies in the field of e-government adoption and implementation) which are important prerequisites of e-government success. Several authors have suggested further study to be conducted in this area to avoid failures of e-government initiatives (e.g. Kanat & Özkan, 2009; Ho & Ni, 2004; Kunstelj & Vintar, 2004; OECD, 2003; Kaaya, 2004; Joseph, 2009; Zhao, *et al*., 2008; Al-omari, 2006; and Peters, Janssen, & Engers, 2004).

Jordan's commitment to e-government necessitates the development of an e-government adoption model that will assist government agencies to collaborate, share information and redesign overlapping responsibilities, to improve the efficiency of the services offered to the general public. The e-government adoption model is used by the agencies as a mechanism and guideline to deploy e-government and realize the benefits that can be gained through the adoption of the best e-government practices that this model can offer. Without a model, the government agencies will not be able to change existing practices, which contribute to the inadequacies and imbalances in the provision of public services (Elsheikh *et al*., 2007).

Several researchers postulated the need for an effective e-government in the Middle Eastern countries. For example, Miriam (2001) pointed out that developing countries attempt to replicate e-government programs from developed countries, ignoring the fact that different countries have different environments. This highlights the fact that one model cannot fit all. Each country should have its own framework as it has different culture, problems and barriers (Miriam, 2001). This was reported by Mofleh and Wanous (2008) in e-government implementation in Jordan. They stated that Jordanian governments' approach to implementing e-government without taking into consideration the actual needs of the citizens and understanding the knowledge of the local environment by replicating e-government programs from other countries could lead to a waste of resources.

Presumably, presenting up-to-date, effective and secure information on an e-government website will encourage more organizations and individuals to gather information, download forms, fill out forms, submit information and conduct transactions with government online. This could lead to significant cost savings and enhance efficiency for all participating parties (Zhoa *et al*., 2008; Tung & Rieck, 2005). Hung *et al*. (2006) suggested empirical research on users' acceptance of e-government services to improve its quality and effectiveness. Kumar *et al*. (2007) concurred that understanding why and how businesses use and interact with e-government websites is an important area for investigation.

Similarly, Mofleh and Wanous (2008) argued that there is a misunderstanding between the actual businesses' needs and how the government understands these needs. Currently, the uptake and widespread use of e-government public services are still problematic in most countries (Verdegem & Verleye, 2009).

Besides, the adoption of e-government is based on businesses rather than individuals; hence the adoption behavior could differ and warrant an organization's appropriate adoption model. Innovation-related theories dominated most previous works such as technology acceptance models (TAM) and unified theory of acceptance and use of technology (UTAUT).

A range of models and theories are used to evaluate and test individual level acceptance of technologies. One of the most commonly employed models is TAM developed by Davis (1989) to explain and predict an individual's acceptance behavior toward a new technology, independent of the user population and the technology being introduced. While this theory is useful for understanding why individuals accept particular technologies across a range of populations, the model is not suited for investigation of organizational level of e-government adoption. Therefore, there is a need to employ an organizational theory to explain and predict a business's adoption of e-government.

Many of the studies that investigate firm level adoption employ Diffusion of Innovation (DOI) Theory (Rogers, 1995), which suggests that diffusion of an innovation is principally based on the characteristics of the technology and users' perceptions of the system. Research based on the DOI Theory assumes that the adoption decision is undertaken to improve operational efficiency (Ramdani *et al*., 2009; Lippert & Govindarajulu, 2006). However, the organizational decision to adopt e-government may also be influenced by external factors of the organization (e.g. competition pressure and government support) that provide barriers and incentives to e-government adoption. Since widespread adoption of e-government across businesses has not yet occurred, it is plausible that the institutional external factors of the firm will play a large role in the organizational adoption decision along with the characteristics of the technology (Ramdani *et al*., 2009; Lippert & Govindarajulu, 2006). As such, it is appropriate to ground this study in a model that considers the influence of the technology, the organization, and the external factors to account for broader external factors likely to influence the scope and degree of e-government adoption. Therefore, the use of Tornatzky and Fleischer's (1990) technology-organization-external (TOE) framework can enable the consideration and proposed investigation of specialized factors likely to influence e-government adoption.

Deploying other theoretical perspectives such as diffusion of innovations (DOI) theory with combination of TOE framework could provide alternative model. Hence, using Rogers's theory of DOI combined with TOE framework could provide a useful model to explain the organization adoption of e-initiatives in general, and e-government among business organizations, in particular (Mohamad & Ismail, 2009; Ramdani *et al*., 2009; Lippert & Govindarajulu, 2006). This model is used in the current study to examine the impact of e-government adoption on organization performance.

However, studies have highlighted that the level of e-government usage is relatively low in even the most advanced countries (Trkman & Turk, 2009). Hence, effort is needed to develop a comprehensive model for assessing e-government adoption in general (Esteves & Joseph, 2008). New theoretical perspectives and concepts to enhance our understanding of e-government processes have to be explored (Yildiz, 2007).

Past studies focused on e-government while current ones have focused on the supply side of e-government (Almahamid *et al*., 2010). In particular, previous researches have looked at the success factors and impediments of e-government initiatives (Aboelmaged, 2010), models of e-government evolution and growth (Reddick, 2004; West, 2004), as well as practices, effectiveness of implementation and challenges of e-government services (Reddick, 2005). Businesses are being neglected because in many cases, IT system in businesses is perceived to be unsophisticated, thus reducing the interest for researchers to examine IT adoption and implementation (Warkentin *et al*., 2002).

Authors such as Lee-Kelley and Kolsaker (2004); Welch *et al*. (2005); Centeno *et al*. (2005); Sealy (2003); Reddick (2004, 2005); Tung and Rieck (2005); and Wei and Zhao (2005) have offered other reasons for the gap between the supply and demand of e-government services in the developing countries. Developing countries try to achieve a competitive advantage by implementing e-government based on the general assumptions of their citizens' demand for e-government services. As a result, they provided their citizens' needs from the government perspective, ignoring the actual need of their citizens.

Furthermore, most of the literature have concentrated on G2C (e.g. Sharifi & Manian, 2010; Rorissa & Demissie, 2010; Doong *et al*., 2010; Lee & Rao, 2009; Lean *et al*., 2009; Al-Shafi & Weerakkody, 2008; van Dijk *et al*., 2008; Horst *et al*., 2007; Navarro *et al*., 2007; Fu *et al*., 2006; Carter & Belanger 2005, 2004, 2003). One potential reason for literature to focus on the web-domain is the large portion of the government budget being spent to provide services to citizens (Joseph, 2009), while G2B have received little attention (Rorissa & Demissie, 2010; Almahamid *et al*., 2010; Morgeson & Mithas, 2009; Zhao *et al*., 2008; Awan, 2007; Sharma, 2007; Chevallerau's, 2005). Another potential reason for the scant academic researches on G2B is that business organizations' uptake of e-government services is similar to the adoption of new technology (e.g. e-commerce and e-business). Hence, the businesses' adoption of e-government should be subject to similar factors of business adoption of e-commerce or e-business (Warkentin *et al*., 2002).

Previous studies focused on business organization's adoption of new technologies as well as adoption of e-commerce or e-business (Gefen & Straub, 2000; Moon & Kim, 2001; Gefen *et al*., 2003; Pavlou, 2003), while the adoption of e-government service has been neglected in the literature. Among limited studies, a study in Dubai by Awan (2007) revealed that while businesses are generally aware of Dubai's e-government services, they do not often use them for transactions.

Research on e-government has highlighted its benefits to citizens, businesses and governments. The impact of new technologies in the government sector has not only helped in improving service delivery (Moynihan, 2004; Von Haldenwang, 2004; West, 2004) and increasing democratization (Von Haldenwang, 2004; West, 2004), but has also helped in reducing corruption (Cho & Choi, 2004; Von Haldenwang, 2004) and increasing national business competitiveness (Srivastava & Teo, 2006). However, there is little research and empirical studies exploring factors that determine adoption of e-government in developing countries (Shareefa, Kumarb, Kumarb, & Dwivedic, 2011). Therefore, these gaps are the prime motivators for this research.

Theoretically, the literature review identified several antecedent factors that drive innovation adoption in general and e-government uptake in particular. These are technological factors, organizational factors, and external/environmental factors (Aboelmaged, 2010; Lean *et al*., 2009; Ramdani *et al*., 2009; Elis & Belle, 2009). Despite the huge body of literature regarding these variables, several authors (e.g. Joseph, 2009;

Zhao *et al*. 2008; Al-omari 2006) highlighted that empirical studies and understanding on the antecedents of e-government are lacking and not consistent across different business environments. One possible reason for that is the inconsistent result regarding these variables across different countries, industry type, and size. For example, studies by Lee (2004) and Ramdani (2009) found that small business organizations' uptake of new innovation is subject to internally important factors such as top management support and organizational culture. However, Buonanno *et al*. (2005) emphasized that the decision process regarding the adoption of new technology is more affected by exogenous reasons rather than business related factors.

While some factors are considered less important in the developed countries such as the IT infrastructure, it is more important in the developing countries including Jordan which faces a critical barrier to adopt e-government since IT infrastructure requires sufficient financial resources to make it available (Mofteh *et al*., 2008). Therefore, they emphasized on certain factors such as the technological factors and ignored other factors in the context of the developing countries which is a major barrier to successfully adopting e-government among business organizations.

Furthermore, inconsistent findings have been found in the literature regarding the impact of innovation adoption on the firms' performance across different sectors. Although there are several evidences that support the significant influence of e-government adoption on the firms' performance in terms of business value (Alawneh & Hattab, 2009; Systinet, 2002), time and cost saving (Alawneh & Hattab, 2009; Badri & Alshare, 2008), other studies (e.g. Tippins & Sohi, 2003) showed the negative impact of IT adoption and firm performance. Thompson *et al*. (2005) supported these findings by observing a negative impact of IT and profitability. This then calls for more investigation on the innovation adoption and its impact on the organizations' performance in order to gain more understanding about adoption of e-government in the business sector. Finally, some of the proposed factors in this research have received little attention in the literature such as organization culture even though it has been found to be significant influencing factor.

1.3 Research Questions

This study aims to extend the knowledge and understanding on e-government adoption, its antecedents as well as the impact of e-government on firms' performance. The research questions examined are as follows:

a) What is the current status of e-government adoption among businesses in Jordan?

b) What are the factors that drive the adoption of e-government among businesses in Jordan?

c) What is the impact of e-government adoption among businesses on firms' performance?

1.4 Research Objectives

The main objective of this study is to propose a model for e-government adoption among businesses in Jordan. In order to achieve it, several sub-objectives are formed as the following:

a) To determine the status of e-government adoption among businesses in Jordan.

b) To identify the factors that drive e-government adoption among businesses in Jordan.

c) To examine the impact of e-government adoption on firms' performance.

d) To develop a model for e-government adoption among businesses in Jordan.

1.5 Significance of Study

E-government is an increasing application area in the IT domain. One important benefit of using e-government services is to obtain information about new business opportunities online (Ho, 2002). If businesses and governments are aware of the current status of e-government adoption, organization performance and the factors affecting business's use of e-government services, appropriate strategies can be employed to reduce some of the inherent barriers. Further, an understanding on the type of applications that support the usage of e-government can provide input to promote more business firms to access government services online (Zhao *et al.*, 2008). In this aspect, this study provides important information into the field of G2B e-commerce. From a practitioner's perspective, it gives developers information on what features and tools are most useful for a G2B platform.

To generalize, the approaches to depict a firm's e-government initiative mainly views adoption of e-government in a single dimension. First, a firm's involvement in e-government is either perceived by what types of business functions are conducted over the internet, or the firm's stage of adoption represented by the types of application being adopted by the firm. Although these offer valuable information about "what" business activities or Internet technologies are being adopted by firms, nonetheless, information, about "how" they have been implemented, which can provide a greater understanding about firms' e-government adoption, is lacking.

Second, in order to provide a comprehensive understanding of firms' adoption behavior, other facets of adoption, such as knowledge and awareness of e-government technologies, and issues related to the barriers of e-government by firms need to be considered. By taking into account various facets of technology adoption and implementation in e-government, a clearer understanding about the e-government adoption and implementation can be obtained.

Third, Almahamid *et al*. (2010) lamented on the very limited studies on e-government, particularly G2B, being conducted in the Asian region. Apart from studies in India (e.g. Reddick, 2005; Dossani *et al*., 2005; Gupta & Jana, 2003; Lau, 2003; Ezz, 2003; Holden *et al*., 2003) and Singapore (e.g. Fu *et al*., 2006; Tung & Rieck, 2005; Hung *et al*., 2009), limited research in the area of e-government is available in Jordan (Al-Qirim, 2007; Almahamid *et al*., 2010).

In general, the purpose of this study is to explore and investigate the factors that drive the adoption of e-government, organizational performance and the current status of the e-government adoption among businesses in Jordan.

As pointed out by Wood-Harper, Ibrahim, and Ithnin (2004), investigating the factors that contribute to the success of e-government services is needed as many countries continue to face challenges in implementing e-government. In addition, Joseph (2009), Mohammad *et al*. (2009) and Tung and Rieck (2005) emphasized that by being aware of the factors that influence businesses' use of e-government services, strategies can be adopted to reduce some of the inherent barriers of e-government uptake. Knowledge gained from better understanding of the current status of e-government adoption among Jordanian businesses will help in the development of appropriate measures and incentives by the authorities to encourage e-government adoption among businesses in Jordan (Alawneh *et al*., 2009).

This study hopes to provide information of e-government adoption to the Jordanian government for future policy planning purposes to enhance the adoption of e-government. The knowledge from Jordan's experience in implementing e-government could also be used by other nations aiming to embark on similar initiatives.

Similarly, this study could benefit consultants and e-government service vendors to design and develop solutions that enhance the effectiveness and efficiency of e-government service that will drive e-government uptake among businesses.

Businesses can use the adoption profiles identified from this study to benchmark their current status of e-government uptake or to guide their plans to embark on new e-government initiatives in the future. As there is a lack of comprehensive studies conducted to examine e-government uptake rate and its impact from the business organization perspective in the developing countries and Jordan, in particular, this has led to an unclear picture of the factors that influence the adoption of the e-government services.

Hence, the findings of this study will help to contribute to the knowledge on the practices of G2B e-government in the Asian region, and specifically, for firms in Jordan. The findings may also be of interest to Jordanian policy makers such as Amman Stock Exchange (ASE) for future e-government planning. By understanding firms' e-government adoption, and the factors associated with the usage and the reasons behind the rejection of e-government applications, appropriate measures and incentives can be drafted to encourage e-government adoption among businesses.

The findings can also provide information for e-government vendors to plan, develop, market and promote their e-government solutions for businesses. Finally, businesses can use the adoption profiles identified by this study to benchmark their current status of e-government adoption. Other business sectors can use the findings as a guideline when they plan to embark on the e-government project in the future.

1.6 Scope of Study

The scope of e-government applications in this research is limited to the utilization of the internet as the technology infrastructure by business firms in Jordan to communicate, distribute and conduct information exchange and business transactions with government agencies. In general, this study focuses on electronic interactions between any government agencies and businesses using the internet or the World Wide Web.

In this study, the unit of analysis is firms that have adopted G2B e-government, which comprise different business sectors in Jordan namely 44.2 percent from the industry sector, 15.9 percent from the insurance sector, 26.5 percent from the service sector and

13.4 percent from the banking sector. Businesses are targeted for several reasons. First, businesses are perceived to play a crucial role in terms of providing employment opportunities and contributing to economic growth of nations (Tung & Rieck, 2005).

Businesses also have an extreme range and form in terms of products and diverse ownership background that provide interesting subjects for research (Awan, 2007). The businesses identified in this study comprise all the Jordanian firms that are registered in the ASE.

The scope within which e-government is investigated is the business sector. Current literature on e-government ignores the business sector when outlining e-government success stories (Awan, 2007). Nowadays, the business sector has become the target as it intends to embark on the adoption of IT (Ramdani *et al*., 2009).

This study focuses on adoption of G2B e-government that uses website technologies to search for general business information (laws and regulations, financial, market and technology information), locate governmental agencies, download forms, fill out forms, submit information online and conduct transactions with government online. These online activities have become an increasingly important topic for both researchers and practitioners (Zhao *et al*., 2008).

Although the commercial potential of G2B e-government is enormous, empirical evidence regarding firms' e-government adoption initiatives are lacking and little is known about the factors that influence a firm's participation in G2B e-government and its impact on organization performance (Alawneh & Hattab, 2009). These warrant the present research to be conducted.

1.7 Structure of Thesis

This thesis is structured into five chapters in the following sequence. Chapter 1 provides an overview of the study. The next Chapter presents the literature review related to the area of study namely e-government. This chapter also describes the development of the research framework. Chapter 3 presents a description of the methodology employed in this study, the justifications and rational of the research design. Chapter 4 presents the results of data analysis, which includes descriptive statistics and multivariate statistics used to provide answers to the research questions. The final Chapter discusses the findings. It also highlights the key managerial and theoretical implications of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of this study is to examine e-government adoption among business organizations in Jordan. In addition, it aims to investigate the factors that are associated with adoption and its impact of such adoption on the business organization's performance. A review of the literature related to theories explaining innovation adoption and diffusion, factors and impact that are linked to innovation adoption are discussed.

2.2 Definition of E-Government

Researchers have suggested various definitions of e-government depending on their research purposes. Due to the fact that different people have different definition of e-government, there is no unanimous agreement of its definition (Table 2.1).

E-government was defined by Tapscott (1996) "as an internet-worked government which links new technology with legal systems internally and in turn links government information infrastructure externally with everything digital and with everybody". Another definition of e-government is presented by United Nation's website, for example, "e-government refers to the use of ICT such as wide area networks, the Internet, and mobile computing by government agencies". The Organisation for Economic Co-operation and Development (OECD) noted that e-government refers to the use of information and communication technologies, and particularly the Internet, as a tool to achieve better government (OECD, 2003).

Sprecher (2000) considered e-government as technologies that simplify and automate transactions between governments and constituents, businesses, or other governments. On the other hand, Hiller (2001), Davis (2001), and Howard (2001) defined e-government as electronic interactions between the government and the public which includes citizens, businesses and government employees. Luling (2001) defined e-government as any interaction one might have with any government body or agency using the internet or the World Wide Web.

Raus *et al*. (2010) stated that ICT innovations in the B2G context are primarily reflected under e-government subjects, which require intensive interactions between government and businesses. Combining business and government perception, e-government is defined as the application of information and communication technology to improve, transform and/or redefine any form of resource and information exchange (transacting and contracting) between involved actors like firms and governmental agencies and their customers, suppliers or other partners by developing and maintaining dedicated inter-organizational systems, virtual organizational arrangements and (inter) national institutional arrangements (Wassenaar, 2000).

Based on the above definitions, the general term of e-government could be defined as the application of information and communications technology to improve government services delivery and promote transparency and accountability in dealing with citizens, government, employees and businesses. Since this research focuses its attention on the businesses adoption (demand-side) of the available e-services provided by the Jordanian government (supply-side), the term e-government is defined in the present study as any electronic interactions between any government body and businesses' using the internet or the World Wide Web.

Table 2.1
Selected Definitions of E-Government

Authors	**E-government Definition**	**Perspective/ Focus**
Layne and Lee (2001)	A government's use of technology, such as the internet, to aid the delivery of information and services to citizens, employees, business partners, other agencies and other government entities	Relationships with partners
Bonham *et al*. (2001)	E-government involves using information technology, specifically the internet, to deliver government information, and in some cases, services, to citizens, businesses, and other government agencies.	Internet Information and service delivery
Dunleavy (2002) and Caldow (1999)	E-government offers an opportunity for governments to re-organize themselves, get closer to the citizens and businesses and co-operate with a variety of societies.	Political
Deloite and Touche (2002)	The use of technology to enhance the access to and delivery of government services to benefit citizens, business partners, and employees.	Access Service delivery
Heeks (2002)	The use of information and communications technologies (ICTs) to improve the activities of public sector organizations.	Improvement
United Nations (2003)	Utilizing the internet and the World-Wide Web for delivering government information and services to citizens and businesses.	Technology
OECD (2003)	The use of ICTs, and particularly the internet, as a tool to achieve better government.	Internet

Table 2.1 (Continued)

Authors	E-government Definition	Perspective/ Focus
Basu (2004)	E-government involves the automation or computerization of existing paper-based procedures in order to prompt new styles of leadership, new ways of debating and deciding strategies, new ways of transacting business, new ways of listening to citizens and communities and new ways of organizing and delivering information. Ultimately, e-government aims to enhance access to and delivery of government services to benefit citizens.	Transformation Access
World Bank Group (2004)	The use of ICTs to improve the efficiency, effectiveness, transparency and accountability of government	Reforming public sector
Ndou (2004)	The use of ICT tools to reinvent the public sector by transforming its internal and external way of doing things and its interrelationships with customers and the business community.	Transformation
Berri (2004)	The use of ICT in public administrations combined with organizational change and new skills in order to improve public services, democratic processes and strengthen support to the public policies.	Change Management
Stoltzfus (2004)	A program that utilizes internet communication technology (ICT) to improve communication, service, and transactional processes with stakeholders.	Internet Communication and service delivery
Chen *et al.* (2006)	E-government is a permanent commitment by government to improve the nature of the relationship between the private citizens and the public sector through enhanced, cost-effective, and efficient delivery of services, information, and knowledge.	Service delivery Public sector efficiency

2.3 The Hashemite Kingdom of Jordan

Jordan is considered a small developing country. Located in the Middle East with a total area of 89,342 square kilometers, Jordan has a population of 5.4 million, of whom 1.2 million live in the capital, Amman. Jordan has limited resources and the gross domestic product (GDP) per capita is around 1,207.8 Jordan dinars (U.S. $1,725). Natural resources are phosphates, fertilizers, potash, agricultural products, and light industry.

The Hashemite Kingdom of Jordan is a constitutional monarchy with representative government. The monarch, His Majesty King Abdullah II, is the head of state, the chief executive, and the commander-in-chief of the armed forces. The King exercises his executive authority through the Prime Minister and the Council of Ministers, or Cabinet. The Cabinet is responsible before the elected House of Deputies which, along with the House of Notables (Senate), constitutes the legislative branch of the government. The judicial branch is an independent branch of the government. Since 1989, all elements of the Jordanian political spectrum have embarked together on a route to greater democracy, liberalization, and consensus building. These reforms, which were guided by the late King Hussein, have placed Jordan on an irreversible road to democratization.

2.3.1 E-Government Initiative in Jordan

E-government initiative in Jordan is a national program initiated by His Majesty King Abdullah II in 2000 and the e-government portal was launched in the last quarter of 2006. The initiative is aimed at improving government performance in terms of service delivery, improve efficiency, accuracy, reduce time and cost required to complete a transaction. In addition, e-government in Jordan aims to help integrate and coordinate various functions provided by different government agencies. The ultimate objective is to achieve an effective, efficient, transparent and better integration among government departments (Tadros, Hammam, & Al-Zoubi, 2008; MoICT, 2005).

According to the Ministry of Information and Communications Technology (MoICT) of Jordon, to share their knowledge and experience in implementing e-government infrastructure and expertise as well as to learn from others about the best practice of e-government program, the Jordanian government works with several other governments, namely Italy, Singapore and Malaysia. As a result, a broad guideline has been developed which helps to deliver e-services to the citizens at various public access points. There is also a continuing regional cooperation for the exchange of experience and information between other Muslim countries such as Oman, Qatar, Dubai, Egypt, Algeria etc. that share similar religion and cultural values with Jordan.

Officials are enthusiastic that the e-government projects and e-government may change the negative image of the current government delivery systems.

2.3.2 E-Government in Jordan

Some believed that the great enthusiasm shown by the officials of the e-government projects stem from their feelings that they may change the negative image of the current government delivery systems. However, the spread of ICTs have contributed to the awareness of citizens and businesses who demand better services and access to information (Elsheikh, 2007; MoICT, 2005).

According to Tadros and Assem (2006), Jordan needs to apply e-government to take advantage of the opportunities offered by all trade agreements. Jordan would need more efficient, market-oriented customs regime in compliance with World Trade Organization (WTO) requirements, capable of handling increased trade at the borders.

According to LMcClure (2000), e-government refers to government's use of information technology to enhance the access and delivery of government information and service to citizens, business partners, employees, agencies and government entities. It encompasses the intranet that allows data to be gathered, processed and shared in more efficient ways, extranet that links government to business suppliers, and public web sites that give citizens and businesses self-service channel for transactions and information (Symonds, 2000).

2.3.2.1 **Vision, Mission, and Goals**

The vision of the application of e-government in Jordan is to contribute to economic and social development through the provision of channels and means of access to information and data services through the internet.

In order to accomplish this mission, Jordan's e-government program aims to implement e-services applications, and identify and build the technological infrastructure of the government, promote and develop the necessary legal framework and regulations, ensure effectiveness of doing business process re-engineering, arrange for the transfer of knowledge and training necessary for the public sector, ensure the promotion and achievement of the organization and restructure the management towards change acceptance (MoICT, 2005).

The e-government initiatives in Jordan intend to move the nation's transformation into a knowledge society founded on a competitive and dynamic economy. As a part of its effort to transform its society, economy and government, Jordan is pursuing a national strategy for e-government which aims to offer high quality services for citizens, improve performance and government efficiency, improve the competitiveness of Jordan, ensure public sector transparency and accountability, reduce costs and improvement, ensure easy interaction with the government, promote the development of the ICT sector in Jordan, enhance the development of skills in the public sector to increase e-government activities, and provide information security (MoICT, 2005).

2.3.3 Jordanian Amman Stock Exchange Background

The ASE was established in March 1999 as a non-profit, private institution with administrative and financial autonomy. It is authorized to function as an exchange for the trading of securities. The exchange is governed by a seven-member board of directors. A chief executive officer oversees day-to-day responsibilities and reports to the board. The ASE membership comprises Jordan's 69 brokerage firms (ASE, 2009).

The ASE is committed to the principles of fairness, transparency, efficiency, and liquidity. The Exchange seeks to provide a strong and secure environment for its listed securities while protecting and guaranteeing the rights of its investors. To provide this transparent and efficient market, the ASE has implemented internationally recognized directives regarding market divisions and listing criteria (ASE, 2009).

To comply with international standards and best practices, the ASE works closely with the Jordan Securities Commission (JSC) on surveillance matters and maintains strong relationships with other exchanges, associations, and international organizations. The exchange is an active member of the Union of Arab Stock Exchanges, Federation of Euro-Asian Stock Exchanges (FEAS), a full member of the World Federation of Exchanges (WFE), and an affiliate member of the International Organization for Securities Commissions (IOSCO) (ASE, 2009).

The ASE is charged with providing enterprises with a means of raising capital by listing on the Exchange, encouraging an active market in listed securities based on the effective determination of prices and fair and transparent trading, providing modern and effective facilities and equipment for trading the recoding of trades and publication of prices, monitoring and regulating market trading, coordination with the JSC as necessary, to ensure compliance with the law, a fair market and investor protection, setting out and enforcing a professional code of ethics among its member directors and staff, ensuring the provision of timely and accurate information of issuers to the market and disseminating market information to the public (ASE, 2009).

2.3.4 Malaysian Government's Initiatives

The electronic government (E-Government) initiative in Malaysia had its genesis during the launch of the Multimedia Super Corridor (MSC) in 1996. The main objective is to propel the country into the Information Age (Ahmad, 2007) and be a major part of the strategy to "reinvent" the government. E-government is one of the seven "flagship applications" under the MSC. These flagship applications aim to jump-start and accelerate the growth of MSC, enhance national competitiveness, create high value jobs and export growth, help narrow the digital divide and position MSC a regional hub and test bed (Ahmad, 2007).

Seven main projects have been identified under the e-government flagship application. Projects under this flagship include Electronic Procurement (EP), Project Monitoring System (PMS), Electronic Services Delivery (eServices), Human Resource Management Information System (HRMIS), Generic Office Environment (GOE), E-Syariah (ES) and Electronic Labor Exchange (ELX) (Ahmad *et al*., 2007).

Several other public sector agencies have also embarked upon initiatives to introduce online services, with the goal of enhancing the ease and efficiency of public services provided for the people. Notable among these are the Public Services Portal (myGovernment), e-Tanah, e-Consent, e-Filing, e-Local Government (e-PBT), e-Kehakiman, Custom Information System (SMK), Pensions Online Workflow Environment (POWER), and Training Information System (e-SILA) (Ahmad *et al*., 2007).

Figure 2.1 shows the over time comparison of the top 10 Organisation of Islamic Cooperation (OIC) member countries by their Evolutionarily Distinct and Globally Endangered (EGDI) ranks in 2007 and 2009. The global EGDI ranks of the top 10 OIC member countries ranged between 13 (Bahrain) and 68 (Brunei) in 2009. Except UAE, Jordan and Qatar, the OIC member countries including Bahrain, Malaysia, Kazakhstan, Kuwait, Saudi Arabia, Tunisia and Brunei in the top 10 list improved their global EGDI ranks from 2007 to 2009 (UNPAN, 2010).

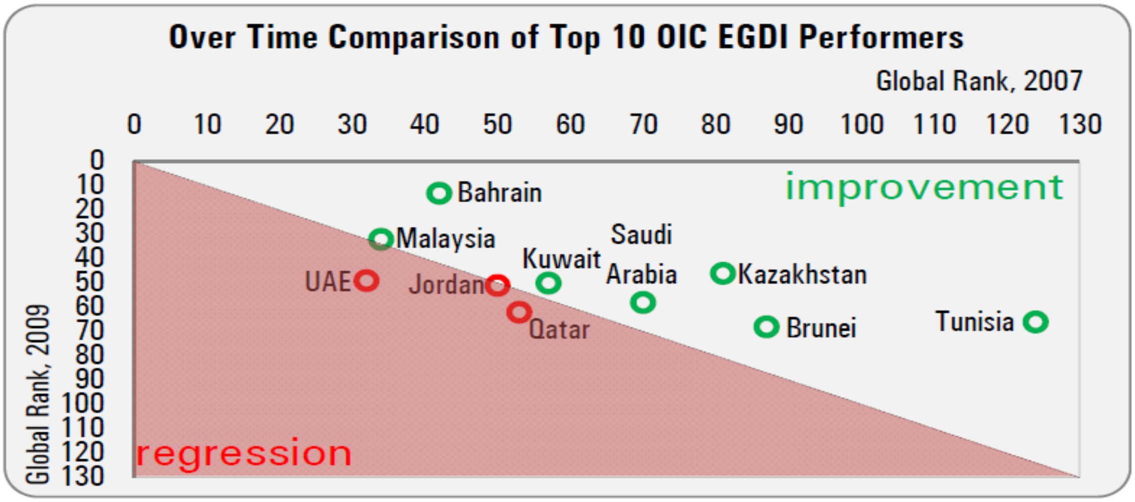

Figure 2.1

Top 10 OIC Member Countries, by Over Time Comparison of E-Government Development Index Scores, 2007 vs. 2009. Source: UNPAN (2010).

Based on UNPAN's report 2010, the rank of Malaysia in 2007 and 2009 were 34 and 32 respectively. Additionally, the EGDI index of OIC member shows that Malaysia improved its policy and strategies in adoption the e-government in the proper place which it is notable were the reason to raise its rank in two years. Unlike Jordan which decreased its rank from 50 to 51 for exercise and practice of the e-government in improper way 9 (see Appendix I).

According to UNPAN's report 2010, it encouraged the OIC's governments to concentrate on their policies which interrelated to the human capital to enhance the capable of the public agency and to make it easy for the public administrations to convey the e-government services efficiently and faster, such as Malaysia as stated above. apparently, Jordan still lake of experience in implementing the e-government which requires it to get conduct more study in the said field and also look at other countries trial which implement the e-government properly.

2.4 Stage Models for Innovation Adoption

A good number of e-government stage models have been proposed throughout the literature; these models are detailed in Table 2.2. These models were developed by either individuals or institutions. These differ from one perspective to another such as technological perspective, organizational perspective and the managerial perspective (Lee, 2010). For example, Layne and Lee's (2001) four-stage model (information dissemination, forms only, end-to-end electronic transaction, and transforming government), and Moon's (2002) and Hiller and Belanger's (2001) five-stage model (information, two-way communication, transaction, integration, and participation) are fairly similar.

The two models are based on a general and integrated perspective that combines technical, organizational, and managerial feasibility. The main difference between these two models is the political participation phase. The model proposed by Layne and Lee (2001) did not consider political participation, whilst the model suggested by Moon (2002) and Hiller and Be´langer (2001) argued that the political participation stage is essential to the ultimate objective of the evolution of e-government.

Researchers such as Moon (2002), Layne and Lee (2001), Hiller and Be´langer (2001), and Symonds (2001) have proposed alternative models. Institutions such as Baum and Maio (2000), United Nations and American Society for Public Administration (2001), MoICT (2005), The North Carolina Information Resources Management Commission (2001), and Deloitte and Touche (2001) have proposed similar models with few differences.

The literature review suggested various types of stage models, some with three phases, while others have four phases or mores phases. However, there are similarities and overlapping between these phases. Whatever the stage the model is in, essential stages should be included. These stages are publishing, transaction and integration stage. Based on that, e-government's lifecycle is still debatable.

One of the most commonly adopted e-government models is Gartner Group’s (2004) model that classifies e-government services into four evolutionary phases namely (1) Publishing (web presence) contact in function is the earliest stage where static information about the agency mission, services, phone numbers and agency address are provided for further communication; (2) Interacting that goes one step further by enhancing the site’s features with search capabilities and intentions-based programs; (3) Transacting that focuses on building self-service application for public to access online. Typical services such as tax filing and payment, driver’s license renewals are available; and finally (4) Transforming that is considered to be the long-term goal of all government services. However, the MoICT in Jordan has adopted the four stage model. These four stages are presentation of information, mutual contacts, financial transactions and the integration of services.

Other models of e-government have appeared in the literature. However, they are generally descriptive in nature. From these models, some basic propositions for the successful development of e-government have been posited. While this is valuable work at the infancy of e-government, Affisco and Soliman (2006) argued that there is a need for e-government to progress towards a more strategic model. Further, the majority of e-government models propose a sort of linear progression as e-government evolves, generally beginning with dissemination, then transactions, and finally to some form of integration. Affisco and Soliman (2006) believed that e-government services need not necessarily follow this path. In fact, some may achieve their strategic purpose at the dissemination stage, and need not go any further. Since the majority of models are based on existing e-government applications, which admittedly have been developed on a piecemeal basis, little thought has been given to the development of a coherent strategic portfolio of applications. A model that begins to broach this topic is sorely needed at this point.

E-government must move through all the preceding stages on the way to the next one. Public organizations, on the other hand, could decide to offer different services at different stages of maturity. However, it has been widely argued that being able to understand e-government evolution could provide researchers a better understanding of the issues related to e-government development.

Table 2.2
Levels and Stages of Application of E-Government

Study	Title	Stage Model
Baum and Maio (2001)	Gartner's Four Phases of E-Government Model	Web presence Interaction Transaction Transformation
Symonds (2001)	Government and the Internet: no Gain Without Pain	One-way communications Two-way communications Exchanges Portals

Table 2.2 (Continued)

Study	Title	Stage Model
United Nations and American Society for Public Administration (2001)	Global Survey of E-Government	Emerging presence Enhanced presence Interactive presence
UNDP (2001)	E-government Considerations for Nations	Information Two-way communications Exchange of values Integrated services and exchange
Hiller and Be´langer (2001)	Privacy Strategies for Electronic Government	Information publishing two-way transaction Multi-purpose portals portal personalization Clustering of common services Full integration and enterprise transaction
Deloitte and Touche (2000)	The Citizen as Customer	Catalogue Transaction Vertical integration Horizontal integration
Layne and Lee (2001)	Developing Fully Functional E-Government: A Four Stage Model	Information dissemination Forms only End-to-end electronic transactions Transforming government
Balutis (2001)	E-government: Understanding The Challenge And Evolving Strategies	Web presence strategy Interaction strategy Transaction strategy Transformation
The North Carolina Information Resource Management Commission (2001)	Report to that State’s General Assembly	Web site Quite close to 1 A big jump from 2 Close to 3

Table 2.2 (Continued)

Study	Title	Stage Model
Australian National Audit Office (2001)	The Office for Government Online (OGO)	One-way communication Two-way communication Service and financial transaction Vertical and horizontal integration Political participation
Clay (2001)	E-Government in the Asia-pacific region	E-mail Enabling inter-organizational 2-way communication Allowing exchange of value Digital democracy Jointed- up government
Moon (2002)	The evolution of e-government among municipalities: Rhetoric or reality?	One-way communication Two-way communication Service and financial transaction Vertical and horizontal integration Political participation
World Bank (2002)	The E-Government Handbook for Developing Countries	Publish Interact Transact
Accenture (2003)	A Proposed Model for E-government Maturity	Online presence Basic capability Service availability Service transformation
Ebrahim *et al*. (2003)	Stages of e-government development (G-G)	Web presence Interaction Transaction Transformation
West (2004)	E-government and the Transformation of Service Delivery and Citizen Attitudes	Billboard stage Service-delivery stage One-stop Service transformation

Table 2.2 (Continued)

Study	Title	Stage Model
Gartner Group's (2004)	E-government from a User's Perspective	Web presence Interaction Transaction Transformation Web presence
Lam (2005)	Barriers to e-government Integration	Informational Transactional Advanced maturity

2.5 Perceived Benefits of E-Government

In this study, perceived benefits refer to the anticipated advantages or benefits that use of e-government can provide to organizations (Chwelos, Benbasat, & Dexter, 2001). For businesses which are motivated by economic advantages such as cost saving and profits, they attempt to adopt e-government (Chean & Thurmaier, 2005). In contrast, citizens are primarily adopting e-government due to economic as well as social reasons.

Several studies have been conducted to determine the drivers and barriers for the adoption of e-government. Perceived benefits of adopting e-government is most frequently cited as one of the major drivers for initial usage and adoption of e-government (Kheng & Al-Hawamdeh, 2002). Perceived benefits are the anticipated or expected advantages that can be provided to organizations (Teo & Tan, 1998). In Thompson *et al*. (2009)'s study on the adoption of e-procurement, direct benefits are primarily intended for operational savings and are related to the internal efficiency of the organization. Direct benefits include reduction in transaction errors and transaction costs, improved data accuracy and information quality, and faster application process. In a similar vein, indirect benefits are associated with the impact of adopting e-procurement for management of business process and relationships. Indirect benefits include better customer services and improved relationship with business partners.

According to Bakry (2004), government, services are clustered into the following groups, namely financial services; business services; justice services; land resources; transportation services; community services; and human services. All of the above listed service clusters have components that are relevant to businesses. For instance, through an e-government portal or website, businesses can learn about new and continuing government projects. Businesses can also use e-government portals to put forward grant proposals and funding requests. Businesses also are an integral part of the supply chain of government agencies providing a variety of raw materials, products, and services (Joseph, 2009).

According to Sharma (2007) and Chevallerau (2005), governments need to adopt e-government as it helps in decreasing corruption, saving time and cost, and providing high-quality services to the citizen. A government that adopts such as e-initiative could get several benefits, which ultimately improve the long-term growth prospects of the nation and provide quality services to the both businesses and citizens.

A report by EPAN (2004) identified various types of interconnected benefits (e.g. Purchase, Goh, & Dooley, 2009; Sharma, 2007; & Cherallerua, 2005). These benefits include reduced cost, increase efficiency and transparency. The report also highlighted some social benefits such as user-friendly public sector, increasing competitiveness, enhancing the country economic growth, and proactive, rather than reactive governance (EPAN, 2004).

According to Dawes (1996), a very useful method to decrease the duplication of data collection and data handling is the sharing of knowledge and information. Government agencies often use the same or overlapping information about a common group of clients, such as local governments. Data sharing partnership can help them share resources and streamline the collection, organization, maintenance, and distribution of data and information. In addition, this will also help to improve the relationships among participating government agencies (Andersen & Richardson, 1994; Dawes, 1996; Dawes, Pardo, Connelly, Green, & McInerney, 1997; Landsbergen & Wolken, 1998).

In the case of e-government adoption in Jordan, it is aimed at improving the performance of its public and private sectors to enhance services provision, efficiency, accuracy, time and cost saving to its citizens (Al-Omare, 2006). The OECD (2003) stresses that the implementation of e-government can provide the following benefits, namely improve efficiency, contribute to reform and build trust between governments, citizens, and businessmen.

These benefits are also supported by Chevallerau (2005) who pointed out e-government has several advantages or benefits such as its ability to improve the quality of information supply, time and cost saving, increased service quality as well as work efficiency, which ultimately lead to customer satisfaction. As the literature review shows, adopting e-government among organizations in general and among business firms, in particular, could provide many benefits, which can lead to the uptake of e-government. Therefore, it is imperative to identify the benefits, especially to business firms, which are the focus of this study.

2.6 Theoretical Basis for Research

The foundation of many previous information system and innovation adoption studies was based on the theoretical frameworks derived from Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA); Ajzen's (1985) Theory of Planned Behaviors (TPB); Davis' (1989) TAM; Rogers's (1983,1995) DOI theory; and Tornatzky and Fleischer's (1990) TOE model (see Figure 2.2). While some of these theories are able to explain the organization level of innovation adoption, others focused on the individual acceptance of new technology (see Table 2.3).

Table 2.3
Applicable Theories

Theories (Author)	Factors	Usage	Selected Articles Using the Theory
Diffusion of innovation (DOI) (Rogers, 1995)	Relative Advantage Compatibility Complexity Trialability Observability	Acceptance of any new innovation Such as e-initiative, computer, internet	Korteland and Bekkers, 2007; Carter and Belanger, 2005; Fu *et al.*, 2006; Schaupp and Carter, 2005; Hussin *et al.*, 2008
Technology-Organization-Environment (TOE) (Tornatsky and Fleischer, 1990)	Technology Organization Environment	Adoption of a technology or innovation such as e-government , mobile, PDA, e-commerce, internet banking	Al-Qirim *et al.*, 2007; Mohamad and Ismail, 2009; Ramdani *et al.*, 2009; Wang and Ahmed, 2009

Table 2.3 (Continued))

Theories (Author)	Factors	Usage	Selected Articles Using the Theory
Technology Acceptance Model (TAM) (Davis, 1989)	Perceived Usefulness (PU) Perceived Easy Of Use (PEOU)	Acceptance of innovation of technology such as mobile, e-initiative, PDA, e-commerce, internet banking	Trkman and Turk, 2009; Colesca 2008; Carter and Belanger, 2005; Dimitrova and Chen, 2006; Gilbert *et al*., 2004; Horst *et al*., 2007; Lau *et al*., 2008; Carter, 2008. Walczuch *et al*., 2007; Wang *et al*., 2006
Theory of Planned Behaviors (TPB) (Ajzen's, 1985)	Attitude toward Using (A) Subjective Norm (SN) Perceived Behavioral Control (BC)	Improved the predictability of intention in various health-related fields such as condom use, leisure, exercise, diet	Horst *et al*., 2007; Warkentin *et al*., 2002.
Theory of Reasoned Action (TRA) (Fishbein and Ajzen's, 1975)	Attitude Toward Behavior (A) Subjective Norm (SN)	Most use in medical innovation such as dieting, condom, limiting sun exposure	Trkman and Turk, 2009; Napoli and Ewing, 2000;

In investigating the individual-level adoption and acceptance of new technologies, several models and theories were used in the literature, but more importantly the TRA (Fishbein & Ajzen, 1975) and the TAM by Davis (1989). According to this stream of research, individual characteristics are mediated by beliefs, which affect attitude, which in turn affect intentions and behaviors. Influenced by the TRA theory, and identified in the literature as the most commonly used model in order to predict an individual's acceptance behavior toward a new technology, TAM model suggests that individual's acceptance is anticipated by two elements. These are "perceived usefulness" which refer to the degree to which a person believes that using a particular system would enhance his or her job performance, and "perceived ease of use" which is the degree to which a person believes that using a particular system would be free from effort. Even though both TRA and TAM model are considered as useful ground in understanding user's acceptance of new technology across a range of populations, they are not suited for investigation into organizational-level acceptance of technologies (Bwalya, 2009). Since the decision to adopt e-government among business is generated as a strategic firm-level initiative, therefore, there is a need to employ an organizational-level theory to explain and predict a firm's acceptance behavior of e-government (Al-shafi & Weerakkody, 2008).

Several previous studies that investigated e-government adoption employ the DOI theory by Rogers 1983 (e.g. Sang *et al*., 2009; Lean *et al*., 2009). DOI describes the process by which an innovation is communicated through certain channels over time between the members of a social society. As the innovation diffusion theory suggests, diffusion occurs as individuals, groups, organizations, or subsystems accept and use new ideas such as technologies (Lippert & Forman, 2005).

DOI was developed with the goal of analyzing the characteristics of innovation adopters. These characteristics include relative advantage, complexity, image, visibility, compatibility, results from demonstrability, and voluntariness of use of the innovation. DOI theory suggests that innovation diffusion is basically based on two factors, the perception of the characteristics of the technology, and the user's perception of the system. Its main concern is about how innovations are adopted as well as the reasons behind different rates of innovation adoption.

However, bearing in mind the business uptake of e-government, one common criticism about DOI theory is that it does not take into consideration the environmental factors where the organization conducts business, such as competition, which could work as a barrier or a motivation to technology acceptance and adoption (Chen *et al*., 2009). Based on that, researchers continue to search other contexts influencing organizational innovativeness and combine them with Rogers's theory to explain the models (Prescott & Conger, 1995).

Since innovation is broadly defined as an object or idea perceived to be new (Rogers, 2003), the concept of e-government with its novelty can be conceptualized as innovations. However, there are four types of e-government. These are G2G, G2B, G2E, and G2C. One framework cannot explain the factors influencing each target market adoption of new innovation. While G2C is investigated at the individual level, G2B should be seen at an organization level of innovation adoption (Al-Qirim, 2007). This suggests that any study that attempts to investigate e-government adoption among business firms, should be grounded on a framework that considers the influence of technological, environmental, as well as organizational factors on such an adoption among organizations (Al-Qirim, 2007; Chen *et al*., 2009; Ellis & Belle, 2009; Duan *et al*., 2010).

Tornatzky and Fleisher (1990) used a framework similar and consistent with the theory of innovation diffusion in organizations by Rogers (1983) in developing a model to add the environment factor to their framework. It explained a firm's technological innovation decision making behavior, and the environment presents both constraints and opportunities for technological innovation (Tornatzky & Fleisher, 1990). According to

Tornatsky and Fleischer (1990), TOE contexts of a firm can influence the diffusion process. The TOE framework makes Rogers's innovation diffusion theory able to explain firm innovation diffusion (Wang & Ahmed, 2009; Hsu *et al*., 2006).

According to the TOE model, there are three areas that an organization uses to determine how to take advantage of the new technology relating to e-government, which can influence the process of adopting, implementing and using technological innovations (Tornatzky & Fleischer, 1990). These are technological factors, organizational factors and environmental factors. The first refers to the existing as well as new technologies relevant to the firm. These factors play a significant role in the firm's adoption decision as it determines the ability of the firm to benefit from e-government initiative. Examples are prior technology usage, and number of computers in the firm. Organizational factors refer to descriptive measures related to organization structure, financial support, managerial beliefs and top management support. The environmental context focuses on the external factors that drive firms to adopt new technology such as competition and government incentives and regulations.

An individual's acceptance and adoption of innovation differ from organization innovation adoption in terms of the factors that influence such adoption (Moon & Norris, 2005; Titah & Barki, 2006). An organizational innovation is defined as a new process, system, or service that is either internally developed or purchased from an external source (Damanpour & Evan, 1984). As the definition suggests, organization replaces an exciting process with a new one (innovation) in the hope of improving the effectiveness as well as the efficiency of the organization performance (Gallivan, 2001). One major reason for such innovation is the environment where the firms operate. The pressures that drive firms to adopt innovation are caused by competitive actions and the firm's struggle to have the competitive advantage (Teo *et al*., 2003). Therefore, Rogers's theory of DOI coupled with TOE framework would provide a useful theoretical framework to explain the organization's adoption of IS in general and e-government among business organizations, in particular (Mohamad & Ismail, 2009; Ramdani *et al*., 2009; Lippert & Govindarajulu, 2006). Such approach could provide a strong empirical support to e-government adoption research and account for the technological, organizational, and external factors influencing e-government adoption among business organizations (Al-Qirim, 2007).

As indicated in Table 2.4, diversifying the research approaches or deploying multiple approaches in a single study is highly commendable to ensure richer findings. Hence, deploying other theoretical perspectives such as DOI combined with TOE in the future researches promise a useful outcome. As such, in order to drive a new model for e-government adoption and implementation among business organizations in Jordan, the present study is based on Rogers's DOI theory combined with TOE model. The reasons for using DOI theory in combination with the TOE model is that the latter can describe the organization adoption of innovation among business firms by considering the external factors while DOI is used as it considers the organizational and the technological factors.

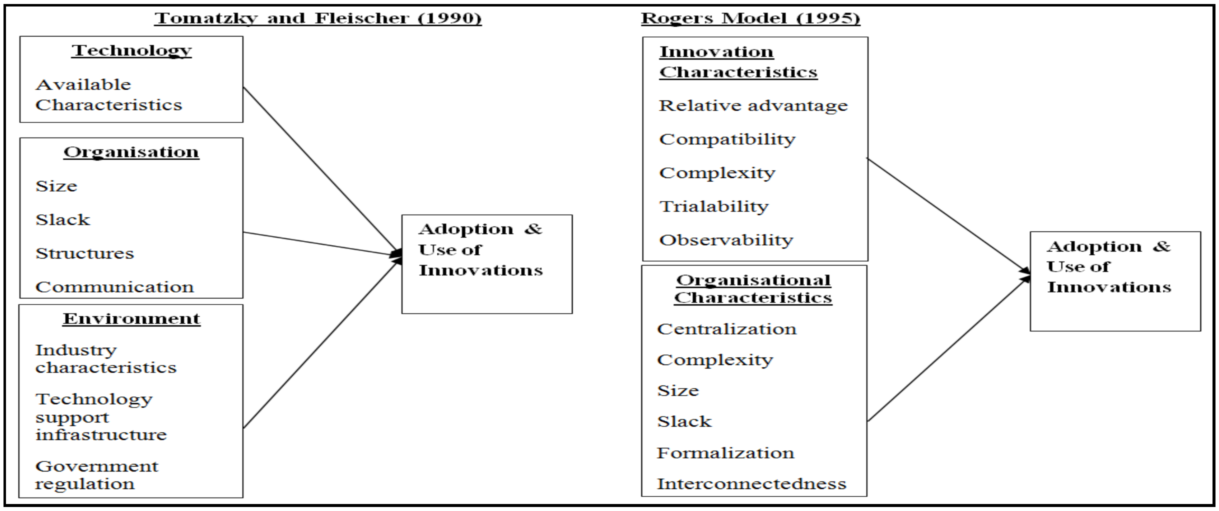

Figure 2.2

Previous Innovation Adoption Models

Table 2.4

Theories Used by Previous Studies of E-Government

Authors	Usage and Country	Theory Used	Finding
Aboelmaged, 2010	e-procurement (United Arab Emirates)	TPB TAM	The results show that the proposed model has good explanatory power and confirms its robustness, with a reasonably strong empirical support, in predicting users' intentions to use e-procurement technology.
Bwalya, 2009	E-government (Zambia)	TRA TAM DOI	The government should play a leading role in developing the ICT infrastructure as this is a requirement for successful e government implementation (as identified in the model by 'Adequate and inexpensive IT infrastructure').
Trkman and Turk, 2009	E-government (Slovenia)	TRA TAM DOI TPB	Conceptual paper
Lean *et al.*, 2009	E-government (Malaysia)	TAM DOI	Comparing the explanatory power of the entire intention based model (TAM, DOI and Trust) with the studied model, it has been found that the DOI model has a better explanatory power.

Table 2.4 (Continued)

Authors	Usage and Country	Theory Used	Finding
Hung *et al*., 2009	E-government services (Taiwan)	TPB	The findings indicate that perceived usefulness, perceived ease of use, training, compatibility, external influence, interpersonal influence, self-efficacy, and facilitating conditions are significant predictors of users' intention to utilize EDMS.
Sang *et al*., 2009	E-government (Cambodia)	TAM DOI	The findings show that the determinants of the research model (perceived usefulness, relative advantage, and trust) are support. At the same time, the important determinants of perceived usefulness include image and output quality.
Ramdani *et al*., 2009	E-procurement (UK)	TPB TRA TAM DOI UTAUT TOE	The results reveal that the factors influencing SMEs' adoption of e-procurement are different from the factors influencing SMEs' adoption of other previously studied information systems (IS) innovations.
Al-Shafi and Weerakkody, 2008	e-government (Qatar)	TRA TAM	The findings are encouraging from a practical perspective for the Qatari government, from a theoretical perspective these results reconfirm that technology acceptance is influenced by key constructs such as Performance Expectancy, Effort Expectancy, and Social influence aspects of the e government services used.
Lau *et al*., 2008	E-government (American)	DOI	Study findings can shed some light on each nation as a model for successful development as well as the implementation of e -government in a non-industrialized, developing nation.
Gumussoy and Calisir, 2009	E-reverse (40 different countries)	TPB TAM DOI	Results indicated that, 76% of employees' intention to use e reverse auction is explained by subjective norms, perceived behavioral control, and perceived usefulness. Among them, subjective norms have the strongest effect.

Table 2.4 (Continued)

Authors	Usage and Country	Theory Used	Finding
Kouki *et al*., 2006	EDI (Canada)	TOE DOI	Conceptual paper
Mohamad and Ismail, 2009	E-commerce (Malaysia)	TOE TRA TAM DOI TPB	Conceptual paper
Hussin *et al*., 2008	E-commerce (Malaysia)	DOI	The findings show that perceived relative advantage, perceived trialability, and perceived observability have significant influence on the willingness to adopt e-commerce.
Scupola, 2009	E-commerce (Denmark and Australia)	TOE DOI	The results of the empirical research provide indication to SMEs interested to adopt B2B e-commerce, large firms interested to conduct e-commerce transactions with small and medium-size firms and policy makers.
Wang and Ahmed, 2009	E-commerce (UK)	DOI TOE	Results of logistic regression analyses proffer support that external pressure and perceived benefits are predictors of e-commerce adoption.
Ellis and Belle, 2009	Open Source Software (South African)	DOI TOE	It was interesting to note that TOE served well as an organizing framework, especially in its OSS-specific formulation. However, despite its comprehensiveness, a number of new factors were uncovered; so it is suggested that TOE should be viewed as an organizing framework rather than a prescriptive theory.
Chen *et al*., 2009	Diffusion of the innovative smart phone adoption (American)	TPB TRA TAM DOI	Attitude towards smart phone adoption was found to be affected mainly by testability and organizational and environmental factors. Technology diffusion is affected by the individual, organization, and social system in which the technology is employed.

2.7 Review of Empirical Studies on E-Government Adoption

E-government empirical studies often differ in their findings in the literature. Accordingly, lack of generalizability is frequently cited as one of the limitations in some empirical studies (Horst *et al*., 2007; Fu *et al*., 2006). For example, Deursen *et al*. (2006) concluded that despite the similarities in Dutch and Scandinavian culture, welfare state, and political system, the usage of e-government vastly differs in these countries.

The early adoption of ICT and higher levels of awareness about the use of technology helped to promote e-government success in developed nations (Sheridan & Riley 2006). In comparison, businesses in developing countries are far behind in the adoption of ICT (Nikam *et al*., 2004). In Jordan, for example, e-government research is in its early stages (Elsheikh *et al*., 2007) and the level of ICT change that would be offered to Jordan will be huge. As a result, the country can hardly afford to be left behind in harnessing the benefits of implementing e-government (Mofleh & Wanous, 2008).

There are a number of empirical studies undertaken in different countries to study e-government adoption. For example, Jordan (Ibrahim & Abdullah, 2006); United States (Norris & Moon, 2005); Germany (Schedler & Schmidt, 2004); Britain (Li, 2003), and South Africa (Wong & Welch, 2004). Each study contributes in providing a strong theoretical understanding of the factors explored in the research model. Table 2.5 discusses the potential advantages of implementing e-government as well as factors on such adoption. These studies are conceptual, descriptive and exploratory in nature. However, the findings failed to provide relevant facts regarding the current state of e-government across different countries and sectors. This study attempt to highlight the gaps in the literature that would have implications for future research in a developing country such as Jordan to provide better understanding of business beliefs and organizational characteristics of governments that could affect adoption of ICT technologies and e-services by businesses in Jordan.

A study conducted by Aboelmaged (2010), investigated the effects of TAM and TPB variables on the intention of e-procurement adoption in the United Arab Emirates (UAE). The factors examined including ease of use, attitude, usefulness, subjective norm, and behavioral control. The findings show that the proposed model has a good explanatory power and confirms its robustness with a reasonably strong empirical support in predicting users' intention to use e-procurement technology.

However, a study showed that recognition selection bias could be a problem because only inactive e-procurement users were used in the data collection process (Aboelmaged, 2010). Hence, future studies should consider the collection of data from experienced people, such as procurement managers. This will remedy the bias and help researchers to better understand e-procurement adoption. In addition, the study was based on TAM model, whereas several authors argued that extending TAM model to include other variables such as organization culture and top management support is very important (Aboelmaged, 2010).

A study conducted by Ramdani (2009) used TOE framework to examine the influence of technological factors (relative advantage, compatibility, complexity, trialability, and observability), organizational factors (top management support, organizational readiness, IS experience, organizational size, and industry sector), and environmental factors (competitive pressure, external IS support, and market scope) to examines the adoption of enterprise systems (ERP, CRM, SCM and e-procurement) among Small and Medium Enterprises (SMEs) located in the Northwest of England. Several factors were found to be significant in influencing enterprise system's adoption in SMEs' such as, relative advantage, trialability, top management support, organizational readiness and size. Surprisingly, environmental factors were found to be insignificant.

This result contradicts the findings of a recent study by Buonanno *et al*. (2005) which emphasized that the decision process regarding the adoption of ERP systems within SMEs is more affected by exogenous reasons than business-related factors. However, it is consistent with the findings of a study by Lee (2004) who suggested that SMEs decisions are based on internal factors. As such, IS innovations are highly differentiated technologies for which there is no single adoption model that could solely be used (Ramdani & Kawalek, 2007a). According to Ramdani (2009), the limitations of this study are focusing on a limited geographical area on three industries only and on the pre-adoption phase of enterprise system's innovation/diffusion process. As such, future research can focus on extending this study to another geographical area. It would be interesting to look at the issues under consideration in a comparative perspective (e.g. a large geographical area, more types of businesses).

A study conducted by Lippert and Weerakkody (2006) examined TOE antecedents to web service's adoption, which indicated important variables of technological factors (security concerns; reliability; deployability), organizational factors (firm size; firm scope; technological knowledge; perceived benefits) and environmental factors (competitive pressure; regulatory influence; dependent partner readiness; trust in the web service provider).

The model presented in Lippert and Weerakkody (2006)'s study offers eleven propositions based on Tornatzky and Fleischer's (1990) TOE framework, which help to explain the organizational contexts which a firm adopts and implements an innovation. Ten positive relationships and one negative relationship were proposed addressing technological, organizational, and environmental issues related to web service's adoption. As adoption behavior is a significant component of organizational effectiveness; better understanding of its determinants will improve overall organizational performance. Hence, these factors deserve further investigation in future research.

Another study was conducted by Thong (1999) using TOE framework to examine CEO characteristics' (CEO's innovativeness and IS knowledge), technological factors' (relative advantage, compatibility, and complexity), organizational factors' (business size, employees' IS knowledge) and environmental factors' (competitive pressure) influence on business innovation adoption. The findings showed that small businesses with certain CEO characteristics (top management and level of IS knowledge), technological factors (relative advantage, compatibility, and complexity of IS), and organizational factors (business size and level of employees' IS knowledge) are more likely to adopt IS.

While CEO and innovation characteristics are important determinants of the decision to adopt, they do not affect the extent of IS adoption. The extent of IS adoption is mainly determined by organizational factors. Finally, the environmental factor of competition pressure has no direct effect on small business adoption of IS.

However, Thong's (1999) study did not include other variables that may be potential determinants of e-government adoption in businesses, including other factors of innovation such as security, IT infrastructure, government pressure, business nature, organization culture, top management support, and financial recourse.

In case of innovation adoption among business organizations, factors such as IT infrastructure and government pressure are very important in impacting the adoption decision which was not included in Thong's (1999) study. Hence, there is a need to investigate such factors in another context such as e-government adoption.

Premkumar and Roberts (1999) examined the adoption of new information technologies in rural businesses in the US. Their aim was to identify the usage of various communication technologies and the factors that influenced the adoption of these technologies. It described the impact of TOE factors on adoption of IT in businesses.

The results indicated that relative advantage, compatibility, top management support, organizational size, external pressure and competitive pressure are important determinants of adoption. In addition, complexity, cost, IT expertise, and vertical linkages are not determinants of adoption.

However, this study focused on the ICTs adoption among business in general and did not consider the impacts of such adoption on the business firm's performance. Furthermore, this study was conducted in USA. There is a need to investigate business firm's adoption of ICT in general and e-government service, in particular, in the developing countries.

Similarly, the OECD (2003) examined several countries' experiences in implementing e-government, including Denmark, Canada, Australia, Mexico, Germany, and the US. This study compared and evaluated the differences of implementing e-government among these selected OECD countries. In addition, they focused on the obstacles and challenges that should be overcome in order for e-governments to develop.

The findings showed that the most important challenges facing governments today and in the future include lack of funds, overall costs, lack of accountability, shortage of skills, and difficulties of monitoring and evaluating e-government programs.

While the OECD (2003) focused on the OECD countries, Heeks (2003) examined the success and failure rates of e-government in developing or transitional countries. Results showed that 85 percent of e-government initiatives face a total or partial failure and only 15 percent are successful. Heeks (2003) provided potential reasons for such failure by highlighting the problem that often arises in developing countries, which is the mismatch between the current and future systems due to the large gap in the economic, cultural, physical, and various other contexts between the software designers and the place it is being implemented. The model led Heeks (2003) to identify archetype situations where design reality gaps are common. These are summarized below:

- Hard-Soft Gaps: the difference between the actual technology (hard) and the social context (people, culture, politics, etc.) in which it operates (soft).

- Private-Public Gaps: the difference between the private and public sectors means of a system that works in one sector often does not work in the other.
- Country Context Gaps: the gap that exists when trying to use the e-government systems for both developed and developing countries.

The above statements show that, there is scope for further research in both the areas of failure and success of e-government in developing countries, and undoubtedly as more real-world cases come forth, so will new interpretations.

It is argued that businesses' adoption of e-government should be subject to similar factors of business adoption of e-commerce (Warkentin *et al*. 2002). Therefore, considering the similarities between e-commerce and e-government, selected empirical evidence are taken from the e-commerce literature to deliberate in the present study. There are also many similarities between e-commerce and e-government, and as previous research has found, factors from TAM, DOI and TOE models play a role in user acceptance of e-commerce (Gefen & Straub, 2000; Moon & Kim, 2001; Gefen *et al*., 2003; Pavlou, 2003). Other researchers also found it to be significant in influencing business's adoption of e-government (Warkentin *et al*., 2002; Carter & Bélanger 2003, 2004, 2005).

For example, Sutanonpaiboon and Pearson (2006) examined the factors that influence e-commerce adoption among business organizations in Thailand from the managers' perspectives. These factors were organizational readiness, perceived usefulness, perceived ease of use, entrepreneurial orientation, and external factors (competitive pressure and government pressure). The results showed that the major reason behind the non-adoption of e-commerce is that the organization is not ready to make that change because of cultural, technological, financial, and/or logistical reasons. In addition, organizational readiness strongly influences e-commerce implementation; top management, financial resources, logistical, and technological factors are key determinants if businesses in developing countries wish to implement e-commerce.

However, Sutanonpaiboon and Pearson (2006) argued that their results may not be generalizable in developed or developing countries because all studies have some limitations. Though Sutanonpaiboon and Pearson (2006) included important variables such as competitive and government pressure, they did not take into consideration other important variables such as organizational culture, business nature, IT infrastructure, organizational views on technology adoption, or government's role in supporting technology implementation. As such, the present study considers most of these variables in order to examine the business organization adoption of e-government service in Jordan.

Al-Qirim (2007) examined the factors influencing adoption and diffusion of e-commerce in developing countries to streamline its business processes and information flow to businesses in Jordan and other international businesses interested in order to invest in Jordan. As result, positive relationships were revealed between innovation adoption and relative advantage, compatibility, image, top management support, size and resources, quality of IS, and competition. In addition, negative relationships were found between innovation adoption and complexity, trialability, observability, cost, user involvement, product champion, suppliers, buyers, and technology vendors. Al-Qirim (2007) highlighted different drivers and impediments to the adoption decision of e-commerce in one non-governmental organizations (Jordan House of Commerce) in Jordan.

However, the study was an exploratory focus on issues surrounding e-commerce adoption and success in one non-governmental organization in Jordan. Organizational factors such as perceived benefit, security, IT infrastructure, government pressure, business nature, organization culture, top management support, financial recourse and examining their impact on the adoption decision process were not the focus in this study. Hence, these factors are proposed for future research areas in Jordanian organizations such as the ASE.

Limited studies were conducted to investigate e-government in Jordan or the rest of the Arab world. One of these studies was conducted by Mofleh and Wanous (2008) who examined factors influencing citizens' adoption of e-government services. It was found that variables such as trust of the internet and government, compatibility, awareness, and previous experience are determinants of citizen's adoption of e-government. The study identified variables that will increase citizens' demand for e-government services. The study also highlighted the different need of Jordanian society's e-government products, and services based on population segments. However, that study only focused on success factors in implementing e-government in Jordan among citizens, and business's adoption of e-government.

Using TOE framework, Alawneh and Hattab (2009), examined the influence of technological factors (technology readiness), organizational factors (firm size, financial resources, IT strategy, online revenues, IT professionals), and environmental factors (competition intensity, regulatory support environment) on the value of e-business adoption using a survey sample of 140 employees from seven banks. Several key factors were found to have significant influence in e-business adoption in banks namely technology readiness, financial resources, IT strategy, competition intensity, and regulatory support environment.

In their study, they discussed an interesting, but not entirely adopted and applied topic; value creation in e-business. According to Alawneh and Hattab (2009), empirical studies on e-business or e-government ventures and application's adoptions among business organizations are rare in Jordan. The authors stated that:

“As far as we know, this study is one of the first in Jordan that has attempted to evaluate the value of adopting e-business in banking services industry."

The statement has provided evidence that research in e-government adoption among business in Jordan is limited. In particular, there is a lack of academic research focusing on performance and status of e-government adoption among businesses in Jordan.

Al-Shafi and Weerakkody (2008) examined the adoption of e-government services in the state of Qatar. They examined the influence of performance expectancy, effort expectancy, and social influence on the intention to use e-government to develop a research model. The results showed that e-government services initiative in Qatar has been successful in promoting wider access to the internet. As a result, the adoption factors such as performance expectancy, effort expectancy, and social influence had a significant impact on intention to use the Qatari e-government services. The author suggested extending similar initiatives to other Arab countries, including Jordan as well as different sectors.

Awan (2007) examined the use of Dubai e-government websites by businesses from various industry sectors. The aim was to examine the usability, services quality, communication, security and content provided by Dubai e-government website. The results showed that service quality such as responses to businesses' queries made online or via e-mail are not rapid enough.

While both e-government sectors significantly affect the digital economy, G2B has major implications beyond G2C. However, Awan (2007) did not focus on types of industry and usage of government. In addition, what factors drive the managers to adopt e-government were not examined.

Zhao *et al*. (2008) examined user-interface characteristics and effectiveness of the e-government to business (G2B) sites from 50 states in the US and functional capacity of each G2B service of four evolutional current status of a web site. The study examined sophistication and functionality of these websites, namely informational activities allowing users to get information only; interactive use that enables users to get or search for information, as well as download forms, and send email; transactional activities allowing users to do business online such as filing tax documents, renewing licenses, and bidding contracts; and intelligent activities enabling users to create accounts and to personalize the site contents and services.

The results showed that majority of the G2B sites included the user-interface characteristics that provided online users with positive experiences when visiting the sites. However, the study identified some weaknesses (e.g. lack of online transaction capacity and lack of other important e-services) that caused negative experience to online users.

However, the study ignored the impact of e-government adoption on the firm's performance. As a result, future research needs to focus on G2B adoption, which helps strengthen the organization's competitiveness and growth from the manager's perspectives. In addition, the antecedent factors of G2B adoption were not investigated. As hence, future studies need to investigate the antecedents of e-government adoption among business organizations as well as the influence of such adoption on the organizations' performance.

Tung and Rieck (2005) examined the adoption of e-government services among business organizations in Singapore. They have investigated the technological factor (perceived benefits), organizational factors (management readiness and sensitivity to cost), and inter-organizational external pressure (such as government and industry) and social influence.

The findings showed that there is a significant relationship between perceived benefits, external pressure, and social influence and firms' decision to adopt e-government services. Tung and Rieck (2005) asserted that governments need to increase public awareness of the direct and indirect benefits of their e-services, to portray e-services as up-to-date, effective and secure, and to put in place various incentives to encourage their adoption. The authors also posited that: due to the low response rate, it was not feasible to conduct an analysis of the adoption decision according to industry. It implies that some businesses are more volatile than others or tend to have a higher need for the use of e-government services in their business activities.

Table 2.5 provides a summary of past studies that focused on e-government among citizens, while lack of studies of e-government adoption is presented among businesses. In addition, Table 2.6 summarizes the extent of research in e-government; it shows that studies have frequently focused on G2G issues of e-government initiatives. In sum, it also shows that there is a need to conduct studies to investigate the drivers, barriers and businesses' perceptions towards the use of e-government (demand-side).

Table 2.5
Empirical Findings and Limitations of E-Government Adoption Studies

Author	**Findings Related to E-Government Adoption**	**Direction for Future Research**	**Segment Market**
Tung and Rieck (2005)	Significant relationship between perceived benefits, external pressure, and social influence and the firms' decision to adopt e-government services	Investigate the adoption decision according to industries. Organizations from different industries face different operating conditions and may possess different requirements	Businesses (Singapore)
Zhao *et al*. (2008)	Majority of the state G2B sites included the user-interface characteristics that provided online users with positive experiences when visiting the sites.	Investigate to what degrees the state G2B sites help strengthen their state economic competitiveness and growth.	Businesses (USA)
Awan (2007)	E-government sectors significantly affect the digital economy; G2B has major implications beyond G2C.	Attempt to examine the extent to which different industries deal with the government online.	Businesses (Dubai)
Ramdani *et al*. (2009)	The results indicate that firms with a greater perceived relative advantage, a greater ability to experiment with these systems before adoption, greater top management support and organizational readiness are predicted to become adopters of e-procurement.	The limitations of this study are focused on a limited geographical area, on three industries only, on the pre-adoption phase of enterprise systems innovation/diffusion process	Businesses (UK)

Table 2.5 (Continued)

Author	**Findings Related to E-Government Adoption**	**Direction for Future Research**	**Segment Market**
Rorissa and Demissie (2010)	The rate of adoption is slow due to several factors. Some of these include infrastructure, literacy, economic development, and culture.	Researchers suggest more research on e-government services to improve implementation of government to business (G2B).	Citizens (Africa)
Dada (2006)	The major problem is seen to be the gaps that exist between the design and the reality of the system. The topic of e-government is still quite new, and perspectives are quite likely to change over time.	There is scope for further research in both the areas of success and failure of e-government in developing countries, and undoubtedly as more real-world cases come forth, so will new interpretation.	Literature review (Developing countries)
Akman *et al*. (2005)	Gender difference is huge in Turkey in relation to e-government adoption	Culture and communication styles need to be explored	Citizens (Turkey)
Al-Fakhri *et al*. (2008)	The Saudis should consider several reforms, chief among which include the following: Increasing the awareness of its e-government program	A future study could look at the major risks of e-government adoption and recommend some suggestions to avoid those risks.	Employees (Saudi Arabia)
Andersen and Henriksen (2006)	Benefits of digitalization of core e-government activities from end-users perspective	Research required to understand the driving forces for progression from one stage to another	Citizens (Denmark)
Al-Shafi and Weerakkod-y (2008)	The e-government services initiative in Qatar has been successful initially in promoting wider access to the internet	Future research can focus on extending this study to other gulf countries	Citizens (Qatar)
Barnes and Vidgen (2007)	Significant differences in perception regarding; usability, design, information, trust and empathy	Suggests the threat of internal validity can be overcome by triangulation techniques	Citizens (UK)
Lean *et al*. (2009)	There are significant positive relationship with citizens' intention toward using e-government services and trust and perceived usefulness	To expand the scope of research to whole Malaysia, in order to better understand the role, DOI and uncertainty avoidance (culture effect) as a whole.	Citizens (Malaysia)

Table 2.5 (Continued)

Author	Findings Related to E-Government Adoption	Direction for Future Research	Segment Market
Carter and Belanger (2005)	PEOU, compatibility and trustworthiness are significant indicators for adoption	Future studies should include a broader set of government agencies.	Citizens (USA)
Ibrahim and Abdullah (2006)	Knowledge sharing especially in e -government can overcome cultural barriers or attitude of staff.	Recommended the need to the importance of attending to the design of Web pages and provides the required services on the page in full.	Citizens (Jordan)
Choudrie *et al*. (2005)	Lack of accessibility and usability affect e-government adoption	Longitudinal research is essential to understand barriers of e-government in UK	Citizens (UK)
Dimitrova and Chen (2006)	Non-demographic characteristics are equally important	Research in 'civic mindedness' and differentiation of 'social networks' is essential	Citizens (USA)
Dossani *et al*. (2005)	Strong infrastructure and partnership with non-governmental organizations required	Research in strategic needs of stake holders	Citizens (India)
Fu *et al*. (2006)	PU and PEOU significantly affect adoption	Research in influence of PU and compatibility in other services	Citizens (Singapore)
Gilbert *et al*. (2004)	Factors influencing barriers of adoption	Research in service quality attributes (e.g. reliability, control, enjoyment)	Citizens (UK)
Gupta and Jana (2003)	Tangible and intangible benefits of e-government implementation	Qualitative analysis of the benefits of e-government are subjective in nature	Citizens (India)
Horst *et al*. (2007)	PU of e-government, PBC and worry about e-government' are insignificant	Research with different sample is suggested	Citizens (Netherlands)
Pilling and Boeltzig (2007)	Systematic barriers of adoption	Research on strategies to overcome digital barriers	Citizens (USA and UK)
Schaupp and Carter (2005)	PEOU, Image and relative advantage does not directly affect intention to use e-voting	Demographics of the sample is restricted	Citizens (USA)

Table 2.6
Review of E-Government Research Focused On G2G

Study	Topic of Analysis (Perspective)	Findings
Reddick (2005)	Models of e-government growth (G2G)	Empirical examination of e-government adoption stages within local governments. Privacy and security issues limit e-government growth.
Abanumy *et al*. (2003)	Evaluating e-government web sites (G2G)	The four stages model of e-government development is a useful way of evaluating the websites of e-government
Ebrahim *et al*. (2003)	Stages of e-government development (G2G)	Compare different adoption models
Ezz (2003)	E-government adoption (G2G)	Strategic and managerial issues should be solved first before implementing e-government
Ghaziri (2003)	Requirements of building e-government (G2G)	Leadership, ICT readiness, and human capital are requirements of e-government initiatives
Holden *et al*. (2003)	Government adoption of e-government (G2G)	Barriers of e-government adoption
Lau (2003)	Challenges of e-government development(G2G)	There are more than technical barriers to e-government such as citizen's trust, level of internet access, and legislative barriers.
Li (2003)	Managing e-government (G-G)	Recommendations on solving strategic management issues when implementing e-government
Melitski (2003)	Managing e-government (G2G)	Develop a model for e-government implementation and give insight from a managerial position
Prattipati (2003)	Difference between countries in the use of e-government (G2G)	Countries with heavy usage of e-government have high GDP, better Internet access, more competitive ICT environment, and spend more on ICT.
Davidrajuh (2004)	Planning for e-government (G2G)	Analyzing implementation strategies of e-government initiatives.

To conclude, the literature highlights the need for more studies to be conducted especially in the developing countries in order to investigate the citizens' and business adoption of e-government. In addition, the literature review indicates that there is a lack of empirical evidence on the factors that influence business firms to adopt e-government and the impact on firm performance. Hence, this study focuses on e-government adoption among businesses in Jordan.

Furthermore, the inconclusive findings by previous studies on e-government adoption had prompted, several authors to suggest further research to be conducted in this area of study.

2.8 Technology-Organization-External (TOE) Framework

According to Damanpour (1991), innovation adoption is generally carried out to enhance the effectiveness of the adopting organization and is subjected to the influence of individual, organizational, and external variables.

Past studies have examined the context associated with e-government adoption. For example, Moon (2002); Moon and Norris (2005); and Titah and Barki (2006) focused on organizational variables and categorized the variables as uncontrollable, partially controllable, and controlled factors that affect the success of e-government systems. Rogers (1995) proposed the effects of innovation attributes on innovation adoption and diffusion. Other IS researchers have examined other contexts to identify new factors, with the objective of providing a rich and more comprehensive framework for the study of innovation adoption.

A review of the success factors of e-government literature suggested that the TOE framework (Tornatzky & Fleischer, 1990) among other frameworks is an appropriate starting point to examine the factors that are linked to e-government adoption. Hence, the intention of businesses to adopt or not to adopt e-government can be affected by these contextual factors that can be explained using the TOE model.

The TOE framework has often been used to examine adoption of a new technology or innovation (Zhu *et al*., 2006; Gibbs & Kraemer, 2000). This framework is useful in studying the determinants of technology usage, implementation and diffusion. The TOE framework is appropriate to explore the factors which determine the success factors of e-initiatives implementation (Zhu *et al*., 2006; Zhu & Kraemer, 2005).

In their studies on the adoption and implementation process, Tornatzky and Fleischer (1990) conceptualized the contexts of the innovation adoption decision as consisting of TOE contexts. Based on the TOE framework, Swanson (1999) investigated the uptake of complex IT innovations. The study showed that a facilitating technology portfolio, organizational factors, and strategic environment, are important requirements for technological adoption.

A plethora of empirical studies (see Table 2.7) have used the TOE framework as a theoretical foundation for investigating organizational acceptance of new technologies. Lin and Lin (2008), for example, used the TOE framework to investigate antecedents that influence e-business use and business value in a multinational study. Mishra, Konana, and Barua (2007) examined the antecedents and consequences of internet use in procurement using the resource-based view of the firm and TOE framework. They found that it had a positive impact on the use of the internet for business. Judy (2007) proposed three contextual factors that are perceived to have an impact on the decision to adopt an innovation.

The literature review shows that the TOE framework has been used in previous studies in ICT domain (Iacovou *et al*., 1995; Chau & Thong, 1999; Hui, 2001; Thompson, Lin, & Lai, 2009). Different studies used different specific factors from each of the three contextual variables. It implies that TOE framework has received consistent empirical support (Zuh *et al*., 2004) in the area of IS studies. Hence, it can provide a foundation to examine factors associated with the adoption of e-government.

For the purpose of identifying various variables that are assumed to be related to innovation adoption based on the TOE framework, literature comprising IS and e-government was reviewed and the various relevant factors were divided into categories.

Table 2.7
Previous Studies Using the TOE Framework

Study	**Type of IT/IS**	**Variables**	**T**	**O**	**E**
			T		
Iacovou and	EDI	Perceived benefits		O	
Benbasat		Organization readiness			
(1995)		External pressure			E
		Organization size		O	
Damanpour	IT	Horizontal complexity		O	
(1998)		Environment uncertainty			E
		Perceived barriers	T		
Chau and Tam	Open system	Satisfaction with existing system		O	
(1997)		External environment			E

Table 2.7 (Continued)

Study	Type of IT/IS	Variables	T	O	E
Thong (1999)	IS	Relative advantage	T		
		Compatibility	T		
		Complexity	T		
		Business size		O	
		Employees' IS knowledge		O	
		Information intensity		O	
		Competitive pressure			E
Ramamurthy and Premkumar (1999)	DEI	Cost	T		
		Compatibility	T		
		Management support		O	
		Expected benefits		O	
		Competitive pressure			E
		Customer support			E
Premkumar and Roberts (1999)	IT	Relative advantage	T		
		Compatibility	T		
		Complexity	T		
		Cost	T		
		Management support		O	
		Size		O	
		IT expertise		O	
		Competitive pressure			E
		External support			E
		Vertical linkages			E
Kuan and Chau (2001)	EDI	Perceived direct benefits	T		
		Perceived financial cost		O	
		Perceived technical competence		O	
		Perceived industry pressure			E
		Perceived government pressure			E
Zhu *et al*. (2003)	E-business	Technology competence	T		
		Firm size		O	
		Firm scope		O	
		Consumer readiness			E
		Trading partner readiness			E
		Competitive pressure			E

Table 2.7 (Continued)

Study	Type of IT/IS	Variables	T	O	E
Zhu *et al*. (2004)	E-business	Technology readiness	T		
		Firm size		O	
		Financial resources		O	
		Global scope			E
		Competition intensity			E
		Regulatory environment			E
Pan (2005)	IT	Technology	T		
		Competence	T		
		Firm size		O	
		Firm scope		O	
		Competitive			E
		Trading partner readiness			E
		Government effect			E
Thi (2006)	E-commerce	Costs of technology	T		
		Security and risks	T		
		Internet service quality	T		
		Firm readiness		O	
		Alignment with firm strategy		O	
		Firm proactiveness		O	
		CEO computing experience		O	
		CEO IT knowledge		O	
		External support			E
		External pressure			E
Srivastava and Teo (2006)	E-government	ICT infrastructure	T		
		Human capital		O	
		Public institutions			E
		Macro-economy			E
Kouki, Poalin and Pellerimet (2006)	ERP	ERP attributes	T		
		IT expertise	T		
		Top management		O	
		Absorptive capacity		O	
		Strategic alignment		O	
		User involvement		O	
		Reward system		O	
		Vendor support			E
		Consultant effectiveness			E
		Institutional pressures			E

Table 2.7 (Continued)

Study	Type of IT/IS	Variables	T	O	E
Lippert and Govindarajulu (2006)	IT	Security concerns	T		
		Reliability	T		
		Deployability		O	
		Firm size		O	
		Firm scope		O	
		Perceived benefits		O	
		Technological knowledge		O	
		Competitive pressure			E
		Trust in web service provider			E
		Dependent partner readiness			E
		Regulatory influence			E
Judy (2007)	E-transformation	IT infrastructure competence	T		
		E-business know-how	T		
		Organizational culture		O	
		Organizational change		O	
		Competitive pressure			E
		Customer readiness			E
		Regulatory environment			E
Al-Qirim (2007)	E-commerce	Relative advantage	T		
		Complexity	T		
		Compatibility	T		
		Trialability	T		
		Observability	T		
		Cost	T		
		Image	T		
		Top management support		O	
		Quality of IS		O	
		User involvement		O	
		Product champion		O	
		Resources		O	
		Competition			E
		Suppliers Buyers			E
		Technology vendors			E
Lin and Lin (2008)	E-business	IS infrastructure	T		
		IS expertise	T		
		Organization compatibility		O	
		Expected benefits of G2B		O	
		Competitive pressure			E
		Trading partner readiness			E

Table 2.7 (Continued)

Study	Type of IT/IS	Variables	T	O	E
Lin (2008)	Technological Innovations	Explicitness of technology	T		
		Accumulation of technology	T		
		Organizational encouragement		O	
		Quality of human resources		O	
		Environmental uncertainty			E
		Governmental support			E
Salwani *et al.* (2008)	E-commerce	Technology competence	T		
		Firm size		O	
		Firm scope		O	
		Web-technology investment		O	
		Managerial beliefs		O	
		Regulatory support			E
		Pressure intensity			E
Thompson, Lin, and Lai (2009)	E-procurement	Perceived direct benefits	T		
		Perceived indirect benefits	T		
		Perceived costs	T		
		Firm size		O	
		Top management support		O	
		Information sharing culture		O	
		Business partner influence			E
Mohamad and Ismail (2009)	E-commerce	Perceived benefit	T		
		Perceived ease of use	T		
		Compatibility	T		
		Security	T		
		Size		O	
		Sector		O	
		Industry types		O	
		product intensity		O	
		Cost readiness		O	
		Competitiveness			E
Alawneh and Hattab (2009)	E-business	Pressures			E
		Technology readiness	T		
		Firm size		O	
		Financial resources		O	
		IT strategy		O	
		Online revenues		O	
		IT professionals		O	
		Competition intensity			E
		Regulatory support environment			E

Table 2.7 (Continued)

Study	Type of IT/IS	Variables	T	O	E
Ramdani *et al*. (2009)	E-procurement	Relative advantage	T		
		Compatibility	T		
		Complexity	T		
		Trialability	T		
		Observability	T		
		Top management support		O	
		Organizational readiness		O	
		IS experience		O	
		Organizational size		O	
		Industry sector			E
		Competitive pressure			E
		External IS support			E
		Market scope			E
Wang and Ahmed (2009)	E-commerce	Perceived benefits	T		
		Organizational readiness		O	
		Competitive pressure			E

E-business is enabled by technological development (Kauffman & Walden, 2001), the adoption of which may affect the strategic environment (Kowth & Choon, 2001). In addition, there is a need for organizational enablers, and business and organizational changes may also be required (Chatterjee, Grewal, & Sambamurthy, 2002).

Based on the review of literature (see Table 2.7), the proposed model for e-government adoption (Model of study) suggests that the decision to adopt e-government is primarily determined by the businesses' perceptions toward this innovation and what benefits it brings to the firm. In this model, e-government adoption is influenced by three factors, namely technological factors (relative advantage, compatibility, security, and IT Infrastructure), organization factors (top management support, financial resources, organization culture, and business nature), and external factors (competition pressure, and government pressure). Finally, this model suggests that e-government adoption will influence the firm performance in terms of efficiency and effectiveness of the work process.

2.8.1 Technology Factors

In terms of technology factors that are associated with e-government adoption, the literature has identified many technology factors that affect the adoption of any e-initiative in general and e-government, in particular. Authors such as Bourn (2002); Rogers (1995); McClure (2002); Themistocleous and Irani (2001); Bonham, Seifert, and Thorson (2001); Dillon and Pelgrin (2002); Layne and Lee (2001); Shung and Seddon (2000); Dawes (1996) and National Research Council (2002) had categorized these technological factors or attributes as key elements. These are relative advantage, compatibility, IT infrastructure and security.

Technologies are perceived to be possessing attributes or characteristics that have an effect on the decision to adopt as well as the way that it will be implemented. Roger (1995) identified the various issues related to innovation diffusion. These are innovation decision process, individual innovativeness, rate of adoption, and perceived attributes. Research in IS and related adoption studies have used perceived attribute's theory extensively to discuss IT innovation based on the five attributes (characteristics) of innovation proposed by Rogers (1995). These attributes are relative advantage, complexity, compatibility, trialability and observability.

An innovation's relative advantage is defined as the degree to which an innovation is perceived as better than the idea it supersedes, Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of the potential adopters (Rogers, 1995). Complexity is the degree to which an innovation is perceived as relatively difficult to understand and to use (Rogers, 1995). Trialability is the degree to which an innovation may be experimented with on a limited basis, and finally, observability is the degree to which the results of an innovation are visible to others (Rogers, 1995).

Even though Rogers's perceived attribute's theory and its five attributes have been used extensively by previous authors, other factors have been found to be significant in influencing the technology adoption. For example, Tornatzky and Klein (1982) performed a meta-analysis of 75 publications on the relationship between innovation characteristics and rate of adoption. The analysis results revealed that relative advantage, compatibility and complexity have been found to be consistently significant in prior studies, while there was less support for trialability and observability (Zmud & Apple, 1992; Permkumar *et al*., 1994; O'Callaghan, 2001).

In addition, Kown and Zmud (1987) and Carter and Be´langer (2005) identified relative advantage and compatibility as the perceived innovation characteristics in their IS implementation model based on innovation diffusion theory. Further, Cooper and Zmud (1990) and Premkumar *et al*. (1994) studied IT adoption had found these variables to be also important in the context of adoption of various information technologies.

Carter and Belanger (2003) identified four technology attributes that influence the diffusion of an innovation, namely relative advantage, compatibility, ease of use, and image. Their study revealed three significant indicators of citizens’ intention to use state government services online, i.e., the relative advantages, perceived image, and perceived compatibility. They suggested that state agencies should promote citizen acceptance and use of e-government services by focusing on factors. E-government grows in importance and priority for government and thus, an understanding of the factors that influence the adoption of government online services is imperative to drive its adoption.

Lean *et al*. (2009) examined e-government services among citizens in Malaysia, and found that adopters and prospectors are more ready to adopt e-government if it is compatible with their existing work practices, environments, and firm's objectives. Relative advantage was found to have a significant positive relationship with citizens’ intention toward using e-government services and perceived complexity has a negative relationship with the intention to use e-government services.

Further, Premkumar *et al*. (1999) found complexity negatively related to innovation adoption of new technology. Technologies that are perceived as not complex will be more likely to be adopted (Raymond, 2001; Thong, 1999). In addition, Al-Qirim (2007) examined e-commerce adoption in Jordan, and found no relationship between complexity, trialability, observability and cost with the adoption of e-commerce in Jordan.

Song *et al*. (2009) examined the factors (compatibility and relative advantage) that influence e-government adoption in Cambodia and found a positive association between compatibility, relative advantage and innovation adoption support to use e-government services in Cambodia. Kenway (2004) and Bourn (2002) posited that technology that is compatible with organizational belief, values and IT infrastructure will contribute to its adoption.

Based on the findings of previous studies on e-government by Karahanna (1999), Moore and Benbasat (1991), Plouffe *et al*. (2001), Van-Slyke *et al*. (2004) and Al-Qirim (2007), it has been suggested that relative advantage and compatibility are the most relevant constructs to adoption research that influence technological innovation diffusion.

Hence, this study examines the influence of relative advantage and compatibility on business intention to use e-government services.

Observability is the degree to which individuals feel they have the option to use an innovation or not. As businesses' use of a web-based state government service is an organization choice and is not likely to be mandated, observability would be unlikely to show significant variability. Complexity is the degree to which an innovation is perceived as relatively difficult to understand and to use. Again, apprehension provoked by observability is not a significant deterrent of e-government adoption, and is therefore inappropriate for this study. Trialability is the degree to which potential adopters feel that they can try the innovation before they actually adopt it.

Although many IS and e-government studies have attempted to examine the association between technological attributes and IS or e-government adoption, the results from these findings were inconsistent and inconclusive. Meanwhile, other studies on inter-organization IT, such as internet technologies, have examined other technological factors which were perceived to drive or inhibit technology adoption and implementation (e.g. Jones & Beatty, 1998; Soliman & Youssef, 2003).

It has long been recognized that higher levels of perceived relative advantage increases business organization intentions to use e-government services. Several studies found it to be significant in influencing users 'decision to adopt' (Hung *et al*., 2010; Sang *et al*., 2009; Carter & Belanger, 2003; 2004; Cook, 2000).

Therefore, the government's role is to identify and communicate to its target group including business organizations, the advantages of using online services as opposed to other means of conducting business matters with government agencies. As a result of e-government services, individuals and organizations received faster and more convenient services from government (Trinkle, 2001). For example, the government could encourage the adoption of online license renewal and formal transactions by emphasizing its convenience and speed compared to the traditional method. Such online transactions can be completed from the home or office 24 hours a day, seven days a week. The availability of the service is not limited to standard business hours. The users can complete this transaction whenever and from wherever it is most convenient.

The comparative benefits of other online services such as license renewal or tax filing should be promoted to the citizens by agencies to increase adoption of these services (Chong, 2004; Carter & Belanger, 2005; Al-Qirim, 2007). Hence, the adoption decision in any organization would involve evaluating the advantages of the new technology. These communication technologies provide many benefits to the adopters in terms of time saving, better customer service, reduced costs and timely information for decision making (Thong, 1999). In a competitive market place, these benefits create significant motivations for adopting these technologies (Kwon & Zmud, 1987; Premkumar, 1994).

The advantage of perceived compatibility is also associated with increased intentions to adopt e-government initiatives. Compatibility describes the consistency of new innovation with existing values, experience and needs. Compatibility is defined as how people perceive e-government initiatives and how e-government approach fits in the government agencies' current work process (Plouffe *et al*., 2001; Van-Slyke *et al*., 2004).

Business organizations tend to adopt e-government as a method of searching for information and services, providing personal information and conducting transactions electronically. Therefore, business organizations will have higher intention to use e-government services than those who view these services as incompatible to their needs (Carter & Belanger, 2005).

Despite the cost of IT going down, an adequate technology infrastructure is the key for successful e-government adoption especially in the developing countries including Jordan. Al-Omari and Al-Omar (2006) stated that IT infrastructure involves all components of IT, including hardware, software, communication and networks infrastructure, software application, legacy systems and the current organization's technology and electronic systems. Joseph and Kitlan (2008) highlighted that limited availability of IT to build the necessary infrastructure can act as a deterrent to the adoption of internet technologies.

It was argued that IT infrastructure is a crucial element to the linkage of information and knowledge integration in e-government adoption (Kim & lee, 2004). Chango (2007) stated that any realistic assessment of the country's journey towards full e-government should start with a clear idea about what is actually on the ground in terms of infrastructure and policies. However, technology alone is not the only requirement for e-government success (Shung & Seddon, 2000; and Themistocleous & Irani, 2001). Sufficient resources, adequate infrastructure, management support, capable IT staff, and effective IT training and support are also needed to ensure success in IS adoption.

Altameem, Zairi, and Alshawi (2006) pointed out that IT infrastructure is considered as the heart of the e-government. The availability of IT infrastructure is considered crucial for the success of e-government adoption. According to Wagner, Cheung, and Lee (2003) and Altameem, Zairi, and Alshawi (2006), some of the server information are data and content management tools; application development tools; hardware and operating systems; and system management platform.

The National Research Council (2002), Dillon and Pelgrin (2002), Bourn (2002), McClure (2002), and Bonham *et al*. (2001) highlighted that many governments viewed the lack of technical infrastructure as the barrier to the development of e-governments. Furthermore, Dillon and Pelgrin (2002) and Layne and Lee (2001) emphasized the importance of the capability of the communications network and infrastructure as an important foundation for the integration of IS across government institutions. Hence, IT infrastructure should be in place before e-government services can be developed (McClure, 2002). In a related study, Cui *et al*. (2006) found that IT infrastructure is one of the most important factors that positively influences the firms' IT usage. This finding concurred with the study by Zhu *et al*. (2002) who highlighted that IT resources, including IT infrastructure plays a significant role in IT adoption.

However, Pan and Jang (2008) who investigated IS adoption among Taiwan's ICT industry, revealed that IT infrastructure has no significant effect on ERP systems adoption by firms in the ICT industry. Other studies also revealed similar findings. For example, Premkumar and Ramamurthy (1995) and Thong (1999) suggested that businesses that adopt IS do not do so because of their existing IT infrastructure. One plausible explanation for such result is that modern IT infrastructure is already in place. As such, this suggests that the influence of IT infrastructure on the firm's adoption of any IT initiative will differ from one country to another as well as from one sector to another.

Therefore, IT infrastructure deserves further investigation in the context of developing countries including Jordan. A broader study conducted by Zhu *et al*. (2006) on 1,857 firms from 10 countries revealed the importance of IT infrastructure differed from the developing countries to the developed countries. Their findings show that in developing countries, IT infrastructure is the most critical factor, while the technology integration is shown to be the strongest factor in developed countries.

Previous innovation diffusion studies were concerned with the influence of technology attributes proposed by Rogers (1995). Other types of variables related to technology adoption are the concern for IT infrastructure, security, legal and privacy issues, and cost (OECD, 2003; Heeks, 2004; Norris *et al*., 2001). IT infrastructure is required to support e-government adoption (Ebrahim & Irani, 2005).

Nambisan and Wang's (1999) study identified the issue of security, both real and perceived, as a factor affecting the intention to adopt an actual adoption behavior. Security is defined as both the perception, or judgment, and fear of safeguarding mechanisms for the movement and storage of information through electronic databases and transmission media.

According to Awan (2007), security issues in terms of privacy and confidentiality of information are important for e-government the same way as for e-commerce. Security is a recurring issue in e-commerce and e-government research (Zhao & Zhao, 2010; Bélanger & Hiller, 2005; Chadwick, 2001; Miyazaki & Fernandez, 2001; GAO, 2001; Hoffman *et al.*, 1999). Security is one of the most significant challenges for implementing e-government. For example, there are legitimate concerns about the citizens' rights to privacy versus the state's national-security concerns. On one hand, there are concerns that the government can know too much about people and could use that information inappropriately. In the same vein, there are government concerns, which include the easy access to information by the public that could undermine national security and therefore social stability (Elsheikh *et al.*, 2007; Al-Omari, 2006).

Melitski *et al*. (2005) assessed the security of web sites. The results suggest that security issue should be taken into account more to enhance business's acceptance. Lack of technology/web staff, financial resources, information about e-government applications as well as security issue, the need to upgrade technologies, convenience fees for online transactions issue and lack of support from the elected officials, were found to be the major barriers to e-government adoption (Holden *et al.*, 2003).

Among these technical barriers, the main challenge in the use of technology especially the internet, is related to security issues (Trkman & Turk, 2009; Joia, 2004; Bonham *et al.*, 2001; Gefen *et al.*, 2002; Daniels, 2002). Its inter-consecutiveness is also vulnerable to attacks by worms, virus, and other forms of denial of service attack hackers (Lambrinoudakis *et al*., 2003; Sanchez *et al*., 2003).

Lippert and Govindarajulu (2006) found positive association between security and innovation adoption. Roy (2005), Joia *et al*. (2004), Holden *et al*. (2003) and Joshi *et al*. (2004) noted the security issue as a major obstacle in the use of the internet and for the adoption of e-government.

Organizations are dependent upon their IS for day-to-day operations. IS databases hold crucial data about customers, suppliers, processes, and business transactions. Compromising the security of these systems can be very costly to the organization in terms of trust, loss of goodwill, potential litigation and firms' image. Since the web services are vulnerable to various threats, it poses new security problems to organizations (Joia *et al*., 2004; Coetzee & Eloff, 2005).

Many studies have found security to be the most significant element in e-government adoption (e.g. Zhao & Zhao, 2010; Roy, 2005; Joia *et al*., 2004; Holden *et al*., 2003; Melitski *et al*., 2005; Gilbert *et al*., 2004; Moon, 2002; Norris & Moon, 2005; Treiblmaier *et al*., 2004; Weerakkody *et al*., 2004) and a key barrier to e-government adoption among citizens and businesses. Lean *et al*. (2009) asserted that to increase businesses' actual participation in adoption of e-government initiative, issues related to security and availability of IT infrastructure should be further examined.

2.8.2 Organizational Factors

The organizational factor represents different mechanisms, structures and characteristics that influence the propensity of adoption and assimilation of an innovation (Tornatzky & Fleischer, 1990). However, the organizational factors that are associated with the uptake of e-government are organization culture, top management support, organizational resources, and business nature, which are important for the implementation of e-government in businesses (Al-Qirim, 2007; Judy, 2007).

The successful adoption and implementation of technological innovations in organizations such as businesses have often been related to four major factors. This is the support of organization culture (Shaukat & Zafar, 2010; Dasgupta & Gupta, 2009; Hung *et al*., 2009), top management support (e.g. Sabherwal, Jeyaraj, & Chowa, 2006; Ho, 2002; Heeks, 1999; Al-Fakhri, 2008; Carrow, 2001; Schedler & Schmidt, 2004; Sagheb-Tehrani, 2007; Kouki *et al*., 2006; Ramamurthy &, Premkumar, 1999), organizational resources (e.g. Bonham *et al*., 2001; Edmiston, 2003; OECD, 2003), and nature of business (Premkumar & Roberts, 1999; Mehrtens *et al*., 2001; Tai & Phelps, 2000; Ulengin & Uray,1999; Iacovou *et al*., 1995).

Due to the fact that top management can increase an organization's adoption of innovation by promoting a friendly culture, such as valuing change, efficiency and goal setting (Caccia-Bava *et al*., 2006), hence, organization culture is an important factor in influencing organization decision to adopt new e-initiative, including e-government among business organizations (Hung *et al*., 2009).

Organizational culture is associated with the organization's sense of identity, its goal or core values, its primary ways of working and a set of shared assumptions (Schein, 2005). It refers to common values and beliefs shared by individuals within an organization (Punnett *et al*., 1990). It dictates the formal and informal way members interact with each other and with people outside the organization (Deshpande & Farley, 1999).

In terms of innovation adoption among organizations, within a friendly or innovation encouraging culture, organizational members are receptive to adopt new practices and technologies and actively apply them to add value to the existing practices (Hung *et al*., 2009). An innovative organizational culture can encourage novelty technology so that they are widely accepted (Wallach, 1983). A high innovative organizational culture is more likely to result in adoption decision (Fink, 1998; Kitchell, 1995).

The role of organization culture or corporate culture as some authors refer to it, is highlighted in the literature as a significant factor. For example, Watson (2003) demonstrated that the basic goal of an organization is to improve the job performance. To achieve this objective, the manager should first deeply study their corporate culture and make sure that all employees are ready to accept the particular change in technology. This suggests that organization culture is an antecedent of any new technology acceptance and adoption in business organizations.

In general, culture refers to values and beliefs of individuals within a unit. It is also considered to be the totality of socially transmitted behavior patterns, beliefs, institutions, and all other products of human work and thought characteristic of a community or population (Ein-Dor *et al*., 1993). Therefore, depending on the unit, culture can be categorized into different types, namely national culture, organizational culture, professional culture, functional culture and team culture.

In recent years, information system's researchers have started exploring this role of culture in the adoption and diffusion of IS. Other studies have investigated the role of organizational culture on IS planning. In short, culture, both organizational and national, has attracted researchers' interest in IS studies (Salleh & Green, 2006).

Few past studies have been conducted in order to examine the impact of organization culture on new technology adoption that demonstrates culture is predictive of organizational technology adoption (Dasgupta *et al*., 1999; Chanasuc and Praneetpolgrang, 2008; Doherty & Doig, 2003; Harper *et al*., 2001; Dasgupta & Gupta, 2009; Harrington *et al*., 2005; and Shaukat & Zafar, 2010). For example, a study conducted by Chanasuc and Praneetpolgrang (2008) found that organizational culture can influence the acceptance of e-learning among Thai undergraduates. Caccia-Bava (2006) reported culture influences the capacity of hospital organizations to innovate by adopting new technology. The results show organization culture as an important factor in developing absorptive capacity, and the latter's influence in the implementation of new technologies.

In the context of e-government adoption, Dasgupta and Gupta (2009) expand the TAM model by identifying the antecedents to technology acceptance to include the role of organizational culture in the acceptance, adoption, and diffusion of e-government service among government organizations employees. The result shows that organizational culture has an impact on the individual's acceptance and use of internet technologies in a developing country. Their findings emphasized on the significant role of organizational culture in promoting adoption of technology. However, Dasgupta and Gupta's (2009) study ignored the external factors such as competition that mostly drives organizations to adopt new technology.

Recently, a study by Shaukat and Zafar (2010) examined have not been examined factors that may affect an organization's decision to adopt an innovation. These factors included organizational factors such as culture, structural, human resources and sociological factors such as social, governmental, economic, and political factors.

Their findings have led to the conclusion that the organizational decisions to adopt a new technology are very much effected by these factors. Among others, the organizational cultural factors are found to be most significant. However, Shaukat and Zafar's (2010) study did not take into account the technological factors that may influence innovation adoption.

Boynton and Zmud (1987) recommended that organizations should evaluate the importance of organizational culture and its impact on IT planning. Researchers have investigated the role of organizational culture on absorptive capacity and IT success (Harrington *et al*., 2005), IT adoption and diffusion (Dasgupta *et al*., 1999), IT implementation (Fedrick, 2001; Harper *et al*., 2001), IT infrastructure flexibility (Syler, 2003) and computer user efficacy (Sheng *et al*., 2003). Other studies have looked at the impact of organizational culture on specific technologies such as knowledge management (Gold *et al*., 2001) and implementation of data warehouses (Doherty & Doig, 2003). Top management support in promoting friendly culture is also vital in promoting innovation in organization (Caccia-Bava, 2006).

Slevin and Pinto (1987) defined top management support as the willingness of top management to provide the necessary resources and authority or power for project success. In the case of e-government adoption, Sabherwal *et al*. (2006) defined top management support as a favorable attitude towards e-government in general. Top management can offer several guidelines to managers in departments and business units about opportunities and risk technologies (Barki & Hartwick, 1989).

Top management perception on e-government is significant as e-government provides a strategic opportunity and serves as strong signals to the rest of society about the importance of management towards adoption of e-government. Through their beliefs and participation, top management can confer legitimacy on the willingness of managers to devote their time and energy on web technology which could be reflected in business operations and activities (Jarvenpaa & Lves, 1991).

A study by Thompson and Rust (2005) identified top management support as a critical factor in e-government adoption and deployment. Such support is necessary to ensure that there is the commitment to the provision of resources in addition to the organizational climate to drive the adoption of e-government.

The support of top management is essential in overcoming barriers and resistance to change (Teo & Tan, 1998). In addition, support of top management was found to be consistent in the application of IT and innovation studies (Ramamurthy & Premkumar, 1999; Purvis, Sambamurthy, & Zmud, 2001). Delone (1988) stated that top management is vital in the adoption because it ensures adequate resources for implementing the innovation such as e-government.

Somers and Nelson (2004) concurred that top management is a key predictor for the successful adoption of e-government project. Top management participation and their continued support throughout all the phases of the project help in ensuring a smooth change management and mobilizing commitment of other stakeholders (Bingi, Sharma, & Godla, 1999; Somers & Nelson, 2004; Al-Mashar *et al*., 2003).

According to Welti (1999), active top management is important to facilitate allocation of enough resources, fast decisions and support for the acceptance of the project throughout the firm. The top management's involvement at every stage of the e-government implementation will also allow for a mindset change in all levels in the organization (Khalil *et al*., 2002).

Al-Qirim (2007) stated that top management support is a driver for e-government adoption in Jordan, which clearly has played a crucial role in the adoption and diffusion of e-government in other developing countries. The top management is important to mobilize necessary resources and momentum in order to adopt the expensive e-government.

Grandon and Pearson (2004) examined factors that influenced e-commerce adoption or non-adoption by businesses in the US. The result showed that the enthusiasm of top management support, compatibility with the firm's work environment, perceived advantage from e-commerce, and knowledge of the firm's employees about computers were significant factors that differentiated between adopters and non-adopters of e-commerce.

Consistent with the results of Mirchandani and Motwani (2001), factors such as the degree of dependence of the firm on information, managerial time required to plan and implement the e-commerce application, financial cost of implementing and the nature of the businesses competition, and operating the e-commerce application were not found to be insignificant in e-commerce adoption.

A study by Lertwongsatien and Wongpinunwatana (2003) investigated business enterprises in Thailand and described the factors that differentiated e-commerce adopters from non-adopters. This included organization size, top management support for e-commerce, existence of an IT department within the organization, perceived benefits and compatibility, and industry competitiveness. Wong (2003) conducted a study of e-commerce diffusion in Singapore and found that the biggest reason firms had not adopted e-commerce was that top management did not see e-commerce as necessary. Nonetheless, top management support, type of businesses, and financial resource do not appear to have been examined in detail and require further study.

Ke and Wei (2004), who examined factors influencing organization's adoption of e-government services, indicated the important variables namely change process and critical success factors on organization adoption of e-government. The study found that top management support was a major enabling factor of e-government adoption at the infusion stage. In addition, presence of a champion, change management, financial resources, and mindset changes, bridging digital divide, usability and strong leadership were found to be critical success factors of portal acceptance. Further research is needed to examine the context specificity and influence strength of each of these factors.

Past studies have focused on the importance of top management support for IS and e-government adoption (Salwani, 2008; Mohamed, 2008; Titah & Barki, 2006; Ke & Wei, 2004; Mirchandani & Motwani, 2001). Support from top management, in general, is viewed as having a significant, positive impact on innovation adoption (Fichman, 2004; Carter *et al*., 2001; Eder & Igbaria, 2001). Attention should be given to management's role in situations of change. In addition, Igbaria *et al*. (1998) found that the key role in driving the technology innovation lies on the shoulders of top management. Gould (2001) identified top management support is one of the three main factors that is necessary for successful e-commerce uptake. This is consistent with a study undertaken by Quinn *et al*. (1997), which found that the most critical single factor in stimulating innovation is top management leadership.

Generally, the above literature has provided empirical evidence that top management which showed interest to adopt e-government and regard e-government as important will ensure sufficient resources to be allocated for its adoption and implementation (Premkumar & Roberts, 1999). Top management will commit substantial personal attention to the realization of their aims, provide attention and interest, which will create conducive environment for technology adoption and implementation. Jarrar, Raz~ni, and Zairi (2000); and Bingi *et al*. (1999) argued that management role is not only initiation and facilitation, in fact, they continue to extend to the full implementation of an e-government system. In addition, they are required to monitor the progress and provide direction to the implementation team.

Schedler and Schmidt (2004) provided empirical evidence linking the top management support with the application of e-government. The theoretical assertions and empirical evidence provided evidence that top management support is vital for the adoption of e-government among businesses.

Prior studies have shown that financial resource is also an important factor for technology implementation (e.g. Heeks, 1999; Norris, Fletcher, & Holden, 2001; Bonham *et al*., 2001; Edmiston, 2003; Irani, Themistocleous & Love 2003; OECD 2003; Ramamurthy & Premkumar, 1999; Kheng & Al-Hawamdeh, 2002; Ho, 2002; Iacovou *et al*., 1995).

Due to the fact that e-government adoption is an investment in hardware, software, system integration as well as employee training, sufficient financial resource is required in order to help businesses in developing e-government capabilities (Chircu & Kauffman, 2002). Businesses that devote greater financial resources to IT and web-based development are more likely to achieve success in e-government implementation and realize its value (UNCTAD, 2002). A study conducted in US revealed that over 50 percent of government organizations had indicated financial resources as the main investment to adopt an e-government initiative for public and private sector organization (Norris *et al*., 2001).

High operational costs of the existing IT infrastructure as well as its maintenance costs are barriers to e-government adoption (Irani *et al*., 2003). Budgeting for e-government can help in the implementation of the e-government project. Based on that, sufficient resources must be allocated due to the fact that resources are needed to start the projects, launch the websites, and provide online information and facilities (Shahkooh &

Abdollahi, 2007). Tung and Rieck (2005) suggested that when the management perceived the adoption of new technologies is important in order to achieve cost reductions, this will lead to higher level of e-government adoption.

Several studies have examined e-government as organizational or individual characteristics (Norris & Moon, 2005; Gilbert *et al*., 2004; Kim & Bretschneider, 2004; Holden *et al*., 2003; Moon, 2002), aimed at identifying specific organizational or individual characteristics affecting e-government acceptance and use. Within this, financial and non-financial resources are found to be the most significant factors affecting adoption of e-government. Lack of financial resources, lack of technology staff and expertise, technological upgrades, security and privacy issues were found to hinder e-government adoption and evolution.

Thompson *et al*. (2009) stated that cost consideration by organizations has a major influence in the uptake of e-government. When an organization perceives the cost as high and is unable to commit financial resources, it will lead to resistance to adoption of an innovation. Such cost may be important for staff training, maintaining and implementing, operating and setting up e-government (Thompson *et al*., 2009). Usually, a business having slack financial resources will be better equipped to implement an integrated e-government. The availability of financial and human resources are positively related to the adoption of e-government among businesses.

Several studies concurred with the positive association between financial resources and innovation adoption (Thompson *et al*., 2009; Zhu & Kraemer, 2005; Zhu *et al*., 2004;

Kuan & Chau, 2001; Damanpour, 1996). However, a study by Alawneh and Hattab (2009) found negative association between financial resources and innovation adoption.

In a similar study comparing e-government and IS adoption between developing and developed nations, Zhu *et al*. (2004) postulated that financial resources are important in developed countries. This suggests that as firms move into deeper stage of adoption, the key determinant of adoption shifts from monetary spending to higher technological capabilities (Zhu *et al*., 2004). Hence, the availability of slack resources in terms of financial and non-financial resources such as expertise are important determinants of e-government success.

2.8.3 External Factors

The external factor is the arena in which an organization conducts its business. The growth of inter-organizational and strategic business systems has highlighted the role of external factors. Researchers have identified a number of environmental factors that influence the propensity to adopt innovations by businesses. The external factors examine the organization's external landscape (Tornatzky & Fleischer, 1990).

Two major external pressures encountered by businesses are competitive pressure and government pressure (e.g. Kuan & Chau, 2001; Kraemer, 2002; Pan, 2005; Sutanonpaiboon & Pearson, 2006). Other factors affecting e-government adoption and diffusion are national factors. For instance, past studies have shown that innovation diffusions differ depending on the country's socio-cultural environment. The level of national infrastructure and government involvement also fosters e-government adoption (e.g. Al-Qirim, 2007; Pan & Jang, 2008; Scupola, 2009).

Many studies have addressed government support for e-government adoption as government policies and especially IT policies can, promote the adoption of e-government among businesses (e.g. Kuan & Chau, 2001; Kraemer, 2002; Pan, 2005; Sutanonpaiboon & Pearson, 2006; Lin, 2008). The external context is significant for IT adoption. These factors include competitors, trading partners and government pressure to adopt IT.

In terms of e-government adoption, Lane (1997) stressed that competition and government pressure can be seen as a push factor that drives organizations for change. Competition and government support can be a powerful tool to encourage businesses to adopt e-government. The adoption of e-government technology itself is a global convergence (Malone, Homas, Yates, & Benjamin, 1987; Ciborra, 1993).

The role of the government is a critical environmental factor affecting innovation diffusion (Kraemer, 2002). Governments can provide firms with capital, laws and policies to ensure trust and security in e-government services formulated. With a supportive government, it will be more likely for firms to adopt new IT.

Competition is identified in the e-government literature as another important factor that drives organization towards innovation adoption. It is widely recognized that competition is a push factor in the innovation adoption literature (e.g. Grover, 1993; Thompson *et al*., 2009; Crook & Kumar, 1998; Lin & Lin, 2008; Judy, 2007; Premkumar, Ramamurthy, &

Rum, 1997; Zuh *et al*., 2003-2004; Premkumar & Roberts, 1998; Iacovou *et al*., 1995; Chevallerau, 2005; Hsu *et al*., 2006).

An IS is an important factor that influences organization success as organizations are becoming reliant on IS to do business. The use of such systems provide competitive advantages for organizations, better reduced operation costs, improved planning, decision making within organizations, and enhanced customers and suppliers' relationship (Alavi & Joachimsthaler, 1992).

Competitive pressure is operationalized as the pressure resulting from a threat of losing competitive advantage, forcing firms to adopt e-government (Lin & Lin, 2008). Lin and Lin (2008) asserted that competitive pressure is an important factor shaping e-initiative diffusion. Competitive pressure was found to positively influence internal integration and external diffusion of the e-initiative. It shows that the emergence of competitive pressure is a key determinant for integration and diffusion of innovation. This implies that when firms face strong competition, they tend to be more proactive in implementation of IS.

Competitive pressure has also been found by several other studies as significant determinant of the degree of computerization (Dasgupta, 1999), inter-organizational system's adoption (Grover, 1993), Electronic Data Interchange (EDI) diffusion (Ramamurthy *et al*., 1999), and/or the uptake of IS (Zhu *et al*., 2003). E-government capability could enhance information managing and facilitates inter-firm collaboration to enhance transactional efficiencies, expand existing channels, and take advantage of new opportunities.

Studies by Raj and Bajwa (1997) and Hsu *et al*. (2006) found greater environmental uncertainty resulted in more competition and is associated with a higher level of IS usage. Past IS research has reported a positive relationship between competition and IS adoption. Kuan and Chau (2001) examined EDI adoption in small businesses using a TOE framework in Hong Kong. The results showed that the adopter firms perceived higher government pressure but lower industry pressure as compared to non-adopter firms in terms of EDI adoption.

Major TOE variables have been identified in literature as related with IS and e-government adoption, particularly between binary groups like adopters and non-adopters. It is noted that different groups of adopters generally have different features when viewed in the light of innovation adoption (Rogers, 1995). This shows the dynamic nature of the factors that impact innovation adoption. Unfortunately, only a few studies were noted to have carried out this view in e-government adoption.

Kuan and Chau, 2001; Grandon and Pearson, 2001; Chang and Cheung, 2001; Mehrtens *et al*., 2001; Iacovou *et al*., 1995; Chwelos *et al*., 2001; Zhu *et al*., 2000; Doolin *et al*., 2003; and Poon and Swatman, 1999, found that competition and government pressure are significant on the intention to adopt the internet while some authors found competition and government pressure to be insignificant on intention to adopt the internet (e.g. Mirchandani & Motwani, 2001; Kula & Tatoglu, 2003; Teo *et al*., 2000). There is a lack of consensus as to the influence of external factors. Further research is needed to examine the role of external factors in prompting e-government adoption.

More recently, Salwani *et al*. (2008) identified that organization factors, especially the managerial beliefs, web-technology investment and technological resource and awareness, are more influential than environmental factors in the stages of e-commerce adoption. However, environment factors, together with commitment, and the government that organizations had installed, affect the institutionalization of e-government. This result again provides further evidence that studies have to discriminate among factors linked to adoption variation among firms, depending on their extent of adoption.

In summary, on the basis of adoption theory, it is expected that factors which explain the adoption of innovations will not be static on the diffusion process but change as a firm progresses through the adoption stages. This implies that factors explaining adoption of innovation will change over time as the diffusion process continues (Thong, 1999; Ramamurthy & Premkumar, 1999; Premkumar & Roberts; 1999; Lippert & Govindarajulu, 2006). However, previous e-government researches mainly focused on identifying these changes, largely between adopters and non-adopters. Limited studies were carried out regarding adoption beyond binary adoption groups.

Several e-government and IS studies have supported and presented empirical evidence of coercive pressure on e-government adoption among businesses (Mehrtens *et al*., 2001; Kuan & Chau, 2001; Chwelos *et al*., 2001; Iacovou *et al*., 1995; Chang & Cheung, 2001; Yildiz, 2007). Nonetheless, the competitive pressure and government pressure do not appear to have been examined in detail by research conducted on e-government adoption.

2.9 Organizational Performance

The primary objective of any e-government initiative is to improve the quality of the interaction between the government and businesses and citizens through improved connectivity, better access, furnishing high-quality services and better processes and systems (Lean *et al*., 2009; and Moon, 2002). According to Warkentin, Gefen, Pavlou, and Rose (2002) e-government is characterized by extensive use of communication technology. The impersonal nature of the online environment, the ease of information that can be collected, processed (data-mining) and used by multiple parties can provide an advantage to businesses. In the same vein, the Jordanian government's e-government initiative is aimed at enhancing the performance of its public and private sector organizations in terms of service provision, enhanced efficiency, accuracy, time and cost saving, transparency, and improved citizens' and business owners' satisfaction (Government of Jordan's research, 2006).

From the demand side, businesses adopt e-government with the hope of improving business efficiency, effectiveness, gain strategic benefits, and provide transparency to the work process. According to Lin and Lin (2008), business organizations increasingly attempt to improve their performance by using internet-based technologies that facilitate and improve the share of information, transactions, improve customer service and strengthen coordination with trading partners.

Enhancing efficiency is one of the primary goals of any IT implementation. Among business organizations, innovation adoption in general and e-government adoption in particular, also aims to increase the firm's efficiency by reducing the costs and time to complete a business process, minimise inventory as well as the human resource needed to perform tasks (Montagna, 2005; Steyaert, 2004).

In terms of effectiveness, it has long been recognized that awareness and access to the government's new information would increase the organization's performance. Access to updated information provided by the government and using this available information is the most important factor that contributes to increasing business organization's effectiveness and performance. Some of this information are economic indicators, future government investment project, agreements developed with other countries, credit or encouragement lines, etc. (Montagna, 2005).

In many cases, the government used to have information available, but it could not be easily accessed by businesses. The large size of the region and the great number of business opportunities made it impossible for many proposals and resolutions to be available to the public. However, by publishing them on the internet such as government web site, this effort will help to project a positive image (Montagna, 2005; Steyaert, 2004).

Riggins (1999) distinguished three categories of value creation for business adoption of ICT. These are improving efficiency (time and cost-related), improving effectiveness (related to communication), and strategic benefits (related to products, markets and services).

Montagna (2005) presented the basic criteria for evaluating advantages and benefits of e-government adoption from both supply (government) and demand (citizen and business) sides. He proposed five dimensions to characterise these advantages from adopting e-government. These are time, product, distance, interaction, and procedures. Each of these factors can be assessed based on four criteria namely efficiency, effectiveness, strategic benefits, and transparency. Fountain (2001), stated that business organizations create products and provide services to the customers. They can benefits from adopting e-government to enhance their effectiveness and efficiency of their work processes.

The governmental web pages offer citizens a single channel to interact with their government (Thomas & Streib, 2003). As a result, communication is improved and citizens do not have to visit numerous government offices to obtain the service they require. Hunaiti *et al*. (2009) argued that there are many ways businesses can benefit from innovation adoption, which ranges from serving current customers better and improving the efficiency of their business processes via e-government adoption.

Several authors highlighted the need for more research to investigate the impacts of IT adoption on the firm's performance (Barua *et al*., 1995; Crowston & Treacy, 1986; Davenport, 1992; Harrison, 1992; Lefebvre & Lefebvre, 2003). The reason for such an argument is that empirical findings on this relationship have been vague and non-conclusive over the past decade (Boyer & Olson, 2002; Gebauer & Shaw, 2002; Grandon & Pearson, 2003; Gunasekaran *et al*., 2002).

Several previous studies showed positive relationship between IT adoption and firms' performance (Steyaert, 2004; Bharadwaj, 2000; Bharadwaj, Sambamurthy, & Zmud, 2003; Hussin, King, & Cragg, 2002; Lang, 2002; Small Business Association, 2000). Other studies (Tippins & Sohi, 2003; Thompson *et al*., 2005) showed negative results between IT capability and organizational performance. Thompson *et al*. (2005) supported these findings because there is no relationship between IT and firms' profitability. The findings of Badri and Alshare (2008) showed the significant effect on time savings and firms' profitability.

These results demonstrated that both revenue expansion (intelligence generation and new businesses) and cost reduction (time savings) had strong positive effects on firm performance and profitability. Furthermore, a study by Navarro *et al*. (2007) revealed that business performance does not affect e-government use. This is in concurrence with Thompson *et al*. (2005) who suggested that enhancing the economic performance of the private sector may not be a priority for the government.

Byrd and Marshall's (1997) research utilized subjective measures to examine the link between IT implementation and organizational performance, which showed a consistent outcome (Byrd & Marshall, 1997). In a related study, Cragg *et al*. (2002), through the utilization of Khandwalla's (1977) subjective measures on organizational performance, revealed that when a firm's business strategy is matched with IT, it is expected to possess better long-term profitability, higher sales growth, and stronger financial resources. In addition, it is also expected to possess higher image and client loyalty compared to its moderate and low-aligned counterparts (Cragg *et al*., 2002).

The same measures were used by Ismail and King (2005) who revealed that when SME's aligned their accounting IS requirements with accounting IS capacity, they have a greater possibility to yield better organizational performance. In another related study, Ismail (2007) revealed that firms that make use of sophisticated IT can provide more management accounting information and consequently improve performance.

Alawneh and Hattab (2009) investigated the impact of e-business adoption on banking performance from the perspective of sales-services-marketing, internal operations and coordination and communication. The result showed that among the benefits are; enhanced communications, attracting new customers, competitive positioning, enhanced services, and improved supply.

Ramamurthy *et al*. (1999) posited that the impact of EDI on firm performance is the consequence of TOE factors. Their empirical results indicated that the impact of EDI on operational and market-oriented performance was significantly affected by these factors. Iacovou *et al*. (1995) found that the impact of EDI on performance was directly affected by its level of integration with other IS processes.

Porter (2001) lamented that although technology such as the internet helps firms to transact business with one another more easily; it also makes it more difficult for firms to capture such benefits as profits. A number of studies have also raised doubts on the benefits accrued as a result of IS or e-government adoption (Cagg & King, 1992; Montagna, 2005). For instance, Cagg and King's (1992) study based on business engineering firms, indicated that there is no significant difference in terms of performance between firms with different levels of IS sophistication.

Zhu and Kraemer (2002) measured performance using three dimensions: profitability, cost reduction, and inventory efficiency among manufacturing firms. Overall weak results were obtained from their study to support any significant relationship between IS capability of firm and firm performance.

The literature review showed there is no consensus on the impacts of IS or e-government adoption. Some literature indicated firm's benefits from IS and e-government adoption in terms of enhanced efficiencies, costs saving, and enhanced relationship among stakeholders. However, other studies did not indicate such benefits. Hence, further research is needed to examine this issue.

2.10 Summary

This study on firms' innovation adoption provided evidence that the adoption and implementation of innovation were characterised and measured using various methods. Though firms were reported to have adopted innovations such as e-government, the adoption profile failed to reflect the breadth of e-government features being adopted, and the depth or extent to which e-government applications were being diffused or used. There is also a lack of established criteria for measuring the extent of e-government adoption and diffusion among businesses that could characterise the nature and group of e-government usage.

Another criticism of past e-government adoption studies is that the physical adoption process and extent of implementation of e-government adoption are often examined individually. Apart from Zhao *et al*. (2008) and Chevallerau (2005), few studies have attempted to characterize e-government adoption using a two-dimensional approach. However, both studies were unable to provide evidence of the extent to which the applications were used.

The studies on factors associated with innovation adoption, particularly e-government adoption, have produced somewhat ambiguous results. The majority of the studies have only attempted to investigate the relationship between factors associated with innovation adoption, and have failed to take into account the dynamic factors associated with innovation adoption and implementation. A few studies have focused on factors that are associated with each phase of innovation adoption, specifically the various stages of e-government adoption. Hence, past results may only be presenting an anecdotal account of the factors that drive technology adoption.

Impacts of innovation on firms which have been explored include benefits realised, improvement to the service level, increased work efficiency, and reduced operational cost. However, the results from previous research using these variables were inconsistent. Though businesses generally reported better access to information as a major benefit, other impacts were inconclusive. Furthermore, as e-government adoption progresses, the nature of impacts on firms' performance may vary at each phase of adoption, which warrant's further examination. The literatures provided the foundation for the development of the research framework for this study, which is discussed in the next chapter.

CHAPTER THREE

RESEARCH FRAMEWORK AND METHODOLOGY

3.1 Introduction

The previous chapter reviewed the literature related to innovation adoption, and more specifically, the adoption of e-government. This chapter presents a research framework to determine the relationships between the research variables. These variables are classified as variables relating to (1) characterizing e-government adoption; (2) factors associated with e-government adoption, namely technology, organizational and external variables, and (3) performance of e-government on organizations. In addition, an integrated conceptual framework that describes the relationships between these variables is presented. Finally, the study presents a systematic and organized procedure in order to investigate the relationship between the different variables included in this study. These procedures are classified into five major sections namely research design, research strategy, research population, sampling and research instrument.

3.2 Research Framework

Reviews of literature discussed in the previous chapter failed to find a comprehensive model that links TOE factors, current status of the e-government adoption, and impact on organization performance. In fact, prior studies mainly attempted to explain the adoption of e-government and the extent of its usage, while limited studies investigated the e-government current status, factors influencing the adoption and impacts on firm performance, particularly of the business sector. As such, one of the principal goals of this study is to develop an enhanced model, which can explain current status of e-government adoption in businesses. In general, the purpose of this study is to explore and investigate the factors that drive the adoption of e-government, the organizational performance and the current status of the e-government adoption among businesses in Jordan.

This study, therefore, hopes to provide information to the Jordanian government for future policy planning purposes to enhance the adoption of e-government. Such a model would benefit research in e-government and also help to eliminate confusion as to where businesses should focus its e-government adoption and investments for optimum organizational performance.

The research model was developed based on the research questions. Furthermore, the model of this study is based on the theories which were developed by various researchers (e.g. Rogers's DOI theory and Tornatzky and Fleischer's TOE model).

Most of the e-government studies have used the innovation diffusion theory (Rogers, 1983). The diffusion of a new technology often relies on a number of antecedents. Tornatsky and Fleischer (1990), claimed that TOE factors of a firm can influence the adoption process. The TOE framework encapsulates principal determinants of innovation diffusion to understand the diffusion process. With reference to the TOE framework, literature review on the antecedents of e-government adoption was conducted for the current study.

Rogers's theory of DOI in combination with TOE framework can provide a useful theoretical framework to explain the organization adoption of any e-initiative in general and e-government among business organizations, in particular (Mohamad & Ismail, 2009; Ramdani *et al.*, 2009; Lippert & Govindarajulu, 2006). The TOE context of a firm can influence the adoption process. The TOE framework and Rogers's innovation diffusion theory could provide the alternative view on firm innovation adoption (Wang & Ahmed, 2009; Hsu *et al.*, 2006).

To develop a new model for e-government adoption and implementation among business organizations in Jordan, this study is based on Rogers's DOI theory and TOE framework by Tornatzky and Fleischer. The reasons for using DOI theory in combination with the TOE framework is that the latter is able to describe the organization adoption of innovation among business firms by considering the external factors while DOI is used as it takes into consideration the organizational and the technological factors.

The model of this research consists of three parts (see Figure 3.1). The first part is the e-government's antecedent factors which are the TOE factors. TOE defines technology adoption factors under the context of three elements, drawing on the DOI theory:

- The technological factors describe the characteristics of the innovation in question as well as the organization's internal technological landscape (Tornatzky & Fleischer, 1990). For the purpose of our research, relative advantage, compatibility, security, and IT infrastructure are examined.

- The organizational factor represents the different mechanisms, structures and characteristics that influence the propensity of adoption and assimilation of an innovation (Tornatzky & Fleischer, 1990). The organizational attributes included are top management support, resources, organization culture, and business nature, which are important to IT implementation in organizations.
- The external factors examine the organization's external landscape (Tornatzky & Fleischer, 1990). For the purpose of this research, competitive pressure, and government support are examined.

The second part is the e-government adoption among businesses in Jordan, which is operationalized in general as the firm's uptake and use of the various available functions and services provided by the Jordanian e-government which ranges from getting information to conducting transactions with government online.

Finally, the third part is e-government adoption impact on the organization's performance which is operationalized in terms of manager's perception on organization's overall performance.

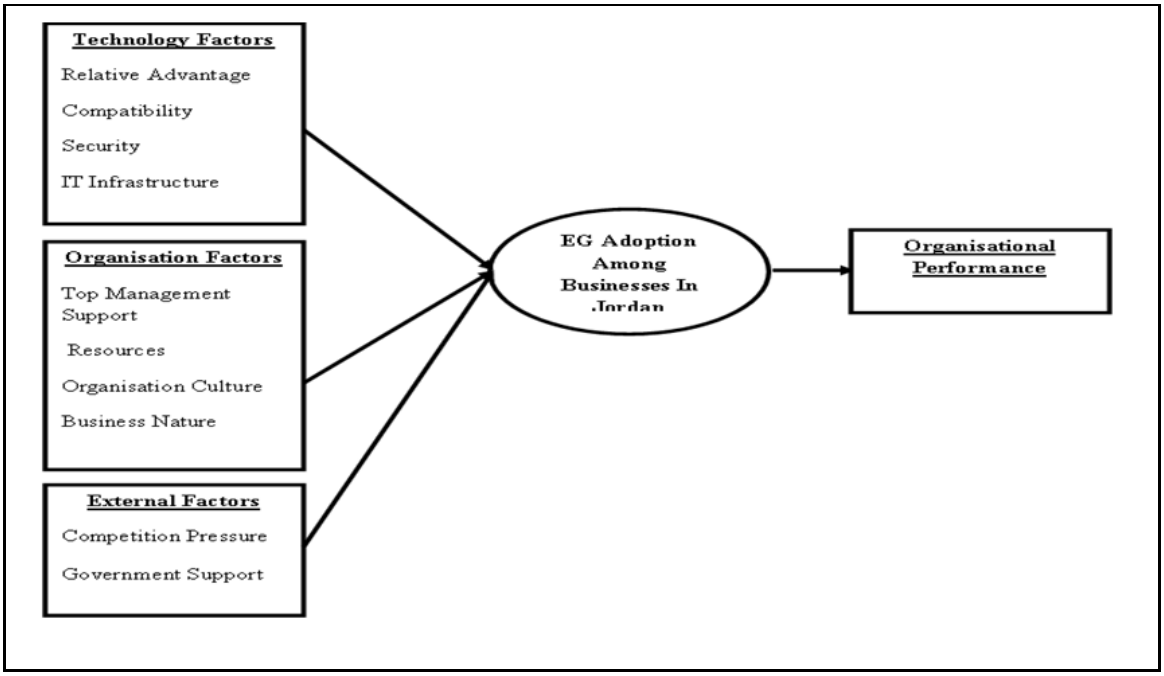

Figure 3.1
Proposed Model for Adoption and Implementation of E-Government

3.3 Approaches to E-Government Adoption Measurement

The literature review in the previous chapter indicated a lack of consensus and established criteria for measuring the extent of innovation implementation that could be used to characterize the nature and pattern of e-government adoption. This resulted in various stages and many terminologies being introduced to describe e-government adoption. The literature also indicated that past studies examined e-government adoption based on online information and services (see Holden, Norris, & Fletcher 2003, Thompson *et al*., 2005, and Norris & Moon 2005), while the evaluation of government web sites was the primary method of data collection (Chean & Thurmaier, 2005). In addition, it was argued by Ho (2002) that most e-government websites are still at the first stage (informational stage) and aimed to move to the final stage which is the interactional stage.

Several reasons have been highlighted throughout the literature for e-government adoption such as political, social, economic, technological and managerial (Sharifi & Manian, 2010; Tung & Rieck, 2005; Gupta & Jana, 2003; Layne & Lee, 2001; Jaeger, 2003; Relyea, 2002; Ebrahim & Irani, 2005; Moon, 2002; Fairweather & Rogerson 2002; OECD, 2003; the World Bank, 2003).

Due to the constantly changing nature of technological, organizational, and environmental factors, it was argued by Ebrahim, Irani, and Shawi (2003) that research on e-government implementation should be exploratory. Zikmund (2000) and Yin (2003) argued that exploratory research is an initial research conducted to clarify and define the nature of the problem and to clarify ambiguous areas such as the case of e-government.

This study attempts to explore the adoption of e-government among businesses in Jordan. The unit of analysis is the firm's uptake, and use of the various available functions and services provided by the Jordanian e-government which ranges from getting information to conducting transactions with government online.

3.3.1 Current Stage of Usage of E-Government Applications

This section aims to solicit the respondents' current level of adoption and extent of usage of each application. Sixteen e-government applications identified from related literature were incorporated in the instrument. The applications were: business facts and figures of the state, business opportunities, business owner's guide to state government, business licenses, permits and regulations, business taxes and reporting, doing business with the state contracts, employment and workforce information, helping businesses succeed, how to start a new business, how to file complaints, how to finance a business not-for-profit organization, small business information and assistance, state environmental requirements, state government offices or agencies for business, and state tax incentives and application forms.

The study measured all the current levels and extent of usage for each of the sixteen e-government applications. Four usage stages were identified for this study: not using, use sometimes, use most of the time, and use all the time. For each application, respondents had to put a tick to indicate its extent of usage in the space on the Matrix Table.

3.3.2 E-Government Status Models

A good number of e-government status models had been proposed throughout the literature which were basically developed by either individuals or institutions (see section 2.4). The literature review on the division status model of the application of e-government has divided them into various phases, whatever the division is; there are similarities and overlapping between the phases (see Table 2.2). However, the MoICT in Jordan has adopted the four stage model. These four stages are presentation of information, mutual contacts, financial transactions and the integration of services.

In the e-government status models, content analysis was found in the literature as a common method of evaluating government web contents, strategies, and deliveries (e.g.

Zhao *et al*., 2006; Wilkinson & Cappel, 2005; Campbell & Beck, 2004; Zhao & Zhao, 2004; Boggs & Walters, 2006). The functional capacity of each G2B service was ranked on the basis of four evolutional phases of web site sophistication and functionality: (1) presentation of information allowing users to get information only; (2) mutual contacts who basically refer to user's ability to get information, download forms, and send email; (3) financial transactions such as filing tax documents and renewing licenses (4) the integration of services that enable users to personalize the site content as well as create user's accounts (e.g. see Koh & Prybutok, 2003; Koh, Ryan, & Prybutok, 2005; McCarty & Aronson 2000, 2001). In this stage, all information systems are integrated, and services can be obtained at one virtual center (Baum & DiMaio, 2000). These four stages of e-government development were further validated by Ebrahim *et al*. (2003) in a comparison study on all e-government adoption-staged models.

Previous empirical studies on innovation deployment and diffusion provided key reference for the research variables and items (Thompson & Rhoda, 2005; Ailawadi *et al*., 2001; Zhao *et al*., 2008; Boggs & Walters, 2006; Campbell & Beck, 2004; Wilkinson & Cappel, 2005; Zhao & Zhao, 2004; Zhao *et al*., 2006; Koh & Prybutok, 2003; Koh *et al*., 2005; McCarty & Aronson 2000, 2001). This study attempts to determine the current status level of e-government adoption among businesses. The level of adoption constitutes the types of applications and functions from the Jordanian e-government website (Elshehe *et al*., 2007). These available functions comprise: how to get information, download forms, and send email, file tax documents, renew licenses, and bid contracts.

In this study, respondents were asked to rate their level of agreement on five-point Likert scales with four items. These items are searching for general business information, locating governmental agencies, forms and applications using governmental web sites, conducting the actual transactions with government online, and filling out forms and submitting information online through governmental web sites.

3.4 Factors Associated with E-Government Adoption

The discussion from Chapter 2 on the published works on e-government adoption, (each targeting different variable), provides evidence that there is relatively little agreement between the works published to identify critical factors that influence e-government adoption, specifically in the context of businesses. To this end, this study is initiated to identify factors affecting e-government adoption among businesses in Jordan. It is envisaged that key factors that influence businesses' e-government adoption might be generated from this study.

Rogers's (1983) DOI theory has dominated most of the previous works of innovation adoption. Rogers (1995) posited two antecedent factors for innovation adoption; these are the technological and the organizational factors. Further, Tomatzky and Fleischer's (1990) TOE framework has been found in the literature as a good starting point in order to examine the adoption of e-government, which highlighted specific contexts, namely (1) technological factors, (2) organizational factors, and (3) external factors, which are all considered as determinants of innovation adoption. This framework had been adopted and validated by previous studies to identify factors that are linked to innovation adoption

(Damanpour & Gopalakrishnan, 1998; Iacovou *et al*., 1995; Ramamurthy & Premkumar, 1999; Chau & Tam, 1997; Zuh *et al*., 2003, 2004; Lin & Lin, 2008; Pan, 2005; Kouki *et al*., 2006; Judy, 2007; Kuan & Chau, 2001; Thompson *et al*., 2009).

Both TOE and DOI theories are well-established innovation theories that are potentially able to provide the explanation of the adoption issue. These two models are highly applicable in predicting adoption behavior of the firm in considering new technology (Mohamad & Ismail, 2009). In addition, TOE framework provided by Tomatzky and Fleischer (1990) is consistent with Rogers's (1983) DOI theory. However, they added the environmental factors where organizations conduct business, which plays a critical role in organization innovation adoption. Based on that, the present study combines both TOE framework and DOI model in order to identify the factors associated with business organization's adoption of e-government. As a result, three antecedent factors were identified, and these are technological, organizational, and external factors.

3.4.1 Technological Factors

Previous studies on e-government examined relative advantage and compatibility as determinants for individual or organizational e-government adoption (e.g. Carter & Bélanger, 2003; 2004; Van-Slyke *et al*., 2004; Al-Qirim, 2007; Song *et al*., 2009). The findings generally indicated a positive relationship between relative advantage (e.g. Lean *et al*., 2009; Song *et al*., 2009) and compatibility (e.g. Song *et al*., 2009; Kenway, 2004; Bourn, 2002) with e-government adoption. Relative advantage and compatibility items were loaded together. These constructs were loaded together in another DOI research

(Moore & Benbasat, 1991; Carter & Bélanger, 2003). Premkumar (2003) argued that there are very few studies that have examined the impact of technological characteristics in the context of business. Rogers's (2003) innovation diffusion theory for organizations is used as a theoretical basis for studying the impact of technological factors on businesses' adoption of e-government.

Relative advantage is operationalized in the present study as "the degree to which an innovation is perceived as being better than the idea it supersedes (Rogers, 2003)". When an e-government innovation is perceived to offer the relative advantages over the firm's current practice, it is more likely to be adopted (Moore 1991). Compatibility of an innovation with a business is operationalized in the present study as the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 2003).

Premkumar (2003) found compatibility to be an important determinant of IS innovation adoption. The adoption of e-government can bring significant changes to the work practices of businesses and resistance to change is a normal organizational reaction (Song *et al*., 2009; Kenway, 2004; Bourn, 2002). Therefore, it is important, especially for businesses, to have the changes compatible with its infrastructure, values and beliefs. The respondents were asked to rate their level of agreement with eight items in five-point Likert scales ranging from 1= strongly disagree to 5-strongly agree. The previous study by Ramdani *et al*. (2009) obtained average alpha reliability of 0.95 for the relative advantage and 0.92 for the compatibility.

IT infrastructure is another factor identified in the present study as important in influencing e-government adoption, which refers to technologies that enable internet-related businesses. Authors such as Shung and Seddon (2000) and Themistocleous and Irani (2001) referred to IT infrastructure as a hardware as well as software that enabled users to do secured electronic services. In a comprehensive review of IT research (Kowtha & Choon, 2001), a highlight of the extent of efforts to introduce an IT innovation depending on complementary resources and existing IT infrastructure was carried out, since firms that are already familiar with IT appear to have a positive attitude toward further IT diffusion. Furthermore, Zhu *et al*. (2003) also argued that e-procurement would be unlikely to become an integral part of the value chain if firms lack necessary technology infrastructure.

Zhu *et al*. (2006) pointed out e-government conduction of value chain activities by using the internet platform in conjunction with existing IT infrastructure. Moreover, as reviewed in Zhu *et al*. (2003) Lin and Lee (2005), and Lin and Lin (2008), IT infrastructure is an important dimension for successful e-procurement adoption. The presence of a sound technological infrastructure is essential for the development and usage of e-government by business organizations (Subramaniam & Shaw, 2002; Dai & Kauffman, 2002). Extending the argument for the requirement of a sound technological infrastructure within an organization as an essential prerequisite for e-procurement development and usage (Gibbs & Kraemer, 2004; Zhu *et al*., 2004), we posit that a well developed IT infrastructure at the firm level is essential for facilitating the development of e-procurement in a firm.

According to IBM (2001), in the organization, the application server is considered as the main component for the construction of IT infrastructure. The server operated through a network enables communication and information transaction between and within the organization. This enables online transactions offering new ways of dealing with business (Ebrahim & Irani, 2005). IT infrastructure has been found by McClure (2002), Bonham *et al*. (2001), Dillon and Pelgrin (2002), Bourn (2002), and National Research Council (2002) as a major barrier for the government that attempts to implement e-government. Based on that, adequate IT infrastructure is considered as a key success in any e-government adoption imitative as it ensures user's easy and reliable electronic access to government.

In order to measure the IT infrastructure in the present study, four items adopted from previously validated measures were developed on the basis of a literature review. Previous empirical studies on innovation deployment and diffusion provided key reference for the research variables and items (Ramamurthy *et al*., 1999; Lin & Lin, 2008; Premkumar & Ramamurthy, 1995; Thong, 1999). The respondents were asked to rate their level of agreement with each item in five-point Likert scales ranging from 1= strongly disagree to 5-strongly agree. A previous study by Lin and Lin (2008) obtained an average of alpha reliability of 0.88 for the IT infrastructure.

A secure IT system reduces the possibility of unauthorized users intercepting data (McKnight *et al*., 1997). Security remains a major deterrent to the usage of e-government (Aldridge *et al*., 1997, Ratnasingham, 1998). Perceptions of insecure electronic transactions on the internet have discouraged many from using e-government (Loh & Ong, 1998). Businesses are concerned about the level of the security present when providing sensitive information online (Warrington *et al*., 2000), and will perform transactions only when they develop a certain level of trust. Therefore, security is identified across many studies as affecting intention by users to adopt the internet-based transaction systems (Wang *et al*., 2003). Shah and Murtaza (2005) also argued that resolving security issues is critical in the widespread adoption of web services. According to Zhao and Cheng (2005), the security issue, with respect to web services, is yet to be resolved. Realizing the importance of security, Yagüe *et al*. (2005) proposed an access control model for web services to address the security issue. As such, security in the present study is operationalized as the perception and fear of safeguarding mechanisms for the movement and storage of information through electronic databases and transmission media (Jones & Beatty, 1998; Fulford & Doherty, 2003).

In order to measure the security in the present study, four items adopted from previously validated measures were developed on the basis of a literature review. Previous empirical studies on innovation deployment and diffusion provided key reference for the research variables and items (Jones and Beatty, 1998; Fulford and Doherty, 2993; Lewis and Byrd, 2003). The respondents were asked to rate their level of agreement with each item in five-point Likert scales ranging from 1= strongly disagree to 5-strongly agree. A previous study by Teo *et al*. (2008) obtained an average of alpha reliability of 0.875 for the security. The sources of technological factors collected from the works of various authors are shown in Table 3.1.

Table 3.1
Literature Used for Technological Factors

Technology	**Sources**
Relative Advantage	Rokhman, 2011; Hung *et al*. (2010), Lean *et al*. (2009), Song *et al*. (2009), Ramdani *et al*. (2009), Al-Qirim (2007), Carter and Belanger (2003), Kuan and Chau (2001), Premkumare and Roberts (1999).
IT Infrastructure	Lin and Lin (2008), Judy (2007), Zhu *et al*. (2006), Ebrahim and Irani (2005), Lin and Lee (2005), Zhu *et al*. (2004), Al-Omari and Al-Omari (2006), Gibbs and Kraemer (2004).
Compatibility	Hung *et al*. (2010), Song *et al*. (2009), Mohamad and Ismail (2009), Ramdani *et al*. (2009), Al-Qirim (2007), Kenway (2004), Bourn (2004), Premkumar (2003).
Security	Teo *et al*. (2008), Joseph and Kitlan (2008), Lippert and Govindarajulu (2006), Srivastava and Teo (2006), Thi (2006), Shah and Murtaza (2005), Yague *et al*. (2005).

3.4.2 Organizational Factors

Organizational culture has been operationalized in a number of different ways in the research literature. Etzioni (1975) explained organizational culture using two dimensions: involvement and participation. Organizations can be classified into three types - coercive, utilitarian and normative organizations based on these two dimensions. Cameron and Quinn (1999) used the dimensions of flexibility/stability and internal/external focus to classify organizations into four types: clan which has flexibility and internal focus, adhocracy with flexibility and external focus, hierarchy with stability and internal focus, and market, which is characterized by stability and external focus.

However, the most common used operationalization of organizational culture in the literature is what has been proposed by Denison and Mishra (1995) who identified four traits of organizational culture: involvement, consistency, adaptability, and mission. Involvement refers to the extent of participation in the organization. Also, the more the individual is involved within an organization the greater is the sense of ownership and responsibility. Consistency provides an implicit control system based on internalized values within the organization. It represents the degree of normative integration. Adaptability is a reflection of the norms and beliefs in the organization and provides the capacity for internal change in response to external conditions. Mission trait provides purpose and meaning and long-term vision.

In the present study, these four constructs are used in order to operationalize the organizational culture comprising involvement, consistency, adaptability and mission as constructs for organizational culture. We examine espoused cultural values in this study, and our unit of analysis is the business managers. As such, this research contributes to literature in the area by exploring the impact of organizational culture traits on adoption of e-government services among business organizations in a developing country in general and in Jordan, in particular.

Organizational culture is identified in this study as an important factor that influences business organizations to adopt e-government services. It is operationalized in this research as a second order construct consisting of four traits. These are adaptability, mission, involvement and consistency (Denison *et al*., 1995).

In order to measure the organizational culture in the present study, eight items were adopted from Denison *et al*. (1995). The respondents were asked to rate their level of agreement with each item in five-point Likert scales ranging from 1= strongly disagree to 5-strongly agree. Previous study by Dasgupta and Gupta (2009) obtained the average of alpha reliability 0.73 for the four constructs.

Top management support and financial resource have been operationalized in a number of different ways in the research literature. Top management support description is the extent of commitment and resource support from top management for the innovation (Delone, 1988; Palvia *et al*., 1994; Grover 1993; Lehman, 1985); financial resource description is the availability of the needed organizational resources for adoption (Iacovou *et al*., 1995; Chwelos *et al*., 2001). Due to the fact that during the implementation of e-government, the complexity and scale of the changes will occur, top management intervention that supports e-government initiative is very important for such e-initiative success (Burn & Robins, 2003; Bonham *et al*., 2001). Top management support could be helpful by making decisions that stress on achievements in quality improvements, cost effectiveness, speed in service delivery, or operational effectiveness (Chairma & Members, 2000).

Van *et al*. (1999) recalled that the senior management will be involved during e-government's implementation and development process. Based on that, top management support or intervention during the implantation could be defined as their participation by action and decisions, which influence the project's success. According to Van *et al*. (1999), top management had to facilitate the important problems of innovation. In the same vein, Standish Group (2001) stressed on the importance of top management involvement, for example, when there is no such involvement, the e-government projects will definitely face a full or partial failure.

Several previous studies found that top management support plays a significant role in e-government projects' success not only by a financial investment to start e-government planning, but also by creating a climate, establishing closer relationships and long-term commitment with business partners, encouraging others to link the process, and eliciting their knowledge of business processes to provide sufficient resources (see Van *et al*., 1999; Kearns & Lederer, 2002; Lin, 2006; Ebrahim *et al*., 2003; Ebbers & Dijk, 2007; Burn & Robins, 2003; Sanchez *et al*., 2003; Chairman & Members, 2000; Bonham *et al*., 2001). In summary, this study expects that top management support could help and lead to effective adoption of e-government in business firms' planning.

Organizational readiness, as used in prior researches (Bonham *et al*., 2001; Heeks, 1999; Ho, 2002) was measured by identifying whether a firm has allocated or spent sufficient financial resources for e-government adoption. Therefore, limited financial resources for e-government investments are considered as major barriers by businesses and stakeholders from the government (e.g. Norris, 1999; Norris & Fletcher, 1999; West, 2000; Holden *et al*., 2003). It was argued by Ebbers and Dijk (2007) that if any organization decided to adopt innovation, sufficient financial resources have to be available in order to be successful. Based on that, financial resources could be defined as the allocation and spending of the amount of money required to support activities and obtain the necessary human and other resources such as hardware and software licenses (Van *et al*., 1999).

Previous studies have shown the importance of technology implementation (Hoogwout, 2003; Klumpp, 2002; West, 2004; O'Hara *et al*., 2000; Relyea, 2002). Basically, adopting e-government is an investment in hardware, software, system integration, as well as employee training. The importance of the sufficient financial resources can be recognized as it provides the firms with IT resources. Based on that, financial resources used to be measured by organization's annual spending on IT and Web-based facilities (Mahmood and Mann, 1993).

Implementation of e-government requires an organization's commitment in many areas. The organization has to be certain that the internet infrastructure can support e-government activities. Internet infrastructure includes the computers and software connected to the internet and the communication networks over which the message packets travel (Schneider & Perry, 2001). The financial/managerial support and logistics/inventory must be considered. Since much of e-government involves trading of physical goods as opposed to information goods, it requires complementary support of a logistics infrastructure for its physical fulfillment (Wong, 2003).

In order to measure the organizational readiness (e.g. top management support and financial resources) in the present study, 12 items adopted from Sutanonpaiboon, and Pearson (2006) were used. The respondents were asked to rate their level of agreement with each items in five-point Likert scales ranging from 1= strongly disagree to 5-strongly agree. Previous study by Wanga and Ahmed (2009) obtained the average of alpha reliability 0.859 for the organizational readiness. The organizational factors collected from the work of various authors are shown in Table 3.2.

Table 3.2
Literature Used for Organizational Factors

Organizational	**Sources**
Organization Culture	Shaukat *et al*. (2010), Dasgupta *et al*. (2009), Chanasuc and Praneetpolgrang (2008), Doherty *et al*. (2003), Harrington *et al*. (2005), Harper *et al*. (2001), Denison and Mishra (1995), Watson (2003), Salleh and Green (2006).
Top Management Support	Hung *et al*. (2009), Salwani (2008), Mohamed (2008), Al-Qirim (2007), Sutanonpaiboon and Pearson (2006), Edmiston (2003), Sabherwal *et al*. (2006), Thompson and Rust (2005)
Resources	Wanga and Ahmed (2009), Ramdani *et al*. (2009), Thompson *et al*. (2009), Alawneh and Hattab (2009), Zhu *et al*. (2004), Iacovou *et al*. (1995), Sutanonpaiboon and Pearson (2006)

3.4.3 External Factors

External pressure has been operationalized in a number of different ways in the research literature. Iacovou *et al*. (1995) defined external pressure as influences from the organizational environment. They further argued that external pressure often originates from two sources, industrial competitors (i.e. competitive pressure) and trading partners (i.e. government support). Competitive pressure is when competitors in the industry take the lead and enjoy advantages brought by the new technology; a firm has to consider whether or not to follow its competitors. Government support for e-government adoption as government policies and especially IT policies can, if successfully implemented, promote the uptake and adoption of e-government among businesses (e.g. Kraemer, 2002; Pan, 2005).

Factors such as external pressure could work as threats and/or opportunities for any organization. These factors that affect a firm's decision to adopt any kind of changes are beyond the control of management (Eze, 2008). According to Chan and Tam (1997) and Hwang, Ku, Yen, and Cheng (2004), under the pressure of such external factors, firms usually attempt to achieve a completive advantage that is a primary objective in establishing strategic links between the way business is conducted and IT.

It is widely recognized that competition has a great influence on the organization's decision to adopt innovations (e.g. Lin & Lin, 2008; Eze, 2008; Zhao, 2008; Pan & Jang, 2008; Lin, 2006; Thong, 1999; Iacovou *et al*., 1995; Premkumar & Ramamurthy, 1995; Chwelos *et al*., 2001; Zhu & Kraemer, 2005; Zhu *et al*., 2003). According to State government officials (e.g. Brush, 2007), in the case of G2B, the location plays a strategic role in enabling businesses to find information easily or in helping businesses that are in need of repairing and completing the transactions work electronically, thereby strengthening competition and the official economic growth.

Governmental support is a critical external factor affecting innovation diffusion (Kraemer, 2002; Pan, 2005) especially in developing countries. The government can provide the domestic firms with capital, supportive laws and policies. So firms with a supportive government will be more likely to adopt e-government. It is widely recognized that competition has a great influence on the organization's decision to adopt innovations (Kuan & Chau, 2001; Kraemer, 2002; Pan, 2005)

In order to measure the external pressure in the present study, 10 items adopted from Sutanonpaiboon and Pearson (2006) were used. The respondents were asked to rate their level of agreement with each items in five-point Likert scales ranging from 1= strongly disagree to 5-strongly agree. A previous study by Salwani *et al*. (2008) obtained an average alpha reliability of 0.909 for the external pressure. The external factors collected from the work of various authors are shown in Table 3.3.

Table 3.3
Literature Used for External Factors

External	**Sources**
Competition Pressure	Wang and Ahmed (2009), Eze (2008), Zhao (2008), Al-Qirim (2007), Sutanonpaiboon and Pearson (2006), Tung and Rieck (2005), Chwelos *et al*. (2001), Lin (2008), Morash and Lynch (2002), Pan and Jang (2008), Zhu and Kraemer (2008).
Government Support	Scupola (2009), Pan and Jang (2008), Lin (2008), Pan (2005), Sutanonpaiboon and Pearson (2006), Yildiz (2007), Morash and Lynch (2002), Lippert and Govindarajulu (2006), Lin (2008), Thompson *et al*. (2009), Judy (2007).

The following research question was posed to examine the influence of organizational, technological, and external factors on the adoption of e-government. The outlined research model incorporating the proposed TOE factors is presented in Figure 3.2.

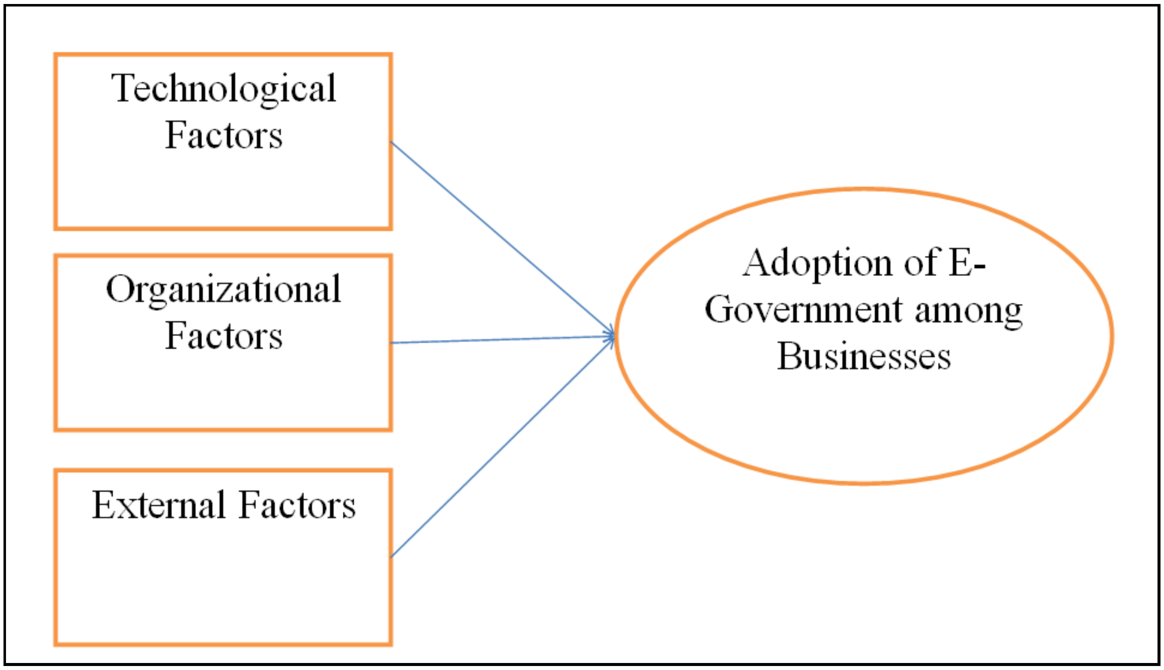

Figure 3.2
Research Model Incorporating the Proposed TOE Factors

3.5 Organization Performance

Today's growing investment in e-government has increased the need to measure the outcomes of e-government adoption and implementation (Verdegem & Verleye, 2009). Although impacts due to IT adoption on firm's performance are an important variable for many studies, it is difficult to define and operationalize firm performance because of the ambiguity as to what firm performance is (Dess & Robinson, 1984). Previous IS and e-government performance assessment research included performance measures and methods that relied on divergent points of view; Zhuang and Lederer (2003) proposed 27-item instruments to measure business benefits of e-commerce retailing, whereas Barua *et al*. (2004) examined operational and financial performance data. DeLone and McLean used six dimensions to measure IS success (systems quality, information quality, use, user satisfaction, individual impact, and organizational impact) which were later updated to deal with e-commerce success (DeLone & McLean, 2004; 2003). Empirical evidence has shown the influence of e-government on organizational performance through several paths: relative product quality, new-product success, sales growth, enhanced customer value, firm image, improvements in strategy consistency and workability, and ultimately, on superior profitability (Badria & Alshareb, 2008; Srivastava & Teo 2008, 2006). Studies also suggested that there might be indirect effects of use of e-government. Thompson *et al*. (2005) suggested that the association between e-government use and firms' profitability occurs through intelligence generation. However, the relationship between new business development and firms' profitability was not significant. Electronic environments can help firms expand and develop new markets through e-government (Fraser *et al*., 2000). Tippins and Sohi (2003) showed that organizational learning improves the firms' ability to deal with customers and competitors and is positively related to superior profitability.

To measure the impact of IT, researchers have used multifarious measures of organizational performance, like productivity enhancement, inventory reduction, cost reduction, and competitive advantage (Devaraj & Kohli, 2003; Hitt & Brynjolfsson, 1996; Melville *et al*., 2004). Apart from creating value at the business unit and process level, the extent of use of IT may also impact the performance at the country level of analysis (Alpar & Kim, 1990; Dewan & Kraemer, 2000) by improving the efficiency and effectiveness of the country. Navarro *et al*. (2007) examined impacts of e-government in improving efficiency (time and cost-related); improving effectiveness (related to communication); and strategic benefits (related to products, markets and services). Zhu and Kraemer (2002) measured performance in the manufacturing sector along three dimensions: profitability, cost reduction and inventory efficiency. Duffy and Dale (2002) examined impacts of e-commerce in enhancing communications, reducing transaction costs, and increasing sales. Zhuang and Lederer (2003) developed an instrument based on an extensive literature review to examine the business benefits of e-commerce. The instrument identified five impacts on a firm, namely back-end efficiency, market expansion, costs' reduction, customer service, and inventory management.

Organizational performance is the dependent variable in this study. Researchers have offered a variety of measures of organizational performance. Subjective measures were used rather than objective measures as subjective measures have been shown to capture a broad concept like business performance (Khandwalla, 1977). The study adopted the instrument developed by Khandwalla (1977), based on the manager's assessment of the firm's performance relative to its competitors. Thus, four items were used to measure long-term profitability, availability of financial resources, sales growth, and image and client loyalty. Each was measured using a five-point scale. Khandwalla found that these measures correlated fairly strongly with objective performance measures, and they have since been validated in the small business context by Miller (1987) and Raymond *et al.* (1995). Both Khandwalla (1977) and Dess and Robin (1984) supported the argument that subjective measures of performance correlated strongly with objective measures. Dess and Robin (1984) recommended using subjective measures, especially when accurate and reliable objective data are not available.

The impacts of e-government for this study were examined in two perspectives, namely firm's overall performance using Khandwalla's (1977) subjective measures, along with other impact measures on business benefits of e-government (Zhao *et al*., 2008). The aims was to provide richer information about the impacts of e-government on businesses. Khandwalla's (1977) instrument was chosen because it has been widely adopted in previous studies and found to be effective in measuring firm performance (e.g. Bergeron *et al*., 2001; Cragg *et al*., 2002; Ismail & King, 2005; Ismail, 2007). Zhao *et al*'s (2008) instrument was also adopted because it was specially developed to examine the benefits of e-government. The development of Zhao *et al*'s (2008) instrument followed well-established principles for designing and validating a research instrument recommended by Chevallerau (2005). The organization performance collected from the work of various authors are shown in Table 3.4.

Table 3.4
Literature Used for Organization Performance

Organization Performance	**Sources**
Performance	Khandwalla (1977), Mohamad and Ismail (2009), Verdegem and Verleye (2009), Salwani *et al*. (2008), Ismail (2007), Ismail and King (2005), Barua *et al*. (2004), Zuh and Kraemer (2002), Steyaert (2003).
Benefit	Hunaiti *et al*. (2009), Alawneh and Hattab (2009), Zhao *et al*. (2008), Navarro *et al*. (2007), Montagna (2005), Zhuang and Lederer (2003), Chevallerau (2005), Thompson *et al*. (2005), Thomas and Streibe (2003).

The following research question was posed to examine the organizational performance of e-government adoption (see figure 3.3).

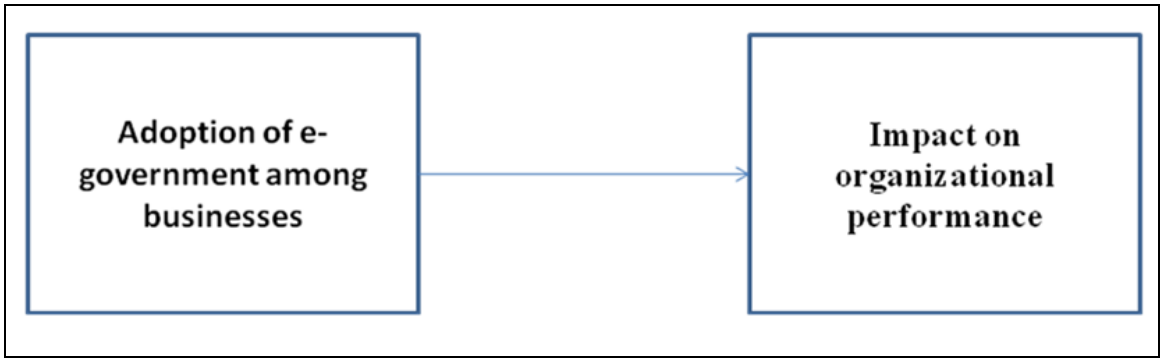

Figure 3.3
Organizational Performance

3.6 Operationalization of Variables

The proposed framework of this research consists of three parts. The first part is the e-government's antecedent factors which are the technological, organizational, and external factors. The second part is the e-government adoption among businesses in Jordan, which is operationalized in general as the firm's uptake and use of the various available functions and services provided by the Jordanian e-government which ranges from getting information to conducting transactions with government online. Finally, the third part is the e-government adoption impact on the organization's performance which is operationalized in terms of manager's perception of the impact of e-government adoption on the organization's overall performance. Table 3.5 below shows the operational definitions of the variables used in this study. However, these variables are discussed in the last section.

Table 3.5
Research Variables and Operational Definitions

Variables	Operationalization	Number of Items	Items Source
E-government Adoption	The firm's uptake and use of the various available functions and services provided by the Jordanian e-government which range from getting information to conducting transactions with government online.	4 items and 16 applications matrix	Zhao *et al.*, 2008
Relative Advantage	The degree to which an innovation is perceived as being better than the idea it supersedes.	4	Moore, 1991
Compatibility	The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters.	4	Premkumar, 2003
IT Infrastructure	Hardware and software that enable users to do secure internet related business.	5	Ramamurthy, 1999
Security	Perception and fear of safeguarding mechanisms for the movement and storage of information through electronic databases and transmission media.	3	Jones and Beatty, 1998; Fulford and Doherty, 2003
Organizational Culture	Second order construct that consisted of four traits. These are adaptability, mission, involvement and consistency.	8	Denison et at., 1995
Top Management Support	The extent of commitment and resource support from organization's top management for e-government adoption.	4	Sutanonpaibo-on and Pearson, 2006

Table 3.5 (Continued)

Variables	Operationalization	Number of Items	Items Source
Resource	Allocation and spending of the amount of money required to support activities and obtain the necessary human and other resources such as hardware and software licenses.	6	Sutanonpaibo-on and Pearson, 2006
Competitive Pressure	Pressure derived from the advantages that competitors enjoy when they adoption new technology, in which a firm has to consider whether or not to follow its competitors, or threat of losing competitive advantage, forcing firms to adopt e-government.	5	Sutanonpaibo-on and Pearson, 2006
Government Support	The government support and promotion of e-government adoption among business.	5	Sutanonpaibo-on and Pearson, 2006
Organizational Performance	Manger's perception of the impact of e-government adoption on the organization overall performance.	17	Khandwalla, 1977; Zhao *et al*., 2008

3.7 Proposed Research Framework

Based on the discussion in the previous sections, the research models depicted in Figures 3.2 to 3.3 were consolidated to incorporate all the dimensions and variables. The upgraded model is presented in Figure 3.4. The model consists of three segments. The one in the middle aims to determine the status of e-government adoption among businesses in Jordan, the second (the lift side of the model) represents the relationships between TOE factors and the determinants of e-government uptake and the third segment (the right side of the model) examines the impact of e-government in terms of delivery of products, services and knowledge to the businesses.

In the literature, the relationship among technological factors, organization factors and external factors are treated as independent variables. For examples, Wang and Ahmed, 2009; Mohamad and Ismail, 2009; Alawneh and Hattab, 2009; Thompson *et al*., 2009; Al-Qirim, 2007. Thus, in the research, there factors will be treated as independent from each other is well. Statically, the values of VIF among these factors are below 1.6 (see Table 4.24). The values showed on multicollinearity between the variables less than 10 for the VIF and more than 0.1 for tolerance as suggested by Field (2005).

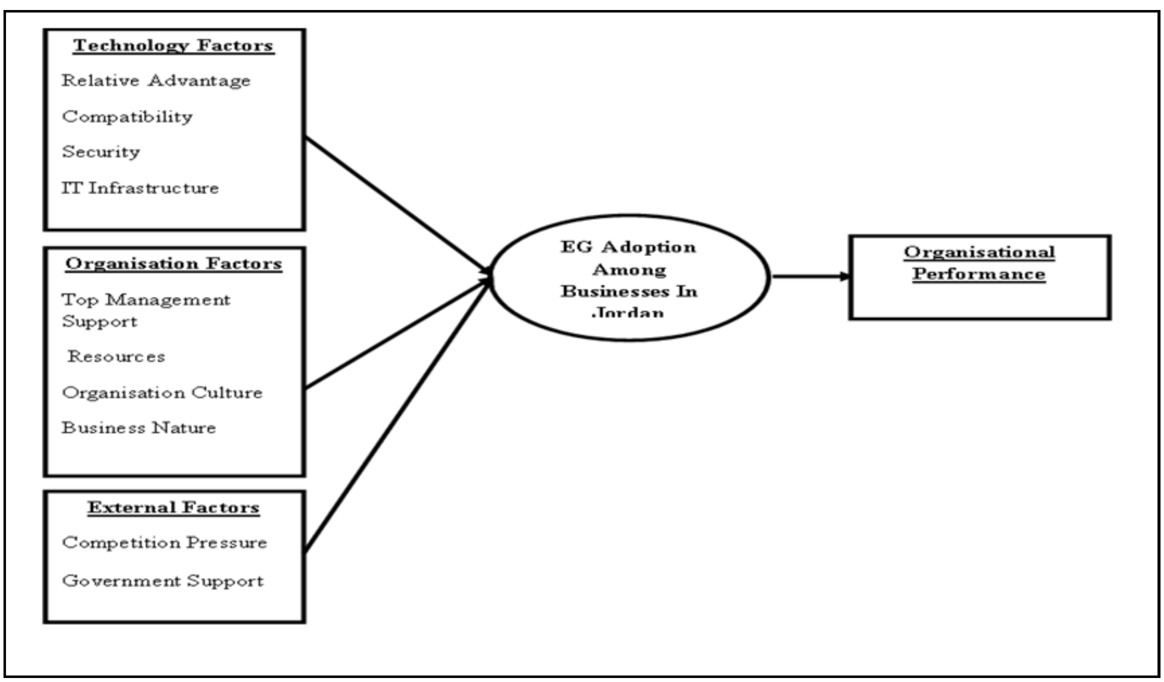

Figure 3.4
Proposed Model for Adoption and Implementation of E-Government

3.8 Research Design

Researchers believed that the research in general can be considered as a systematic process in order to find out things. To achieve the research purpose, a suitable research design should be developed. According to Kumar (1996), the research design is defined as a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. The plan is a complete scheme or program of the research. It includes an outline of what the researchers will do from writing the hypotheses and their operational implications to the final analysis of data (Kerlinger, 1986).

A traditional research design plan would complement the research works, which results in changing the activity that could be measured, in selecting a sample of interest to study and the collection of data to be used as a base to test hypotheses, and in analyzing results (Thyer, 1993). Based on these definitions, this study follows the systematic process in order to achieve its purpose using a suitable design.

3.9 Nature of Research

According to Kumar (1996), Sekaran (2000), and Zikmund (2000), research can be classified into three main categories according to its nature, and these categories are exploratory and descriptive. The research data are collected by questionnaire, interview or observation (Gay & Airasian, 2003). The aim of this study is to investigate the relationship between various variables, hence; it can be considered as descriptive in nature.

3.10 Research Strategies

Various researchers have conducted reviews for the purpose of identifying major research designs adopted in IS studies (e.g. Alani & Carlson, 1992; Galliers, 1992). Based on Galliers's (1992) study, there are eight major research designs utilized in IS research, i.e., laboratory experiments, field experiments, survey, case studies, action research, simulation, forecasting, and phenomenological studies.

A similar study conducted by Boudreau *et al*. (2001), involved the review of 193 articles on IS researches, which were published between 1997 and 1999. The author found that 64 percent of the studies utilized field study approach while 25 percent utilized experiments. In addition, six percent used case studies, and finally, five percent used field experiments. Prior to the introduction of the approach employed in the present research, the characteristics of the research designs determined by Galliers are highlighted, and their respective strengths and weaknesses are discussed.

3.10.1 Forecasting

Forecasting or what is commonly called 'future research' requires the use of regression and time series analysis for the prediction of future events. It is an invaluably useful way to IS research for coping with the changes happening in IT: it is commonly used to predict the effects of the changes on individuals and organizations. However, the researcher was unable to create real versions of the future, just scenarios or possible events in the future owing to the lack of knowledge of the unknown future.

3.10.2 Field Experiments

This type of research activity is considered as an extension to the former type into real-life situations and real organizations. However, it is superior in a sense that it provides realistic scenarios as compared to the former. Nevertheless, in this type of research, it is still challenging to identify organizations that are inclined to be under observation. In addition, the achievement of sufficient control and replication of similar studies also poses a challenge.

3.10.3 Survey

According to Galliers (1992), the survey can be considered as a good approach to use for viewing a greater number of variables that are impossible to do with experimental approaches. Also, survey data are gathered regarding the real-world environment instead of just allowing the research to study several variables simultaneously. Owing to its capability of studying a large sample size, and if a sample is carried out carefully; it is not surprising why survey findings are used to generalize real word situations. However, its disadvantage lies in the fact that it generally provides a mere cross-sectional picture at a point in time and as such, it is a challenge to gain insights into the causes or procedures that are present in the phenomena (Cornford & Smithson, 1996).

3.10.4 Action Research

Action research is also considered as collaborative research in which the researcher is a part of the subject in the problem situation (Cornford & Smithson, 1996) and his role is to associate himself through the contribution to the existing knowledge and to help resolve practical concerns of people involved in the problematic situation (Gill & Johnson, 2002). In this type of research, the outputs are produced from the "involvement with members of an organization over a matter of genuine concern to them" (Eden & Huxman, 1996). Its strength lies in providing practical advantages that have the possibility of cropping up in the client organizations. In other words, action research outputs are more readable, more relevant and more interesting to practitioners and academic audience as compared to the previous activities (Bryman & Bell, 2003). However, its major disadvantage lies in its similarity with case studies whereby researchers have the inclination to interpret different events differently and generally; it is also confined to studying of a single organization which makes it almost impossible to generalize the outcome (Zikmund, 2003).

3.10.5 Case Study

A case study is a thorough exploration of the situation under study. Its strength lies in its capability of investigating an in-depth and detailed study of an entire organization (Zikmund, 2003). This is evidenced by Cornford and Smithson (1996) when they stated that the strength of the case study is evidenced by the richness of data that can be collected through different ways even when researchers confine the study into a single case. However, like the two previous activities, in a case study, data collection and data analysis processes are vulnerable to the influence of the researcher and hence, depend on the researcher's subjective interpretation. In other words, different researchers may have different interpretations regarding a similar data, thus opening the study to research bias. Also, case studies are considered to be generally confined to a single organization and therefore, its generalized findings can be misleading as most situations are different from one another (Zikmund, 2003).

3.10.6 Laboratory Experiments

Cornford and Smithson (1996) described laboratory experiments as the type of research activity that is normally carried out in controlled conditions. In other words, the researchers using this type of activity possess control and are able to isolate the independent variables for the purpose of observing the results. This approach precisely identifies relationships between small numbers of variables using quantitative analytical techniques in designed laboratory situations. However, laboratory experiments have limitations in identifying relationships existing in the real world owing to the often over-simplification of the experimental situation (Galliers, 1992). The confined laboratory setting also suggests that the context being studied is not parallel to that of the real world. Therefore, researchers need to use caution when generalizing statements obtained from experimental findings to real-world situations.

3.10.7 Simulation

Simulation is the type of activity that represents a situation through the creation of an artificial simulated setting in which individual or group behavior is observed (Bryman & Bell, 2003). The researcher in this instance has the ability to create, or modify the situation and to carry out an examination of the effect of intervention. Its strength lies in its ability to accumulate a large amount of data in a short period of time. However, not unlike the laboratory and field experiments, it is almost impossible to simulate situations enough for it to resemble real-world situations.

3.10.8 Phenomenological Studies

These studies have their basis on the belief that human action is meaningful; it has been meaning for people, and people normally act based on some meaning attributed to both their acts and the acts of others (Bryman & Bell, 2003). This type of research activity tries to capture the meanings of an individual's behavior through studying things from the individual's perspective. The researcher's work is to try to predict people's common sense thinking, to interpret their actions and their social world from their own perspectives (Bryman & Bell, 2003). In addition, the researcher needs to adopt a creative and speculative stance as opposed to merely that of an observer. The advantage of the approach lies in the fact that new theories can be built, and new ideas generated and tested through it. Nevertheless, there is a possibility for biases to crop up as this type of study has been characterized as unstructured and is a subjective form that has its basis on the researcher's subjective interpretations of events.

3.11 Survey Strategies

This study adopts the survey method; some of the major survey approaches are suggested by Dillman (2000), namely mail survey, personal interview, telephone interview, and internet survey, which are discussed in the following sections.

3.11.1 Personal Interview

Personal interview or face-to-face interview as it is known is a two-way conversation between the interviewers and the respondents in order to gather information (Cooper & Schindler, 2003). This technique can be done in several ways such as: It is structured, which is conducted as the interviewer knows the information needed or unstructured where the interviewer has no readily prepared questions (Sekaran, 2003). Bloom (1988) affirmed that individual interviews are the most effective means for gathering feedback and that their yield of data is richest. However, similar to any other techniques, as shown in Table 3.6, there are several advantages and disadvantages of such technique (McClelland, 1994).

Table 3.6
Face-to-Face Interview Advantages and Disadvantages

Advantages	**Disadvantages**
- Produce direct, observable feedback	- The most expensive data gathering method
- Produce excellent qualitative data	- Are the most time consuming
- Can be used in a structured (forced-choice) format thereby producing quantitative data on objectives which are focused and well defined	- Will require an experienced interviewer
- Can be used in a non-structured (open-ended) format thereby generating feedback on objectives which have been only broadly defined	

As the research sample comprised Jordanian firms that are registered in the ASE numbering 260 firms (ASE, 2010) (see Appendix B), it will be money and time-consuming to carry out for the purpose of collecting the required data which the researcher cannot afford.

3.11.2 Telephone Interview

Telephone interview means that the interviewer collects data from the respondents by telephone (Zikmund, 2000). Using the telephone in the interview technique can lead to the overcoming of some of the disadvantages faced by face-to-face interview such as the distance and cost problems. In addition, a telephone interview is less expensive and can be quick (Oantzker & Hunter, 2005).

According to Oantzker and Hunter (2005) and McClelland (1994), a telephone interview is considered as the most cost-effective type of individual interview, and it is also easier to monitor interviewer bias through it. Specifically, telephone surveying eliminates the possibility of sending any nonverbal cues. The disadvantage of a telephone interview is the interviewer's disability to establish credibility with a prospective respondent; limiting the scope of research; difficulty in obtaining in-depth responses; elimination from the sample parameters of anyone without a telephone; and possible high refusal rates (Oantzker & Hunter, 2005; Peterson & Wilson, 1992; Wymer & Carsten, 1992).

As the research sample comprises Jordanian firms that are registered in the ASE numbering 260 firms (ASE, 2010), it will be a money and time-consuming process to carry out for the purpose of collecting the required data which the researcher cannot afford.

3.11.3 Internet Survey

Survey through the Web quickly gained popularity owing to the efforts of the data set that focuses on cutting the population of internet users. Internet survey may look similar to the mail survey. However, the latter has the ability to go to the internet users only, while the internet survey can be distributed to a more general population (Davis, 1996).

Few authors argued in favor of using e-mail survey or web surveys due to several advantages such as the speed of responses, time and cost saving. When the sample of interest included specific population such as business at specific industry, a survey posted on a popular web site is recommended (Dillman, 1999; Zikmund, 2000). However, there are disadvantages for this technique that is in terms of the longer survey, the survey compilation's rate will be very low, and it does not reflect the general population (Sekaran, 2000; Cooper & Schindler, 2003).

In this research, the internet survey data collection technique was not used because the web-based research frequently involves a loss of control by the experimenter in the following aspects; he or she will not be sure who is really responding, sampling issues may not be representative of the population, bad e-mail addresses, difficult to pay incentives to respondents, technical problems, and a subject can get distracted or simply lose interest and end the study.

3.11.4 Mail Survey

When the study sample includes respondents with literacy and/or of higher educational levels, then it is recommended to use mail survey. Mailing lists could be used in order to help the researchers in reaching the desired target population. In addition, because it does not need personal contact, mail survey has the ability to reach larger population with low cost. Mail survey can be simply conducted by sending the questionnaire to the respondents through their mails, which will achieve flexibility and cost reduction (Davis, 1996).

The advantages of this method include: it is simple and relatively low cost to let the postal service do the leg work of delivering the surveys, little or no geographical barriers, being able to have a larger universe, and the respondent's ability to answer at their leisure. However, low response rate is considered as a disadvantage of the mail survey (Bachmann*et al*., 1996; Mehta & Sivadas, 1995).

3.12 Choice of Survey Method

According to Zikmund (2000), there is no better method than the survey, while each of the task forces has weaknesses. Romano (1989) noted that the selection of a science research should not be affected by popular regularly built scientific insights. Rather, it should be given the benefit of or related to your search. A researcher must choose the most appropriate methodology to achieve objectives. It is difficult to choose the optimal method because the researcher has to make a tradeoff between the advantages and disadvantages for each method (Cooper & Schindler, 2003).

Throughout the literature, several issues could influence the response rate of using mail survey. Since this study revolves around the relations between many variables and a descriptive study in its nature, and the respondents chosen are widespread and with high qualification, based on Kumar (2005)'s suggestion, it seems that the best method to be applied is the mail survey.

Sekaran (2003) suggested that the researcher can improve the response rate by following-up with the respondents and designing a well-structured simple questionnaire. Therefore, the questionnaire for this study focused on the issues to overcome these disadvantages as discussed in the section involving questionnaire design.

Since the population of this study consists of the firms' managers who are highly educated and located at a wide geographic area, using mail survey has several advantages such as low cost, wide area coverage and the respondents can answer the questionnaire at their leisure.

3.13 Population of Study

The target population for this study is managers in the business sector in Jordan. The unit of this study consists of managers in industry, service, insurance, and banking sector. There are six industrial cities spread over the regions of the Kingdom namely Abdullah II Industrial City in Amman - Sahab and the Al Hassan Industrial City in Irbid, Al-Hussein Bin Abdullah II Industrial City in Karak, and Aqaba International Industrial City in Aqaba, and Ma'an Industrial City in Ma'an. The industry and service sectors are located in these regions while the banking and insurance sectors are located in Amman (MoIT, 2010).

The population of this study consists of all Jordanian firms that are registered in the ASE numbering 260 firms (ASE, 2010). It comprises 133 firms from industry sectors, 28 firms from insurance sector, 81 firms from service sector, and 18 firms from banking sector (see Appendix B).

3.14 Sampling Frame

The sample is considered as a sub-set of the population. According to Kumar (2005), the sampling frame can be used for selecting the samples. For the purpose of this study, the samples include all the population, which means the sample size is the same as the population size. This approach is adopted because of the small population size of 260 firms, which are listed in ASE. The reasons for taking such as decision are:

1. The population for this study is not too large.
2. The appropriate sample size for most of the research ought to be larger than 30 and less than 500 (Sekaran, 2003).
3. The sample size should be sufficiently large for the purposes of conducting a data analysis that includes multivariate analysis.

3.15 Data Collection Procedure

The main focus of this study is to examine the relationship between TOE and e-government adoption in general. Therefore, the unit of analysis for this study comprised the managers from firms listed in the ASE. They were adopting e-government services in Jordan.

To achieve the objectives of this research, a questionnaire was developed to collect data from the respondents to provide answers to the research questions. However, as stringent regulations prohibit Jordanian firm's employees to respond to any questionnaire except with the consent of the top management, a formal request letter was sent to seek permission from them. Permission was obtained from these firms, and the questionnaires were sent to the public relations office at the head office of firms listed in ASE, which subsequently redirected them to the respective managers.

3.16 Pre-Test

The pilot study is a pre-testing of the research instrument. Conducting pilot study before collecting the data has many significant advantages that contribute to the study's success as it gives the researchers the opportunity to look back on some area that the researchers have been unclear about. As a result of that, the researcher will be able to refine and improve the questionnaire in order to record the data successfully and ensure the respondents have no problem with answering the questions (Bryman, 2004).

In this research, the pre-test was carried out during August and September, 2010 by applying the questionnaire to Associate Professors and lecturers in the technology management departments in the Jordanian public and private universities and business managers. A pilot test was conducted before the questionnaires were distributed to the target respondents. The major objective of the pilot test was to assess the goodness of the measurement in terms of validity and reliability.

The objectives of the pre-test in this research are:

- To ensure that the information required is clearly understood by the participant,
- To ensure the questionnaire can be completed within a time span so that the respondents do get tired with the questionnaire or have less motivation,

- To refine the questionnaire so that they will have no difficulties in answering the questions, and
- To ensure that the proposed method is suitable for this study.

To achieve this objective, a total of 35 questionnaires representing 13.5 percent of the sample was sent to respondents as a sub-sample from the study population to obtain their feedback. According to Cooper and Schindler (2003), the range from 25 to 100 questionnaires is a suitable size for pilot test.

After ten days from the date of sending the questionnaire to the respondents, a total of 15 questionnaires were returned representing a return rate of 42.8 percent. After another ten days, another 12 questionnaires were returned making the total number of returned questionnaires to 27. This made the response rate for the pilot test to be above 50 percent, which is sufficient for such research (Sekaran, 2003).

The 27 questionnaires were subjected to analysis procedures to test the validity and reliability of the instrument. Analysis was conducted on TOE dimensions, the adoption of e-government, and the impact of e-governments, which were the three major concepts in this study.

One of the criteria of selection of past instruments was internal consistency of the scales using Chronbach's alpha reliability coefficients. As a result of the pilot study, the reliability estimates ranged from 0.65 to 0.88 which according to Sekaran (2006), is considered sufficient for the research purpose. Based on that, the scales were regarded as relatively reliable.

The results of the pilot study suggested the deletion of several items in some parts of the questionnaire. For TOE factors, there were initially 47 items representing three different dimensions of TOE. The results indicated misinterpretation to a reverse item about the IT infrastructure, "Our firm makes PCs and laptops available for the staff", top management support, "Top management has shown support for e-government use", and government support, "Government support for e-government is readily available". These items were subsequently deleted from the questionnaire. The items related to TOE factors were reduced to 44 items from 47 items.

The other main construct in this research was the adoption of e-government. This construct was measured by four items related to four different characteristics of current status of e-government adoption and sixteen applications matrix.

The impacts of e-government for this study were examined in two perspectives, namely firm's overall performance measured by five items, along with other impact measures on business benefits of e-government measured by sixteen items. The results of impact of e-government showed misunderstanding by the respondents to a reverse question about the subordinate's commitment to the benefits of e-government, "Improved access to suppliers' price and product descriptions", "Greater integration of automated systems", and "Enhanced ability to compete". This item was also deleted from the questionnaire. As a result, the items related to adoption of e-government dimensions now consisted of only twelve items. Based on the above discussion, some amendments were made to the final version of the questionnaire which consists of six pages (refer to Appendix A).

3.17 Questionnaire Design

In the development of the research instrument for this study, four guidelines proposed by Dillman (1999) were adopted in structuring the questionnaire and in sequencing or ordering. These guidelines were adopted based on the premise that they would encourage respondents to answer as follows:

1- Order questionnaire item in descending order of usefulness and importance
2- Place questions that are similar in content together.
3- Build a sense of flow and continuity through the questionnaire by taking advantage of the cognitive links that respondents are likely to make among groups of questions.
4- Position the questions that are most likely to be difficult to answer after those that are easier to answer.

The questions used in the questionnaire were based upon literature survey and incorporated all variables discussed in chapter three. The questionnaire was structured in five sections:

1- Section **A** comprised a series of questions to elicit background information about the firm. It was chosen as the first section because these questions were easy to answer.
2- Section **B** was designed to probe the adoption of e-government applications. The questions for this section were specifically developed for purpose of this study, and presented in four questions. The status of e-government (G2B) services for

business - this section was placed second in view of its intended contribution and importance to this research. This section was also relatively easy to answer.

3- Section **C** was developed to measure antecedents or factors associated with adoption of e-government. The sequence of the questions in this section followed the flow of cognitive links between questions based, on three dimensions, namely technological, organizational, and external factors. Responses to each question were measured on a 5-point scale.

4- Section **D** was designed to elicit information related to organizational performance and other perceived benefits as a result of e-government adoption. The questions developed a sense of flow and continuity by taking advantage of the cognitive ties that respondents were likely to make on these questions. Furthermore, questions on firm performance are perceived as sensitive and personal to some owners of firms, hence these were asked in a later part of the questionnaire. A 5-point scale was adopted for this section.

5- Section **E** was designed to elicit information about the respondent's commitment to IT and to identify the current position of the person who had actually responded to the survey. An open-ended question was also incorporated to seek additional comments to add richness to the study. The design of this section was based on an exchange principle; rewarding respondents by seeking their views in a consultation manner, and with expression of appreciation, as well as a promise of a summary of results.

3.18 Validity and Reliability of the Measurement Instrument

Assessment of the validity and reliability of the items were conducted before the questionnaires were distributed to the respondents. This was to ensure the items were suitable for use in this study.

The validity of the instrument can be classified into two main categories, namely content validity and construct validity. The content validity is the conformity of the instrument, whether it measures what it is proposed to measure. This can be achieved through adopted items, which were used in previous research (Saunders *et al*., 2007).

To assess the content validity, Hair *et al*. (2007) suggested seeking an opinion from individuals such as academics who are experts in their respective area. Individuals from the population can also be chosen to obtain the feedback on the questionnaire items.

On the other hand, construct validity is concerned with the theoretical and hypothetical development of the relationships between the variables (Pallant, 2007). According to Hair *et al*. (2007), construct validity can be verified using two approaches, namely convergent validity, which is to examine whether the construct of the study related positively with other measures of this construct. The other approach is discriminate validity, which is to examine whether correlations exist between the study constructs and other different constructs.

For the purpose of this study, the definitions of the main variables were carefully reviewed from related literature as suggested by Saunders *et al*. (2007). A pre-test was conducted by seeking feedback from experts, academicians, students and firm's managers. Based on their comments, amendments were carried out to ensure the familiarity, wordings and the clearness of the questionnaire items.

The second criterion for assessing the measurement scale is the reliability of measurement. As validity is related to accuracy, reliability, on the other hand, is related to consistency (Hair *et al*., 2007). Reliability is perceived as the degree by which similar results can be obtained when repeating the same course of action under different circumstances (Crowther & Lancaster, 2009).

Two approaches can be used to assess the reliability of the measurement, namely test-retest, which is appraised by administrating the questionnaire to the sample in different circumstances and comparing the differences of their correlations. The second measure of reliability is to examine the internal consistency between items using Cronbach's coefficient alpha (Pallant, 2007). Cronbach's coefficient alpha value is the most widely used statistics to determine the reliability of the measurement (Crowther & Lancaster, 2009; Hair *et al*., 2007; Leedy & Ormrod, 2001; Pallant, 2007; Saunders *et al*., 2007; Sekaran, 2003).

The value of Cronbach's coefficient alpha ranges from 0 to 1. The acceptance of this value depends on the nature and the research objectives. Commonly accepted values are around 0.7 and the value can be reduced to 0.5 for the exploratory research (Hair *et al*., 2007). The strength of relations for Cronbach's coefficient alpha value is summarized in Table 3.7.

Table 3.7
Alpha Coefficient Ranges and Strength

Alpha Coefficient Range	Strength of Association
< 0.6	Poor
0.6 to < 0.7	Moderate
0.7 to < 0.8	Good
0.8 to < 0.9	Very Good
$\geq$ 0.9	Excellent

Source: Hair et al. (2007)

3.19 Data Analysis

Having discussed the operationalization of the constructs, this research, now describes the data analysis that was adopted in the research. In order to answer the research questions of the current study, various methods of analysis, namely descriptive statistics, factor analysis, test of differences, correlations and multiple regressions were conducted to provide answers to the research questions.

3.19.1 Descriptive Statistics

Descriptive statistics were used to explore, summarize and describe the data collected. Pallant (2007) revealed that descriptive statistics aimed to depict the different attributes of the data, verify any violation of the principal assumptions for the statistical methods to be used in the study, and to address particular research questions.

In this study, the descriptive statistics were undertaken using central tendency and variation statistics such as means, ranges and standard deviation. Frequencies, percentages and relevant charts were also computed for nominal data.

3.19.2 Factor Analysis

One important step in data analysis is to understand the dimension of the variables in the proposed model or relationships in empirical research (Hair, Anderson, Tatham & Black, 1998). In other words, factor analysis is conducted to identify the structure of interrelationship (correlation) among a large number of items. This is done by defining common underlying dimensions, known as factors (Hair *et al*., 1998).

In this study, factor analysis was undertaken to determine the dimensions of the three major concepts namely TOE factors, the adoption of e-government, and the impact of e-governments. Factor analysis was carried out following the main steps suggested by Pallant (2007) which consist of:

1- Consideration of the appropriateness of the data for the factor analysis by fulfilling the required assumptions such as adequate sample size, existence of adequate correlations between the variables in the same factor, achieving linearity condition and checking for outliers.

2- Factor extraction using suitable techniques to verify the smallest number of factors. In this study the principle component analysis (PCA) was adopted since this technique was widely used by researchers (Pallant, 2007). In PCA, the main variables were grouped into smaller linear variables and all the shared variance was analyzed by using a mathematical model (Tabachnick & Fidell 2007). Stevens (1996) preferred PCA as it does not include any problems like other related analysis. Furthermore, Tabachnick and Fidell (2007) considered this approach as the best choice in the case of looking for an experimental review of the variables. For these reasons, PCA was adopted for this study.

3- Factor rotation and explanation is the last step in factor analysis. In specific cases, there is a need to repeat the rotation, when there appears to be high loadings in more than one factor.

After the factor analysis, reliability test was undertaken to assess the goodness of the measurement. Specifically, reliability analysis is to determine the internal consistency of the measurement items after factor analysis. The most widely used measurement for the reliability of the scale is Cronbach's alpha value that ranges from 0 to 1. According to Hair *et al*. (2007), a value of 0.7 is an acceptable alpha value for research in general.

3.19.3 Test for Differences

Chi-square test is conducted to examine if there are any significant differences between the early and the late responses in terms of their demographic profiles. A chi-square test is used to determine if two categorical variables are related (Pallant, 2001). Demographic variables which were not in a categorical format in the questionnaire (that is age and working experience) were converted into categorical variables. Before the test was carried out, it was ascertained that we have not violated the assumption for chi-square test that is, minimum expected cell frequency in any cell should be five or more for two-by-two tables (Pallant, 2001). As suggested by Pallant, in the case where two-by-two table violates this assumption, Fisher's exact probability test was considered.

T-test was used to see if there is a statistically significant difference in the mean scores for two groups of variables in terms of their level of e-government adoption. The assumption of homogeneity of variance was first examined through Levene's test for equality of variance. In the case where the assumptions of equal variances were violated, the t-value reported for equal variances not assumed was used.

One way analysis of variance (ANOVA) was used to examine whether there exist any differences in the level of e-government adoption by demographic variables with more than two categories. As ANOVA test assumed equal variances, the Levene's test for homogeneity of variance was first examined in order to ensure that the assumptions of homogeneity of variance have not been violated.

3.19.4 Correlation Analysis

Pearson's correlation was used to describe the strength and direction of the relationship between two variables (Hair *et al*., 2007). In this study, the relationship between organization performance dimensions and adoption of e-government as well as between antecedent factors (TOE) and adoption of e-government were examined using this analysis. A positive correlation indicates that as one variable increases, so does the other. A negative correlation indicates that as one variable increases, the other decreases.

A perfect correlation of 1 or -1 indicates that the value of one variable can be determined exactly by knowing the value of the other variable. On the other hand, a correlation of 0 indicates a relationship between the two variables. The perfect correlation of 1 or -1 indicates that the value of one variable can be determined exactly by knowing the value of other variable. Besides, the correlation value 0 indicates no relationship between the specified two variables. Cohen (1988) provided a guideline to explain the strength of the relationship between two variables (r) as shown in Table 3.8.

Table 3.8
Cohen's Guideline of Correlation Strength

r values	Strength of relationship
r = +.l0 to .29 or r = -.l0 to -.29	Small
r = +.30 to .49 or r = -.30 to -.49	Medium
r = +.50 to l.0 or r = -.50 to -.l.0	Large

3.19.5 Cluster Analysis Method

According to Everett, *et al*. (2001), cluster analysis can be defined as the method for categorizing observations into types such that the observations contained in each group are similar to each other while observation within each group is different from other groups, or similarly, it can also be defined as the identification of a set of groups, which leads to minimization of the group variation and maximization of the structural characteristics of a group. Similarly, Aldenderfer and Blashfield (1984) asserted that cluster analysis can be considered as a multivariate statistical procedure that begins with a particular data set that contains information regarding a sample of entities and the attempts of the re-categorization of these entities into homogeneous groups.

According to Hair *et al*. (1998), cluster analysis can be described as having two steps. The first step involves the measurement of some kind of similarity or relationship between the entities for the determination of the number of groups existing in the sample. This is followed by the second step which involves the profiling of the variables for the purpose of determining their composition. Aldenderfer and Blashfield (1984) stressed that majority of the varied uses of cluster analysis can be categorized into four principal objectives: (i) development of a typology or classification, (ii) investigation of useful conceptual schemes for grouping entities, (iii) hypothesis generation through data exploration, and (iv) hypothesis testing, or the attempt to determine if types defined through other procedures are in fact present in a data set. On the other hand, Chenhall and Langfield-Smith (1998) stated that the significant issue in cluster analysis is the determination of the optimal number of clusters and while there are various formal decision rules that guide this procedure, researchers commonly use heuristics.

For the formation of clusters, Statistical Package for the Social Sciences (SPSS) software is commonly used as it offers different methods for it. Among them is hierarchical clustering, which enables the user's selection of the definition of distance, the selection of the linking method, and the determination of the number of clusters that are suitable to the data (Sharma 1996). In another type of clustering known as K-means clustering, the researcher has the ability to specify the number of clusters prior to calculating the assignment of cases to the K clusters. This type of clustering is much fewer computers-intensive as compared to other types and hence, it is commonly preferred. The last type of clustering is the two-step clustering that leads to the creation of pre-clusters, and then the clustering of the pre-clusters.

The hierarchical cluster is used in this study as the number of cases is small having only four variables being examined.

3.19.6 Logistic Regression Analysis

The final method of data analysis for this study is logistic regression. According to Pallant (2007), logistic regression is an extension of correlation and is used to explore the predictive ability of a set of independent variables on one dependent variable.

In order to test the research question developed in the present study, logistic regression analyses were conducted. Besides that, the amount of variance of organization performance dimensions explained by adoption of e-government as well as the variance of adoption of e-government explained by the antecedent factors (TOE) were also examined using this analysis approach.

Before proceeding with the analysis, basic assumptions of the linearity (represents the degree to which the change in the dependent variable is associated with the independent variable), normality of the error terms distribution and homoscedasticity (constant variance of the error terms) were first examined.

Since logistic regression is very sensitive to outliers, i.e., standardized residual values about 3.3 (or less than -3.3) (Pallant, 2001), it was detected by case-wise diagnostics in the regression analysis. To minimize the effect of outliers, they were deleted from the data set. Before the regression results were considered valid, the degree of multicollinearity and its effect on the results were examined. Therefore, the variance inflation factor (VIF) and the condition indices for all the variables were examined. According to Hair *et al*. (1998), the VIF should be close to 1.00 to indicate little or no multicollinearity. They further suggested the cutoff value of 10.00 as an acceptable VIF.

Although path analysis has been used in past studies (Behrman & Perrault, 1982; Dubinsky & Hartley, 1986), this method of analysis was not utilized in the present study. This is because logistic regression was adequate for use in this study as the main objective of this study was to investigate the antecedents of adoption of e-government and not to establish the pattern of causation of the model.

3.20 Summary

This chapter discussed the research framework and components within it. Three research questions have been identified. The research variables are classified according to variables characterizing e-government adoption and implementation, variables associated with factors that are perceived to influence e-government adoption and implementation, and variables relating to impacts of e-government, depending on the extent to which firms have adopted e-government.

Further, this chapter reviewed various quantitative research methods used in past information system studies. This study adopted mail survey for its ability to collect data from a large number of businesses and for generalization of the findings on the adoption of e-government among businesses. The advantages and the limitations of the selected research method were discussed and steps to overcome the limitations were considered. Finally, data analysis techniques used to analyze data was discussed. The next chapter discusses the results from the output of data analysis.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the results of data analysis. SPSS version (18) was used to analyze the data. In general, this chapter gives the findings of the study in accordance to the objectives listed in chapter one. This chapter starts with the description of the data collection and response rate followed by data cleaning and screening, profile of the respondents and business firms. Analysis on goodness of measures to test the validity and reliability of the variables is discussed next. Finally, the test results related to the relationship between the variables are also presented.

4.2 Overview of the Data Collected and Response Rate

To achieve the purpose of this study, the data was collected from 11 October until 9 December 2010 using survey approach. A total of 260 questionnaires was distributed by using mails survey. The respondents were the managers in the business sector in Jordan, who were identified as the key information persons. A total of 121 questionnaires were received, and six questionnaires were excluded as they were unusable due to many uncompleted items. The final responses consisted of 115 questionnaires, which represented 44.2 percent of the total number of questionnaires being distributed. According to Lambert and Harrington (1990), the accepted response rate for mail survey ranged from 20 to 30 percent. Furthermore, Saunders *et al*. (2007) considered that a response rate of 30 to 50 percent for mail survey is reasonably high. Thus, the overall response rate in the present study was considered high.

4.2.1 Data Screening and Cleaning

Data screening and cleaning procedures for errors or outliers were conducted in the present study. According to Zikmund (2003), an outlier is related to the data, which has value that lies outside the normal range of data. To achieve this objective, data were subjected to descriptive analysis in order to examine if there are any errors. The outcome of the descriptive test which included mean, minimum and maximum values in addition to box plot showed that two questionnaires have extreme values in most of the responses. Hence, the two questionnaires were excluded from the final analysis. As such, the final usable questionnaires were 113 which represent 43.4 percent response rate. Any individual item with Mahalanobis Distance (D^2) scores greater than Chi-square values ($X^2 = 126.09$) are considered as multivariate outliers (Hair *et al*., 2006).

Due to the fact that the assumption of normality is a prerequisite for many inferential statistical techniques, a researcher must consider the issue of normality distribution of the data before further analysis can be conducted. For the purpose of the present study, test of normality distribution of the data is conducted using Skewness and Kurtosis. Skewness is a measure of symmetry, or more precisely, the lack of symmetry and a distribution, or data set, is symmetric if it looks the same to the left and right of the center point. On the other hand, Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. That is, data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak (Hair *et al*., 2006).

Hair *et al*. (2006) described positive kurtosis indicates to the peak of distribution while the negative value indicates to flatness of distribution. On the other hand, skewness indicates the distribution swing of the scale to both sides - a positive skew if it is skewed to the left-side, and a negative skew if it is skewed to the right-side. The results of Kurtosis and Skewness for relative advantage statements are presented in Table 4.1 below while the rest of results are shown in Appendix C.

Table 4.1
Results of Skewness and Kurtosis for Relative Advantage Statements

Relative Advantage	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
E-government allows us to better communicate with our business partners	113	-.027	.227	-.569	.451
E-government allows us to cut costs in our operations	113	.496	.227	-.790	.451
E-government increases the profitability of our business.	113	.838	.227	-.379	.451
E-government provides timely information for decision making.	113	.357	.227	.519	.451

As the results indicated, there were no values that exceeded the acceptable range of skewness suggested by Hair *et al*. (2006) which is between -2.58 and +2.58 at the 0.01 significance level or between -1.96 and +1.96 at 0.05 significance level. As for kurtosis, the normal range is between -3 and +3. Based on the kurtosis and skewness results, there was no serious concern about the normality distribution of the data for this study to be used for further analysis.

4.2.2 Non-Response Bias Test

There is always the possibility that non-respondents and respondents differ in some significant manner due to the fact that most of the studies rely on voluntary participation (Zikmund, 2003). Because identifying the non-respondents characteristics in anonymous research is considered difficult, an alternative test of non-response bias was conducted in this particular study. According to Armstrong and Overton (1982), to examine the non-response bias, a test that compares the early and late respondents could be conducted. In addition, Armstrong and Overton (1977) highlighted that non-respondents were assumed to have similar characteristics to late respondents. Based on that, this procedure involved breaking the sample into early responses (received within the first month) and late responses (received after the first month).

For the purpose of this study, and as recommended by Armstrong and Overton (1982), 69 respondents were classified as early responses and 44 were late responses. Then, independent sample t-test was conducted to examine if there were any significant differences in the major variables between early and late responses.

The results for test of non-response bias showed that there were no significant differences between early and late response (refer to Appendix D). All p-values were above the significant level of 0.05. Therefore, the results indicated no major concern regarding the issue of non-response bias between the early and late responses for this study. Hence, the non-response bias did not significantly affect the study's generalizability of findings, and hence, the analysis was carried out on the full 113 responses. With this concern addressed, the following descriptive analysis of data was conducted.

4.2.3 Firms' Profile

This section provides background information on the businesses that participated in the survey. The characteristics examined include the sector in which the firm operates, geographical location of the firm, age, type of ownership and annual sales turnover.

4.2.3.1 Sector

Table 4.2 indicates that the sample came mainly from the industry sector (44.2 percent), insurance sector (15. percent), service's sector (26.5 percent), and banking sector (13.4 percent).

Table 4.2
Sector of Business

Sector	Frequency	Percentage (%)
Industry Sector	50	44.2
Insurance Sector	18	15.9
Services Sector	30	26.5
Banking Sector	15	13.4
Total	113	100%

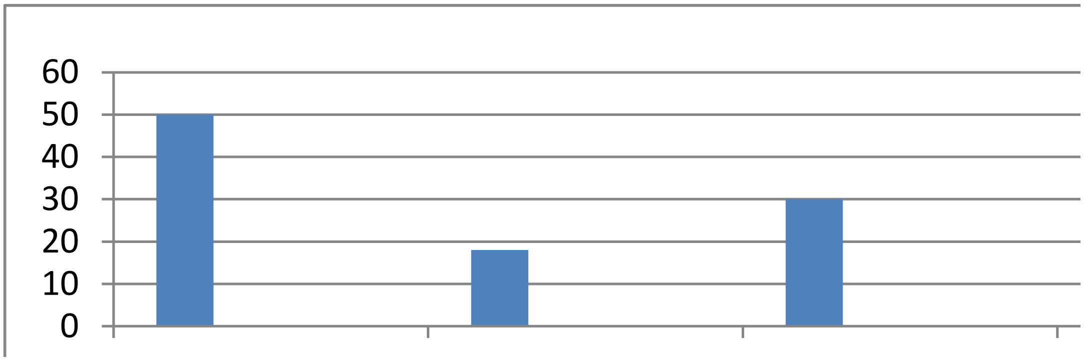

Figure 4.1
Business Types

4.2.3.2 Geographical Distribution of Sample

Table 4.3 shows the distribution of the sample throughout the country. The largest number of responding firms is found in Amman with 36.3 percent, followed by Abdullah II Industrial City with 17.7 percent and Al Hassan Industrial City with 17.7 percent, Al-Hussein Bin Abdullah with 13.3 percent, Aqaba International Industrial City comes next with eight percent, and the lowest responding firm is found in Ma'an Industrial City with 6.9 percent.

Table 4.3
Geographical Distribution

Locations	**Frequency**	**Percentage (%)**
Amman	41	36.3
Abdullah II Industrial City	20	17.7
Al Hassan Industrial City	20	17.7
Al-Hussein Bin Abdullah	15	13.3
Aqaba International Industrial	9	8
Ma'an Industrial	8	6.9
Total	113	100%

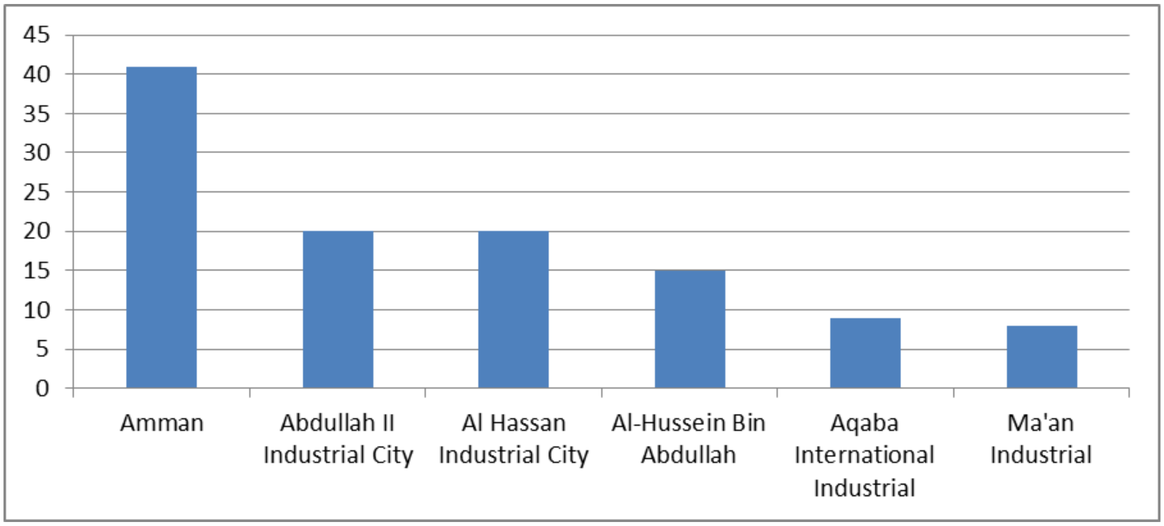

Figure 4.2
Geographical Distribution

4.2.3.3 Firm Age

As Table 4.4 illustrates, more than 61 percent of the responses have been in business for more than 15 years, while 17.7 percent have operated between 11 to 15 years. Approximately, 12 percent were founded less than five years ago, and only 8.8 percent have been operating between five to 10 years.

Table 4.4
Firm Age

Firm Age	Frequency	Percentage (%)
Less than 5 years	13	11.5
5-10 years	10	8.8
11-15 years	20	17.7
More than 15 years	70	61.9
Total	113	100%

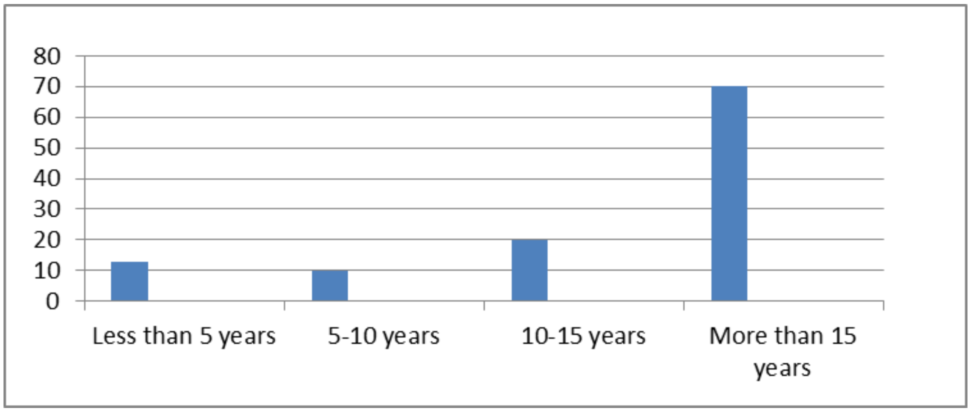

Figure 4.3
Firm Age

Overall, the result shows that more than two-thirds of the businesses in the sample are more than ten years old, which means that the responding businesses are mature businesses that have accumulated experience in producing their products.

4.2.3.4 Form of Ownership

Table 4.5 segregates the sample based on whether the firm is citizen owned, foreign owned or joint ownership. The result shows that 61.9 percent of the businesses in the sample are owned by Jordanian citizens, while the remaining businesses in the sample are either foreign owned, or are under joint ownership between local citizens and foreigners.

Table 4.5
Form of Ownership

Form of Ownership	**Frequency**	**Percentage (%)**
Citizen owned	70	61.9
Foreign owned	17	15.1
Joint foreign/citizen	26	23.0
Total	113	100%

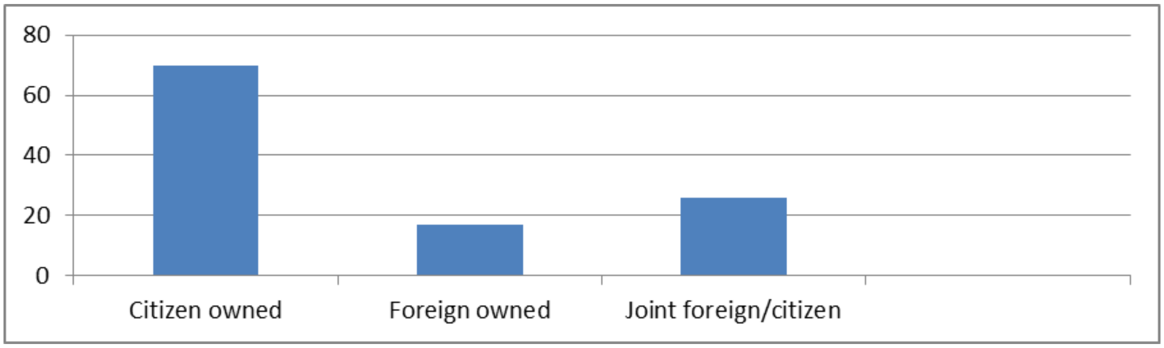

Figure 4.4
Form of Ownership

4.2.3.5 Number of Employees

Table 4.6 shows that 40.7 percent of the samples have fewer than 50 employees. According to the definition of businesses adopted by AEC, this is small-sized business. The remaining sample (60.3 percent) employed 51-150 employees, and is classified as medium-sized business.

Table 4.6
Number of Employees

Number of Employees	Frequency	Percentage (%)
Fewer than or 50 employees	46	40.7
51-100 employees	38	32.8
101-150 employees	29	25.0
Total	113	100%

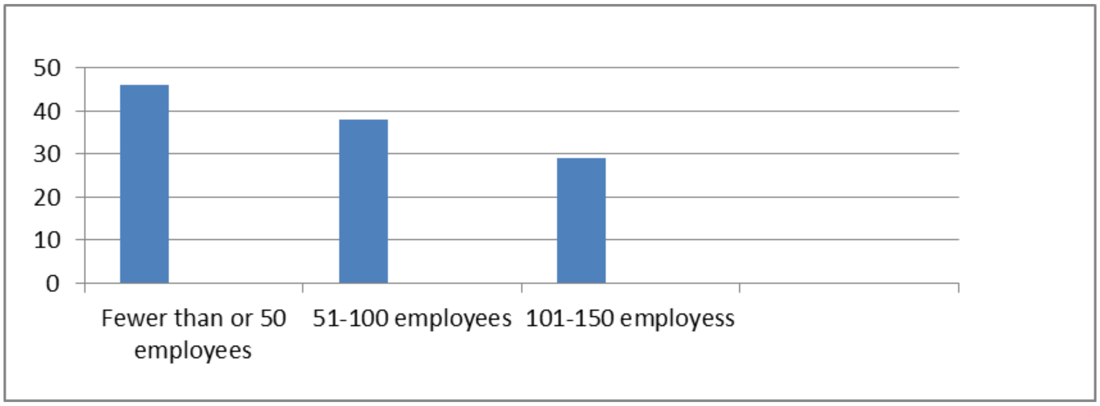

Figure 4.5
Number of Employees

4.2.3.6 Annual Sales Turnover

As shown in Table 4.7, more than 47 percent of the sample has a turnover of more than JD 10 million, while 52.2 has an annual turnover of less than JD 10 million.

Table 4.7
Annual Sales Turnover

Sales Turnover	Frequency	Percentage (%)
Less than JD1 million	32	28.3
JD1 million to 10 million	27	23.9
More than JD10 million	54	47.8
Total	113	100%

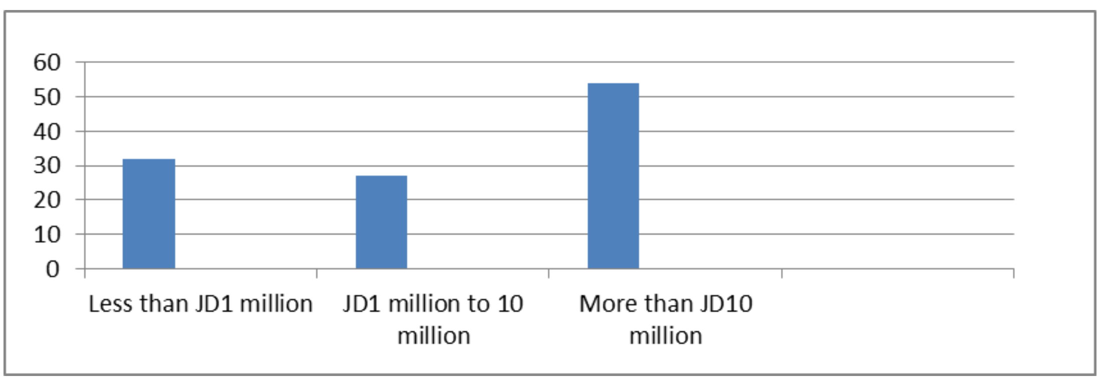

Figure 4.6
Annual Sales Turnover

4.2.3.7 IT Staff

Table 4.8a presents the response of full-time IT staff among the sample. About, 61.2 percent of the sample did not employ any IT staff, while 15.5 percent employed fewer than two staff. Overall, the results showed that about 77 percent of the sample had no IT staff, or had fewer than two. The result in Table 4.8b shows that the majority of small-sized firms (25.7) did not employ any IT staff, because usually a small-sized business has limited resources to engage such staff. Table 4.8c shows that there is a relationship between firm size and employment of internal staff (Chi-squared = 7.590, df = 2, $p<.05$).

Table 4.8a
IT Staff

Employees of IT Staff	Frequency	Percentage (%)
None	71	61.2
1 to 2 IT staff	18	15.5
More than 2 IT staff	24	20.7
Total	113	100%

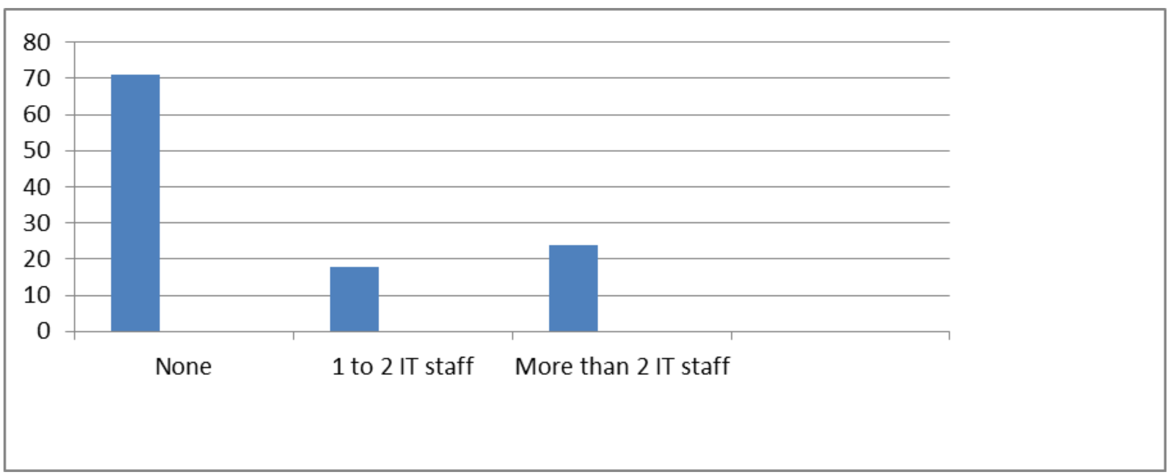

Figure 4.7
IT Staff

Table 4.8b

Cross-Tabulation Firm Size by Number of Internal IT Staff

		No IT staff	**1-2 IT staff**	**More than 2 IT staff**	**Row Total**
Firm size	Small-size	29 25.7%	9 8%	11 9.7%	49 43.4%
	Medium-size	42 37.2%	2 1.8%	20 17.7	64 56.6%
	Colum Total	71 62.8%	11 9.7%	31 27.4%	113 100%

Table 4.8c

Chi-squared of Test between Firm Size and Number of Internal IT Staff

	value	**df**	**Asymp.Sig. (2-sided)**
Pearson Chi-squared	7.590	2	0.022

4.2.3.8 Annual Budget for IT

As IT investment is closely linked with adoption of IT (Good & Stevens, 2002; Teo & Ranganathan, 2004), a question is also included to ask about the SME annual budget for IT. The results are shown in Table 4.9a.

Almost all the responding businesses (91.2) had less than 10 percent of their budget allocated for IT, supporting some findings that businesses placed low priority on IT, as reflected in their relatively low annual IT budget.

The chi-squared statistic is used to test whether any significant relationship exists between firm size, and firm’s budget allocated for IT. Due to a low number of observations in certain categories, the categories were collapsed into two that is less than five percent and more than five percent of businesses’ annual budget was allocated for IT. The results of the chi-squared test are presented in (4.9b). Table 4.9c, which indicate no significant relationship between firm size and firm annual budget for IT. In order words, there is no difference in terms of the percentage of businesses allocated for IT between small-sized and medium-sized businesses (at five percent confidence level).

Table 4.9a
Percentage of Annual Budget Allocated for IT

% of Annual Budget Allocated for IT	**Frequency**	**Percentage (%)**
Less than 5%	89	78.8
5-10%	14	12.4
11-15%	5	4.4
16-25%	3	2.7
Over 25%	2	1.8
Total	113	100%

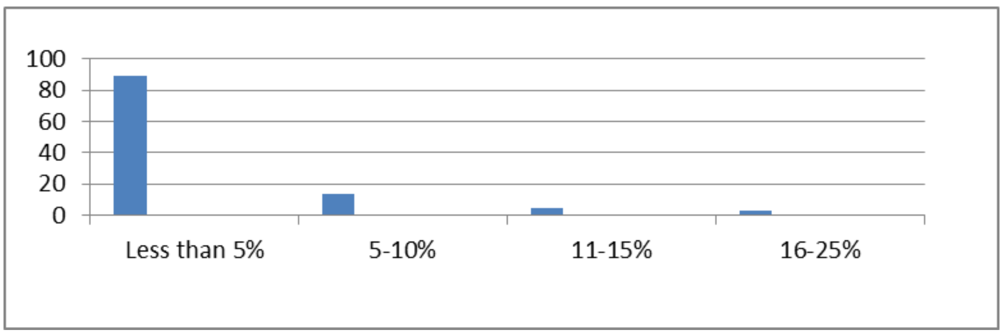

Figure 4.8
Percentage of Annual Budget Allocated for IT

Table 4.9b
Cross-Tabulation Firm Size by Percentage of Annual Budget Allocated for IT

		5% or less	**More than 5%**	**Row Total**
Firm size	Small-size	47 41.6%	2 1.8%	49 43.4%
	Medium-size	56 49.6%	8 7.1%	64 56.6%
	Colum Total	71 91.2%	10 8.2%	113 100%

Table 4.9c

Chi-squared Test between Firm Size and Percentage of Annual Budget Allocated for IT

	value	df	Asymp.Sig. (2-sided)
Pearson Chi-squared	2.438	1	0.118

4.2.3.9 IT Usage by Firms

To gauge the perception of businesses on their usage of IT, a question about manager perception of their firm's use of IT was included in the survey.

Table 4.10a shows the distribution of manager perception of firm's IT usage. Less than two-thirds (59.5 percent) of the businesses in the sample perceived their usage of IT is in the middle of the pack or somewhat behind or lagging implying that businesses perceived themselves as slow to adopt IT. The results of chi-squared in (4.10b)Table 4.10c show there is no significant differences between small-sized and medium-sized firms in their perception on IT usage.

Table 4.10a

IT Use by Firm

Firm IT Use	Frequency	Percentage (%)
Industry leader	7	6.2
Close follower	16	14.2
Middle of the pack	44	38.9
Somewhat behind	46	40.7
Total	113	100%

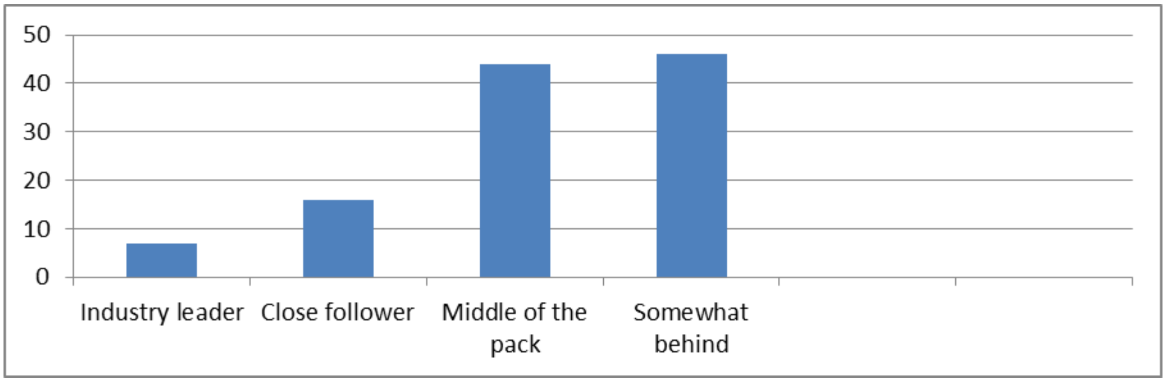

Figure 4.9
IT Use by Firm

Table 4.10b
Cross-Tabulation Firm Size by Perception of Firm IT Usage

		Industry leader	Close follower	Middle of the pack	Somewhat behind	Row Total
Firm size	Small-size	4 3.5%	5 6.9%	19 16.8	21 18.6	49 43.4%
	Medium-size	3 2.7%	11 9.7%	25 22.1	25 22.1	64 56.6%
	Colum Total	7 6.2%	16 14.2%	44 38.9	46 40.7	113 100%

Table 4.10c
Chi-squared Test between Firm Size and Perception of Firm IT Usage

	value	df	Asymp.Sig. (2-sided)
Pearson Chi-squared	1.596	3	0.660

4.2.4 Respondents' Profile

This section provides background information and characteristics of the respondents. Questions included in this study are respondents' current position, computing experience, gender, age, and educational level. The results are shown and discussed in the following sub-sections.

4.2.4.1 Respondents' Current Position

As can be seen in Table 4.11 below, about half of the respondents were CEOs or owner/proprietors of businesses. The remaining respondents were either senior managers or managers of businesses. The high hierarchical levels of respondents provided some assurance on the validity of responses, as respondents from senior management levels in businesses could generally be expected to be more knowledgeable about their firms' e-government activities.

Table 4.11
Respondents' Current Position

Position	Frequency	Percentage (%)
Owner/Proprietor	8	7.1
Managing Director/Chief Executive Officer	49	43.4
Senior Manager	18	15.9
Manager	38	33.6
Total	113	100%

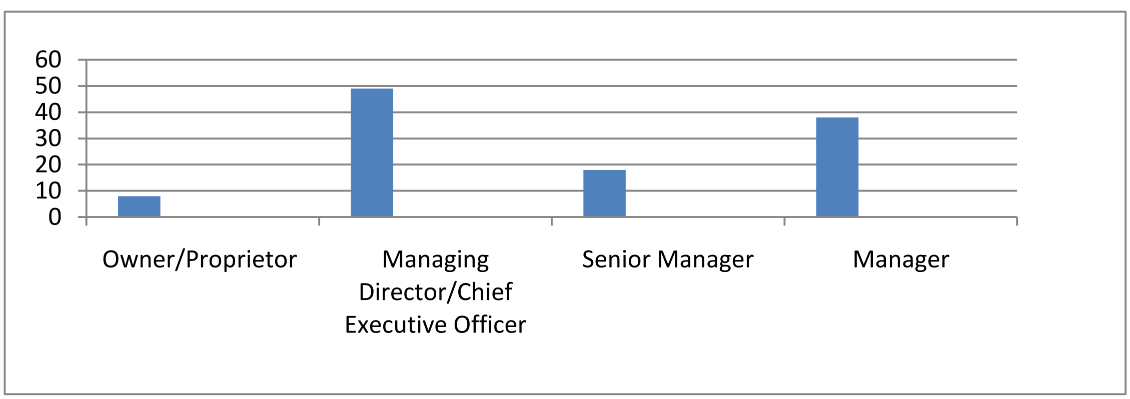

Figure 4.10
Respondents' Current Position

Since CEOs/Top management is a major variable for this study that includes owner/proprietor, CEO/ managing director, senior managers and managers, formal tests were conducted to check for survey bias by examining answers given by the respondents to variables measuring factors associated with impact on firms. The sample was split into two groups, namely (1) CEO who were owners/proprietors and CEO/managing directors, and (2) Top management, comprising senior managers and managers. Test statistics were computed to test the proposition that the sample distribution of CEO is equal to that of top management. The results are shown in Table 4.12.

Table 4.12
CEO and Top Management

Variables Measuring Impact	CEO		Top management		Levene Test		Significant at 95% level
	Mean	S.D	Mean	S.D	F	Sig	
In long term profitability	3.68	.869	3.88	.916	.004	.950	Not significant
In sales growth	3.54	.629	3.86	.804	1.23	.268	Not significant
In financial resources	3.47	.734	3.59	.516	1.811	.181	Not significant
In firm image and client loyalty	3.40	.651	3.61	.985	10.48	.001*	Significant
In market share	3.82	.889	3.86	.796	.474	.493	Not Significant
Improved quality of information supply	3.67	.873	3.84	.910	.044	.835	Not significant
Improve accuracy	3.54	.657	3.79	.803	1.843	.177	Not significant
Improved service level	3.46	.734	3.54	.852	2.405	.124	Not significant
Fewer administrative burdens	3.18	.782	3.55	.933	6.320	.113	Not significant
Increased customer satisfaction	3.07	.563	3.27	.904	11.59	.501	Not significant
Increased work efficiency	3.09	.635	3.41	.910	14.45	.500	Not significant
Reduced operational cost	3.61	.861	3.70	.761	1.265	.263	Significant
Reduced work-process time	3.35	.744	3.75	.837	1.116	.293	Not significant
Reduce error rates	3.37	.698	3.77	.738	.449	.504	Not significant
Reduce need for cash-on-hand	3.51	.735	3.55	.851	.979	.325	Not significant
Reduce communication cost	3.33	.636	3.68	.741	3.918	.051	Not significant
Reduce uses of paper	3.26	.642	3.54	.738	4.818	.030*	Significant

The p-value associated with each test statistic on each variable is insignificant (at five percent significance level), with only two exceptions- firm image and reduced uses of paper. Although this could suggest the bias results, it is more likely to be due to randomness, since it happened to two out of seventeen variables tested. The overwhelming evidence suggests both groups of respondents could be treated as one sample. Hence, the term CEO and top management could be used interchangeably for subsequent discussion.

4.2.4.2 Respondents' Gender

Table 4.13 shows a vast majority of the respondents were male as they represented 92 percent of the sample. The rest were female managers that only represented eight percent of the sample. This result reflects the nature of Jordanian and Arab culture in general where males dominate and hold top management positions. This result is consistent with Al-Gahtani, Hubona and Wang (2007) who revealed there were rigid restrictions for women compared to men in Saudi Arabia and most Middle-East nations where women in top management positions were very limited.

Table 4.13
Respondents' Gender

Gender	Frequency	Percentage (%)
Male	104	92.0
Female	8	8.0
Total	113	100%

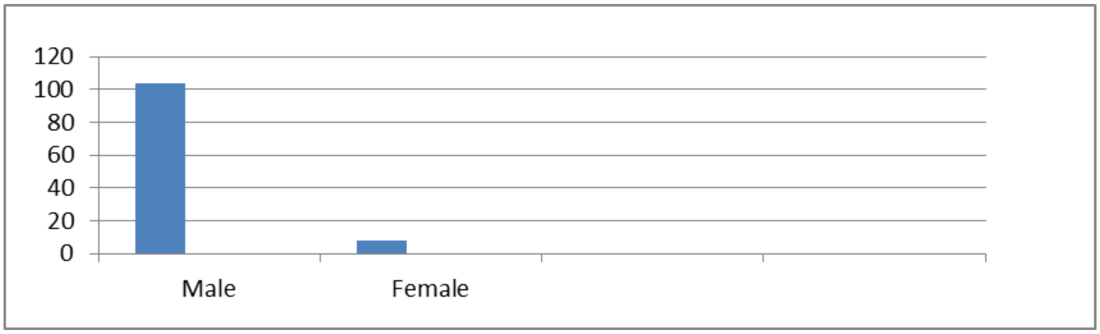

Figure 4.11
Respondents' Gender

4.2.4.3 Respondents' Age

Table 4.14 indicates that most of the respondents were between the ages of 40-49 years and they represent 49.6 percent of the total number of respondents. Respondents in the age group of 30-39 represented by 27.4 percent of the sample; this is followed by the age group of 50 years and above which represents 23 percent of the respondents, while none of the respondents was less than 30 years old.

Table 4.14
Respondents' Age

Age	Frequency	Percentage (%)
Under 30 years	00	00
30-39 years	31	27.4
40-49 years	56	49.6
50 years and above	26	23
Total	113	100%

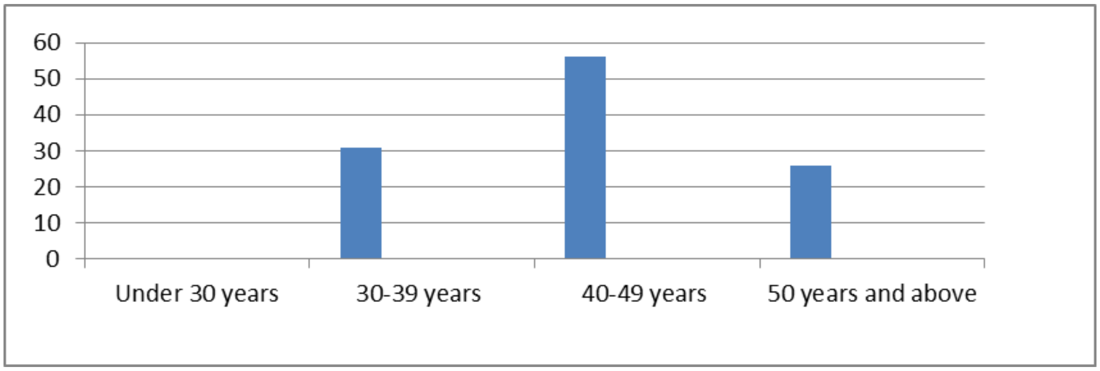

Figure 4.12
Respondents' Age

The result shows that most of the branch managers (72.6 percent) were above 40 years old. This could be due to the fact that the business manager is a senior position which requires a manager to have many years of work experience.

4.2.4.4 Respondents' Education Level

Table 4.15 reveals the majority of the respondents had a bachelor's degree and they represented 66.4 percent of the respondents. The results indicate that education level is an important factor in seeking employment in the firms, specifically for the positions of top management as these are senior positions in firms.

Table 4.15
Respondents' Education Level

Education Level	Frequency	Percentage (%)
Diploma or below	3	2.7
Bachelor Degree	75	66.4
Master Degree	27	23.9
PhD	8	7
Total	113	100%

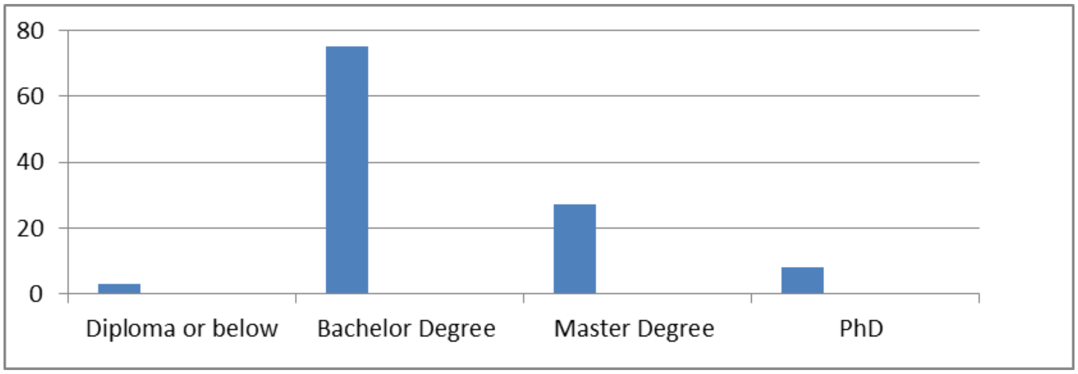

Figure 4.13
Respondents' Education Level

4.2.4.5 Respondents' IT Experience

Table 4.16 shows eight percent of the respondents used the computer for less than one hour a day as CEOs or top management, followed by 37.1 percent who used the computer for more than three hours a day. Approximately, 31 percent of the respondents used a computer between two and three hour a day and 24 percent of respondents used a computer between one and two hours a day.

The vast majority of respondents used a computer for at least an hour a day. The results provide evidence that the majority of the CEOs or top management in the sample had experience in using a computer.

Table 4.16
Frequency of Computer Use

Computer Use	Frequency	Percentage (%)
Less than 1 hour a day	9	8
1 to 2 hour a day	27	23.9
2 to 3 hour a day	35	31
More than 3 hours a day	42	37.1
Total	113	100%

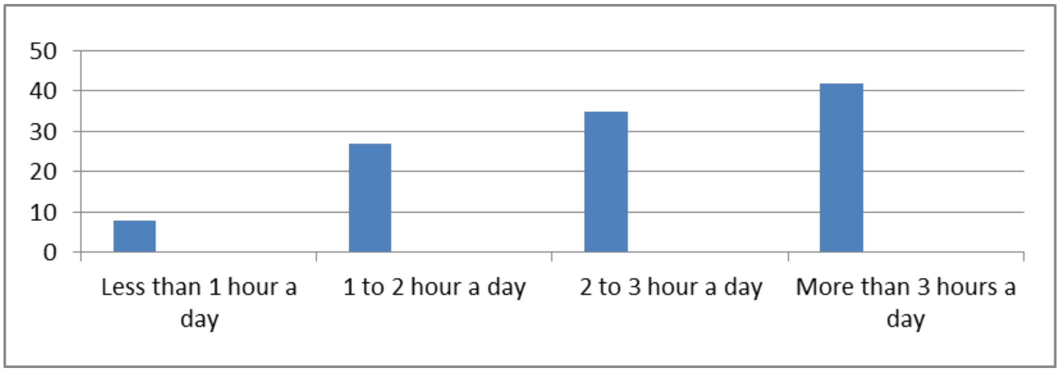

Figure 4.14
Frequency of Computer Use

4.3 Goodness of Measures

The goodness and suitability of the measurement tool can be examined by testing the validity and reliability of its constructs.

4.3.1 Construct Validity

As mentioned in the previous chapter, most of the items used to measure the variables were borrowed from the literature which has confirmed their discriminant and convergent validity (Bianchi & Pike, 2009). Most of the literature on e-government adoption and its antecedent factors focus on studies carried out in western countries, particularly, USA, UK, Denmark, and Netherlands where the environment and culture are entirely different from Jordan. Because these previous studies may differ from this study in terms of the context of the investigation (Jordan) as well as the respondents (Managers), it was necessary to reexamine the validity of these measures. To do so, exploratory factor analysis was conducted on all items used in this study to ensure that these items measured what they are supposed to measure and are suitable for the purpose of this study. Factor analysis was described by Zikmund (2003) as a kind of data reduction approach employed to discriminate the fundamental dimensions from the original variables.

4.3.2 Factor Analysis Assumptions

For the purpose of this study, factor analysis was conducted to combine the large number of statements into a smaller set of factors to represent the TOE dimensions as well as the organization performance. However, several requirements had to be satisfied before factor analysis can be applied. First, Hair *et al*. (2006) highlighted that as a general rule, the minimum is to have at least ten times as many observations as there are variables to be analyzed. This study has 10 variables, and therefore, the minimum sample size needed was 100 observations. This study consists of 113 respondents, and the ratio between the variables used in factor analysis and sample size is 1:11. Hence, the first assumption for using factor analysis is met.

The second test to determine the appropriateness of factor analysis is the type of data used for factor analysis. Hair *et al*. (2006) highlighted that the data for factor analysis should be a metric measurement. In this study, all the variables for factor analysis adopted metric scale; hence, factor analysis could be carried out.

The final assumption is the factorability of the correlation matrix. The researcher must ensure that the data matrix has sufficient correlations to justify the applications for factor analysis (Hair, Anderson, Tatham, & Black, 2003). There are two common tests employed to test the correlations among the variables namely Bartlett Test of Sphericity

(BTS) and Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) which generates an index that ranges from 0 to 1 (Hair *et al*., 2006).

For the purpose of factor analysis in this study, the KMO MSA and the BTS were used to determine whether factor analysis can be carried out. A small KMO value indicates that factor analysis may not be a good option. Therefore, a KMO value of more than 0.5 is required in order to be suitable for factor analysis. On the other hand, Kaiesr (1974) classified MSA values as meritorious if it is above 0.80, middling if it is in the 0.70s, mediocre if it is in the 0.60s, miserable if in the 0.50 and unacceptable if it is under 0.50. In this study, the MSA value for each variable was first examined and those values falling in the unacceptable level were excluded. Once the individual variables achieved an acceptable range, the overall MSA was evaluated before conducting any further factor analysis.

After the suitability of variables for factor analysis was ensured, the factor analysis was conducted according to the following main steps: First, determining the factor loading in order to obtain the initial factors. In this step, the following requirements had to be fulfilled: Factor loading should be 0.5 or more, there is no cross loading between the variables and each component should have more than one variable. In order to extract the number of factors or dimensions, three major principles were used, namely latent root criterion, screen test and percentage of variance explained criterion. Second, Varimax rotation was used to guarantee that all the correlated variables were presented in the same factor. Finally, new factors were labeled based on their components to give meanings to the factors.

4.3.3 Results of Exploratory Factor Analysis

For factor analysis purposes in this study, separate factor analyses were performed on the TOE variables. The reason behind that is to ensure that the ratio of variables to sample size is maintained at 1:10 (Hair *et al*. 2003). In addition, to ensure the stability of the factor loading of various constructs, the same procedure had been performed in previous studies (Thi, 2006).

4.3.3.1 Factor Analysis on Technological Factors

According to Hair *et al*. (2006), the first stage of factor analysis is to determine the number of extracted factors through initial un-rotated factor matrix, and the Scree plot factors. Secondly, to rotate the number of factors from the initial factor matrix that leads to a reduction of the number of variables, and thirdly, to decide whether there is a need to delete any variables due to cross-loading.

In this section, factor analysis was performed on technological variables, which were relative advantage, compatibility, security and IT infrastructure that described the ability of the firms to benefit from e-government initiative as a new technology. These variables were subjected to the following criteria; factor loading should be greater than 0.5 and there should be no cross-loading of variables (Hair *et al*. 2006).

Table 4.17
KMO and BTS for Technological Factors

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.799
Bartlett's Test of Sphericity	Approx. Chi-Square	1146.297
	df	120
	Sig.	.000

To test whether factor analysis was appropriate, the technological variables, KMO, MSA and BTS were carried out on the variables. The results are shown in Table 4.17 above. The KMO value for technological variables was 0.79 indicating that the data were 'middling', and hence appropriate for factor analysis (Kaiser, 1974). The observed BTS value is very large (1146.297) and its associated significance value is very low ($p < 0.001$). The result of the KMO MSA and BTS clearly indicated the sixteen technological items fulfilled the conditions required and were thus suitable for subsequent factor analysis.

As can be seen in Table 4.18 below, the result of extracted components for technological variables showed four factors with eigenvalue exceeding one. These four factors were adopted using the latent root criterion which explained about 75 percent of the variance.

Table 4.18
Results for Extraction of Components for Technological Factors

Total Variance Explained

Component		Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
dimension0	1	4.945	30.907	30.907	4.945	30.907	30.907	3.348	20.923	20.923
	2	3.295	20.595	51.501	3.295	20.595	51.501	3.120	19.500	40.422
	3	2.261	14.131	65.633	2.261	14.131	65.633	3.036	18.972	59.394
	4	1.491	9.320	74.953	1.491	9.320	74.953	2.489	15.558	74.953
	5	.773	4.831	79.784						
	6	.544	3.399	83.182						
	7	.490	3.061	86.244						
	8	.426	2.663	88.906						
	9	.338	2.115	91.021						
	10	.290	1.811	92.832						
	11	.253	1.584	94.416						
	12	.241	1.508	95.924						
	13	.188	1.178	97.102						
	14	.173	1.081	98.183						
	15	.157	.980	99.163						
	16	.134	.837	100.000						

Extraction Method: Principal Component Analysis.

In addition, the eigenvalues for each factor in the scree plot further supported the extraction results. As the Figure 4.15 shows, the curve flattens out from factor four, which indicates that there are four factors.

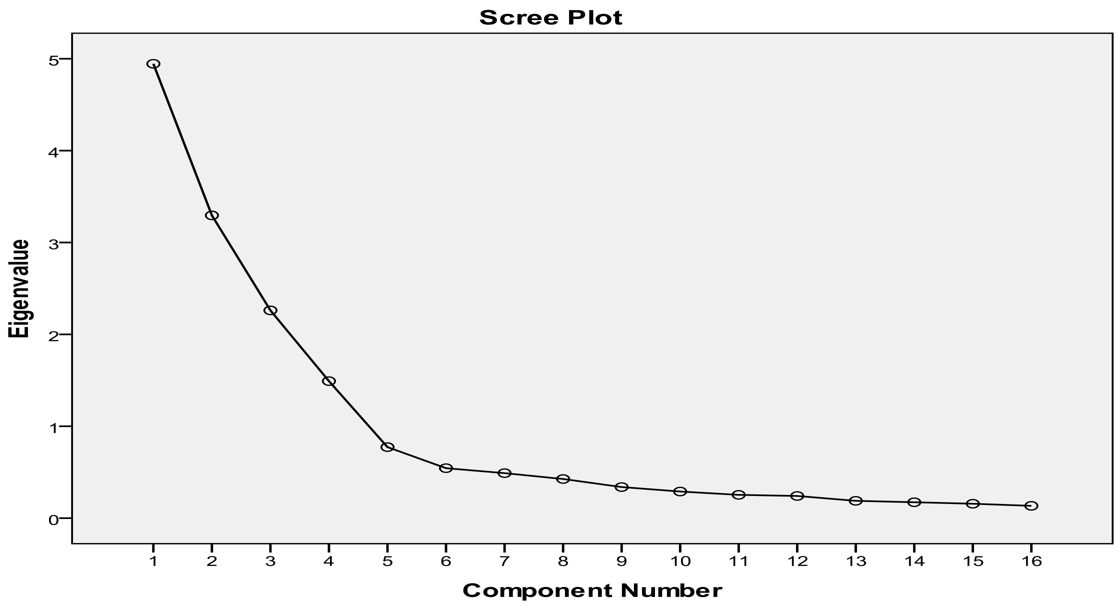

Figure 4.15
Scree Plot for Technological Factors

Based on the final factor structure and the component variables, four different factors with the variables in each factor were identified. In addition, all the rotated variables were returned as there was no cross loading of variables of more than 0.5 observed.

Table 4.19

Loadings on Final Four Factors Using Varimax Rotation

Rotated Component Matrix[a]

	Component			
	1	**2**	**3**	**4**
TITI3	.851			
TITI5	.846			
TITI2	.829			
TITI4	.816			
TITI1	.537			
TRA2		.880		
TRA1		.873		
TRA3		.859		
TRA4		.848		
TC2			.891	
TC1			.882	
TC3			.882	
TC4			.802	
TS3				.865
TS2				.861
TS1				.857

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

In order to provide meanings to each factor, these factors were labeled based on the meanings of the variables in each factor. Factor 1 consisted of five items related to IT infrastructure; therefore, this factor was labeled as ‘IT infrastructure’. Factor 2 had four items related to relative advantage, so this factor was labeled as ‘Relative advantage’. The third factor consisted of four items all related to compatibility, as such this factor was labeled as ‘Compatibility’. Finally, three items were grouped in the last factors which all related to security. Thus, this factor was labeled as ‘Security’.

4.3.3.2 Factor Analysis on Organizational Factors

In this section, factor analysis was performed on organizational variables, which were organizational culture, top management support and resource that are associated with the adoption of e-government. Similarly, these variables were subjected to the following criteria; factor loading should be greater than 0.5 and there should be no cross-loading of variables (Hair *et al*. 2006).

To test whether factor analysis was appropriate, the organizational variables, KMO, MSA and BTS were carried out on the variables. The results are shown in Table 4.20.

Table 4.20
KMO and BTS for Organizational Variables

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.678
Bartlett's Test of Sphericity	Approx. Chi-Square	1498.739
	df	153
	Sig.	.000

The KMO value for organizational variables was 0.678 indicating that the data were ‘mediocre’, and hence appropriate for factor analysis (Kaiser, 1974). The observed BTS value was very large (1498.739) and its associated significance value was very low ($p < 0.001$). The result of the KMO MSA and BTS clearly indicated the twenty-one organizational items fulfilled the conditions required and were thus suitable for subsequent factor analysis.

As can be seen in Table 4.21 below, the result of extracted components for organizational variables showed five factors with eigenvalue exceeding one. These five factors were adopted using the latent root criterion which explained about 76 percent of the variance.

Table 4.21
Results for Extraction of Components for Organizational Factors

Total Variance Explained

Component		Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
dimension0	1	4.105	22.805	22.805	4.105	22.805	22.805	3.118	17.324	17.324
	2	3.722	20.678	43.483	3.722	20.678	43.483	3.069	17.048	34.372
	3	2.267	12.596	56.078	2.267	12.596	56.078	2.766	15.366	49.737
	4	1.966	10.921	66.999	1.966	10.921	66.999	2.505	13.915	63.653
	5	1.522	8.456	75.456	1.522	8.456	75.456	2.125	11.803	75.456
	6	.819	4.552	80.007						
	7	.733	4.071	84.078						
	8	.528	2.936	87.014						
	9	.487	2.703	89.717						
	10	.416	2.313	92.030						
	11	.347	1.928	93.958						
	12	.301	1.674	95.632						
	13	.268	1.489	97.121						
	14	.198	1.101	98.221						
	15	.138	.766	98.987						
	16	.088	.491	99.478						
	17	.075	.415	99.893						
	18	.019	.107	100.000						

Extraction Method: Principal Component Analysis.

In addition, the eigenvalues for each factor in the Scree plot further supported the extraction results. As the figure 4.16 below shows, the curve flattens out from factor five, which indicates that there are five factors.

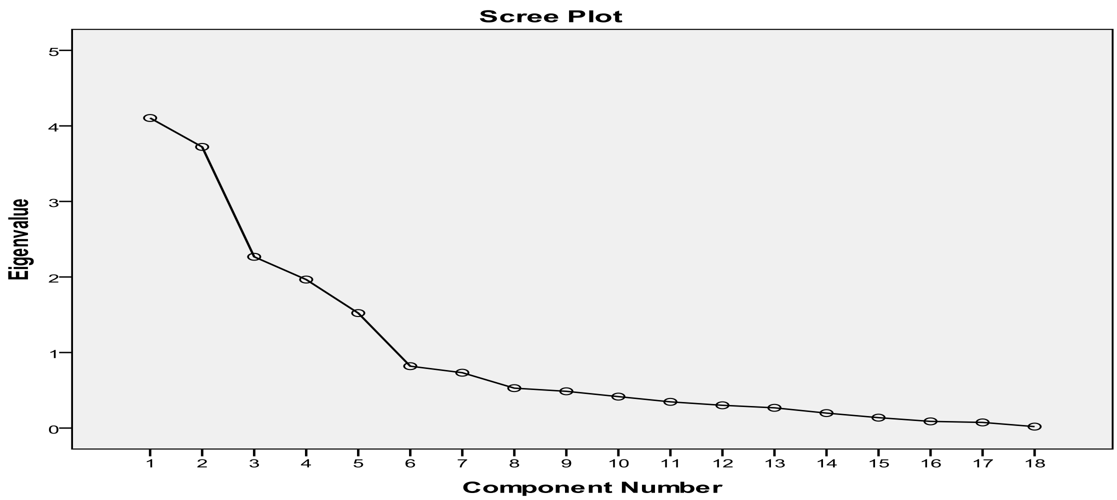

Figure 4.16
Scree Plot for Organization Factors

Based on the final factor structure and the component variables, five different factors with the variables in each factor were identified. In addition, all the rotated variables were returned as there was no cross loading of variables of more than 0.5 observed.

Table 4.22

Loadings on Final Five Factors Using Varimax Rotation

Rotated Component Matrix[a]

	Component				
	1	**2**	**3**	**4**	**5**
OOC3	.898				
OOC4	.869				
OOC5	.864				
OOC2	.808				
OOC6		.928			
OOC7		.850			
OOC8		.839			
OOC1		.759			
OTMS4			.940		
OTMS1			.937		
OTMS2			.729		
OTMS3			.589		
OR6				.923	
OR1				.895	
OR2				.852	
OR4					.870
OR3					.795
OR5					.759

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

In order to provide meanings to each factor, these factors were labeled based on the meanings of the variables in each factor. The first factor consisted of four items all related to the adaptability and mission of the organization; therefore, this factor was labeled as ‘Organization adaptability and mission’. Factor two had four items - all were related to the involvement and consistency of the organization, so this factor was labeled as ‘Organization involvement and consistency’. The third factor consisted of four items all related to the support of the top management, as such this factor was labeled as ‘Top management support’. The fourth factor had items related to human resource in the organization, and therefore, this factor was labeled as ‘Human resource’. Finally, three items were grouped in the last factors which all related to financial resources. Thus, this factor was labeled as ‘Financial resources’.

4.3.3.3 Factor Analysis on External Factors

In this section, factor analysis was performed on external variables, which were government support and competitive pressure that act as environment external factors, which drive firms to adopt new technology. To test whether factor analysis was appropriate, the external variables, KMO, MSA and BTS were carried out on the variables. The results are shown in Table 4.23.

Table 4.23
KMO and BTS for External Variables

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.749
Bartlett's Test of Sphericity	Approx. Chi-Square	497.706
	df	45
	Sig.	.000

The KMO value for external variables was 0.749 indicating that the data were ‘middling’, and hence appropriate for factor analysis (Kaiser, 1974). The observed BTS value was large (497.706) and its associated significance value was very low ($p < 0.001$). The result of the KMO MSA and BTS clearly indicated the ten external items fulfilled the conditions required and were thus suitable for subsequent factor analysis.

As can be seen in Table 4.24 below, the result of extracted components for external variables showed two factors with eigenvalue exceeding one. These two factors were adopted using the latent root criterion which explained about 60 percent of the variance.

Table 4.24
Results for Extraction of Components for External Factors

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.183	31.826	31.826	3.183	31.826	31.826	3.182	31.820	31.820
2	2.800	27.997	59.823	2.800	27.997	59.823	2.800	28.003	59.823
3	.978	9.777	69.600						
4	.662	6.620	76.220						
5	.627	6.267	82.487						
6	.505	5.048	87.535						
7	.468	4.679	92.214						
8	.383	3.825	96.039						
9	.292	2.924	98.963						
10	.104	1.037	100.000						

Extraction Method: Principal Component Analysis.

In addition, the eigenvalues for each factor in the scree plot further supported the extraction results. As the figure 4.17 below shows, the curve flattens out from factor two, which indicates that there are two factors.

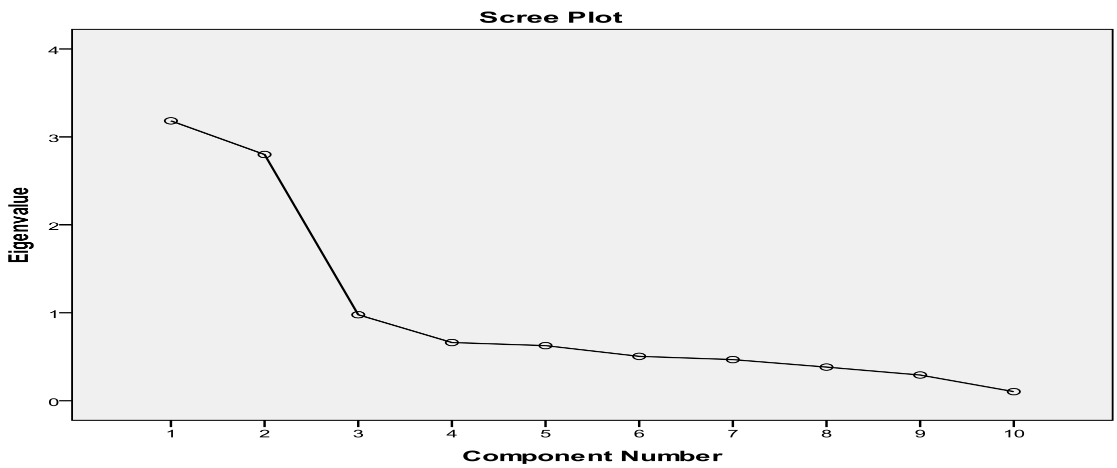

Figure 4.17
Scree Plot for External Factors

Based on the final factor structure and the component variables, two different factors with the variables in each factor were identified. In addition, all the rotated variables were returned as there was no cross loading of variables of more than 0.5 observed.

Table 4.25
Loadings on Final Two Factors Using Varimax Rotation

Rotated Component Matrix[a]

	Component	
	1	**2**
EGS5	.871	
EGS1	.870	
EGS2	.740	
EGS3	.728	
EGS4	.723	
EC3		.818
EC2		.793
EC4		.781
EC1		.714
EC5		.614

Extraction Method: Principal Component Analysis. .

In order to provide meanings to each factor, these factors were labeled based on the meanings of the variables in each factor. Factor 1 consisted of five items related to government support; therefore, this factor was labeled as ‘Government support’. Factor 2 had five items related to ‘competitive’, so this factor was labeled as ‘Competitive’.

4.4 Factor Analysis of E-Government Impact Factors

As discussed in the earlier section, factor analysis was used to discover whether a small number of components or underlying factors account for most of the variance in variables. The variables used to measure e-government impact were derived from prior empirical studies (discussed in Chapter 3), and were adapted to suit this research context. Pre-testing of the variables was conducted to ensure content validity, and the variables were deemed relevant to the practical perspective.

Similarly, convergent and discriminate validity of the variables were evaluated using principal component factor analysis. Similar criteria of eigenvalue greater than 1, factor loading greater than 0.5, and a well-explained factor structure used to analyze TOE variables were also used to analyze the latent dimensions of e-government impact variables. Two dimensions were examined in terms of firm overall performance and types of benefits gained by firms as a result of e-government adoption.

As explained in Chapter 3, five measures of firm performance were employed in this research: long-term profitability, sales growth, financial resources, firm image and client loyalty and market share. The performance variables were measured using a 5-point Likert scale. Similarly, twelve benefits variables measured using such a scale were used to discover underlying dimensions characterizing the benefits of e-government. Tests were conducted to decide whether the variables were appropriate for summarizing the underlying factors (e-government). Computation of the correlation matrix was carried out on the performance and benefits variables. KMO MSA and BTS were used to summarize the correlation matrix.

4.4.1 Impact on Firm Performance

In testing whether a factor was analysis appropriate for the firm performance variables, KMO and Bartlett test were used, with the result shown in Table 4.26.

Table 4.26
KMO and BTS for Performance Factor

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.800
Bartlett's Test of Sphericity	Approx. Chi-Square	269.872
	Df	10
	Sig.	.000

From Table 4.22 above, the KMO measure for firm-performance variables show a value of 0.80; this indicates a ‘meritorious’ adequacy, and hence appropriate for use in factor analysis (Kaiser, 1974). The observed BTS value is also large (269.872) and its associated significance level is very low ($p < 0.001$). Combining the result of both KMO and BTS, the variables used in the performance measure met the conditions, and were appropriate for subsequent factor analysis.

Table 4.27

Result for Extraction of Components for Performance Factor

Total Variance Explained

Component		Initial Eigenvalues			Extraction Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
dimension0	1	3.087	61.737	61.737	3.087	61.737	61.737
	2	.964	19.283	81.021			
	3	.425	8.493	89.514			
	4	.300	6.001	95.515			
	5	.224	4.485	100.000			

Extraction Method: Principal Component Analysis.

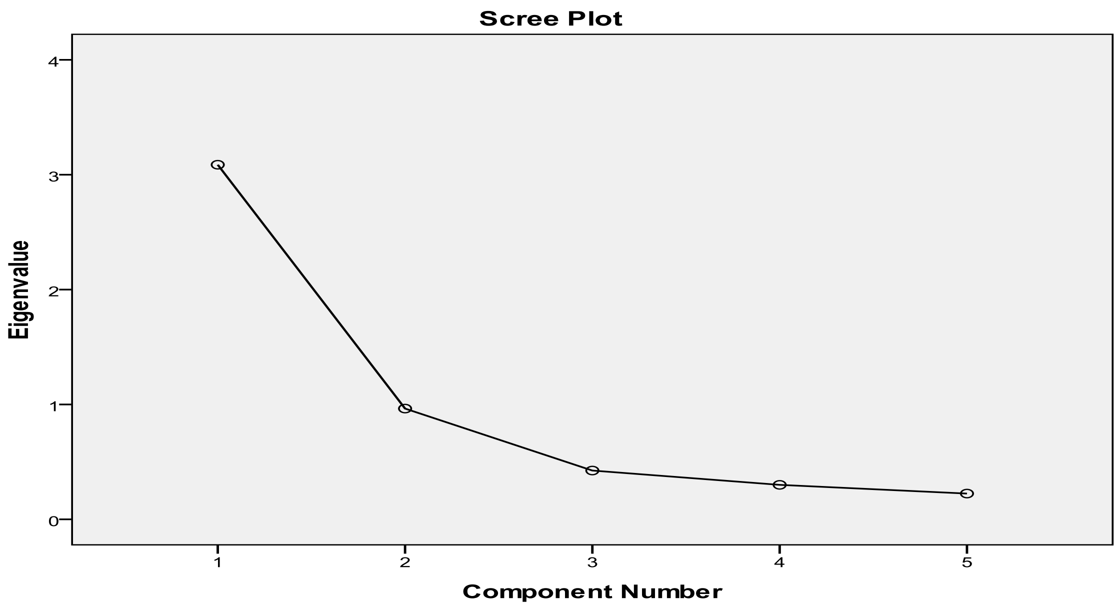

Figure 4.18

Scree Plot for Firm Performance Factor

One factor was extracted with factor loading of more than 1. The eigenvalues of each performance variable are given in Table 4.27. The scree plot steeply descending curve turns into the gentle sloping scree after the first factor (Figure 4.18 above).

The factor loading of each performance variable and factor structure after rotations are given in Table 4.28. Out of five variables, four variables have factor loading values greater than 0.5 and, interestingly, all these four variables are from a single factor that explains 61.737 percent of the variance. The Scree plot test provides further support for the single factor extracted. This indicates that there is a high degree of confidence in the factor solution for the variables used in the measure of firm performance. Specifically, four out of the five variables were retained among the one factor.

Table 4.28

Scee for Firm Performance Factor

	Factor1
Long term profitability	.881
Sales growth	.873
Financial resources	.867
Firm image and client loyalty	.851

Extraction Method: Principal Component Analysis.
a. 1 components extracted

4.4.2 E-Government Benefits

The KMO value for e-government impact variable was .0830. It implies the data were 'meritorious' and appropriate for factor analysis (Kaiser, 1974). The observed BTS value was also large (799.362) and associated with significance level ($p< 0.001$). Combining the result of both KMO and BTS, the variables used in the performance measure met the conditions, and were appropriate for subsequent factor analysis.

Table 4.29

KMO and BTS for Benefit Factors

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett's Test of Sphericity	Approx. Chi-Square	799.362
	df	66
	Sig.	.000

Three factors were identified based on the latent criterion of eigenvalues of more than 1. The eigenvalues of each benefits variable are given in Table 4.29. The scree plot steeply descending curve turns into the gentle sloping scree after the third factor (Figure 4.19).

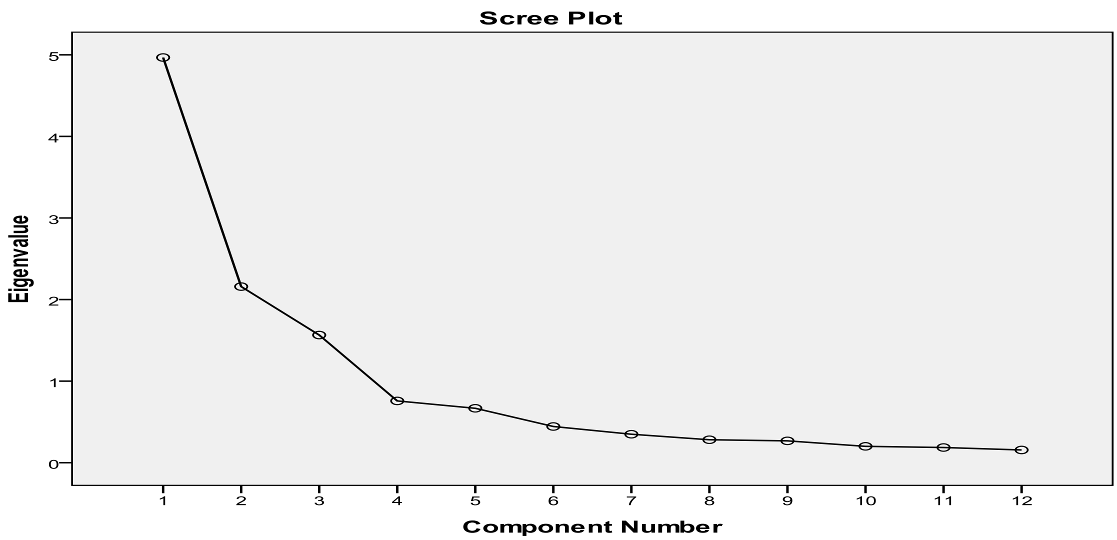

Figure 4.19
Scree Plot for Firm Benefits Factor

Based on the final factor structure and the component variables, three different factors with the variables in each factor were identified. In addition, out from 12 variables, 11 rotated variables were returned as there was no cross loading of variables of more than 0.5 observed.

Table 4.30
Loading on Final Three Factors Using Varimax Rotation

Rotated Component Matrix[a]

	Component		
	1	**2**	**3**
Impact12	.830		
Impact11	.799		
Impact8	.770		
Impact7	.749		
Impact9	.741		
Impact10			
Impact6		.897	
Impact4		.867	
Impact5		.852	
Impact1			.908
Impact2			.901
Impact3			.850

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

Factor 1 consists of items related to reducing operational cost, reduced work-process time, reduce error rates, reduce communication cost and reduced uses of paper. Hence, this factor was labeled ‘Time and cost’. Factor 2 was labeled ‘Efficiency’ as it related to increased work efficiency, fewer administrative burdens, and increased customer satisfaction. Factor 3 was labeled ‘Effectiveness’, which related to improved quality of information supply, improved accuracy, and improved service level. Specifically, eleven out of the twelve variables were retained among the three factors.

4.5 Reliability Assessment of Constructs

Reliability is an assessment of the degree of consistency between multiple measurements of a variable. Two measures of reliability, are first, test-retest, and second, internal consistency can be used to assess reliability of constructs. Test-retest consistency is measured between the responses for an individual at two points in time. The objective is to ensure that responses are not too varied across a time period, so that a measurement taken at any point is reliable (Hair *et al*., 2006).

This study is a cross-sectional one using several variables to measure key concepts related to adoption factors and impact of e-government on businesses. A diagnostic measure in the form of a reliability coefficient was computed to assess internal consistency of the scale. Cronbach's alpha was used because it is the most widely used measure to ascertain the coefficient of reliability (Hair *et al.,* 2006).

The philosophy behind Cronbach's alpha is that we assume that variables on a scale are positively correlated with each other because they are measuring, to a certain extent, a common entity. If these variables are not positively correlated with each other, there is no reason to believe that are correlated with other possible variables we may have selected from a universal set of possible variables. In such case, we do not expect to see a positive relationship between this scale and other alternative scales designed to measure the same common entity (De-Vaus, 1991).

4.5.1 Reliability of Scales

The factor analysis established above demonstrated the construct validity of the fifteen factors. Having decided which variables were worth including in the final factors, each scale reliability score was then calculated and rechecked for this sample, using the test for reliability. The next step was to test the internal consistency of each factor, using Cronbach's alpha.

Hair *et al*. (2003) quoted from Robinson *et al*. (1973, 1991) that generally, the lower limit for Cronbach's alpha is 0.7, and it may be decreased to 0.6 in exploratory researches. Nunnally (1978) further suggested that an average reliability score of 0.70 would suffice for basic research.

Table 4.31
Comparing Original Dimensions to Final Dimension after Factor Analysis

Original dimension	**Dimension derived after factor analysis**	**N. Items**	**Alpha (a)**
	Technology Factors		
Relative Advantage	Relative Advantage	4	.897
Compatibility	Compatibility	4	.888
IT Infrastructure	IT Infrastructure	5	.864
Security	Security	3	.887
	Organizational Factors		
Resources	Human Resources	3	.774
	Financial Resources	3	.892
Top Management Support	Top Management Support	4	.832
Organizational Culture	Organization Adaptability and Mission	4	.896
	Organization Involvement and Consistency	4	.884
	External Factors		
Competition	Competition	5	.798
Government Support	Government Support	5	.847
	Performance		
Performance	Performance	4	.892
	Impacts		
Impacts	Time and cost	5	.871
	Efficiency	3	.892
	Effectiveness	3	.872

The fifteen multi-variable factors used in this study underwent several successive reliability testing treatments. The statistical information for the fifteen factors is given in Table 4.31. The results show that Cronbach's alpha scores are 0.77 or higher. Since the lowest score is 0.77, for example human resources, all the constructs are deemed to have adequate reliability.

4.6 Descriptive Analysis

4.6.1 Major Variables

The following section answers the second and third research questions which are "What are the factors that drive the adoption of e-government among businesses in Jordan?" and "How is the impact on organizational performance after adopting e-government among businesses in Jordan?" In doing so, the following section provides the final lists of variables that were subjected to the descriptive statistics in order to identify their characteristics. Specifically, mean value and standard deviation values were computed. In general, the higher the mean value, the stronger the level of agreement with the statements and the smaller the standard deviation, the more concentrated the data around the mean (Jennings, 2001). For ease of interpretation, the range of five-point Likert-scales was categorized into equal sized categories of low, moderate, and high. Hence, scores of less than 2.33 (4/3 + lowest value 1) is considered as low; scores of 3.67 (highest value (5) – 4/3) is considered as high and those in between is considered moderate.

4.6.1.1 Descriptive Analysis for Technological Factors

Frequency distribution and measurements in the form of means and standards deviations for the four technological factors are reflected in the Table 4.32 below which shows that respondents are moderate in all technological factors which include ‘relative advantage’, ‘compatibility’, ‘IT infrastructure’, and ‘security’. More specifically, the results show the highest overall mean score of 3.59 was related to ‘relative advantage’ as it was about the degree to which an innovation is perceived as being better than the idea it supersedes. The lowest overall mean score was 3.28 which was related to “security’ dimensions as it was about the perception and fear of safeguarding mechanisms for the movement and storage of information through electronic databases and transmission media.

Table 4.32
Descriptive Statistics for Technological Factors

N.	Statement	N	Mean	Std. Deviation
	Relative Advantage			
1	E-government allows us to better communicate with our business partners	113	3.75	.892
2	E-government allows us to cut costs in our operations	113	3.66	.739
3	E-government increases the profitability of our business.	113	3.50	.792
4	E-government provides timely information for decision making.	113	3.43	.754
Overall Relative Advantage		113	**3.59**	.697
	Compatibility			
1	E-government is compatible with our firm's values and beliefs.	113	3.67	.930
2	E-government is compatible with management support	113	3.57	.743
3	E-government is compatible with competitive advantage	113	3.42	.842
4	E-government integration into our current procedures would not be difficult	113	**3.34**	.786
Overall Compatibility		113	**3.55**	.761

Table 4.32 (Continued)

N.	Statement	N	Mean	Std. Deviation
IT Infrastructure				
1	Our firm has a good telecommunications infrastructure	113	3.53	.791
2	Our firm shares the databases for various applications	113	3.40	.701
3	Our firm has a reliable Internet connections	113	3.50	.709
4	Our firm has fast Internet downloading/access speed	113	3.65	.810
5	Our firm makes PC's and laptops available for the staff	113	3.55	.813
Overall IT Infrastructure		113	**3.53**	.616
Security				
1	E-government reduces the risk of unauthorized access	113	3.42	.904
2	Online payment does not pose security risks	113	3.18	.759
3	E-government website is secure in terms of computer viruses	113	3.26	.799
Overall Security		113	**3.28**	.743

(Strongly disagree 1, Disagree 2. Neutral 3, Agree 4, Strongly agree 5

4.6.1.2 Descriptive Analysis for Organizational Factors

Frequency distribution and measurements in the form of means and standards deviations for the five organizational factors are reflected in the Table 4.33. First, it shows that the respondents are high in their financial resources and human resources with the mean score of 4.12 and 4.04 respectively. Second, the respondents are moderate in the top management support with the mean score of 3.51. Finally, the respondents are low in their adaptability and mission of the organization and involvement and consistency of the organization with the mean score of 2.04 and 2.12 respectively. More specifically, the results show the highest overall mean score of 4.12 was related to ‘financial resources’ as it was about the allocation and spending of the amount of money required to support activities and obtain the necessary human and other resources such as hardware and software licenses. The lowest overall mean score was 2.04 which was related to 'adaptability and mission of the organization' dimensions as it was about the second order construct.

Table 4.33
Descriptive Statistics for Organizational Factors

N.	Statement	N	Mean	Std. Deviation
Organization Adaptability and Mission				
1	In this organization, cooperation and collaboration across functional roles is actively encouraged	113	1.97	.860
2	In this organization, there is a high level of agreement about the way that we do things	113	2.06	.859
3	In this organization, the approach of doing business is very consistent and predictable	113	2.10	.916
4	In this organization, customers' comments and recommendations often lead to changes	113	2.00	.886
Overall OrganizationalCulture4532		113	**2.04**	.767
Organization Involvement and Consistency				
1	This organization is very responsive and changes easily	113	2.12	.989
2	This organization has a long-term purpose and direction.	113	2.18	1.054
3	There is a shared vision of what this organization will be like in the future.	113	2.17	1.043
4	In this organization, most people have input into decisions that affect them	113	2.00	.886
Overall OrganizationalCulture1678		113	**2.12**	.857
Top Management Support				
1	Top management supports the adoption of e-government	113	3.53	.733
2	Top management has allocated adequate resources to adopt e-government	113	3.49	.745

Table 4.33 (Continued)

N.	Statement	N	Mean	Std. Deviation
3	Top management is aware of the benefits of e-government adoption.	113	3.49	.733
4	Top management actively encourages employees to use the e-government in their daily tasks	113	3.52	.721
Overall Top Management Support		113	**3.51**	.598
Financial Resources				
1	The financial resources to implement e-government is available	113	4.07	.842
2	The financial resources to support e-government is available	113	4.14	.800
3	The technological resources to support e-government is available	113	4.07	.844
Overall financial resources		113	**4.12**	.752
Human Resources				
1	The human resources to implement e-government is available	113	3.83	.885
2	The human resources to support e-government is available	113	3.65	.864
3	The technological resources to implement e-government is available	113	3.80	.746
Overall human resources		113	**3.76**	.692
Valid N (listwise)		113		

(Strongly disagree 1, Disagree 2. Neutral 3, Agree 4, Strongly agree 5)

4.6.1.3 Descriptive Analysis for External Factors

Frequency distribution and measurements in the form of means and standards deviations for the two external factors are reflected in the Table 4.34 which shows that respondents are high in all external factors which include ‘competitive pressure’ and ‘government support’. More specifically, the results show the highest overall mean score of 4.09 was related to ‘government support’ as it was about the government support and promotion of e-government adoption among business. The lowest overall mean score was 3.91 which was related to 'competitive pressure' dimensions as it was about the pressure derived from the advantages that competitors enjoy when they adopt new technology, in which a firm has to consider whether or not to follow its competitors.

Table 4.34
Descriptive Statistics for External Factors

N.	Statement	N	Mean	Std. Deviation
Government Support				
1	Government is generally supportive of e-government	113	4.12	.867
2	Government provides incentives for our organization to implement e-government	113	4.12	.874
3	Government helps training manpower with e-government skills	113	4.10	.834
4	Government provides financial support for the development of e-government technologies	113	3.99	.931
5	Government support for e-government is readily available	113	4.13	.891
Overall Government Support		113	**4.09**	.693
Competition				
1	Competition makes it necessary for our organization to implement e-government	113	4.21	.850
2	Competition is forcing our organization to implement e-government	113	3.87	.891
3	E-government is considered an important economic function of our economy	113	3.69	.867
4	E-government is needed in order to be a leader in our organization's industry	113	3.79	.773
5	Many organizations within our industry have implemented e-government	113	3.99	.891
Overall Competition		113	**3.91**	.636
Valid N (listwise)		113		

(Strongly disagree 1, Disagree 2. Neutral 3, Agree 4, Strongly agree 5)

4.6.1.4 Descriptive Analysis for Organization Performance

Table 4.35 shows that respondents are moderate in all organization performance which includes ‘performance’, ‘time and cost’, ‘efficiency’, and ‘effectiveness’. More specifically, the results show the highest overall mean score of 3.62 was related to ‘effectiveness’ as it was about the possibility of being aware of that new information would increase the organization performance. The lowest overall mean score was 3.26 which was related to ‘efficiency’ dimensions as it was about the primary proposed object for any IT introduction.

Table 4.35

Descriptive Statistics for Organization Performance

N.	Statement	N	Mean	Std. Deviation
Performance				
1	In long term profitability	113	3.78	.894
2	In sales growth	113	3.70	.743
3	In financial resources	113	3.53	.791
4	In firm image and client loyalty	113	3.50	.836
Overall Performance		113	**3.62**	.551
Time and cost				
1	Reduced operational cost	113	3.65	.810
2	Reduced work-process time	113	3.55	.813
3	Reduce error rates	113	3.57	.743
4	Reduce communication cost	113	3.50	.709
5	Reduce uses of paper	113	3.40	.701
Overall Time and cost		113	**3.53**	.614
Efficiency				
1	Fewer administrative burdens	113	3.36	.877
2	Increased customer satisfaction	113	3.17	.755

Table 4.35 (Continued)

N.	Statement	N	Mean	Std. Deviation
3	Fewer administrative burdens	113	3.25	.797
Overall Efficiency		113	**3.26**	.736
	Effectiveness			
1	Improved quality of information supply	113	3.78	.894
2	Improve accuracy	113	3.70	.743
3	Improved service level	113	3.53	.791
Overall Effectiveness		113	**3.64**	.723
Valid N (listwise)		113		

(Strongly disagree 1, Disagree 2. Neutral 3, Agree 4, Strongly agree 5)

4.7 E-Government Adoption and Identifying Adoption Groups

This section describes the use of the framework proposed in Chapter 3 to measure and characterize e-government adoption by the Jordanian businesses.

4.7.1 Adoption Profile

The respondents were asked to identify the types of e-government application adopted by their firms and, at the same time, to indicate the extent of usage for each application. It aims to provide a description on the current state of e-government adoption among businesses. It also aims to answer questions on what applications have been adopted and how these applications have been used among businesses.

4.7.1.1 Level of Adoption

The level of e-government applications' adoption is the aggregate adoption of three categories of usage, namely use sometimes, use most of the time, or use all the time. It provides the initial pictures of types of application's adoption by Jordanian businesses. Figure 4.20 illustrates the distribution of e-government applications adopted by these businesses.

The result shows that business taxes and reporting are the most widely adopted (95.7 percent), followed by doing business with the state (89.7 percent), state government offices or agencies for business (88.8 percent), state tax incentives and application forms (87.9 percent), non-for-profit organization (86.6 percent), how to finance a business (86.2 percent), employment and workforce information (86.2 percent), how to file complaints (84.5 percent), and small business information and assistance (82.8 percent). About three-quarters (74.1 percent) of the businesses have also adopted online business facts and figures of the state, online business licenses, permits, and regulations; followed by how to start a new business (70.7 percent), while 50.9 percent of the businesses have adopted state environmental requirements. Applications with low adoption rate among the businesses are the online business owner's guide to state government and online business opportunities, with adoption rate of 37.1 percent and 35.3 percent, respectively.

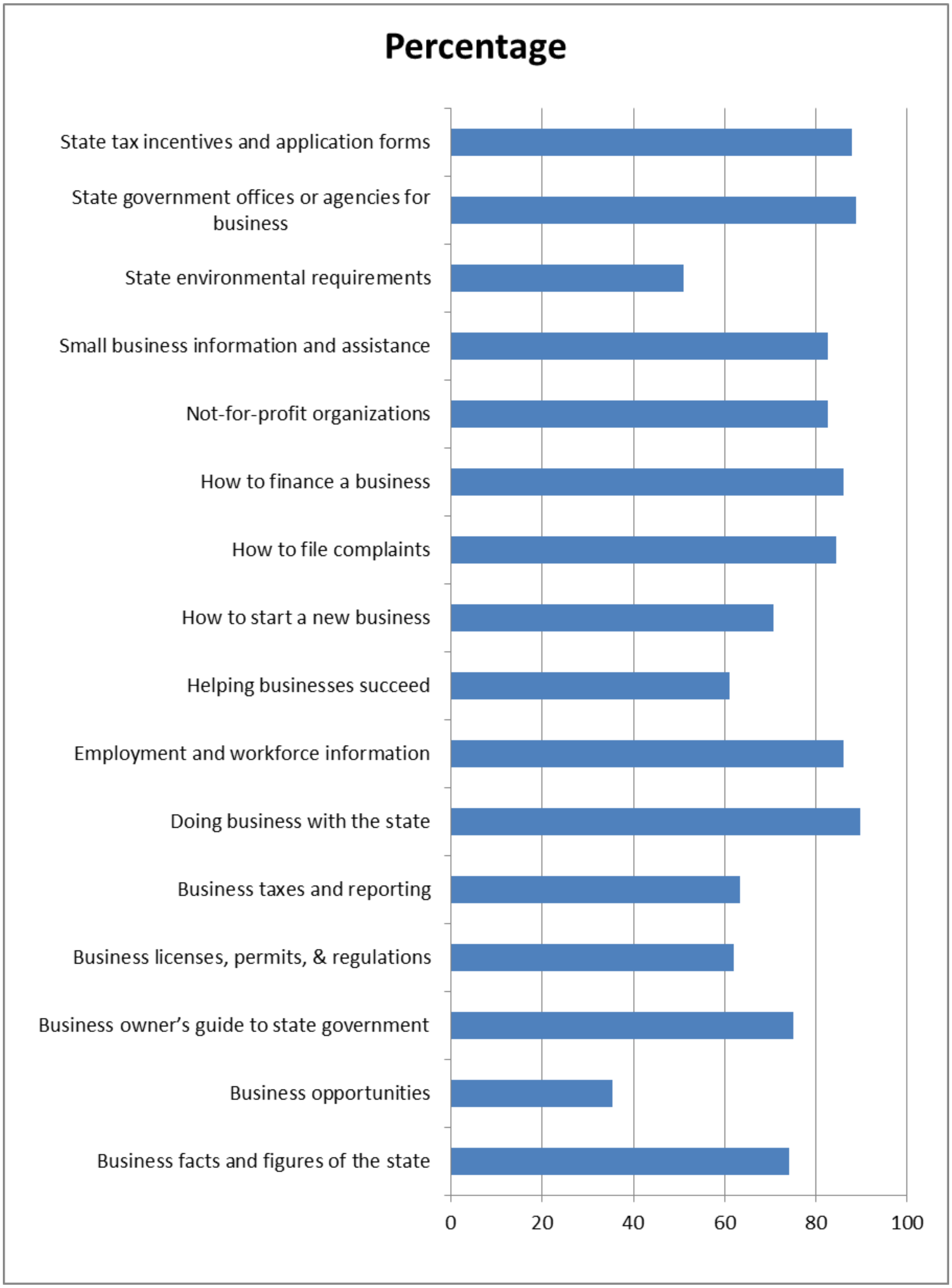

Figure 4.20

Level of E-Government Applications

4.7.1.2 Extent of Usage

Four usage stages were identified for this study: not using, use sometimes, use most of the time, and use all the time. Figure 4.21 indicates e-government application diffusion using the above indicators.

From Figure 4.21, it is observed that business opportunities and business owner’s guide to state government are the least adopted e-government applications. For those businesses that adopted these two applications, they are mainly used on a ‘use sometimes’ or ‘most of the time’. About, three percent of the businesses have used ‘all the time’ methods of business opportunities and business owner’s guide to state government with an online inventory management system.

Businesses that have adopted how to file complaints, how to finance a business, not-for-profit organizations, and small business information and assistance are found to use these applications, mainly on a parallel basis. In other words, these businesses are still using traditional business transaction methods such as laws and regulations, financial, market and technology information.

A similar trend can be observed for the remaining applications, namely state tax incentives and application forms, business taxes and reporting, business licenses, permits, and regulations, doing business with the state, and employment and workforce information. Businesses have adopted these applications, mainly on a ‘use most of the time’ which is using them along with other traditional business transaction methods.

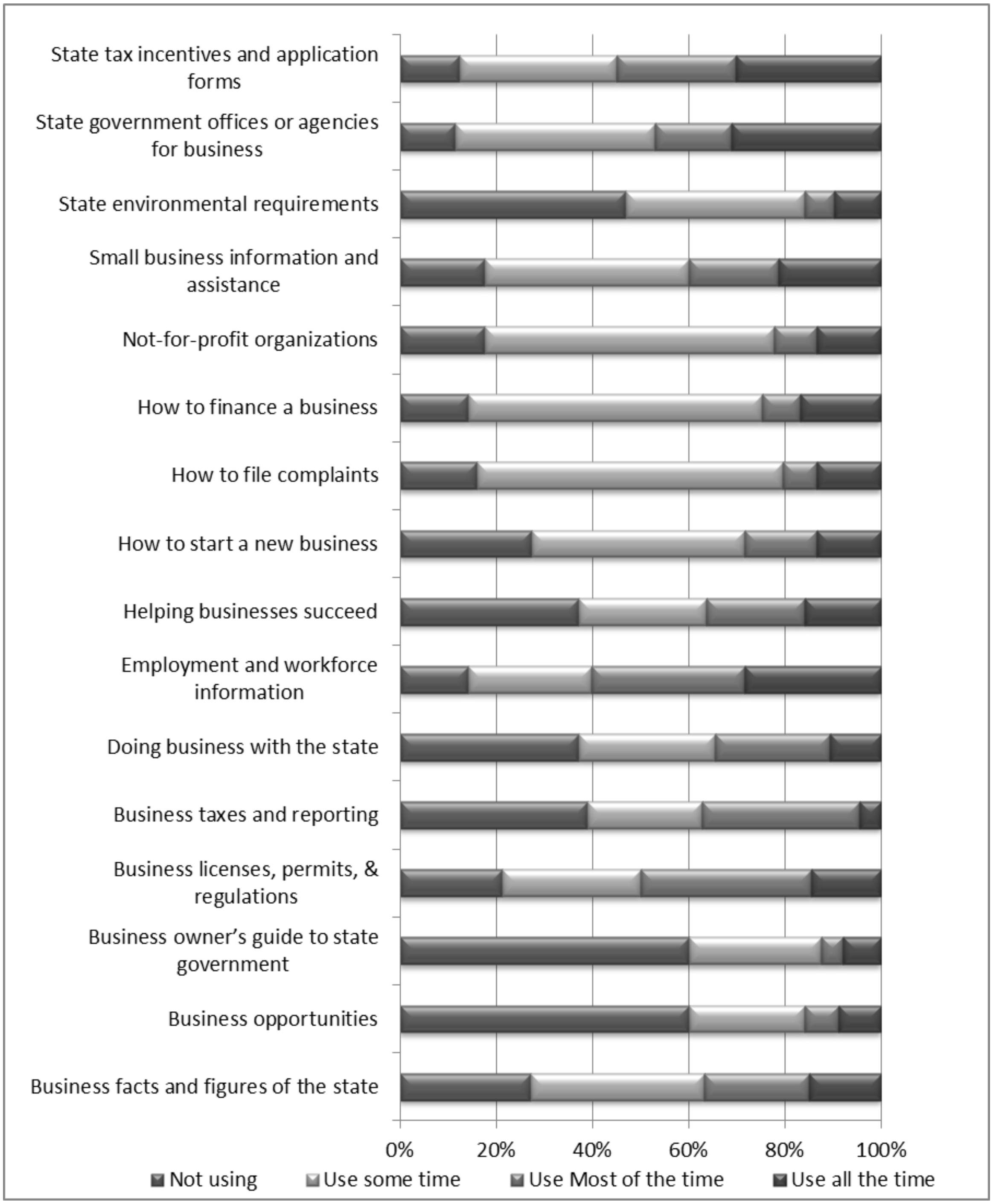

Figure 4.21

Extent of Usage E-Government Applications

4.7.2 Cluster Analysis

This activity categorizes the cases into groups or clusters. A cluster is described as a group of homogeneous cases or observations in a way that the level of association is strong between firms of the same cluster while the level of association is weak between firms of different clusters. According to Everett, *et al*. (2001), cluster analysis is a way for dividing observations into groups in a way that observations in one group are all similar while observation in another varies from other groups. This type of analysis aims to identify a set of groups which decreases within-group variation and increases between-group variation. Hair *et al*. (2006) asserted that cluster analysis comprises a collection of statistical methods, which categorizes groups of samples behaving similarly or present similar characteristics.

Hierarchical and non-hierarchical clustering is the most widely used procedure of clustering analysis. The former involves a series of n -1 clustering decisions where n is equal to the number of the observations that joins observations into a structure of hierarchy while the latter (e.g. K-means) does not involve the treelike construction process but instead assigns objects into clusters after the number of clusters is specified.

K-means functions in a non-hierarchical divisive cluster analysis on input data and possesses several distinctive characteristics that distinguish it from the common hierarchical clustering methods. This is clear from the fact that with hierarchical methods, two elements, which are execution time and necessary storage leads to the increase with the square of the number of objects being clustered while with K-means, execution time increases linearly with the increase of the product of the number of units, the number of variables, the maximum number of clusters desired (usually much less than the number of units) and the (unpredictable) number of iterations. Also, in the K-means, storage increases linearly with the increase of the product of the number of objects and variables. Therefore, it is possible to utilize this method of clustering with larger numbers of objects. However, in contrast to the hierarchical methods, which surely finds the best solution, K-means fails to search for the best solution for a provided level of clustering giving the former an upper hand. Also, another disadvantage of K-means is the fact that in hierarchical procedures, hierarchy or tree-like structure is constructed to determine the association among entities (observations or individuals) while in the non-hierarchical method, a position in the measure is considered as the central place and distance is measured from it. The identification of the correct central point poses a big challenge and therefore, leads to the less popularity of the non-hierarchical method.

As mentioned earlier, the aim of cluster analysis is to group observations into one cluster. However, in case of K-means, there is a need to pre-specify the number of groups and in such instances, the data analyst is provided the often difficult task of running the algorithm repeatedly with a different number of groups. The determination of the number of clusters to form has its basis on the combination of the subject matter expertise and the distance's definition. One of the cons of K-means is the fact that it fails to yield the same result with each run, since the resulting clusters depend on the initial random assignments. Also, in K-means, there is a need to specify the number of clusters that are used as inputs to the algorithm because the algorithm is incapable of determining the suitable number of clusters, and it is up to the user to identify and determine it. This could be best explained through a scenario: if a group of people were easily clustered based upon gender, using the K-means algorithm with K=3 would force the people into three clusters, when K=2 would provide a more natural fit. Furthermore, if a group of individuals were clustered easily on the basis of their home state and the K-means algorithm is used with K=20, the results might be too generalized to be effective. In the present study, the specification of the number of clusters to be inputs to the algorithm would either produce unnatural or general results, and hence, the algorithm provides no guarantee of a best solution. As such, using hierarchical clustering allows some flexibility in the determination of the number of clusters. Cluster analysis is carried out on adoption groups for the purpose of answering the research questions that generally lead to the identification of the current level of e-government adoption among businesses. In the present study, the hierarchical clustering method analysis is the most suitable one to be used.

Specifically, this type of clustering method led to the study of different cluster solutions. On the other hand, non-hierarchical clustering maximizes the clustering solutions through the resignation of observations up until the achievement of minimum heterogeneity within clusters. Owing to this fact, the use of hierarchical method will likely come up with a different number of observations in each cluster as compared to non-hierarchal method.

7.4.2.1 Hierarchical Cluster

On the basis of the previous discussions, it is clear that hierarchical clustering is suitable for smaller samples (typically < 150) (Everitt *et al*. 2001), and hence, this type of clustering is chosen for the present study. In addition, it is the most suitable cluster analysis method for solving classification problems (Rudzkiene & Martinaityte, 2010). It aims to categorize cases into cases or variables or groups or clusters for the purpose of the strong level of association between members of the same cluster and the weak level of association between members of different clusters. Each cluster represents the class to which its members belong; a description that may be obtained from the use of a general class or type. Cluster analysis is considered as a tool of discovery as it reveals relationships and structure present in data, which were not noticed previously. The outcome of cluster analysis may lead to the determination of the definition of a formal classification scheme; it may lead to the recommendation of statistical models or the indication of rules for assigning new cases to classes for the purpose of identifying and diagnosing purposes or determining exemplars to represent classes.

Hierarchical switching methods are comprised of a large group of methods and in the general case, the cluster consists of more than a single element but the set and the distance between the clusters can be determined in different ways. There are various popular hierarchical switching methods, which is the single linkage or nearest neighbor (calculating distances between clusters), complete linkage, average linkage, Ward's linkage (including Ward's method), weighted average linkage, centroid linkage, median linkage and others.

The Squared Euclidean distance (the square root of the sum of the squared differences in the value for each variable) and the Complete Linkage method for objects clustering based on the maximum distance between them (also called the furthest Neighbor rule) were used for the purpose of expert assessment analysis. Then this was followed by the creation of the assumptions for cluster analysis. Data can be described as the interval in level or true dichotomies for hierarchical and K-means clustering – although it has been evidenced that two-step clustering is suitable for categorical data. In cases where at least a single variable is categorical, two-step clustering was utilized.

Hierarchical cluster analysis involves the following three steps:

- The searching of similarity or lack thereof between the pairs in the data set.
- The grouping of units into a binary, hierarchical cluster tree.
- The determination of the place where the hierarchical tree should be cut into clusters.

According to Hair *et al*. (2006), hierarchical clustering techniques have long been the more popular clustering method with average linkage probably being the best available. The average linkage method is chosen in this analysis as a compromise to the algorithms relying on a single observation (single or complete- linkage algorithm) while also generating clusters with small within-cluster variation. Ward's method was not used because of its tendency to generate clusters of equal size, and determining cluster size variation in the sample is an important consideration in this research question (Hair *et al*. 2006).

4.7.2.2 Result of Hierarchical Cluster Analysis

To accomplish hierarchical clustering, the researcher specified how similarity or distance is defined, how clusters are aggregated (or divided), and how many clusters are needed.

Corter (1996) added that hierarchical clustering generates all possible clusters of sizes 1 … K, but is used only for relatively small samples. In hierarchical clustering, the clusters are nested rather than being mutually exclusive, as is the usual case, i.e., in hierarchical clustering; larger clusters created at later stages may contain smaller clusters created at earlier stages of agglomeration (Sharma 1996). The following results show a sample of the results of the hierarchical clustering, which results in two clusters (refer to Appendix F).

Table 4.36
Agglomeration Schedule under Hierarchical clustering

stage	**Cluster Combined**		**Coefficients**	**Stage Cluster First Appears**		**Next Stage**
	Cluster 1	**Cluster 2**		**Cluster 1**	**Cluster 2**	
1	43	113	.000	0	0	68
2	41	112	.000	0	0	40
3	42	111	.000	0	0	71
4	76	109	.000	0	0	20
5	28	106	.000	0	0	99
6	37	102	.000	0	0	43
7	72	101	.000	0	0	24
8	81	100	.000	0	0	16
9	82	99	.000	0	0	62
10	25	97	.000	0	0	46

Table 4.37 shows the number of cases in each cluster and their percentages. The first cluster includes 74 firms (65.5 percent), whereas cluster two consists of 39 firms (34.5 percent) of the sample.

Table 4.37
Number of cases in each cluster

Average Linkage (Within Group)

		Frequency	Valid Percent	Cumulative Percent
Valid	1	74	65.5	65.5
	2	39	34.5	100.0
	Total	113	100.0	
Missing		0		
Total		113		

Based on the initial cluster centers that include two clusters and given the average value of each variable in each cluster, it can be observed that cluster (1) has the highest averages with all variables. In addition, referring to the clustering analysis result - cluster membership - confirmed this observation. For example, firms (1, 7, 8, and 9) are in the first cluster which has the highest values, while firms 3, 10, and 11 are in the second cluster which has the lowest averages (see Figure 4.22 below). Based on this, as well as the mean average of each variable in each cluster, these two clusters could be named. The first cluster is labeled as advanced-adopters while the second cluster is named as basic-adopters.

	Information	Mutual	Financial	Integration	CLU2_2
1	4	3	2	4	1
2	4	4	3	4	1
3	2	3	1	3	2
4	4	5	3	4	1
5	4	4	3	3	1
6	4	4	2	1	1
7	3	3	4	2	1
8	4	4	3	1	1
9	4	4	3	3	1
10	3	3	2	3	2
11	3	3	1	2	2
12	5	5	2	2	1

Figure 4.22
Initial cluster centers

In addition, test of differences (t-test) between the four adoption items was conducted. The result in Table 4.38 below shows that the mean score of cluster 1 (advanced-adopters) in all four items are higher than the mean score of cluster 2 (basic adopters). This result supports the clustering result in the previous analysis.

Table 4.38
Comparisons of E-Government Current Stage by Adoption Groups

Adoption Groups / Current Stage	Cluster1 (advanced-adopter) (N=74) Means*	Cluster2 (basic-adopter) (N=39) Means*	F Stat (p-value)	Games-Howell Test
Information	4.08	3.59	4.483 0.001	(1) >> (2)
Mutual	3.70	3.23	3.520 0.001	(1) >> (2)
Financial	2.45	1.31	6.457 000	(1) >> (2)
Integration	2.12	1.69	574 0.011	(1) >> (2)

*Measured by 5 point scale

Cluster 1 above reports a high mean in information and mutual 4.08 and 3.70 out of two respectively as compared with the mean scores within both clusters. Product diversity has also a high mean score in the first cluster (4.08) whereas, cluster two has a less mean score of 3.59 respectively. Finance and integration recorded a moderate mean score within cluster one (2.45 and 2.12) and the least mean scores in cluster two.

According to the results above, cluster one includes those firms (74 firms) which have a high mean score of all variables (advanced-adopters), and cluster two (39 firms) consists of medium mean scores (basic-adopters).

The post-hoc analysis using Games-Howell procedure was carried out to determine pairs of the groups which appear to have different means. This procedure was adopted because, according to Field (2005), it is more accurate when comparing sample sizes, which are unequal.

Based on the post-hoc result (Table 4.38), it is noticed that significant differences for firm information measure are observed between the advanced-adopters (mean = 4.08) compared with the rest of the basic-adopters (mean = 3.59). The result indicates that businesses which have adopted e-government advanced-adopters have been able to achieve better information compared to basic-adopters. However, no significant differences in terms of information were observed among the lower adoption groups.

On the other hand, significant differences were observed for mutual gain between the advanced-adopters (mean = 3.70) compared with the rest of the basic-adopters (mean = 3.23). For finance, significant differences were observed for mutual gain between the advanced-adopters (mean = 2.45) compared with the rest of the basic-adopters (mean = 1.31). For integration, significant differences were observed for mutual gain between the advanced-adopters (mean = 2.12) compared with the rest of the basic-adopters (mean = 1.69).

4.7.3 Profile of Adoption Groups

The characteristics of the two adoption groups were examined based on firms' demographic variables, namely firm size, employment of internal IT staff, ownership type, annual sales and budget for IT. Chi-squared tests were used to examine the relationships, as the variables examined comprised nominal data. The results are displayed in Table 4.39 below.

Table 4.39
Profile of Adoption Groups and Organizational Variables

Organization variables	Advanced-adopters N=74	Basic-adopters N=39	P value
Firm size			.018
Small-size	29 39.2%	20 51.3%	
Medium-size	45 60.8%	19 48.7%	
Employments of internal IT staff			.406
No IT staff	14 18.9%	10 25.7%	
Employ IT staff	60 81.1%	29 74.3%	
Ownership type			.006
Citizen owned	48 64.8%	22 56.4%	
Non-citizen/joint	26 35.2%	17 43.6%	
Annual sales			.886
JD 10 million or less	39 52.7%	20 51.3%	
More than 10 million	35 47.3%	19 48.7%	
IT budget			.702
5% or less	68 91.8%	35 89.7%	
More than 5%	6 8.2%	4 10.3%	

Table 4.39 indicates significant difference between adoption groups and firm size. Approximately, 52 percent of basic-adopters comprised small firms, while 48.7 percent are medium-sized. Conversely, 60.8 percent advanced-adopter comprised medium-sized, while only 39.1 percent were of the small firms. The result shows that basic-adopters mainly comprised small firms, while advanced-adopters comprised medium-sized firms.

Significant difference is also observed between adoption groups and firms ownership type. The result shows a majority of advanced-adopters (64.8 percent) are citizens owned firms, while foreign-owned firms represent 35.2 percent of the advanced-adopters. Approximately, 44 percent of the advanced-adopters were joint firms. However, by looking at these firms, it can be interpreted that 60.4 percent of the foreign firms included in this study were advanced-adopters, while 39.6 percent of them were basic-adopters. This is followed by citizen owned firms. Of the citizen owned firm's respondents, about 68.5 percent were advanced-adopters while 31.5 percent were basic-adopters. The result shows that the majority of foreign owned and citizens owned firms are advanced-adopters of e-government services.

As shown in Table 4.39, there is no significant difference between adoption group and firms' annual sales, number of IT staff and budget for IT. The findings refute the perception that number of IT staff and firm budget allocated to IT help to support firm's innovation adoption as suggested by Goode and Stevens (2000) and Kowtha and Choon (2001). A summary of the groups' characteristics is given in Table 4.39.

4.7.3.1 Basic-adopters

Basic-adopters group represented about 35 percent of the sample. Approximately, 52 percent of the businesses in this group was small-sized firms, citizen owned firms, and engage internal IT staff. This was not surprising, as these businesses had allocated five percent or less of their annual budget for IT, implying their low priority in adopting IT.

4.7.3.2 Advanced-adopters

The advanced-adopters group represented about 65.5 percent of the total number of businesses in this study. This group was fairly equal in terms of annual sales turnover. Approximately, 61 percent of the businesses in this group was medium-sized firms, citizen owned firms, and engage internal IT staff. This was not surprising, as these businesses had allocated five percent or less of their annual budget for IT, implying their low priority in adopting IT. The results concurred with past study that firm size has a positive link with IS adoption (Thong & Yap, 1995) and supported the argument that firm size had a significant impact on extent of IS adoption (Thong, 1999). To sum up, there were links between two organizational factors (firm size and ownership type) and e-government adoption.

4.7.4 E-Government Adoption by Business Sector

The initial cross tabulation of the two levels of e-government adoption and four businesses sectors, as used in the questionnaire, resulted in a eight cell matrix (2 by 4). A number of the cells in this matrix had zero observations. As emphasized by Menard (2001) and Siegel and Castellan (1988), such zero cells distort the Chi-Square value. This resulted in Table 4.40, shown below.

Table 4.40

Businesses Sectors and Levels of E-Government Adoption

Group	Industry	Insurance	Serves	Banking
Basic-adopters N=39	15 30%	6 35%	13 43%	5 33%
Advanced-adopters N=74	35 70%	12 65%	17 57%	10 67%
Number of firms	50 100%	17 100%	30 100%	15 100%

As shown in Table 4.40, some 70 percent of industry firms are considered as the advanced-adopters, as opposed to 67 percent of banking, 65 percent of insurance, and 57 percent of service sectors.

The chi-squared test (Table 4.41) below shows that the relationship between businesses sector and e-government adoption status is not significant (*p*-value=.681).

Table 4.41

Chi-Square Tests for Businesses Sectors

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.504[a]	3	.681
Likelihood Ratio	1.480	3	.687
N of Valid Cases	113		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.18.

In summary, in this section 4.7, the use of a framework to measure and characterize e-government adoption is based on a cluster analysis. This analysis worked fairly well in identifying different adoption patterns that were present in the sample. Businesses were subsequently grouped based on similar adoption. The section finally presented the two groups solution, labeled as basic-adopters and advanced-adopters. The next section explores the link between these groups with factors perceived to be associated with e-government adoption.

4.8 Identifying Factors Associated with-Government Adoption

The previous section identified two e-government adoption groups, using the cluster analysis. This approach took into account the level of adoption represented by the types of applications adopted, and the extent of usage measured with a non-metric scale. The initial descriptive statistics presented in the previous section indicated that the groups were distinct in terms of firm employment of IT staff, annual sales turnover, and whether the firms had annual budget allocated for IT.

The following sections examine and identify factors that are perceived to be associated with e-government adoption among the two adoption groups. It aims to provide an answer to Research question two, namely to identify the TOE contexts that are linked with e-government adoption.

The TOE factors were measured using both metric and non-metric scales while the outcomes of the cluster analysis resulted in two categorical groups. For this reason, regression analysis that was normally adopted to examine the relationships between the dependent and independent variables was not appropriate; instead binary logistic regression was used for this purpose.

The organization of this section begins with a discussion of the logistic regression technique, followed by its application in this study, and the outcomes of the analysis.

4.8.1 Logistic Regression Analysis

Logistic regression is commonly used among health science researchers in predicting both outcome and lack of disease (Tabachnick & Fidell, 2001). Currently, logistic regression models have also been made use of in IT arena (e.g. Kuan & Chau, 2001; Waarts *et al*., 2002; Zhu *et al*., 2003; Hong & Zhu, 2006).

Among the notable studies which dealt with the description of logistic regression is Hosmer and Lemeshow's (2000) study. According to them, logistic regression can be considered as analogous to multiple regressions with the exception to its binary variable outcome. Similar to multiple regressions, its predictor variables could be metric or categorical measurements. If the outcome is the former, multivariate regression is more suitable. On the other hand, the use of categorical variables as dependent variables in a multiple regression analysis would be considered as a violation of the assumptions for the use of the technique.

In addition, discriminant analysis could also be carried out in instances when the dependent variable is categorical. Nevertheless, the use of discriminant analysis would necessitate all independent or predictor variables to be metric. According to Hair *et al*. (2006), logistic regression tends to be more flexible than discriminant analysis as the former possesses no assumptions about the predictor variable's distribution. In logistic regression, the predictors do not need to be normally distributed or linearly related. In addition, they also do not need to be of equal variance with other predictors (Hair *et al*., 2003). Pres and Wilson (1978) asserted the suitability of discriminant analysis in situations where the predictor variables are distributed in a normal multivariate way.

Logistic regression is akin to other multivariate techniques as it is also considered as a multivariate approach that can encapsulate the entire profile of factors impacting the dependent variables. Additionally, the associations among the attributes can be considered, and the results are easily interpretable. Moreover, logistic regression could be enabled to be extended beyond the analysis of binary groups. Consequently, the resulting model is referred to as the binary, polychotomous or polychromous logistic regression (Hosmer & Lemeshow, 2000; Menard, 2002).

The dependent variable of this study consists of two adoption groups, which are basic and advanced adoption. The predictor variables are both continuous and discrete in nature; hence, binary logistic regression is used to identify factors that are associated with the various adoption groups.

4.8.2 Assumptions in Applying Logical Regression

In order to answer the second research question, that address the relationship between TOE factors and adoption of e-government among businesses in Jordan, logistical regression analyses were conducted to examine the relationship between the dependent and independent variables. However, few assumptions needed to be fulfilled before conducting a regression analysis. These were normality, linearity, outliers, homoscedasticity and multicollinearity (Hair *et al*., 2006; Tabachnick & Fidell, 2007).

Normality is concerned with data distribution. This assumption can be tested using different tests such as a histogram of residual plots and the normal probability plot of the regression. A histogram in general is a graphical demonstration that displays the regularity of the record values to observe the distribution shape (Hair *et al*. 2006). For the purpose of this study, these two approaches were used to examine the assumption of normality.

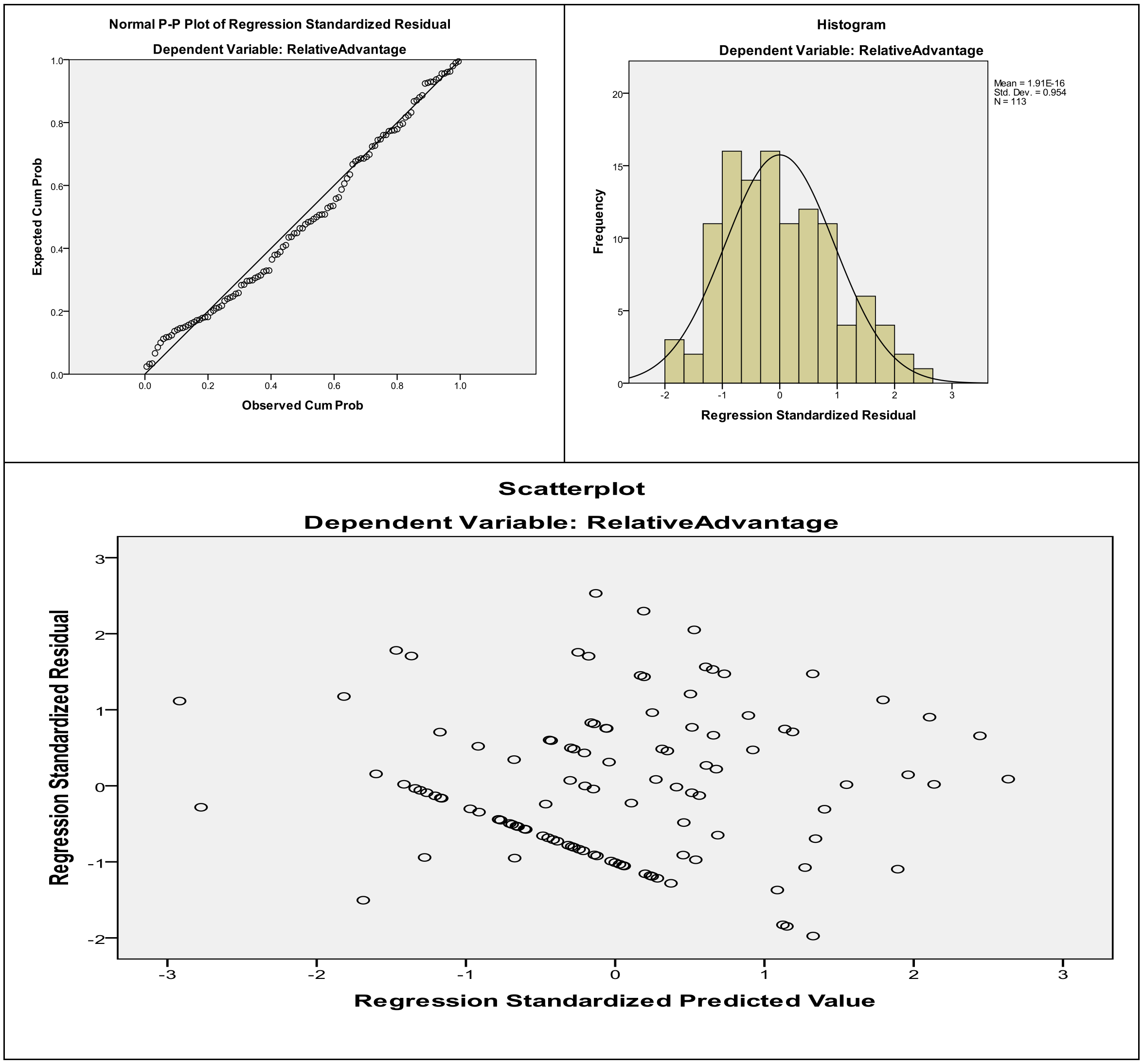

Figure 4.23
Example of Violations Assumptions Results

An example for results of the histogram of residual plots is shown in the above Figure 4.23, and the rest are presented in Appendix E. The results indicate that the assumption of normality was not violated. The figures show that the distribution appeared normal and there was no cluster or skewness. These results supported the normal distribution of data as regression standardized residual lie around the instantly sloping line from the bottom left to top right (Appendix E).

The second assumption for the regression is the linearity of the variables. Linearity is the degree of how the relationship between the variables can be portrayed in a straight line (Johnson & Wichern, 2007; Tabachnick & Fidell, 2007). To assess the assumption, linearity residual plots as suggested by Hair *et al*. (2006) were employed. The results of the histogram of residual plots as shown in the above Figure 4.23 and Appendix E revealed the assumption of linearity was met as the figures showed the distribution scatter around the center of the shape. The results of linearity assumption provide justification on the use of multiple regressions to explore the relationship between the dependent and independent variables.

Homoscedasticity appears when the variance over a variety predictor variable seems to be constant. In other words, the values of the variance of the dependent variable concentrate in only a limited range of the independent variable (Hair *et al*., 2006). Homoscedasticity assumption was examined through the residual plot as it was satisfied if there was no pattern of increasing or decreasing residual. As shown in Figure 4.23 and Appendix E**,** the assumption of homoscedasticity was fulfilled and there was no longer a concern about using multiple regression analysis.

Multicollinearity is a degree to which the other variables can explicate a variable in the analysis (Hair *et al*., 2006). According to Tabachnick and Fidell (2007), multicollinearity appears if there is a high degree of correlation between the variables. The difficulty to clarify the effect of any single variable due to its association and multicollinearity is the rationale behind this assumption. In order to examine the multicollinearity among the variables in this study, VIF and tolerance tests were adopted. Tolerance is defined by Hair *et al*. (2006) as the amount of variability of the selected independent variable not explained by the other independent variables, while VIF is the opposite of tolerance value. For the purpose of this study, the two tests were conducted to determine the multicollinearity assumption. The result of VIF and tolerance results are discussed in the next section. However, the values showed no multicollinearity between the variables as their values were less than 10 for the VIF and more than 0.10 for tolerance as suggested by Field (2005).

Since the regression analysis is very sensitive to outliers (standardized residual values above 3.0 or less than 3.0); it was deleted by casewise diagnostic in the regression analysis in SPSS package version 18. Finally, the interruption of the regression analysis was based on the estimated coefficients and R-square which provided answers for the research questions.

4.8.3 Conceptual Framework

The main objective of this study was to identify factors that were perceived to be associated with each of the adoption categories (advanced and basic adopters). The eleven factors were identified from previous literature, and a conceptual model for examining the adoption of e-government at the firm level was developed. The framework was based on the TOE theoretical framework developed by Tornatzky and Fleischer

(1990), and is shown in Figure 4.24. It should be noted that TOE factors that was illustrated in the figure below are the factors derived after the factor analysis.

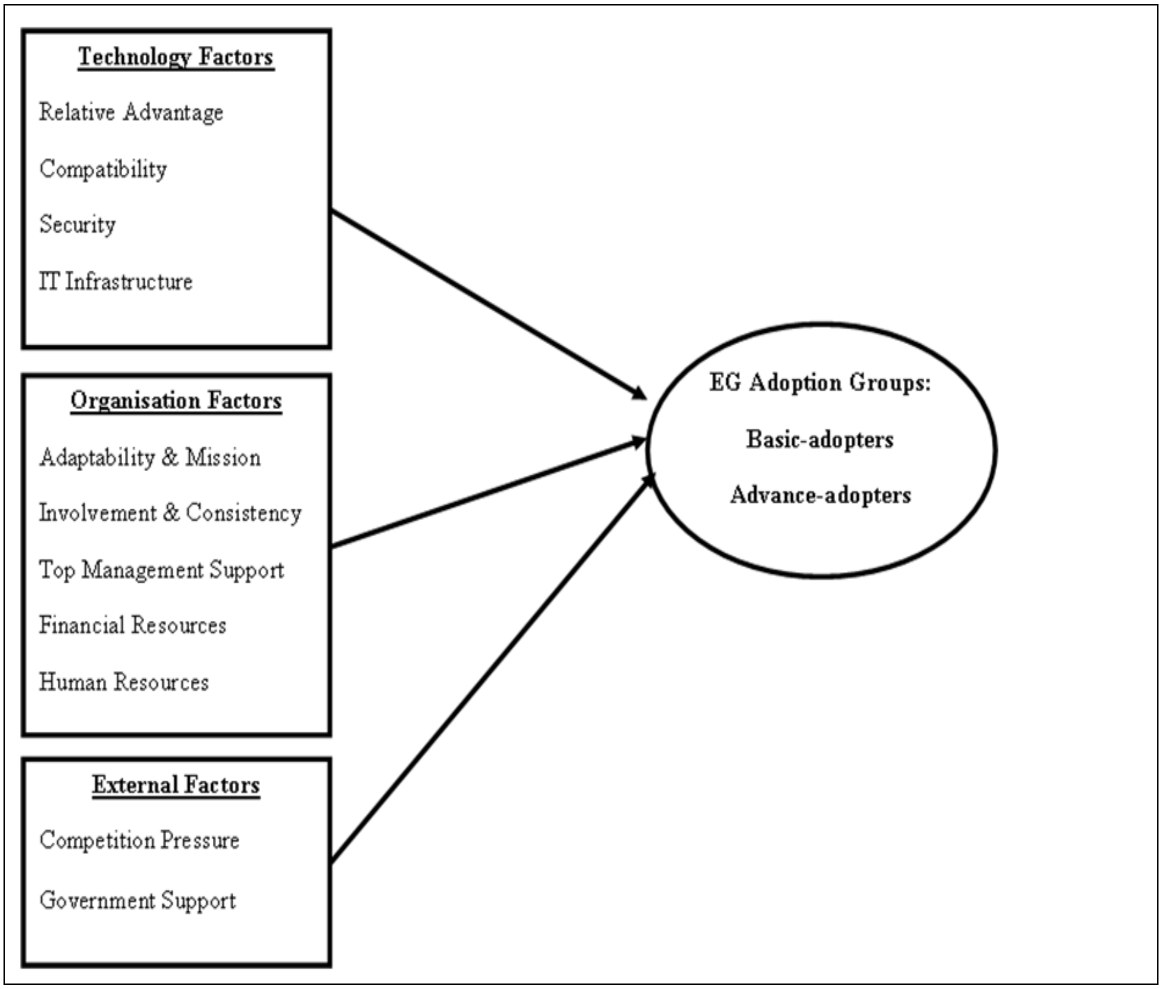

Figure 4.24
Proposed Model for Adoption of E-Government

The e-government adoption group representing the businesses, identified previously (section 4.7) was the dependent variable. Furthermore, the two groups of businesses could be regarded as being ordered from the least to the most extensive level of e-government adoption. The ordered model took into account the order of the groupings, namely basic-adopters and advanced-adopters.

The objective of this study was to identify factors associated with each of the two e-government adoption groups. Thus, the binary logistic regression was used, instead of the ordered logistic regression model.

4.8.4 Stepwise logistic regression

According to Hosmer and Lemeshow (2000), a stepwise procedure to determine the parsimonious model can be utilized to explain the variation in the dependent variable. The benefit of this procedure, particularly in an exploratory approach, is the fact that it is concerned with the identification of a model as opposed to causality. This identification includes a set of predictor variables providing an effective prediction of some event (Menard, 2002).

This approach has its basis on the choice of computer algorithms and not on the choices opted for by a researcher in the selection of a set of predictors for inclusion or removal from a regression model. It is considered useful for an exploratory research to carry out an examination of the associations between dependent and predictor variables (Hosmer & Lemeshow, 2000; Menard, 2002).

The likelihood ratio statistic is made use of in case a comparison is carried out between the current model and the model, particularly when a predictor variable is removed. If this removal impacts the fit of the model to the data, then the variable is not removed owing to the fact that the model would be in a better position with the predictor included. On the other hand, if its removal makes little or no difference, then its elimination poses no problem.

4.8.4.1 Sample Size

Binary logistic regression does not make the assumption of normality, linearity, and homogeneity of variance for the dependent variables. Therefore, the initial step in the binary logistic analysis is to ensure sufficient data are available for analysis. Cases containing missing information are excluded.

The sample size of 113 cases fulfilled the criteria recommended by Peduzzi *et al*. (1996). Furthermore, as another rule of thumb, Hair *et al*. (2006) proposed that the sample size of 10 times as many observations as there were variables to be analyzed is accepted. In this study, eleven factors were examined, and a sample size of 113 respondents produced a variable-to-observation ratio of 1:11, indicating sufficient data were available for analyses.

4.8.4.2 Testing for Multicollinearity

When the cases are enough, the next step taken is the generation and the examination of the within-groups correlations' matrix, since multicollinearity among the predictor variables will impact multivariate analysis results. The correlation matrix will determine the level to which one variable is negatively or positively related to another.

To test for multicollinearity in the regression model, the Collinearity diagnostics based on the VIF, and tolerance statistics are made use of. There is a lack of stringent rules regarding the values of VIF, but Field (2005) based on Myers (1990), recommended that VIF of 10 and over, shall pose a problem.

In another similar study, Menard (2002) recommended that tolerance value below 0.2 may pose a problem for the existence of multicollinearity among predictors. The results of the multicollinearity test of the current study are presented in Table 4.42.

Table 4.42
Collinearity Statistics

Model	**Collinearity Statistics**	
	Tolerance	**VIF**
Relative Advantage	.632	1.582
Compatibility	.735	1.360
IT Infrastructure	.675	1.482
Security	.634	1.578
Competition	.705	1.418
Government Support	.644	1.552
Adaptability & Mission	.793	1.261
Involvement & Consistency	.836	1.196
Top Management Support	.728	1.373
Financial Resources	.728	1.373
Human Resources	.700	1.429

In the table, the tolerance for all of the twelve predictors had values above 0.3. The results did not indicate any evidence of Collinearity occurring among the predictor variables (Menard, 2002). The VIF values for all the predictor variables also had values of less than 10. The results of multicollinearity tests provided further confidence in interpreting the outcomes generated from binary logistic regression.

4.8.5 Data Analysis

The binary logistic regression analysis was performed to identify factors, which were associated with adoption groups namely basic and advanced adopters (refer to Appendix G). Backward eliminations, a method of stepwise regression was used as it would retain only the predictor variables that were statistically significant in the model (Menard, 2002).

The preliminary results of the chi-squared tests and pseudo R square values that measure the effectiveness of the regression model (testing the overall fit of the model) showed that the chi-squared difference was significant at 0.00 level (Table 4.43 below). In other words, the improvements in the results after the predictor variables were included provided evidence that the predictors were indeed associated with adoption.

Table 4.43
Model Fitting Information

	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	145.630			
Final	87.531	58.099	11	.000

In addition, Table 4.44 below shows Nagelkerke R square value of 0.402 for the overall model. The results indicate the model could explain approximately 40 percent of the variance in the dependent's variables. Nagelkerke R square was chosen because it is a modification over the Cox and Snell R square and has a range of 0 – 1.

Table 4.44
Pseudo R-Square

Pseudo R-Square

Cox and Snell	.402
Nagelkerke	.555

The Wald statistic is used to evaluate the statistical significance of each predictor variable in explaining the dependent variable, and Wald statistic indicates whether the *β*-coefficient for a predictor is significantly different from zero. If so, then the predictor variable is assumed to make a significant contribution to the prediction of the outcome of the dependent variable.

Table 4.45
Binary Logistic Regression Model

Current Status [a]		**B**	**Std. Error**	**Wald**	**df**	**Sig.**	**Exp(B)**	**95% Confidence Interval for Exp(B)**	
								Lower Bound	**Upper Bound**
Advance	Intercept	7.649	3.585	4.552	1	.033			
	Relative Advantage	1.286	.581	4.901	1	**.027**	.276	.089	.863
	Compatibility	.253	.449	.317	1	.573	1.287	.534	3.102
	IT Infrastructure	1.398	.598	5.466	1	**.019**	4.045	1.253	13.054
	Security	.197	.490	.161	1	.688	1.217	.466	3.181
	Competition	1.246	.598	4.343	1	**.037**	.288	.089	.929
	Government Support	1.282	.509	6.340	1	**.012**	3.602	1.328	9.768
	Adaptability & Mission	.995	.436	5.205	1	**.023**	2.704	1.150	6.354
	Involvement &Consistency	2.006	.468	18.378	1	**.000**	7.434	2.971	18.600
	Top Management Support	.598	.569	1.107	1	.293	1.819	.597	5.542
	Financial Resources	.919	.463	3.945	1	**.047**	.399	.161	.988
	Human Resources	.530	.510	1.081	1	.299	1.700	.625	4.622

a. The reference category is: Basic.

Table 4.45 shows the summary of the results from the binary logistics regression. Seven predictor variables, namely relative advantage, IT infrastructure, competition, government support, adaptability and mission, involvement and consistency, and financial resources, were found to be significantly associated with e-government adoption.

More specifically, and as can be seen in the Table 4.45, the results show a set of significant variables that could differentiate between each group of adopters (basic and advance adopters). Relative advantage had a positive impact on the probability of adopting advance level e-government compared to basic level. This implied that when business firm's relative advantage increases, this provides confidence for business firms to initiate e-government adoption. The result supports findings from previous studies of the importance of relative advantage attributes on firm's IT and e-government adoption (Ramdani *et al*., 2009; Al-Qirim, 2007).

Advanced adopters were also proactive towards adopting new technologies compared with basic adopters. The influence of government support was also positively related to e-government adoption. This implied that external support especially the government support, could promote the initial phase of e-government adoption by the business firms in Jordan. These findings support previous studies in the literature (e.g. Ramdani *et al*., 2009; Al-Qirim, 2007; Lin, 2008).

In addition, financial recourses and IT infrastructure were found to have a positive impact on the probability of adopting advanced level of e-government. This makes sense, as Lin and Lin (2008) noted that firms with more sophisticated technological resources (hardware, software, expertise) may be more able to implement e-procurement effectively

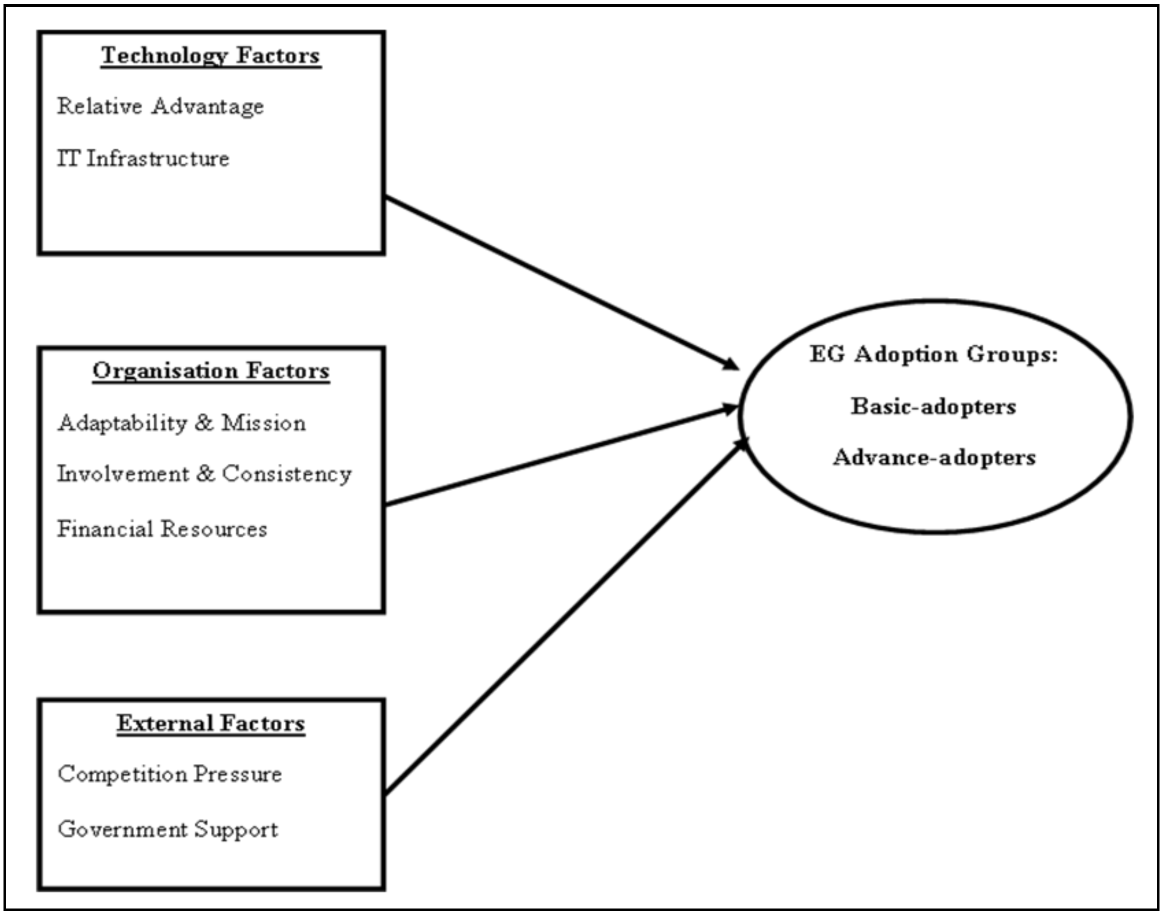

Figure 4.25
Final TOE Framework

In summary, this section presented the results from binary logistic regression analyses that were meant to identify factors that were perceived to be associated with e-government adoption. Drawing upon technological diffusion theory, a framework was developed for assessing e-government adoption, incorporating eleven factors related to firm adoption of e-government. Seven variables were found to be associated with e-government adoption. Two of the seven variables were technological context variables, and three of the seven variables were organizational context variables. The other variable was the external context. The next section examines the outcomes for the businesses which had embarked on e-government.

4.9 E-government adoption and impacts on businesses

Section 4.7 discussed and identified two distinct e-government adoption groups among businesses, namely the basic-adopters and advanced-adopters of e-government applications. These groups were identified using the cluster analysis. This section examines the association between e-government adoption and its impacts on businesses. It aims to provide answers to Research question 3; namely, to determine the impact of G2B e-government adoption on businesses.

The variables used to measure the impact on businesses are based on Khandwalla (1977) who had used subjective measures. These variables were validated in studies conducted by Bergeron *et al*. (2001) and Cragg *et al*. (2002) to measure firm performance. Twelve variables for measuring the business benefits of e-government were also adopted from Zhao *et al*. (2008).

4.9.1 Exploring Relationship between E-Government Adoption and Its Impacts on Businesses

As explained in section 4.4, four measures were derived to examine the impacts on businesses as a result of e-government adoption. Each measure was derived from a set of questions through factor analysis. The high reliability of these measures (Cronbach's alpha > 0.70) provided confidence in the results obtained. The four measures of impact identified through factor analyses are: firm's overall performance, time and cost, efficiency, and effectiveness.

To find the score for each factor, Singleton *et al*. (1993) proposed taking the average (mean) of the scores of the individual who constitutes each factor. This method has been adopted by other similar studies (e.g. Teo & Pian, 2003, 2004). Figure 4.26 reproduces a partial diagram of the research framework discussed in Chapter 3.

Figure 4.26
Relationship between E-Government Adoption and Impacts on Businesses

The correlation analysis was used to ascertain whether relationship exists between the extent of e-government adoption and the four impact measures. A non-parametric correlation test, namely Spearman's rho, was used for this purpose because this study used the variables which are e-government adoption and impact measures, comprising an ordinal scale.

The result in Table 4.46 shows that there is a significant correlation between e-government adoption and business time and cost (positive correlation of 0.214) and business efficiency (positive correlation of 0.198). Further analysis was conducted to provide a better understanding on the differences of impacts gained by the various adoption groups.

Table 4.46a
Correlation Coefficients between E-Government Adoption and Impact Measures

Impact / EG Adoption	Time and Cost		Efficiency		Effectiveness		Performance	
	Sig.	**r**	**Sig.**	**r**	**Sig.**	**r**	**Sig.**	**R**
Advance	.023	.214*	.036	.198*	.754	-.030	.576	.053

Table 4.46b
Correlation Coefficients between E-Government Adoption and Impact Measures

Correlations

		Time and cost	Efficiency	Effectiveness	Performance	Advance
Time and cost	PC	1	.475**	.214*	.074	.214*
	Sig		.000	.023	.434	.023
	N	113	113	113	113	113
Efficiency	PC	.475**	1	.184	.046	.198*
	Sig.	.000		.051	.627	.036
	N	113	113	113	113	113
Effectiveness	PC	.214*	.184	1	-.054	-.030
	Sig.	.023	.051		.573	.754
	N	113	113	113	113	113
Performance	PC	.074	.046	-.054	1	.053
	Sig	.434	.627	.573		.576
	N	113	113	113	113	113
Advance	PC	.214*	.198*	-.030	.053	1
	Sig	.023	.036	.754	.576	
	N	113	113	113	113	113

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Regression analysis was used to find the predictors (i.e. independent variables) of organization performance (i.e. dependent variables) to answer the research question in the research model (Hair *et al*., 1992). Four combinatorial regression analysis tests were performed between the independent and dependent variables in the research model. The dependent variables were time and cost, efficiency, effectiveness, and performance. In Regression model 1, variables for time and cost, and an advanced-adopter were used as independent variables. The model examined whether these variables can explain how the respondents perceive the time and cost of adoption of e-government. In the Pearson's correlation test, the time and cost variable correlated positively with the dependent variable of advanced-adopters (.214).

As can be noted from Figure 4.27, there is normality. The points are positioned in a somewhat straight diagonal line. This is a sign that there are no deviations from normality.

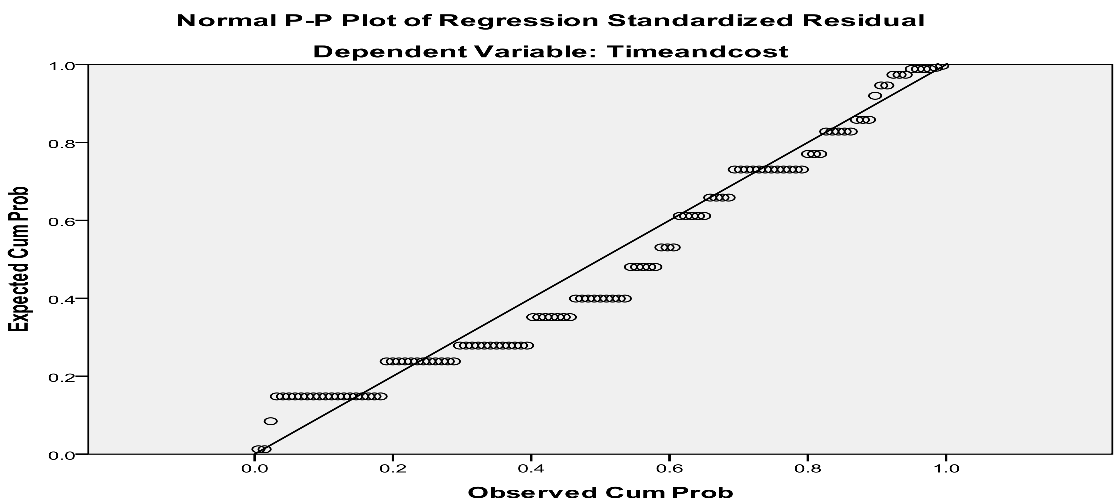

Figure 4.27
Normality Probability Plot Regression Model 1

The coefficient of determination (R^2) measures the proportion of the variance of the dependent variable about its mean that is explained by the independent or predictor variables (Hair *et al*., 1998). The higher the value of R^2, the greater the explanatory power of the regression model. Table 4.47 shows that the R Square of the regression is 0.046 indicating that 4.6 percent of time and cost is explained by the independent variables. The adjusted R Square is lower (0.037). However, the model is statistically significant (F= 5.350, p<.05). The values of the regression coefficients and their significance determine the variables included in the model.

Subsequently, the independent variables are examined. Table 4.47 outlines the results obtained, and it can be noted that the variable time and cost has the highest Beta value (0.214). This means that time and cost contributes the most to predicting adoption of e-government.

Table 4.47
Results for Logistics Regression Analysis between E-Government Adoption and Impact Organization Time and Cost

R Square	Adjusted R Square	F	Sig	Unstandardized Coefficients		Standardized Coefficients
				B	Std. Error	Beta
0.046	0.037	5.350	0.023	0.276	0.119	0.214

In the second model, for variables for efficiency, an advanced-adopter was used as independent variable. The model examined whether these variables can explain how the respondents perceive the efficiency of adoption of e-government. In the Pearson's correlation test, the efficiency variable is correlated positively with the dependent variable of advance-adopters (.198).

As can be noted from Figure 4.28, there is normality. The points are positioned in a somewhat straight diagonal line. This is a sign that there are no deviations from normality.

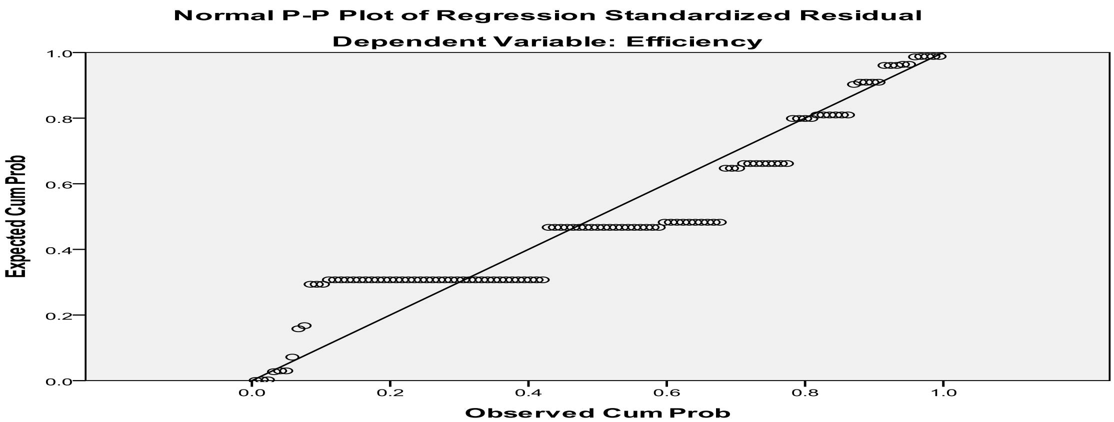

Figure 4.28
Normality Probability Plot Regression Model 2

Table 4.48 shows that the R Square of the regression is 0.039 indicating that 3.9 percent of time and cost is explained by the independent variables. The adjusted R Square is lower (0.031) but the result is still significant. The model is statistically significant (F= 4.530, p<.05). The values of the regression coefficients and their significance determine the variables included in the model.

Subsequently, the independent variables were examined. Table 4.48 outlines the results obtained, and it can be noted that the variable efficiency has the highest Beta value (0.198). This means that efficiency contributes the most to predicting adoption of e-government.

Table 4.48
Results for Logistics Regression Analysis between E-Government Adoption and Impact Organization Efficiency

R Square	Adjusted R Square	F	Sig	Unstandardized Coefficients		Standardized Coefficients
				B	Std. Error	Beta
0.039	0.031	4.530	0.036	0.305	0.143	0.198

In the third model, for variables for effectiveness, an advanced-adopter was used as independent variables. The model examined whether these variables can explain how the respondents perceive the efficiency of adoption of e-government. In the Pearson's correlation test, the effectiveness variable is correlated negatively with the dependent variable of advance-adopters (-0.030).

The regression is showing normality. This can be seen from Figure 4.29 where the line is quite diagonal and straight.

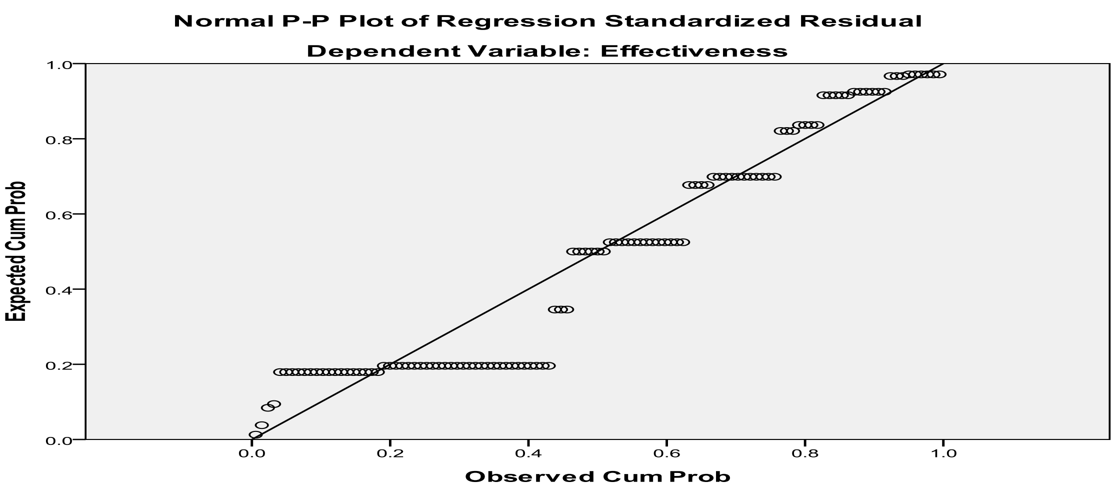

Figure 4.29
Normality Probability Plot Regression Model 3

Table 4.49 shows that the R Square of the regression is 0.001 indicating that 0.1 percent of effectiveness are explained by the independent variables. The adjusted R Square is lower (-0.008) but is still quite good. The ANOVA result is 0.754 indicating that this regression model has statistically no significance.

Subsequently, the independent variables were examined. Table 4.49 outlines the results obtained, and it can be noted that the variable effectiveness has the highest Beta value (-0.03). This means that effectiveness did not contribute the most to predicting the adoption of e-government.

Table 4.49
Results for Logistics Regression Analysis between e-government Adoption and Impact Organization Effectiveness

R Square	Adjusted R Square	F	Sig	Unstandardized Coefficients		Standardized Coefficients
				B	Std. Error	Beta
0.001	0.008	5.350	0.754	-0.045	0.144	-0.034

In the fourth model, for variables for performance, an advanced-adopter was used as independent variables. The model examined whether these variables can explain how the respondents perceive the performance of adoption of e-government. In the Pearson's correlation test, the performance variable is correlated positively with the dependent variable of advance-adopters (0.053).

The regression is showing normality. This can be seen from Figure 4.30 where the line is quite diagonal and straight.

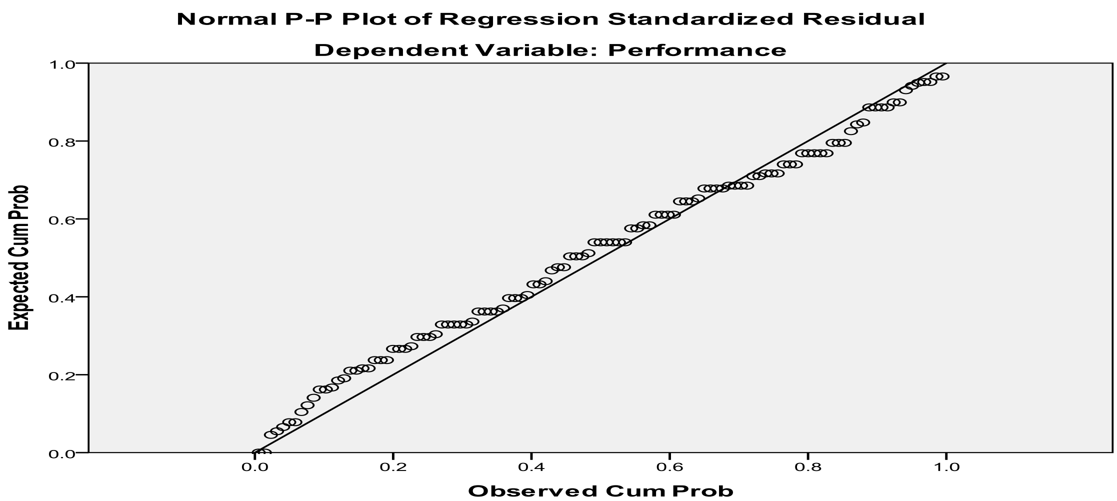

Figure 4.30
Normality Probability Plot Regression Model 4

Table 4.50 shows that the R Square of the regression is 0.003 indicating that 0.3 percent of effectiveness are explained by the independent variables. The adjusted R Square is lower (-0.006) but is still quite good. The ANOVA result is 0.576 indicating that this regression model has statistically no significance.

Subsequently, the independent variables were examined. Table 4.50 outlines the results obtained, and it can be noted that the variable effectiveness has the highest Beta value (0.053). This means that effectiveness did not contribute the most to predicting adoption of e-government.

Table 4.50
Results for Logistics Regression Analysis between e-government Adoption and Impact Organization Performance

R Square	Adjusted R Square	F	Sig	Unstandardized Coefficients		Standardized Coefficients
				B	Std. Error	Beta
0.003	0.006	.314	0.576	0.061	0.109	0.053

4.9.2 Preliminary Analysis

Preliminary analysis using error bar charts was performed to identify any between-group differences for each group and the impact measures identified in this study. The error bar charts are used to compare the confidence interval or the standard error, which centered on the mean of a distribution that extends above and below to show a confidence interval or a specified number of standard error or standard deviations. If the confidence intervals between groups do not overlap, it implies differences occur between these groups.

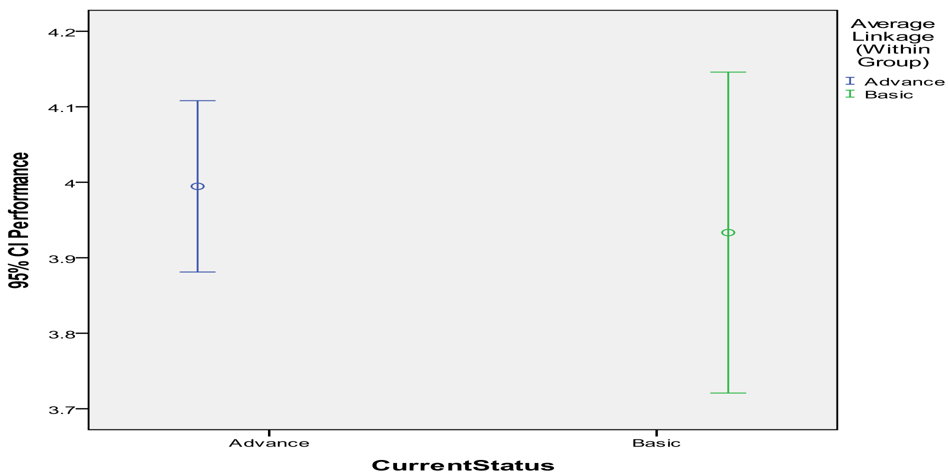

Figure 4.31
Error Bar Chart for Impact on Businesses Performance

In Figure 4.31 above, the error bar chart shows the impact on firm's overall performance between groups of businesses. The groups' confidence intervals overlap, which implies there are no differences in terms of their performance as a result of e-government adoption.

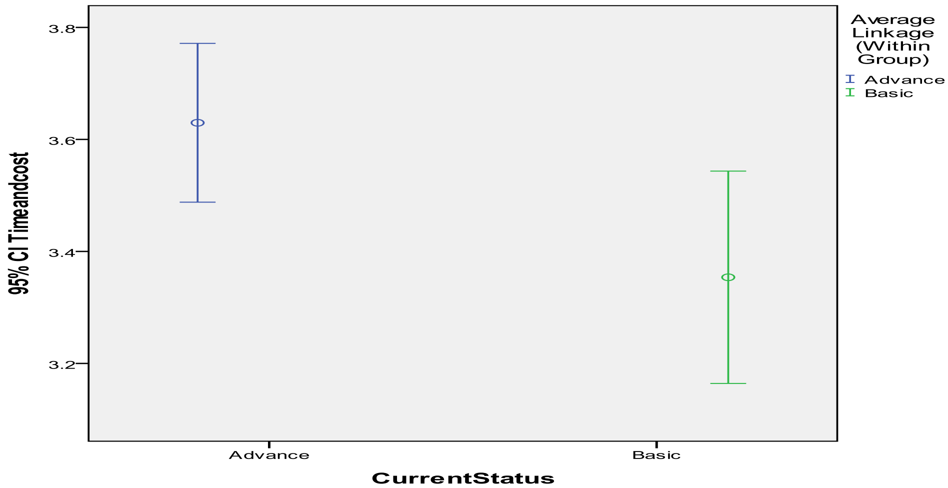

Figure 4.32
Error Bar Chart for Time and Cost

Figure 4.32 above shows that the error bars representing time and cost had overlapped. This implies that businesses are similar, and there are no between-group differences in time and cost as a result of e-government adoption.

Figure 4.33
Error Bar Chart for Efficiency

Figure 4.33 shows that the error bars representing efficiency had overlapped. This implies that businesses are similar, and there are no between-group differences in efficiency as a result of e-government adoption.

Figure 4.34
Error Bar Chart for Effectiveness

Figure 4.34 above shows that there are no differences between the basic-adopters and advanced-adopters. This implies that businesses are similar, and there are no between-group differences in effectiveness as a result of e-government adoption.

4.9.3 E-Government Adoption Impact

The preliminary result from the error bar charts provided early indications that there is no between-group differences in relation to business firm's overall performance, time and cost, efficiency, and effectiveness. T-test was used to provide further evidence, whether there is any between-group difference between the groups and impact measures.

4.9.3.1 Comparisons of E-Government Impact by Adoption Groups

Levene test was performed first to check for equality of variance among the groups. The results are shown in Table 4.51.

Table 4.51
Test of Homogeneity of Variances

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Time and cost	1.624	1	111	.205
Efficiency	.072	1	111	.789
Effectiveness	.202	1	111	.654
Performance	4.445	1	111	.037

Levene tests for equality of variances indicated that the p-value is smaller than 0.05 for performance measure. This indicates that firm performance variable had violated the equality of variance assumption.

Table 4.52
Comparison of e-government impacts by adoption groups

	Advanced-adopters N (74) 1	**Basic-adopters N (39) 2**	**F**	**Sig**	**Games-Howell Test**
Time and cost	3.63	3.35	1.624	**.023**	1>>2
Efficiency	3.36	3.06	.072	**.036**	1>>2
Effectiveness	3.62	3.67	.202	.754	
Performance	3.99	3.93	4.445	.576	

The t-test results provided evidence that significant difference is observed between the two adoption groups for the time and cost ($F=1.624$, $p< 0.05$) and efficiency ($F=.072$, $P< 0.05$). However, there were no significant differences between groups among the two adoption groups when effectiveness and performance are concerned.

Based on the t-test result (Table 4.52), it can be noticed that significant differences for time and cost measure are observed between the advanced-adopters (mean = 3.63) compared with the rest of the lower basic-adopters (means = 3.35). The results indicate that businesses which have adopted e-government extensively have been able to achieve better overall time and cost compared to other lower adoption groups. However, no significant differences in terms of time and cost were observed among the lower adoption groups.

On the other hand, significant differences were observed for efficiency gained between the advanced-adopters (mean = 3.36) and basic-adopters (mean = 3.06). There was no evidence to support the existence of between-group differences in terms of Effectiveness and Performance accrued among the two adoption groups.

In order to seek a greater insight into meaning on the above statistical results, graphical comparisons of e-government impact were made between the two-adoption groups as plotted in the Figure below. The objective was to determine whether there are any distinct trends between the impact measures and the various adoption groups.

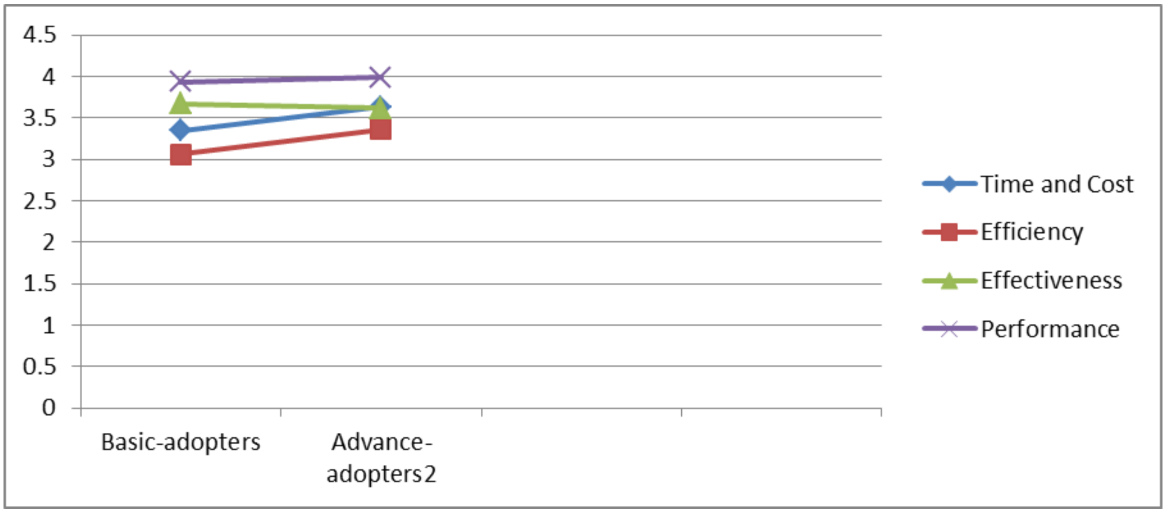

Figure 4.35
Comparisions of E-Government Impacts

In Figure 4.35, performance delined initially but indicated an increasing trend at later stage. It was also observed that the strategic benefits generally show an increasing trend when the extent of e-government adoption increased. This reinforced the suggestion that strategic values gained by businesses increased as adoption progressed. A similar trend was also observed for the operational impact which showed increasing trend as e-government penetration increased.

4.9.5 Summary

This chapter presented the results of data analysis used for the purpose of this study. A good response rate was achieved (43.4 percent). For the survey, the test of non-response bias also demonstrated that there is no statistically significant difference between early and late response. As a result of that, the issue of non-response bias did not significantly affect the generalization of the findings of this study. Factor analysis was conducted in order to test the construct validity of for all interval scale variables; Reliability was also tested for all interval scale variables to see how free it is from random error. Further, the researcher tested the assumptions of normality, linearity, and homoscedasticity and the results show that the assumptions were generally met.

Further, the use of a framework to measure and characterize e-government adoption based on a cluster analysis method. The hierarchical cluster worked fairly well in identifying different adoption groups that were present in the sample. Firms were subsequently grouped based on similar adoption groups. The finding indicated two distinct groups which emerged, which reflected the adoption of e-government among the businesses. To enable further analysis on e-government adoption, two groups of adopters are labeled as basic-adopters and advance-adopters.

The results from logistic regression analysis that were meant to identify factors that were perceived to be associated with e-government adoption. Drawing upon technological diffusion theory, a mode was developed for assessing e-government adoption, incorporating seven factors related to firm adoption of e-government. Two of the four technological factors (relative advantages and IT infrastructure) were found to influence businesses' adoption of e-government. Three of the five organizational factors (organization adaptability and mission, organization involvement and consistency, and financial resources) were found to influence businesses' adoption of e-government. In addition, external factors (competition and government support) were found to influence businesses' adoption of e-government.

Finally, this chapter examined the relationship between the extent of e-government adoption and its impacts on the businesses. The analysis indicates that businesses which have adopted and integrated their e-government applications with their front office or/and back-office operations have performed better than the businesses which do not adopt e-government application extensively. Similarly, businesses that are categorised as advanced-adopters of e-government applications has gained better time and cost and efficency as comperd to busineses which are basic-adopters of e-government applications. The findings in this chapter will be discussed and concluded in the next chapter with recommendations presenting based on these findings.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the results from the data analysis which were presented in the previous chapter. Specifically, this chapter discusses the main findings, the managerial and theoretical implications for this study, limitations and recommendations for future research.

5.2 Discussion

This section discusses the result that emerged from the data analysis. It is divided into three main parts representing the three objectives of this study. The first part relates to objective one, and it discusses the results obtained from interpreting the current status and applications in characterizing e-government adoption. The second part concerns objective two and discusses the factors associated with e-government adoption. The final part gives emphasis upon objective three and discusses the impacts of e-government adoption on firms. In doing so, attempts are made to explore how the result is related to the findings from previous studies. The approaches adopted in this section are the discussion that reiterates the highlights if the results are as expected, and if the results are unexpected, the discussion is an attempt to reconcile.

5.2.1 Characterizing E-Government Adoption

Whilst the works of Thompson *et al*. (2009), Boggs and Walters (2006), Campbell and Beck (2004), Wilkinson and Cappel (2005), Zhao and Zhao (2004), and Zhao *et al*. (2006) provided the approach to describe firm's e-government progression, these studies focused mainly on whether an application has been adopted or not and whether there is any plan to adopt an application. This study has sought to extend existing adoption studies by focusing on both the range of e-government applications adopted and the extent of usage of each one in order to provide a comprehensive picture of the adoption of e-government by Jordanian businesses.

This study developed a framework to measure e-government adoption based on two-dimensions representing current stage of e-government adoption as well as the extent of usage. Due to the nature of the measurement scale which used five-point scale on the current status for each e-government adoption, a hierarchical clustering was used for this study. Based on a sample of 113 responding businesses, the hierarchical clustering successfully identified two e-government adoption groups among the Jordanian businesses. The advantage of the hierarchical cluster lies in its flexibility in the determination of the number of clusters. More specifically, cluster analysis was conducted in order to answer the research question that aims to identify the current stage of e-government adoption among businesses.

The finding from this study indicated two distinct groups which emerged, which reflected the adoption of e-government among the businesses. To enable further analysis on e-government adoption, the two groups of adopters were labeled as basic-adopters and advanced-adopters.

Basic-adopters represented about 35 percent of the sample. The choices of applications adopted by these businesses were limited. They mainly adopted e-government applications, which included searching for general business information (laws and regulations, financial, market and technology information), locating governmental agencies, downloading forms, and applications on governmental web sites.

On the other hand, the advanced-adopters group represented about 65.5 percent of the total number of businesses in this study. Advanced-adopters, in addition to adopting the applications of basic-adopters, also adopted more sophisticated applications such as filling out forms, submitting information online and conducting transactions with government online.

One possible reason to explain the high percentage of advanced adopters in the present study is the effort made by the Jordanian government since year 2000 to concentrate on achieving high level of online services believing that e-government success can be achieved by enabling a complicated service online (MoICT, 2007; Mofleh & Wanous, 2008). Though the current status of e-government adoption for the basic adopter-group could be sufficient to meet their needs, however, the basic adopters group which represents 35 percent of the study sample shed the light on the need to improve government efforts in promoting as well as developing high-quality online service among business firms in Jordan.

The extent of usage was represented by sixteen types of e-government applications and was measured using a four-category scale represented by not using, used sometimes, used most of the time, and used all the time with e-government applications. It was also observed that businesses migrated from traditional methods of conducting business to adopt internet technologies. As proposed by Chin and Marcolin (2001), actual usage of the innovations provided a clearer understanding on innovation diffusion but this was neglected in previous innovation adoption studies. In this study, the adoption is described as triggering usage of applications on a limited basis leading to the final stage whereby an application would be substituted for an existing traditional business transaction method.

Findings from the present study showed that most of the e-government applications provided by the Jordanian government to business firms are mainly used on the parallel basis. In other words, business firms use these applications sometimes or most of the time along with the traditional business transaction methods. This trend suggests that the outcomes of adoption depend how adopters have accumulated knowledge and experience in using these applications. When businesses have adopted e-government applications on a trial basis, positive feedback would reinforce their usability, and would set the stage for subsequent usage of the application, and application from other levels. Furthermore, this approach to adopt application is a logical move for businesses, because errors in IT implementation might be much more costly for businesses to absorb due to their limited resources and assistance (Sadowski *et al*., 2002). As such, businesses have possibly migrated towards more sophisticated e-government applications when they have gained experience in using the earlier applications. The group is displayed when applications used on a trial basis shifted from simple application to more sophisticated applications, when businesses have adopted them.

The study further revealed that, generally, the Jordanian businesses adopt e-government applications in a sequential manner. An assumption could be made that simple applications such as employment and workforce information, how to finance a business and state tax incentives and application forms are adopted first before business firms initiate adoption of more sophisticated applications such as doing business with the state.

Applications that were mainly used on matrix, include state tax incentives and application forms, business taxes and reporting, business licenses, permits, and regulations, doing business with the state, and employment and workforce information. These applications were adopted on a use some time and use most of the time basis by a majority of these businesses. Most of the businesses using e-government adoption offered the following five e-services with effective informational, mutual contacts, financial transaction, and integration service.

However, the findings identified some weaknesses that need improvement. For example, only a minority of the e-government sites provided other types of e-services, such as business opportunities, business owner's guide to state government, employment and workforce information, and how to start a new business. Among these less available e-services, just a few had advanced transactional and intelligent service. These weaknesses seemed to have a causal relationship to the negative online experience because the lack of online transaction capacity and the lack of other important e-services were often mentioned by online users as reasons for their negative online experience.

5.2.2 Factors Associated With E-Government Adoption

One of the objectives of this study is to identify factors that are associated with e-government adoption. This section discusses the results based on the findings from the analysis. The binary logistic regression was used to examine the association of TOE factors as independent variables against the two adoption groups.

The findings from this study indicate that seven of the eleven factors are significantly associated with various stages of e-government adoption. Among the independent variables, relative advantage, IT Infrastructure, organization adaptability and mission, organization involvement and consistency, financial resources, competition, and government support were found to be significant determinants of business's adoption of e-government. It is found that higher explicitness and accumulation of technology can help the transfer of technological knowledge within the organization and can raise the capability to adopt innovative technologies. Jordanian firms can increase their technological innovation capabilities by encouraging or supporting their employees to adopt e-government and by training and educating their employees. Not surprisingly, TOE factors were found to be significant. The finding from this study confirmed the important roles played by TOE in e-government adoption, and are consistent with findings from previous information system studies conducted by Alawneh (2009), Thompson *et al*. (2009), Salwani (2008), Lin (2008), and Al-Qirim (2007). The results for significant factors are summarized in Table 5.1.

Table 5.1
Factors Associated with E-Government Adoption

Factors	Basic-adopters Mean	Advanced-adopters Mean
Relative Advantage	3.62	3.57
IT Infrastructure	3.34	3.67
Adaptability and Mission	1.89	2.23
Involvement and Consistency	1.55	2.41
Financial Resources	4.24	4.05
Competition	4.04	4.12
Government Support	3.96	3.88

Based on the means score of each factor, IT infrastructure, organization adaptability and mission, organization involvement and consistency as well as financial resources are significant factors that distinguish advanced-adopters from basic-adopters. The following sections describe the results based on the findings from the analysis.

5.2.2.1 Technological Factors

What are the significant technological factors associated with the adoption and usage of G2B e-government among businesses?

Two of the four technological variables were found to influence businesses' adoption of e-government. The variables identified were relative advantages and IT infrastructure.

Relative advantage is one of the main factors, which facilitates innovation adoption. This is consistent with the results of prior studies that have found it to be a significant variable for initiating many innovations adoption (e.g. Rokhman, 2011; Kuan & Chau, 2001; Iacovou *et al*., 1995; Grover, 1993; Premkumar *et al*., 1994; Carter & Belanger, 2003; Al-Qirim, 2007; Ramdani *et al*., 2009; Hung *et al*., 2010). Based on the findings, advanced-adopters and basic-adopters perceive that relative advantage is an important factor that influences their decision to adopt e-government. This is consistent with results from previous research that have found the relative advantage to be a significant variable in the adoption of an IS (e.g. Hung *et al*., 2010; Ramdani *et al*., 2009; Al-Qirim, 2007; Kuan & Chau, 2001; Thong, 1999; Iacovou *et al*., 1995).

Previous innovation diffusion research, as indicated in chapter three, also identified relative advantage to be one of the important factors for the adoption of new innovation. Participants of this research recognized the importance of the adoption of e-government initiatives and believed that firms would realize the benefits of adopting e-government. The benefits include reducing the time and cost of providing service to the general public, empowering employees, reducing bureaucracy and increasing the efficiency and effectiveness of businesses.

Similarly, IT infrastructure was also significantly linked to e-government adoption. This is consistent with the results of prior studies that have found it to be a significant variable for initiating innovation's adoption (e.g. Premkumar & Ramamurthy, 1999; Thong, 1999; Pan & Jang 2008). However, the findings indicate that basic-adopters were less ready to adopt e-government compared to advanced-adopters because they perceived lack of IT infrastructure as a barrier.

The findings indicate that a firm with sophisticated IT infrastructure is important in explaining both aspects of e-government adoption. The results are similar to Lin and Lin (2008) and Kowtha and Choon’s (2001) findings that firms with more sophisticated technological resources (hardware, software, expertise) may be more able to implement an IS effectively. Accordingly, a firm with sophisticated IT infrastructure is more likely to increase e-government adoption. This implies that technology competence helps to leverage the adoption of e-government applications. The important technological factor for this research is building the required IT infrastructure in every firm. The findings show that the firms with a well-established IT infrastructure were willing to adopt e-government adoption, while firms, which lack appropriate IT infrastructure, were reluctant to participate in e-government initiatives.

5.2.2.2 Organizational Factors

What are the significant organizational factors associated with the adoption and usage of G2B e-government among businesses?

Three of the five organizational variables were found to influence businesses' adoption of e-government. The variables were organization adaptability and mission, organization involvement and consistency, and financial resources.

Organization adaptability and mission, and organization involvement and consistency were found to be significant factors influencing businesses adoption of e-government. Our results showed that the mission had a significant impact on e-government adoption, and two traits: mission and adaptability had a significant influence on e-government adoption among businesses. The mission trait refers to the purpose and meaning and long-term vision. This implies that the higher the sense of purpose and long-term vision the higher the adoption of e-government among businesses. The adaptability cultural trait is a reflection of the norms and beliefs in the organization and provides the capacity for internal change in response to external conditions.

Firms are known to have stable cultures that resist change; therefore, this finding seems to suggest that due to the lack of capacity for internal change, employees in the firms found the new technology less useful.

In short, results show that organizational culture influences e-government adoption which supports the existing literature in the area of culture and IS (Denison & Mishra, 1995; Shaukat *et al*., 2010; Dasgupta *et al*. 1999, 2009; Doherty *et al*., 2003; Harper *et al*., 2001; Harrington *et al*., 2005).

Furthermore, the findings also indicate that basic-adopters were less ready to adopt e-government compared to advanced-adopters become they perceived organization cultures as a barrier. This is consistent with the results of prior studies that have found it to be a significant variable for initiating many innovations (e.g. Denison & Mishra, 1995; Dasgupta *et al*. 1999, 2009; Doherty *et al*., 2003; Harper *et al*., 2001; Harrington *et al*., 2005).

Another significant organizational factor is financial resources, suggesting that without sufficient financial resources, businesses will not be able to adopt e-government. This is consistent with previous studies (e.g. Iacovou *et al*., 1995; Zhu *et al*., 2004; Ramdani *et al*., 2009). Financial resource refers to the firm's readiness to pay for the development, implementation and usage of e-government adoption. Usually, businesses with available financial resources will be better equipped to implement e-government. This is consistent with previous studies (e.g. Wanga & Ahmed, 2009; Ramdani *et al*., 2009; Zhu *et al*., 2004; Iacovou *et al*., 1995). The findings indicate that advanced-adopters were less ready to adopt e-government compared to basic-adopters because they perceived financial resources as a barrier.

5.2.2.3 External Factors

What are the significant external factors associated with the adoption and usage of G2B e-government among businesses?

External variables were found to influence businesses' adoption of e-government. The variables were competition and government support. Hence, external pressure is recognized to have an effect on e-government adoption. This finding is consistent with the results from Iacovou *et al*. (1995), Grandon and Pearson (2004), and Tung and Rieck, (2005).

With regards to competition, this study shows that the emergence of competitive pressure is a key determinant of adoption of e-government. This implies that when firms face strong competition, they tend to implement more aggressively. Similarly, government support to businesses was also significantly linked to e-government adoption. This is consistent with the results from prior studies that found it to be a significant variable for initiating many innovations adoption among businesses (e.g. Lin, 2008; Kuan & Chan, 2001). The significant role played by governmental support is that it can encourage and guide logistics service providers to e-government adoption. The government can draw up public policies to encourage private sector performance improvements through trade and inter-modal policies, infrastructure investment and development, creative financing arrangements, tax incentives, safety regulation, public/private partnerships and special programs and projects (Lin, 2008; Tung & Rieck, 2005; Morash & Lynch, 2002). Based on the findings, advanced-adopters and basic-adopters perceive that government support is an important factor that influences their decision to adopt e-government.

From a business perspective, the relationships between competitive pressure and government support with the dependent variable are both significant. These results are in line with studies on EDI adoption, network effects, and e-government service (Bouchard, 1993; Chwelos *et al*., 2001; Tung & Rieck, 2005).

Competition is one of the main factors, which facilitates innovation adoption. This is consistent with the results of prior studies that have found it to be a significant variable for initiating innovations adoption (e.g. Iacovou *et al*., 1995; Al-Qirim, 2007; Wang & Ahmed, 2009).

Similarly, government support to businesses was also significantly linked to e-government adoption. This is consistent with the results from prior studies that found it to be a significant variable for initiating many innovations adoption among businesses (e.g. Lin, 2008; Kuan & Chan, 2001). Based in the findings advanced-adopters and basic-adopters perceive that government support is one important factor that influences their decision to adopt e-government.

5.2.3 E-Government Impacts on Businesses

The present section attempts to discuss the impact of e-government adoption on the basis of four measures namely the impact on firm's overall performance, time and cost, efficiency, and effectiveness. It aims to examine differences of these impacts among the two adoption groups.

The third research question which is discussed is:

What are the significant impacts of G2B e-government adoption on businesses?

Among the objectives of the present study is the examination of the links between e-government adoption and firm's performance. Apart from the Khandwalla's (1977) subjective measures of firm performance, two measures of e-government benefits, namely time and cost and efficiency were used to examine the association between impacts on firms as consequences of e-government adoption. Although causal links could not be deduced from this study, the result managed to indicate that e-government adoption had an impact on businesses. The impacts accrued were different across various adoption groups.

The findings of this study indicate that the adoption of e-government had achieved better e-government efficiency and gained time and cost benefits. This is important, because it suggests a positive relationship between increased e-government penetration and increased positive impacts by businesses that have adopted e-government. The following sections describe the impact on firm's overall performance, time and cost, efficiency, and effectiveness.

5.2.3.1 Firm Performance

Based on the study by Zhu and Kraemer (2002), evidence does support any significant relationship between the firm's e-government capability and firm performance. On the other hand, studies by Salwani *et al*. (2008), Zhu and Kraemer (2002), and Teo and Pian (2003), showed that there is a correlation between firm performance and e-government adoption that provide significant improvements in firm performance.

Furthermore, another similar study carried out by Teo and Pian (2003) revealed evidence to support the positive relationship between web-adoption levels and firm's growth on the based annual sales, financial assets, market share, return on investment, and better performance of organization goals. These measures of firm growth are very similar to the measures for firm performance adopted in this study, as proposed by Khandwalla (1977).

Additionally, in the present study, firm's performance is represented through firm's profitability, sales, growth, market share, financial resources, and firm image. The results presented in Section 4.9.3.1 (Chapter 4) revealed no significant differences between the two adoption groups on firm performance. The results of the study concur with that of the study by Cragg and King (1992) which revealed no significant difference on the basis of performance between SMEs at different levels of IS implementation.

5.2.3.2 Time and Cost Benefits

Generally speaking, e-government eradicates the need for computer files' translation into paper documents that often lead to errors and delays. It gets rid of paper documentation, reduces operational costs, work-process time, error, cash-on-hand, and communication cost for firms. Moreover, e-government adoption helps to reduce costs of promotion and marketing firms' products and services (Yamin *et al*., 1999; Ainin, 2000).

Another factor to be considered is time saving. In this issue, the internet is able to connect with various partners in real time. This leads to a significant alteration and modification in work procedures. The possibility of obtaining available information by government enables a reduction in the time required to complete a procedure. The features of the services provided by government change totally if they are thought of as on a 24 hour a day basis. Any consult made to a Web site has an impact on time and the need for displacement so as to obtain the information (Montagna, 2005). Hence, it is expected to show a link between e-government adoption and firms' time and costs of operation.

As expected, the findings from this study provide further empirical evidence of positive links between e-government adoption, and the time and cost values obtained. However, evidence of contrasting gains accrued by different adoption groups was also observed. The present findings show that advanced-adopters gain higher time and cost benefits than basic-adopters.

5.2.3.3 Efficiency Benefits

In the case of efficiency, the objective for the introduction of IT has been the search for efficiency. Applications that tend to automate office operations have been useful to reduce the use of material and human resources to perform various tasks.

The first notion that arises around a computer network is that it drastically reduces connection costs. In the case of e-government, every initiative that allows users, contributors or citizens to present documentation through electronic forms will help to reduce data input costs and simplify data processing.

The possibility of carrying out a procedure electronically, gathering the information needed to take an administrative procedure, and reducing the time required will help businesses to complete an administrative process. Also, the administrative costs required to process these transactions will be decreased.

As expected, the findings from this study provide further empirical evidence of positive links between e-government adoption and firms' efficiency. However, evidence of contrasting gains accrued by different adoption groups was also observed. The findings show that advanced-adopters have gained higher efficiency benefits compared to basic-adopters.

5.2.3.4 Effectiveness Benefits

Most past studies found adoption of e-government improved relationships with trading partners and speeded up business transaction. For example, Riggins (1998), and Liao *et al*. (2002) found the benefits realized by firms as a result of adoption e-government include enhancing their services, improved quality of information supply, and improved accuracy. This is also consistent with Kendall *et al*. (2001) who found e-commerce adoption improved firms' operation effectiveness throughout the entire value chain. They argued that e-commerce also enables firms to manage inventory effectively.

Many firms' become more effective when accessing information provided by e-government on economic indicators, future government investment's projects, trade agreements with other countries, credit or encouragement lines of various activities. Businesses can achieve greater development of their capabilities when they are aware of how government actions could affect them. If a government web site can be accessed to get information on procedure and requirements, businesses will be able to fulfill their tasks more effectively (Montagna, 2005). Surprisingly, the findings from this study do not provide evidence of such a link between the two variables.

5.3 Theoretical Contributions

From the theoretical standpoint, the results gained from this study were consistent with the theories and previous literature. The empirical evidence from this study contributes to the body of knowledge in the fields of IS and e-government adoption. This study was undertaken with various underpinning theories. Therefore, this study could contribute to each of these theories by means of supporting the theories.

This study hopes to contribute to knowledge on the implementation and adoption of e-government among businesses in Jordon, in particular, and the e-government literature in general. Generally, it gives indication of how businesses can build, enhance and strengthen these factors with the aim of increasing the willingness to adopt e-government. This study helps in providing the alternative approach toward measuring e-government.

A significant contribution of the present study is the fact that adoption has been observed along a two-dimensional view based on the current status, and the level of the application used. Both the said dimensions were utilized as surrogates to depict e-government adoption in businesses.

Unlike previous studies that described adoption based mainly on one dimension, which is the level of adoption, this study has given considerable attention to both the level of adoption and the extent of usage for each application. Moreover, the framework provides a more comprehensive picture of the nature of e-government adoption by the businesses.

The results suggest that factors under study such as the categories of application adopted, the extent of usage measured in terms of not using, and the extent of e-government usage, could be used to characterize e-government adoption. Furthermore, both dimensions could be the basis for which firms are categorized in future studies on which causal models could be based.

For the second research question which was about the relationship between the factors that drive the adoption of e-government among businesses, this study provided empirical evidence to support the diffusion of innovation framework (Rogers, 1995) as well as the TOE framework (Tronatsky & Fleischer, 1990). The results support using both theories, i.e., Rogers's DOI framework coupled with TOE framework which can provide a useful theoretical framework to explain the organization adoption of IS in general and e-government among business organizations in particular (Mohamad & Ismail, 2009; Ramdani *et al*., 2009; Lippert & Govindarajulu, 2006). Such approach could provide a strong empirical input to e-government adoption research (Al-Qirim, 2007).

IS innovations are highly differentiated technologies for which there is not necessarily a single adoption model (Ramdani & Kawalek, 2007). TOE factors have been found to be significant. The findings from this study confirmed the importance of TOE factors in e-government adoption. This is consistent with findings from previous IS studies by Alawneh (2009), Thompson *et al*. (2009), Salwani (2008), Lin (2008), and Al-Qirim (2007). These findings asserted further that factors influencing the adoption of e-government are different from factors influencing businesses' adoption of IS innovations.

The major contribution of this study is statistically validating the factors influencing businesses' adoption of e-government. Thus, it can be assumed that businesses with a greater perceived relative advantage, a greater IT infrastructure with e-government before adoption, greater financial resource, greater organization adaptability and mission, greater organization involvement and consistency, greater government support and competition are more likely to adopt e-government.

Another implication for the theory under study is the notion that adoption of e-government can lead to improvements in firms' performance. It has been revealed that positive influences generally increase with the increase of e-government penetration. In this respect, the current study has provided further evidence of the link between adoption and overall firm performance.

Nevertheless, in light of the benefits that have been presented, it is notable that advanced-adopters had gained time and cost benefits, and efficiency through efficient operations, work efficiency, operational cost, work-process time, error rate, communication cost, use of paper while basic-adopters are lagging behind.

To summarize, this study has provided empirical evidence that supports the related theories. Moreover, the aim of this study is to fill the gap in the literature by investigating the organizational performance, the current status of the e-government adoption as well as the factors that drive the adoption of e-government among businesses in Jordan.

5.4 Methodological Contributions

The methodological contributions of this study are basically related to identifying the types of e-government applications adopted by the firms. Furthermore, it contributes to demonstrate the extent of usage for each application. It aims to provide a description on the current state of e-government adoption among businesses. It is also targeted to answer the questions on what applications have been adopted and how these applications have been used among businesses. This has filled the gap in the literature as previous studies mainly left out whether an application has been adopted or not and whether there is any plan to adopt an application.

One significant contribution of the present study of e-government is the fact that adoption has been observed along a two-dimensional view. More specifically, it was based on the type of current status, and the level of the application used. Both the said dimensions have been utilized as surrogates measuring e-government adoption in businesses. Hence, the present study is distinct from prior studies where adoption has been described mainly on one dimension, which is the level of adoption. Moreover, in the present study, the researcher has developed a framework that enables current status of e-government applications to be accountable, providing a more extensive picture into the e-government's adoption of businesses.

Consequently, the results suggest that factors under study such as the categories of application adopted, the extent of usage measured in terms of not using, and the extent of e-government usage, could be used for the characterization of e-government adoption. Furthermore, both dimensions could be the basis for which firms are categorized in future studies, in which causal models could be based in such a way that it explores the links between variables like the factors related to adoption and impact on firms.

The current study also presented factors like relative advantage, IT Infrastructure, organization adaptability and mission, organization involvement and consistency, financial resources, competitive, and government support as related significantly to businesses' e-government adoption initiative, implying that researchers will be requested to apply a novel viewpoint to the roles played by each individual external party such as customers, when researching technology adoption. Furthermore, the factors' analysis linked with e-government adoption revealed the possibility of building and testing causal models.

5.5 Managerial Implications

The findings have implications for policy makers, businesses themselves, and for vendors or consultants who depend on e-government for revenue through the promotion of e-government products and services. The e-government adoption profile described in this study provided an overview of e-government adoption among businesses.

Policy makers in agencies such as the ASE businesses could use the information from the study to formulate strategies to promote the adoption of e-government among businesses. As a majority of the ASE Jordanian businesses from the sample undertake e-government on their own initiatives, this proactiveness put them in a better position to adopt other new technologies. Special focus, however, also needs to be given by policy makers to the effort of enriching CEO or owner of IT knowledge, as this attribute is found to be significantly linked to the extensiveness of e-government adoption by the businesses.

In terms of extent of usage, the parallel usage of most of the e-government applications provided by the Jordanian government highlighted that significant recommendations need to be taken into consideration. Particularly, when business firms have a positive experience and feedback from using these applications, this would set the stage for subsequent usage of the application, and application from other levels by reinforcing their usability. In addition, errors in IT implementation might be much more costly for businesses to absorb due to their limited resources. As such, besides promoting e-government applications, Jordanian government is required to ensure a positive experience, error free, and positive feedback for their businesses firms when they use their e-government websites and applications. Such approach would increase the trust as well as the reliability from the consumer point of view which in turns helps in moving the extent of usage from the parallel to full range usage.

The second implication for theory concerns the assumption made in past studies, which examined factors that drive adoption, mainly between binary groups, which are non-adopters versus adopters.

This study identified two adoption groups, and has provided evidence that apart from some common factors that were associated with all adoption groups, some groups had distinct factors to drive their adoption of e-government. In other words, certain factors were perceived to be more important for a particular adoption group.

The findings suggested that relative advantage characteristics needed to be given greater emphasis in researching e-government adoption in businesses. In particular, the adopter tends to utilize e-government as a tool for increasing customer satisfaction and improving service quality in order to help the businesses gain relative advantage and ultimately increase operation performance. The relative advantage variable discussed in this research showed a positive result concluding that the more benefits seen to be gained from adopting e-government, the more willingness the businesses would have to adopt e-government.

The third implication for theory concerned the assumption that adoption of e-government would enhance firms' performance. It was found that positive impacts increased as e-government penetration increased. This study has provided evidence of the association between adoption and overall firm performance.

However, in terms of the benefits identified, advanced-adopters had gained time and cost and efficiency benefits in operating in an efficient manner, work efficiency, operational cost, work-process time, error rate, communication cost, and uses of paper. The study has shown that advanced-adopters had significant gains in time and cost and efficiency benefits compared to basic-adopters.

5.6 Limitations

The strength of this study is in the acknowledgment of its limitations. Those limitations lead to suggestions for future research and clarify the theoretical implications. This research contributes to the body of knowledge in that it looks into the essence of e-government adoption among businesses in Jordan. The researcher has classified the limitations of this study into two main parts, which are geographical limitation and methodological limitations. Since this study was conducted on e-government adoption among the businesses, emphasizing upon those in ASE, the researcher suggests that more studies should be done on e-government adoption among other business groups or other respondents which may give rise to other significant findings. In addition, the researcher suggests that more studies be carried out on other hypotheses, which had been used in this research to resolve the responsiveness and personalization hypotheses.

One of the limitations that was faced by the researcher while conducting this study was the lack of prior relevant research. This means that this research is not as strongly grounded due to lack of prior research. Moreover, participants may possess certain attributes that differ from those in other parts of the world. Future research may use more diversified random sampling to verify the dimensions developed in this study. Regarding the methods which were used by the researcher to investigate the e-government adoption, it is suggested that future studies use the both quantitative and qualitative methods to enhance the results of the field.

Another limitation of this research is it does not classify the population into vendors and non-vendors groups, because this information is not available. As selected by the examiner, the level it usage between these two groups can be different. Thus, future research is concerned to explore more this issue.

5.7 Future Research and Conclusions

The present study is considered as an exploratory study, and it attempts to give a better understanding on the e-government adoption profile among businesses in Jordan. It also intends to propose a model for e-government adoption for businesses in Jordan. In the present study, an effort was made to ensure that all e-government applications are relevant to the implementation stages in the framework adoption. However, there might be other possible factors, which can be included in the framework but may have been overlooked and have not been taken into account. Therefore, it is recommended to future research works to examine new relevant factors, which may affect the e-government adoption in Jordan. Furthermore, it is recommended to replicate the same approach of analyzing with different samples elsewhere.

The present study is a cross-sectional study and attempts to examine the adoption groups' determining factors that motivate e-government adoption and its impacts on firms. The factors and influences constructs have been measured according to respondent perceptions at one point in time. Although every effort has been taken to reduce this shortcoming in the design of these constructs in the survey, the risk of some of the factors or impacts relevant to the study could have been overlooked.

Furthermore, this is an empirical study, and the research model provides a way of viewing the real world, i.e., in simplified form. In the complex world of business, there are potentially other factors that could influence the adoption of e-government and implications for firms. However, for the purpose of this study, these factors are controlled. In other worlds, the adoptions, and the links between e-government adoption and firm impacts, are hypothesized to exist.

Causal relationships are difficult to establish under a cross-sectional study. Therefore, future studies may adopt qualitative research such as ethnographic studies of a small number of firms that adopt e-government. This will enhance our knowledge and understanding on the factors relevant to e-government adoption and its effects to the adopting firms.

The current study concentrates only on G2B but the developed framework can be utilized to carry out a comparative study among various forms of e-government such as government to government (G2G) or government to employees (G2E) context, which will provide knowledge on the topic of e-government adoption.

Future studies can investigate the adoption decision according to businesses. Organizations from different businesses face different operating conditions and may possess different requirements. For example, business conditions in a manufacturing industry are different from that in a pharmaceutical industry. Such findings may be invaluable in delivering more effective and targeted administrative services.

The respondents chosen for the study have been taken from various industries but the model is confined to single-country context. Hence, the research fails to provide comprehensive information for other industries in other countries. Therefore, further research is called for the purpose of providing a comprehensive insight using the similar framework to be conducted in other countries such as Syria, Iraq, Yemen, and Gulf countries.

Similarly, the adoption analysis can also be carried out from the perspective of individuals and households as the e-government services provided by the Jordanian government involves various customers comprising both businesses and individuals. It is suggested for future research to explore the various factors impacting the decisions of individuals and households whereby the differences between them will provide knowledge on what kinds of e-government services are needed for these categories of users.

The research model of the current study has integrated two theoretical research streams, which are TOE and the literature on DOI. Hence, this research can be a starting point for further research focusing on the adoption decisions of other technologies such as technology competence, image, and technology readiness. In addition, the previous theoretical framework of innovation diffusion has been less effective at the adoption decision of e-government services. On the other hand, it is believed that this framework could be used to explain the adoption of other technologies (delivered via World Wide Web and others). In terms of the obstacles of adoption, the factors referred to the organizational perspective have been found to be insignificant in this study although still a sufficient theory for understanding successful technology adoption. However, it is important to continue to explore other model factors in future studies.

5.8 Concluding Remarks

The current study has contributed to our understanding on e-government adoption, providing an exploratory research on e-government adoption among businesses in the insurance, services, and banking industries in Jordan. The study has also contributed a research instrument comprising two-dimensions representing the current status of e-government adoption as well as the extent of usage. The former comprises four stages of e-government adoption and is measured through a five-point scale. This instrument is rigorous and yet flexible, because it allows metric data to be analyzed using hierarchical cluster to identify adoption patterns. As e-government gains wider acceptance among businesses, research that accurately characterizes and measures e-government adoption will become increasingly important. This study is an early attempt in that direction.

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Appendix A

UNIVERSITI UTARA MALAYSIA

06010 UUM Sintok, Kedah Darul Aman, Malaysia. Tel: 604 - 928 4000

College of Business

"KEDAH SEJAHTERA"

UUM/COB/A-3 (92218)

November 10, 2010

TO WHOM IT MAY CONCERN

Dear Sir/Madam

DATA COLLECTION

PROGRAMME : DOCTOR OF PHILOSOPHY
SUPERVISOR : THI LIP SAM

This is to certify that the following is a postgraduate student from the College of Business, Universiti Utara Malaysia. He is pursuing the above mentioned course which requires him to undertake an academic study at any organisation. The details are as follows:

NO.	NAME	MATRIC NO.
1.	Mohammad Issa Al. Zoubi	92218

In this regard, I hope that you could kindly provide assistance and cooperation for him to succesfully complete the assignment given. All the information gathered will be strictly used for academic purposes only.

Your cooperation and assistance is very much appreciated.

Thank you.

"ILMU BUDI BAKTI"

Yours faithfully,

ROSLEE BIN MARDAN
Assistant Registrar
College of Business

COB COLLEGE OF BUSINESS SINTOK MALAYSIA

c.c - Student's File (92218)

QUALITY SYSTEM SIRIM MS ISO 9001 : 2008 REG. NO. AR 2471 UKAS 074 MSC MALAYSIA Status Institution

University Utara Malaysia
College of Business

Dear Manager,

I am a PhD candidate in the field of technology management. The main aim of my study is to examine e-government adoption among businesses in Jordan.
I would appreciate your co-operation in making my research a success. Please spare some of your valuable time to complete this questionnaire. All personal information will be kept confidential. If you have any questions about the questionnaire or would you like to see the final results, feel free to contact me.
Thank you for participating in this study. Your cooperation in the matter is highly appreciated.

Yours sincerely,
Mohammad Issa AL-Zoubi
Student id Number: 92218
PhD Candidate
College of Business
University Utara Malaysia
E-mail: s92218@student.uum.edu.my

SURVEY ON E-GOVERNMENT ADOPTION AMONG BUSINESSES IN JORDAN

QUESTIONNAIRE

The purpose of the study is to gain a better understanding of the adoption of electronic government applications by businesses in Jordanian

This questionnaire should take about 15 minutes to complete. Your answers are very important to this study and will be kept strictly confidential. Please return the completed questionnaire at your earliest convenience.

Thank you for your cooperation

Section (A): Background Information

I would like to obtain some information about your company so that we can better understand your decision about e-government adoption. Please tick (✓) an appropriate box.

1. **Which of the following best describes the sector in which your company operates?**

Industry Sector	1 ▢	Insurance Sector	2 ▢
Services Sector	3 ▢	Banking Sector	4 ▢

2. **Please indicate the region where your company is located.**

Amman	1 ▢	Abdullah II Industrial City	2 ▢
Al Hassan Industrial City	3 ▢	Al-Hussein Bin Abdullah	4 ▢
Aqaba International Industrial	5 ▢	Ma'an Industrial	6 ▢

3. **Please indicate how long your company has been in business.**

1 ▢ Less than 5 years 2 ▢ 5-10 years 3 ▢ 11-15 years 4 ▢ More than 15 years

4. **Please specify the form of ownership of your business.**

1 ▢ Citizen owned 2 ▢ Foreign owned ▢ Joint foreign/citizen owned

5. **What is your company's approximate annual sales turnover?**

________ Millions JD

6. **Approximately how many employees in your company?**

________ Employees

7. **Does your company employ information technology (IT)/ information system (IS) staff?**

1 ▢ Yes 2 ▢ No

If YES. Please state approximately the number of IT staf ______

8. **Approximately what portion of your annual budget is allocated for IT?**

1 ▢ Less than 5% 2 ▢ 5-10% 3 ▢ 11-15% 4 ▢ 16-25% 5 ▢ Over 25%

9. **How would you describe your company's use of internet?**

1 ▢ Industry leader 2 ▢ Close follower 3 ▢ Middle of the pack

4 ▢ Somewhat behind 5 ▢ Lagging

Section (B): Adoption of E-Government Applications

Part I.

Now, I like to learn about the current stage of e-government adoption. Please indicate the extent to which you agree or disagree with each of the following statements.

	Our firm uses the government website for…..	Strongly Disagree				Strongly Agree
1	Searching for general business information (laws and regulations, financial, market and technology information) on governmental web sites.	1	2	3	4	5
2	Locating governmental agencies, and downloading forms and applications.	1	2	3	4	5
3	Filling out forms and submitting information online through governmental web sites.	1	2	3	4	5
4	Conducting transactions with government online.	1	2	3	4	5

Part II.

Now, I like to learn about the adoption of e-government. Please tick (✓) to indicate your CURRENT stage of usage of the following e-government applications.

	E-Government Applications	Not using	Use some time	Use Most of the time	Use all the time
1	Business facts and figures of the state				
2	Business opportunities				
3	Business owner's guide to state government				
4	Business licenses, permits, & regulations				
5	Business taxes and reporting				
6	Doing business with the state (contracts)				
7	Employment and workforce information				
8	Helping businesses succeed				
9	How to start a new business				
10	How to file complaints				
11	How to finance a business				
12	Not-for-profit organizations				
13	Small business information and assistance				
14	State environmental requirements				
15	State government offices or agencies for business				
16	State tax incentives and application forms				

Section (C): Perceptions of E-Government Adoption Factors

Now, I like to learn about the factors that influenced your company's decision to adopt e-government. Please indicate the extent to which you agree or disagree with each of the following statements.

1. **Technology Factors**

	It is my perception that…	**Strongly Disagree**				**Strongly Agree**
Relative Advantage						
1	E-government allows us to better communicate with our business partners	1	2	3	4	5
2	E-government allows us to cut costs in our operations	1	2	3	4	5
3	E-government increases the profitability of our business.	1	2	3	4	5
4	E-government provides timely information for decision making.	1	2	3	4	5
Compatibility						
1	E-government is compatible with our firm's values and beliefs.	1	2	3	4	5
2	E-government is compatible with management support	1	2	3	4	5
3	E-government is compatible with competitive advantage	1	2	3	4	5
4	E-government integration into our current procedures would not be difficult	1	2	3	4	5
IT Infrastructure						
1	Our firm has a good telecommunications infrastructure	1	2	3	4	5
2	Our firm shares the databases for various applications	1	2	3	4	5
3	Our firm has a reliable Internet connections	1	2	3	4	5
4	Our firm has fast Internet downloading/access speed	1	2	3	4	5
5	Our firm makes PC's and laptops available for the staff	1	2	3	4	5
Security						
1	E-government reduces the risk of unauthorized access	1	2	3	4	5
2	Online payment does not pose security risks	1	2	3	4	5
3	E-government website is secure in terms of computer viruses	1	2	3	4	5

2. **Organizational Factors**

	In our organization…	Strongly disagree				Strongly Agree
Resources						
1	The financial resources to implement e-government is available	1	2	3	4	5
2	The financial resources to support e-government is available	1	2	3	4	5
3	The human resources to implement e-government is available	1	2	3	4	5
4	The human resources to support e-government is available	1	2	3	4	5
5	The technological resources to implement e-government is available	1	2	3	4	5
6	The technological resources to support e-government is available	1	2	3	4	5
Top Management Support						
1	Top management supports the adoption of e-government	1	2	3	4	5
2	Top management has allocated adequate resources to adopt e-government	1	2	3	4	5
3	Top management is aware of the benefits of e-government adoption.	1	2	3	4	5
4	Top management actively encourages employees to use the e-government in their daily tasks	1	2	3	4	5
Organizational Culture						
1	In this organization, most people have input into decisions that affect them	1	2	3	4	5
2	In this organization, cooperation and collaboration across functional roles is actively encouraged	1	2	3	4	5
3	In this organization, there is a high level of agreement about the way that we do things	1	2	3	4	5
4	In this organization, the approach of doing business is very consistent and predictable	1	2	3	4	5
5	In this organization, customers' comments and recommendations often lead to changes	1	2	3	4	5
6	This organization is very responsive and changes easily	1	2	3	4	5
7	This organization has a long-term purpose and direction.	1	2	3	4	5
8	There is a shared vision of what this organization will be like in the future.	1	2	3	4	5

3. **External Factors**

It is my perception that….		**Strongly disagree**				**Strongly Agree**
Competition						
1	Competition makes it necessary for our organization to implement e-government	1	2	3	4	5
2	Competition is forcing our organization to implement e-government	1	2	3	4	5
3	E-government is considered an important economic function of our economy	1	2	3	4	5
4	E-government is needed in order to be a leader in our organization's industry	1	2	3	4	5
5	Many organizations within our industry have implemented e-government	1	2	3	4	5
Government Support						
1	Government is generally supportive of e-government	1	2	3	4	5
2	Government provides incentives for our organization to implement e-government	1	2	3	4	5
3	Government helps training manpower with e-government skills	1	2	3	4	5
4	Government provides financial support for the development of e-government technologies	1	2	3	4	5
5	Government support for e-government is readily available	1	2	3	4	5

Section (D): Performance of your Company

I would like to learn about the performance of your company. Please circle the most appropriate number for each statement.

1. Relative to the industry average, or to comparable companies, how do you rate your company's current performance in the following areas?

	Very weak	**weak**	**Same weak**	**Strong**	**Very strong**
In long term profitability	1	2	3	4	5
In sales growth	1	2	3	4	5
In financial resources (liquidity and investment capacity)	1	2	3	4	5
In company image and client loyalty	1	2	3	4	5
In market share	1	2	3	4	5

2. On the scale from 1 to 5; (5 being strongly agree and 1 strongly disagree) what impact do you believe the adoption of e-government has had/will have on your company?

	E-government Adoption Impacts	1	2	3	4	5
1	Improved quality of information supply					
2	Improve accuracy					
3	Improved service level					
4	Fewer administrative burdens					
5	Increased customer satisfaction					
6	Increased work efficiency					
7	Reduced operational cost					
8	Reduced work-process time					
9	Reduce error rates					
10	Reduce need for cash-on-hand					
11	Reduce communication cost					
12	Reduce uses of paper					

Section (E): Respondent's profile and IT knowledge
I would like to have a better understanding of your personal background and knowledge of IT. Please tick (✓) an appropriate box.

1. How often do you access the internet?

1 ▢ Never 2▢ About an hour a day 3▢ 1 to 2 hour a day
4▢ 2 to 3 hour a day 5▢ More than 3 hours a day

2. Please indicate your gender.

1▢ Male 2▢ Female

3. Please indicate your age.

1▢ Under 30 2▢ 30-39 3▢ 40-49 4▢ Above 50

4. Please indicate your highest level of education.

1▢ Diploma or below 2▢ Bachelor degree 3▢ Master degree 4▢ PhD

5. What is your current position in your company?

1▢ Owner/Proprietor ▢ Managing Director/Chief Executive Officer
2
3▢ Senior Manager 4 ▢ Manager
5 ▢ Other. Please specify…………………………….

Please use this space if you wish to share your insights about your adoption of e-government.

……
……
……
……
……
……
……

Thanks you for your cooperation

Appendix B

All Firms Listed in Amman Stock Exchange (http://www.ase.com.jo/ar/index.php)

1. Banking Sector
Company's Name

1. JORDAN ISLAMIC BANK
2. INVEST BANK
3. JORDAN KUWAIT BANK
4. CAPITAL BANK OF JORDAN
5. JORDAN COMMERCIAL BANK
6. CAIRO AMMAN BANK
7. THE HOUSING BANK FOR TRADE AND FINANCE
8. BANK OF JORDAN
9. ARAB JORDAN INVESTEMENT BANK
10. JORDAN NATIONAL BANK
11. INDUSTRIAL DEVELOPMENT BANK
12. ARAB BANK
13. UNION BANK
14. SOCIETE GENERALE DE BANQUE - JORDANIE
15. ARAB BANKING CORPORATION /(JORDAN)
16. ALRAJEHE BANK
17. GULF ARAB BANK
18. BANK ALGAHERA AMMMAN

2. Insurance Sector
Company's Name

1. GENERAL ARABIA INSURANCE
2. THE ARAB ASSURERS
3. THE UNITED INSURANCE
4. THE MEDITERRANEAN & GULF INSURANCE - JORDAN
5. THE HOLY LAND INSURANCE
6. MIDDLE EAST INSURANCE
7. ARAB UNION INTERNATIONAL INSURANCE
8. AL-NISR AL-ARABI INSURANCE
9. THE NATIONAL INSURANCE
10. JORDAN INSURANCE
11. JORDAN INTERNATIONAL INSURANCE
12. DELTA INSURANCE
13. ARAB GERMAN INSURANCE
14. JERUSALEM INSURANCE
15. THE ISLAMIC INSURANCE
16. JORDAN FRENCH INSURANCE
17. YARMOUK INSURANCE
18. EURO ARAB INSURANCE GROUP
19. GERASA INSURANCE
20. ARAB JORDANIAN INSURANCE GROUP
21. AL-MANARA INSURANCE
22. AL BARAKAH TAKAFUL CO.LTD

23. ARAB ORIENT INSURANCE COMPANY
24. FIRST INSURANCE
25. JORDAN EMIRATES INSURANCE
26. ARAB LIFE & ACCIDENT INSURANCE
27. JORDAN GULF INSURANCE
28. PHILADELPHIA INSURANCE

3. Services Sector
Company's Name

1. AL-BILAD MEDICAL SERVICES
2. AL-BILAD MEDICAL SERVICES
3. INTERNATIONAL FOR MEDICAL INVESTMENT
4. INTERNATIONAL FOR MEDICAL INVESTMENT
5. THE CONSULTANT & INVESTMENT GROUP
6. THE CONSULTANT & INVESTMENT GROUP
7. AL-ZARQA EDUCATIONAL & INVESTMENT
8. AL-ZARQA EDUCATIONAL & INVESTMENT
9. THE ARAB INTERNATIONL FOR EDUCATION & INVESTMENT.
10. THE ARAB INTERNATIONL FOR EDUCATION & INVESTMENT.
11. ITTIHAD SCHOOLS
12. ITTIHAD SCHOOLS
13. PETRA EDUCATION COMPANY
14. PETRA EDUCATION COMPANY
15. AL-ISRA FOR EDUCATION AND INVESTMENT PLC
16. AL-ISRA FOR EDUCATION AND INVESTMENT PLC
17. PHILADELPHIA INTERNATIONAL EDUCATIONAL INVESTMENT COMPANY
18. PHILADELPHIA INTERNATIONAL EDUCATIONAL INVESTMENT COMPANY
19. AL-TAJAMOUAT FOR TOURISTIC PROJECTS CO PLS
20. AL-TAJAMOUAT FOR TOURISTIC PROJECTS CO PLS
21. AL-DAWLIYAH FOR HOTELS & MALLS
22. AL-DAWLIYAH FOR HOTELS & MALLS
23. JORDAN HOTELS & TOURISM
24. JORDAN HOTELS & TOURISM
25. ARAB INTERNATIONAL HOTELS
26. ARAB INTERNATIONAL HOTELS
27. JORDAN HIMMEH MINERAL
28. JORDAN HIMMEH MINERAL
29. MEDITERRANEAN TOURISM INVESTMENT
30. MEDITERRANEAN TOURISM INVESTMENT
31. ZARA INVESTEMENT HOLDING
32. ZARA INVESTEMENT HOLDING

33. AL- SHARQ INVESTMENTS PROJECTS(HOLDING)
34. AL- SHARQ INVESTMENTS PROJECTS(HOLDING)
35. AMMAN FOR DEVELOPMENT & INVESTMENT
36. AMMAN FOR DEVELOPMENT & INVESTMENT
37. JORDAN PROJECTS FOR TOURISM DEVELOPMENT
38. JORDAN PROJECTS FOR TOURISM DEVELOPMENT
39. WINTER VALLEY TOURISM INVESTMENT CO.
40. WINTER VALLEY TOURISM INVESTMENT CO.
41. AL-RAKAEZ INVESTMENT COMPANY
42. AL-RAKAEZ INVESTMENT COMPANY
43. MODEL RESTAURANTS
44. MODEL RESTAURANTS
45. SURA DEVELOPMENT & INVESTMENT
46. SURA DEVELOPMENT & INVESTMENT
47. JORDAN NATIONAL SHIPPING LINES
48. JORDAN NATIONAL SHIPPING LINES
49. SALAM INTERNATIONL TRANSPORT & TRADING
50. SALAM INTERNATIONL TRANSPORT & TRADING
51. JORDAN EXPRESS TOURIST TRANSPORT
52. JORDAN EXPRESS TOURIST TRANSPORT
53. TRANSPORT& INVESTMENT BARTER COMPANY
54. TRANSPORT& INVESTMENT BARTER COMPANY
55. ALIA-THE ROYAL JORDANIAN AIRLINES
56. ALIA-THE ROYAL JORDANIAN AIRLINES
57. MASAFAT FOR SPECIALISED TRANSPORT
58. MASAFAT FOR SPECIALISED TRANSPORT
59. TRUST INTERNATIONAL TRANSPORT
60. TRUST INTERNATIONAL TRANSPORT
61. UNIFIED TRANSPORT & LOGISTICS
62. UNIFIED TRANSPORT & LOGISTICS
63. JORDAN HOTELS & TOURISM
64. JORDAN HOTELS & TOURISM
65. ARAB INTERNATIONAL HOTELS
66. ARAB INTERNATIONAL HOTELS
67. JORDAN HIMMEH MINERAL
68. JORDAN HIMMEH MINERAL
69. MEDITERRANEAN TOURISM INVESTMENT
70. MEDITERRANEAN TOURISM INVESTMENT
71. ZARA INVESTEMENT HOLDING
72. ZARA INVESTEMENT HOLDING
73. AL- SHARQ INVESTMENTS PROJECTS(HOLDING)
74. AL- SHARQ INVESTMENTS PROJECTS(HOLDING)
75. AMMAN FOR DEVELOPMENT &
76. AMMAN FOR DEVELOPMENT &

INVESTMENT

77. JORDAN PROJECTS FOR TOURISM DEVELOPMENT
79. WINTER VALLEY TOURISM INVESTMENT CO.
81. AL-RAKAEZ INVESTMENT COMPANY

INVESTMENT

78. JORDAN PROJECTS FOR TOURISM DEVELOPMENT
80. WINTER VALLEY TOURISM INVESTMENT CO.

4. Industrial Sector
Company's Name

1. DAR AL DAWA DEVELOPMENT & INVESTMENT
3. ARAB CENTER FOR PHARM.& CHEMICALS
5. MIDDLE EAST PHARMA. & CHMICAL IND. & MEDICAL APPLIANCES
7. HAYAT PHARMACEUTICAL INDUSTRIES CO.
9. ARAB FOOD AND MEDICAL APPLIANCES
11. THE JORDANIAN PHARMACEUTICAL MANUFACTURING
13. JORDAN CHEMICAL INDUSTRIES
15. UNIVERSAL CHEMICAL INDUSTRIES
17. NATIONAL CHLORINE INDUSTRIES
19. COMPREHENSIVE MULTIPLE PROJECT COMPANY
21. THE ARAB PESTICIDES & VETERINARY DRUGS MFG. CO.
23. THE INDUSTRIAL COMMERCIAL & AGRICULTURAL
25. PREMIER BUSINESS AND PROJECTS
27. RAFIA INDUSTRIAL
29. INDUSTRIAL INDUSTRIES &

2. DAR AL DAWA DEVELOPMENT & INVESTMENT
4. ARAB CENTER FOR PHARM.& CHEMICALS
6. MIDDLE EAST PHARMA. & CHMICAL IND. & MEDICAL APPLIANCES
8. HAYAT PHARMACEUTICAL INDUSTRIES CO.
10. ARAB FOOD AND MEDICAL APPLIANCES
12. THE JORDANIAN PHARMACEUTICAL MANUFACTURING
14. JORDAN CHEMICAL INDUSTRIES
16. UNIVERSAL CHEMICAL INDUSTRIES
18. NATIONAL CHLORINE INDUSTRIES
20. COMPREHENSIVE MULTIPLE PROJECT COMPANY
22. THE ARAB PESTICIDES & VETERINARY DRUGS MFG. CO.
24. THE INDUSTRIAL COMMERCIAL & AGRICULTURAL
26. PREMIER BUSINESS AND PROJECTS
28. RAFIA INDUSTRIAL
30. INDUSTRIAL INDUSTRIES &

MATCH/JIMCO

31. JORDAN SULPHO-CHEMICALS
33. JORDAN INDUSTRIAL RESOURCES
35. NATIONAL TEXTILE AND PLASITIC INDUTRIES
37. JORDAN KUWAIT FOR AGR. & FOOD PROD.
39. INTERMEDIATE PETRO CHEMICALS INDUSTRIES CO.
41. JORDAN PAPER & CARDBOARD FACTORIES
43. ARAB FOR INVESTMENT PROJECTS
45. NATIONAL INDUSTRIES
47. ARAB INVESTMENT & INTERNATIONAL TRADE
49. PEARL- SANITARY PAPER CONVERTING
51. AL-EKBAL PRINTING AND PACKAGING
53. UNION ADVANCED INDUSTRIES
55. UNIVERSAL MODERN INDUSTRIES
57. NUTRI DAR
59. JORDAN POULTRY PROCESSING & MARKETING
61. JORDAN DAIRY
63. GENERAL INVESTMENT
65. AL-QARIA FOOD AND VEGETABLE OIL INDUSTRIES
67. KAWTHER INVESTMENT
69. NATIONAL POULTRY
71. THE ARAB INTERNATIONAL FOOD FACTORIES
73. MODERN FOOD IND & VEG.OIL
75. AMANA FOR AGR.& INDUSTRIAL INVESTMENT
77. JORDAN SAFI SALT
79. MIDDLE EAST INTERNATIONAL INVESTMENT GROUP
81. JORDAN VEGETABLE OIL

MATCH/JIMCO

32. JORDAN SULPHO-CHEMICALS
34. JORDAN INDUSTRIAL RESOURCES
36. NATIONAL TEXTILE AND PLASITIC INDUTRIES
38. JORDAN KUWAIT FOR AGR. & FOOD PROD.
40. INTERMEDIATE PETRO CHEMICALS INDUSTRIES CO.
42. JORDAN PAPER & CARDBOARD FACTORIES
44. ARAB FOR INVESTMENT PROJECTS
46. NATIONAL INDUSTRIES
48. ARAB INVESTMENT & INTERNATIONAL TRADE
50. PEARL- SANITARY PAPER CONVERTING
52. AL-EKBAL PRINTING AND PACKAGING
54. UNION ADVANCED INDUSTRIES
56. UNIVERSAL MODERN INDUSTRIES
58. NUTRI DAR
60. JORDAN POULTRY PROCESSING & MARKETING
62. JORDAN DAIRY
64. GENERAL INVESTMENT
66. AL-QARIA FOOD AND VEGETABLE OIL INDUSTRIES
68. KAWTHER INVESTMENT
70. NATIONAL POULTRY
72. THE ARAB INTERNATIONAL FOOD FACTORIES
74. MODERN FOOD IND & VEG.OIL
76. AMANA FOR AGR.& INDUSTRIAL INVESTMENT
78. JORDAN SAFI SALT
80. MIDDLE EAST INTERNATIONAL INVESTMENT GROUP
82. JORDAN VEGETABLE OIL

INDUSTRIES

83. FIRST NATIONAL VEGETABLE OIL INDUSTRIES CO.
84. FIRST NATIONAL VEGETABLE OIL INDUSTRIES CO.
85. AFIA INTERNATIONAL COMPANY - JORDAN
86. AFIA INTERNATIONAL COMPANY - JORDAN
87. AL-EQBAL INVESTMENT
88. AL-EQBAL INVESTMENT
89. UNION TOBACCO & CIGARETTE INDUSTRIES
90. UNION TOBACCO & CIGARETTE INDUSTRIES
91. JORDAN TOBACCO & CIGARETTES
92. JORDAN TOBACCO & CIGARETTES
93. THE PUPLIC MINING
94. INDUSTRIAL INDUSTRIES & MATCH/JIMCO
95. COMPREHENSIVE MULTIPLE PROJECT COMPANY
96. COMPREHENSIVE MULTIPLE PROJECT COMPANY
97. THE ARAB PESTICIDES & VETERINARY DRUGS MFG. CO.
98. THE ARAB PESTICIDES & VETERINARY DRUGS MFG. CO.
99. THE INDUSTRIAL COMMERCIAL & AGRICULTURAL
100. THE INDUSTRIAL COMMERCIAL & AGRICULTURAL
101. PREMIER BUSINESS AND PROJECTS
102. PREMIER BUSINESS AND PROJECTS
103. RAFIA INDUSTRIAL
104. RAFIA INDUSTRIAL
105. INDUSTRIAL INDUSTRIES & MATCH/JIMCO
106. INDUSTRIAL INDUSTRIES & MATCH/JIMCO
107. JORDAN SULPHO-CHEMICALS
108. JORDAN SULPHO-CHEMICALS
109. JORDAN INDUSTRIAL RESOURCES
110. JORDAN INDUSTRIAL RESOURCES
111. NATIONAL TEXTILE AND PLASITIC INDUTRIES
112. NATIONAL TEXTILE AND PLASITIC INDUTRIES
113. JORDAN KUWAIT FOR AGR. & FOOD PROD.
114. JORDAN KUWAIT FOR AGR. & FOOD PROD.
115. INTERMEDIATE PETRO CHEMICALS INDUSTRIES CO.
116. INTERMEDIATE PETRO CHEMICALS INDUSTRIES CO.
117. JORDAN PAPER & CARDBOARD FACTORIES
118. JORDAN PAPER & CARDBOARD FACTORIES
119. ARAB FOR INVESTMENT PROJECTS
120. ARAB FOR INVESTMENT PROJECTS
121. NATIONAL INDUSTRIES
122. NATIONAL INDUSTRIES
123. COMPREHENSIVE MULTIPLE PROJECT COMPANY
124. COMPREHENSIVE MULTIPLE PROJECT COMPANY
125. THE ARAB PESTICIDES & VETERINARY DRUGS MFG. CO.
126. THE ARAB PESTICIDES & VETERINARY DRUGS MFG. CO.

127. THE INDUSTRIAL COMMERCIAL & AGRICULTURAL

128. THE INDUSTRIAL COMMERCIAL & AGRICULTURAL

129. PREMIER BUSINESS AND PROJECTS

130. PREMIER BUSINESS AND PROJECTS

131. RAFIA INDUSTRIAL

132. RAFIA INDUSTRIAL

133. INDUSTRIAL INDUSTRIES & MATCH/JIMCO

APPENDIX C

Skewness and Kurtosis

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Information	113	1	5	3.91	.786	-.517	.227	.702	.451
Mutual	113	1	5	3.54	.732	.276	.227	.474	.451
Financial	113	1	5	2.05	.895	.580	.227	.015	.451
Integration	113	1	4	1.97	.860	.565	.227	-.352	.451
TRA1	113	1	5	3.75	.892	-.027	.227	-.569	.451
TRA2	113	2	5	3.66	.739	.496	.227	-.790	.451
TRA3	113	2	5	3.50	.792	.838	.227	-.379	.451
TRA4	113	1	5	3.43	.754	.357	.227	.519	.451
TC1	113	1	5	3.67	.930	-.179	.227	-.204	.451
TC2	113	1	5	3.57	.743	-.032	.227	.476	.451
TC3	113	1	5	3.42	.842	.361	.227	.468	.451
TC4	113	1	5	3.34	.786	-.227	.227	1.108	.451
TITI1	113	1	5	3.53	.791	.172	.227	.148	.451
TITI2	113	2	5	3.40	.701	.845	.227	.294	.451
TITI3	113	2	5	3.50	.709	.750	.227	-.224	.451
TITI4	113	2	5	3.65	.810	.406	.227	-.860	.451
TITI5	113	1	5	3.55	.813	.297	.227	-.025	.451
TS1	113	1	5	3.42	.904	-.188	.227	.846	.451
TS2	113	1	5	3.18	.759	-.434	.227	2.678	.451
TS3	113	1	5	3.26	.799	.142	.227	1.211	.451
OR1	113	1	5	4.07	.842	-.683	.227	.407	.451
OR2	113	1	5	4.14	.800	-.794	.227	.929	.451
OR3	113	1	5	3.83	.885	-.526	.227	.428	.451
OR4	113	1	5	3.65	.864	-.111	.227	-.223	.451
OR5	113	2	5	3.80	.746	-.044	.227	-.475	.451
OR6	113	1	5	4.14	.844	-.729	.227	.331	.451
OTMS1	113	1	5	3.53	.733	.307	.227	.481	.451
OTMS2	113	1	5	3.49	.745	.244	.227	.475	.451
OTMS3	113	2	5	3.49	.733	.738	.227	-.193	.451
OTMS4	113	1	5	3.52	.721	.285	.227	.576	.451
OOC1	113	1	5	2.00	.886	.705	.227	.275	.451
OOC2	113	1	4	1.97	.860	.565	.227	-.352	.451
OOC3	113	1	4	2.06	.859	.397	.227	-.547	.451
OOC4	113	1	4	2.10	.916	.514	.227	-.501	.451
OOC5	113	1	5	2.04	.876	.662	.227	.291	.451

OOC6	113	1	5	2.12	.989	.724	.227	.060	.451
OOC7	113	1	5	2.18	1.054	.895	.227	.479	.451
OOC8	113	1	5	2.17	1.043	.858	.227	.520	.451
EC1	113	1	5	4.21	.850	-1.223	.227	2.155	.451
EC2	113	1	5	3.87	.891	-.889	.227	1.344	.451
EC3	113	1	5	3.69	.867	-.355	.227	.355	.451
EC4	113	1	5	3.79	.773	-.321	.227	.504	.451
EC5	113	1	5	3.99	.891	-.522	.227	-.165	.451
EGS1	113	1	5	4.12	.867	-.662	.227	.009	.451
EGS2	113	1	5	4.12	.874	-.963	.227	1.261	.451
EGS3	113	1	5	4.10	.834	-.656	.227	.320	.451
EGS4	113	1	5	3.99	.931	-1.133	.227	1.859	.451
EGS5	113	1	5	4.13	.891	-.651	.227	-.211	.451
PL1	113	1	5	3.78	.894	-.158	.227	-.462	.451
PS2	113	2	5	3.69	.733	.283	.227	-.649	.451
PF3	113	2	5	3.53	.791	.502	.227	-.482	.451
PC4	113	1	5	3.50	.836	.126	.227	-.073	.451
PM5	113	1	5	3.84	.841	-.424	.227	.168	.451
Impact1	113	1	5	3.75	.892	-.027	.227	-.569	.451
Impact2	113	2	5	3.66	.739	.496	.227	-.790	.451
Impact3	113	2	5	3.50	.792	.838	.227	-.379	.451
Impact4	113	1	5	3.36	.877	-.137	.227	1.088	.451
Impact5	113	1	5	3.17	.755	-.417	.227	2.762	.451
Impact6	113	1	5	3.25	.797	.170	.227	1.271	.451
Impact7	113	2	5	3.65	.810	.406	.227	-.860	.451
Impact8	113	1	5	3.55	.813	.297	.227	-.025	.451
Impact9	113	2	5	3.57	.743	.501	.227	-.465	.451
Impact10	113	1	5	3.53	.791	.172	.227	.148	.451
Impact11	113	2	5	3.50	.709	.750	.227	-.224	.451
Impact12	113	2	5	3.40	.701	.845	.227	.294	.451
Valid N (listwise)	113								

APPENDIX D

Non-Response Bias Test

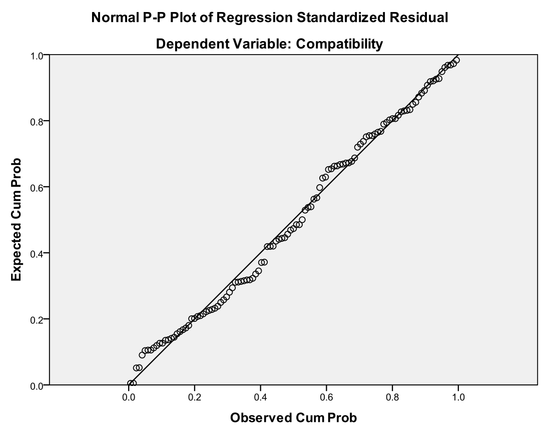
	Levene's Test	Sig.	Significance at 95% level
Searching for general business information (laws and regulations, financial, market and technology information) on governmental web sites.	.547	.461	Not Significant
Locating governmental agencies, and downloading forms and applications.	1.604	.208	Not Significant
Filling out forms and submitting information online through governmental web sites.	.240	.625	Not Significant
Conducting transactions with government online.	.018	.892	Not Significant
E-government allows us to better communicate with our business partners	.186	.667	Not Significant
E-government allows us to cut costs in our operations	1.097	.297	Not Significant
E-government increases the profitability of our business.	2.912	.091	Not Significant
E-government provides timely information for decision making.	.494	.484	Not Significant
E-government is compatible with our firm's values and beliefs.	4.003	.148	Not Significant
E-government is compatible with management support	1.148	.286	Not Significant
E-government is compatible with competitive advantage	.304	.582	Not Significant
E-government integration into our current procedures would not be difficult	3.044	.084	Not Significant
Our firm has a good telecommunications infrastructure	.965	.328	Not Significant
Our firm shares the databases for various applications	.152	.698	Not Significant
Our firm has a reliable Internet connections	.399	.529	Not Significant
Our firm has fast Internet downloading/access speed	.126	.723	Not Significant
Our firm makes PC's and laptops available for the staff	.709	.401	Not Significant
E-government reduces the risk of unauthorized access	.187	.666	Not Significant
Online payment does not pose security risks	.134	.715	Not Significant
E-government website is secure in terms of	.617	.434	Not Significant

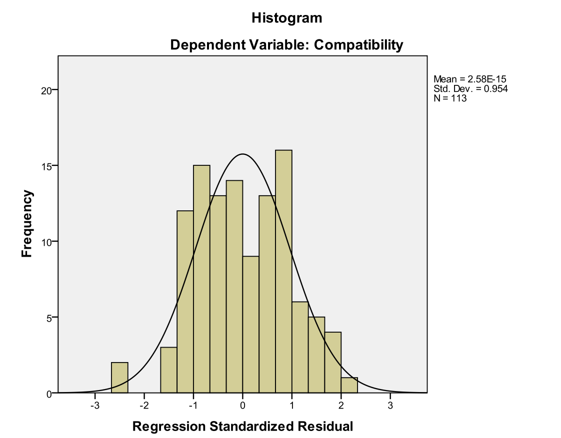
computer viruses			
The financial resources to implement e-government is available	.095	.758	Not Significant
The financial resources to support e-government is available	.010	.919	Not Significant
The human resources to implement e-government is available	.171	.680	Not Significant
The human resources to support e-government is available	.133	.716	Not Significant
The technological resources to implement e-government is available	.153	.697	Not Significant
The technological resources to support e-government is available	.003	.958	Not Significant
Top management supports the adoption of e-government	.116	.734	Not Significant
Top management has allocated adequate resources to adopt e-government	.009	.926	Not Significant
Top management is aware of the benefits of e-government adoption.	1.060	.306	Not Significant
Top management actively encourages employees to use the e-government in their daily tasks	.030	.862	Not Significant
In this organization, most people have input into decisions that affect them	.003	.955	Not Significant
In this organization, cooperation and collaboration across functional roles is actively encouraged	.018	.892	Not Significant
In this organization, there is a high level of agreement about the way that we do things	.982	.324	Not Significant
In this organization, the approach of doing business is very consistent and predictable	.128	.721	Not Significant
In this organization, customers' comments and recommendations often lead to changes	.106	.746	Not Significant
This organization is very responsive and changes easily	2.062	.154	Not Significant
This organization has a long-term purpose and direction.	5.623	.019	Not Significant
There is a shared vision of what this organization will be like in the future.	3.450	.066	Not Significant
Competition makes it necessary for our organization to implement e-government	.005	.942	Not Significant
Competition is forcing our organization to implement e-government	.944	.333	Not Significant
E-government is considered an important economic function of our economy	.411	.523	Not Significant
E-government is needed in order to be a	2.500	.117	Not Significant

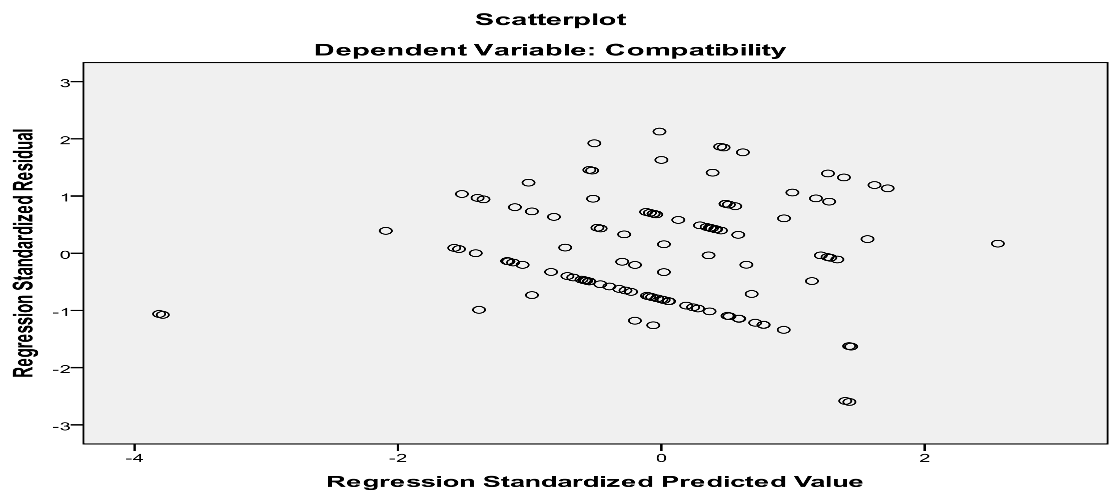
leader in our organization’s industry			
Many organizations within our industry have implemented e-government	2.037	.156	Not Significant
Government is generally supportive of e-government	3.503	.064	Not Significant
Government provides incentives for our organization to implement e-government	2.685	.104	Not Significant
Government helps training manpower with e-government skills	2.354	.128	Not Significant
Government provides financial support for the development of e-government technologies	1.318	.253	Not Significant
Government support for e-government is readily available	.415	.521	Not Significant
In long term profitability	.115	.735	Not Significant
In sales growth	.142	.707	Not Significant
In financial resources (liquidity and investment capacity)	4.806	.030	Not Significant
In company image and client loyalty	2.482	.118	Not Significant
In market share	.253	.616	Not Significant
Improved quality of information supply	.186	.667	Not Significant
Improve accuracy	1.097	.297	Not Significant
Improved service level	2.912	.091	Not Significant
Fewer administrative burdens	.077	.781	Not Significant
Increased customer satisfaction	.246	.621	Not Significant
Increased work efficiency	.788	.377	Not Significant
Reduced operational cost	.126	.723	Not Significant
Reduced work-process time	.709	.401	Not Significant
Reduce error rates	1.852	.176	Not Significant
Reduce need for cash-on-hand	.965	.328	Not Significant
Reduce communication cost	.399	.529	Not Significant
Reduce uses of paper	.152	.698	Not Significant

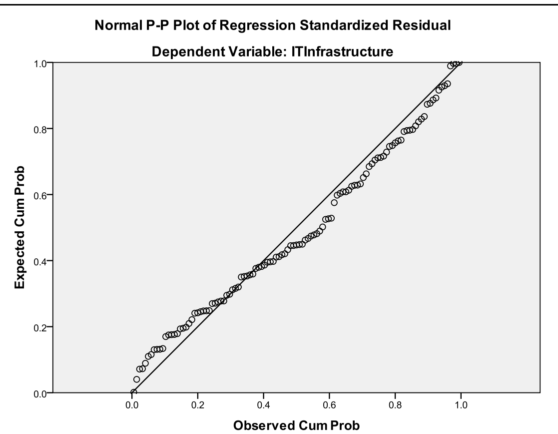
Appendix E

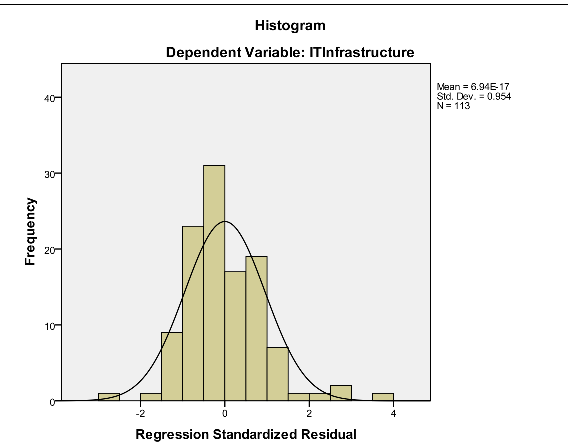
Assessment of Violations Assumptions

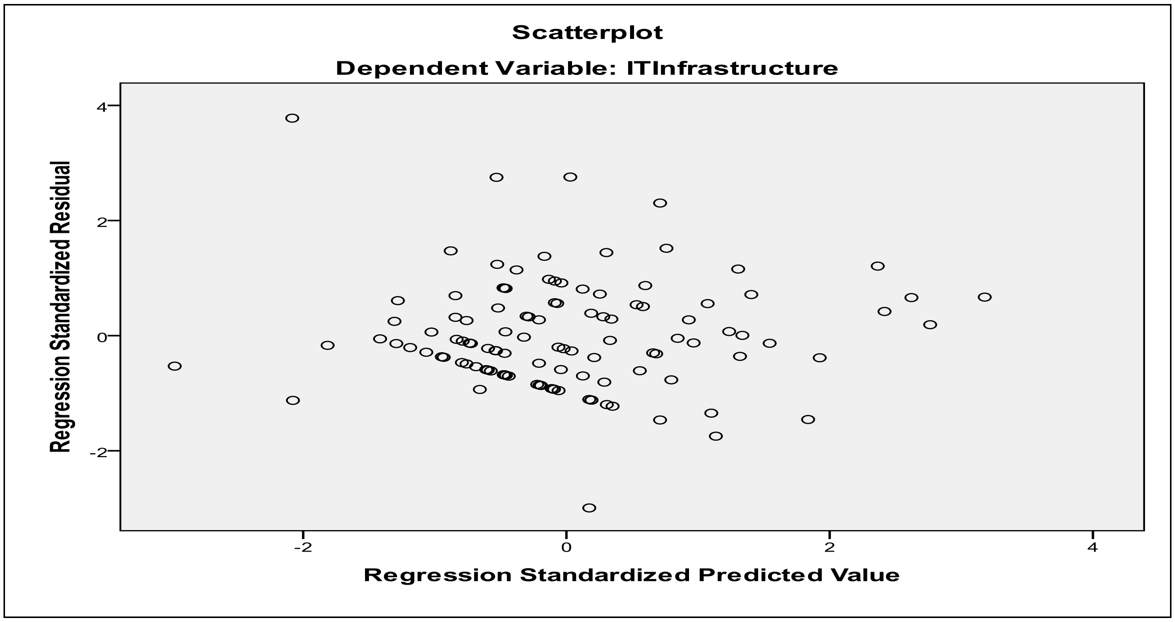


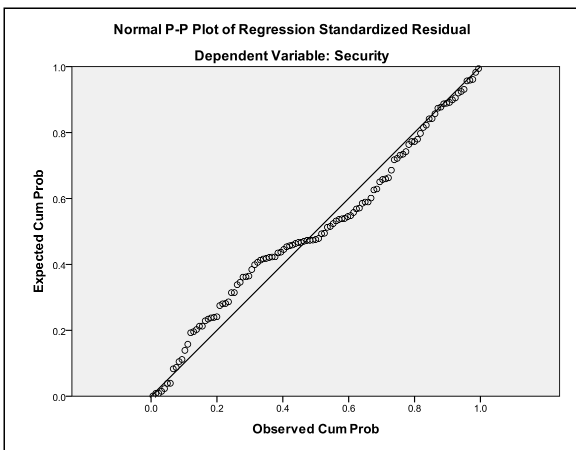


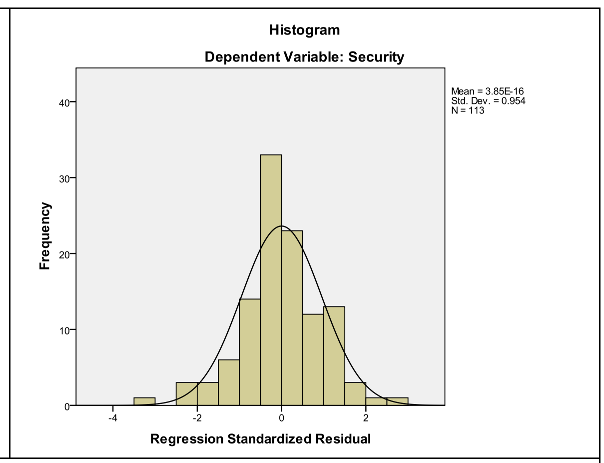


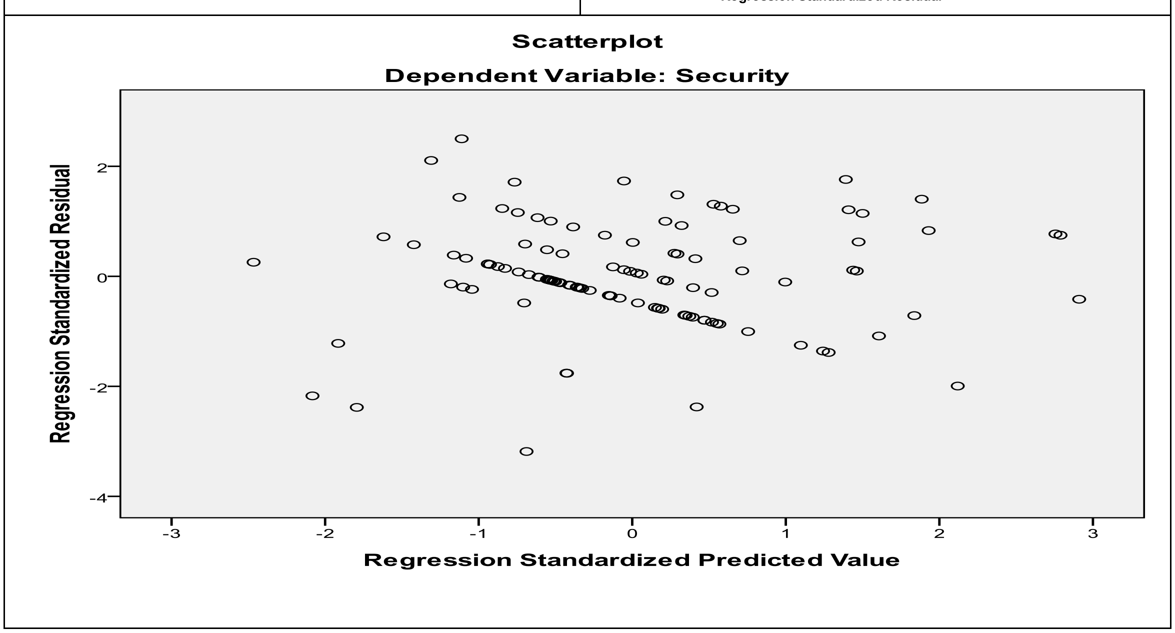


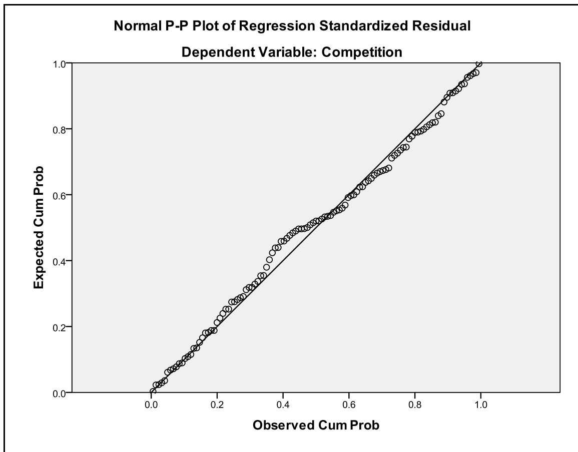


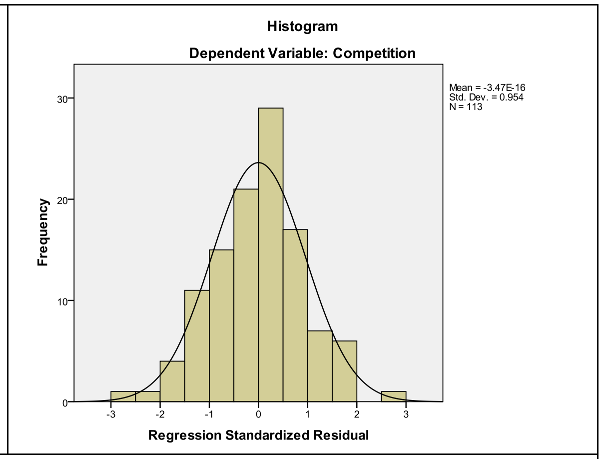

Scatterplot
Dependent Variable: ITInfrastructure
Regression Standardized Residual
Regression Standardized Predicted Value
-2
0
2
4

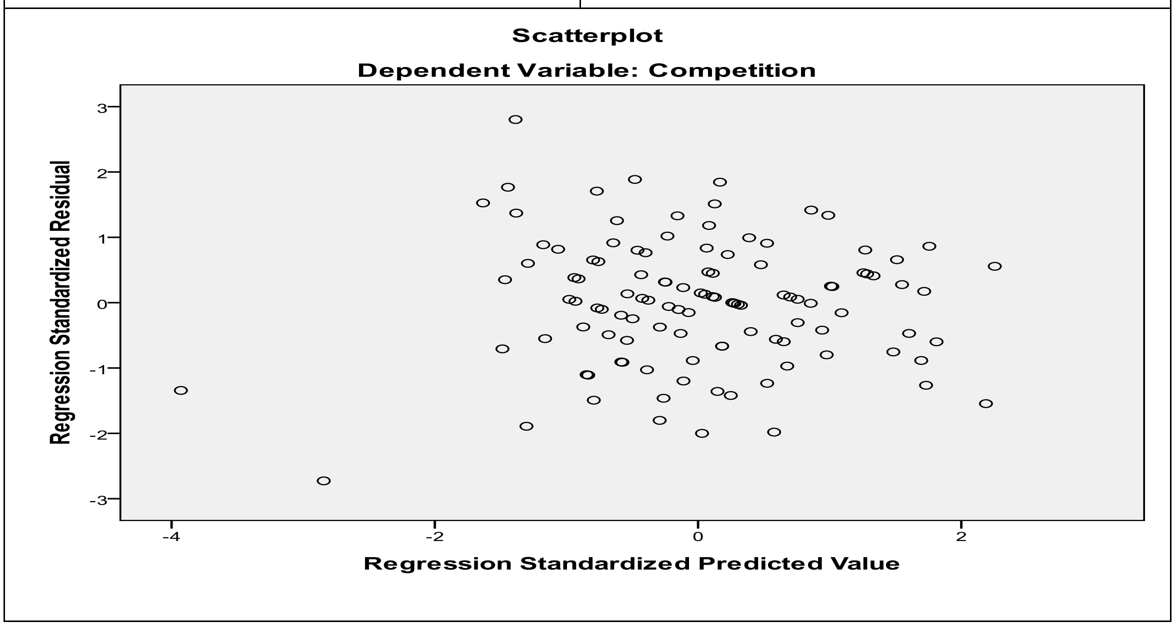

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Security
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

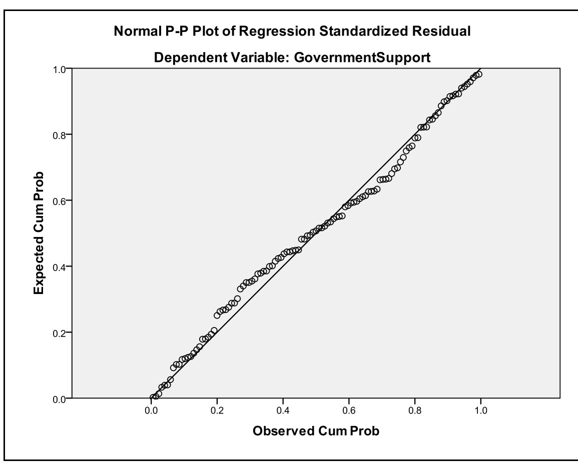

Histogram
Dependent Variable: Security
Mean = 3.85E-16
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual
0
10
20
30
40
-4
-2
0
2

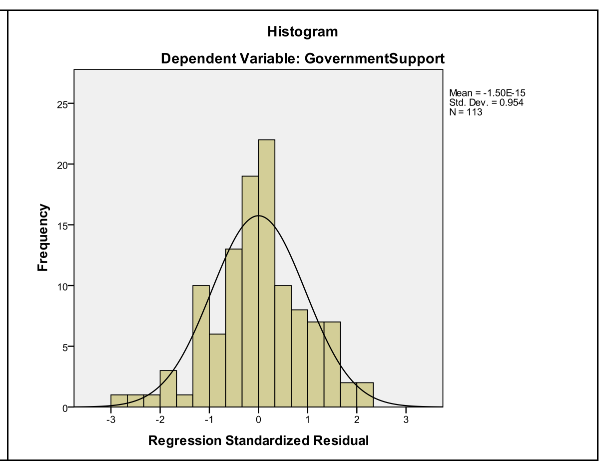

Scatterplot
Dependent Variable: Security
Regression Standardized Residual
Regression Standardized Predicted Value
-4
-2
0
2
-3
-2
-1
0
1
2
3

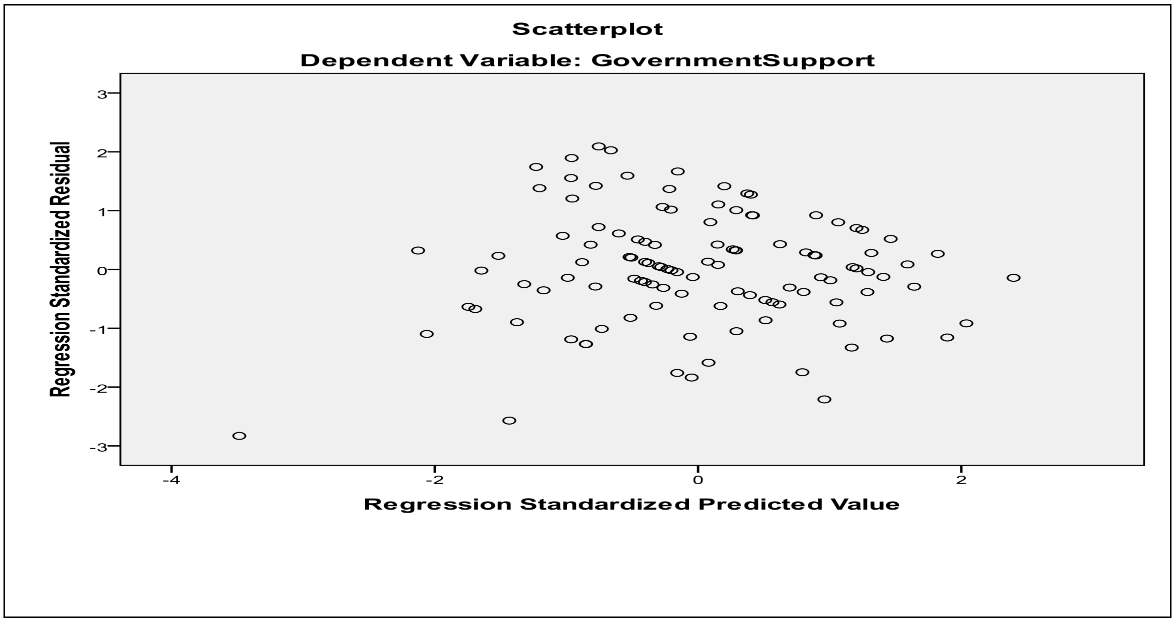

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Competition
Expected Cum Prob
Observed Cum Prob

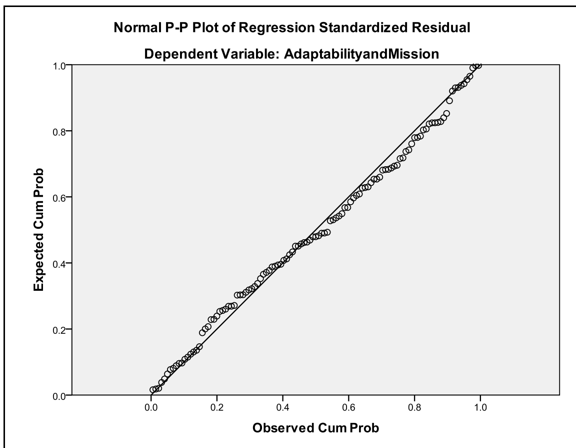

Histogram
Dependent Variable: Competition
Mean = -3.47E-16
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual

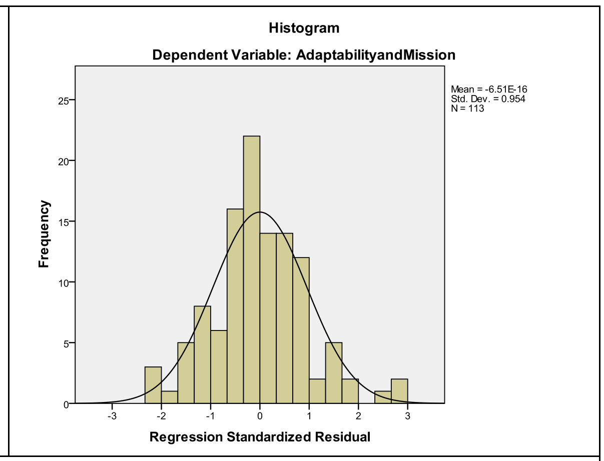

Scatterplot
Dependent Variable: Competition
Regression Standardized Residual
Regression Standardized Predicted Value

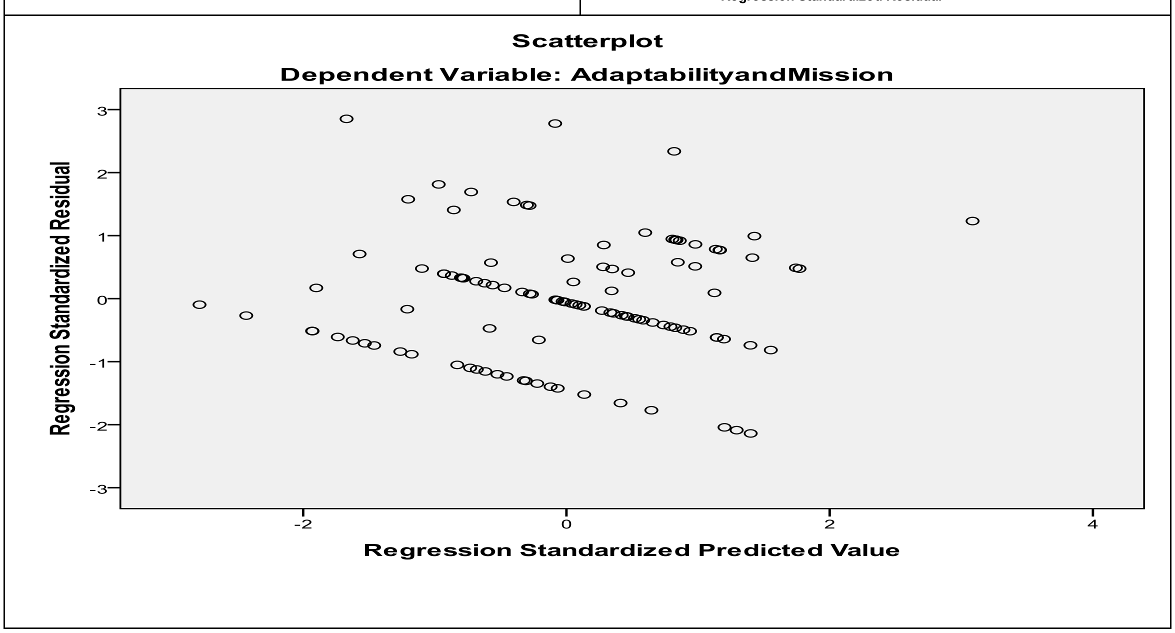

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: GovernmentSupport
Expected Cum Prob
Observed Cum Prob

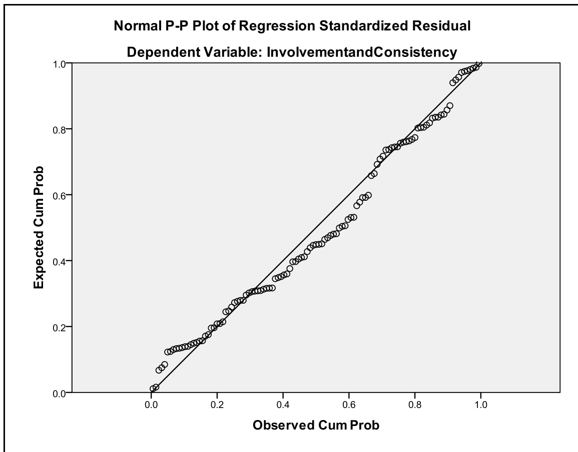

Histogram
Dependent Variable: GovernmentSupport
Mean = -1.50E-15
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual

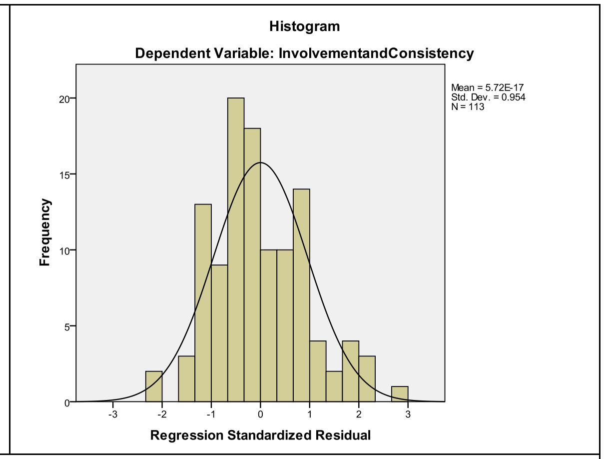

Scatterplot
Dependent Variable: GovernmentSupport
Regression Standardized Residual
Regression Standardized Predicted Value

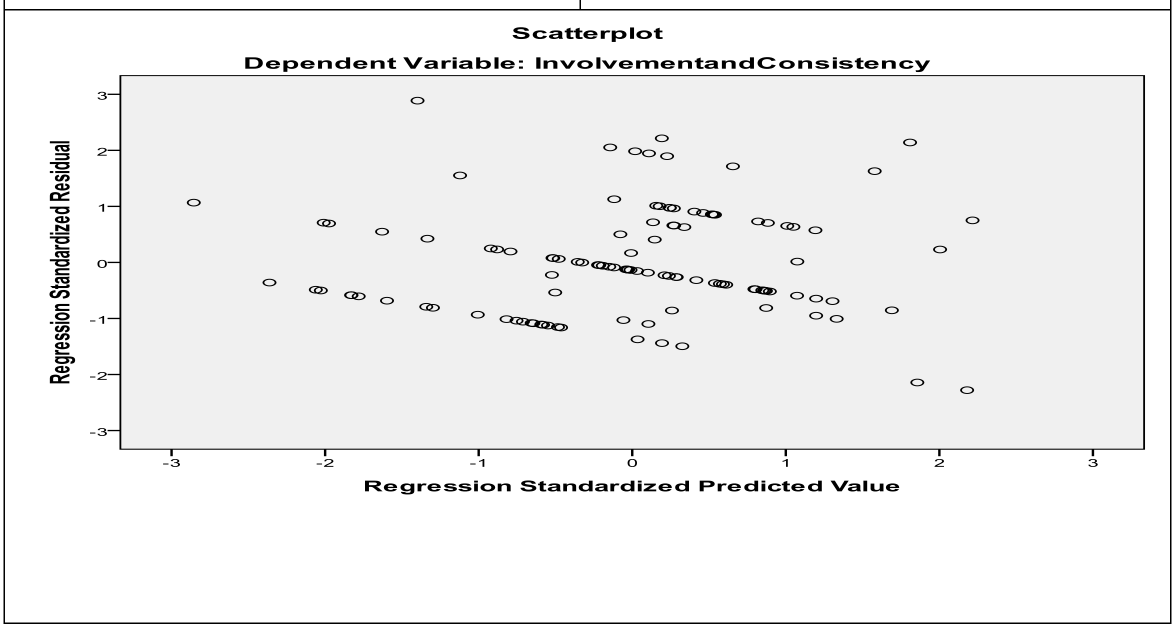

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: AdaptabilityandMission
Expected Cum Prob
Observed Cum Prob

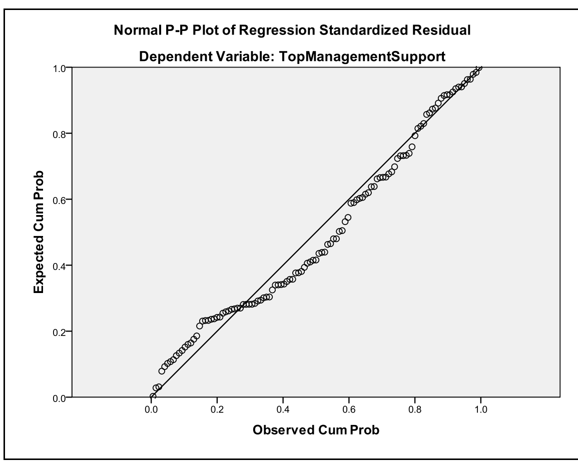

Histogram
Dependent Variable: AdaptabilityandMission
Mean = -6.51E-16
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual

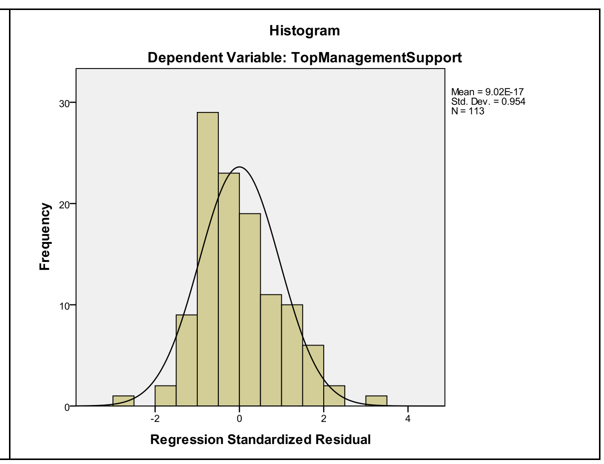

Scatterplot
Dependent Variable: AdaptabilityandMission
Regression Standardized Residual
Regression Standardized Predicted Value

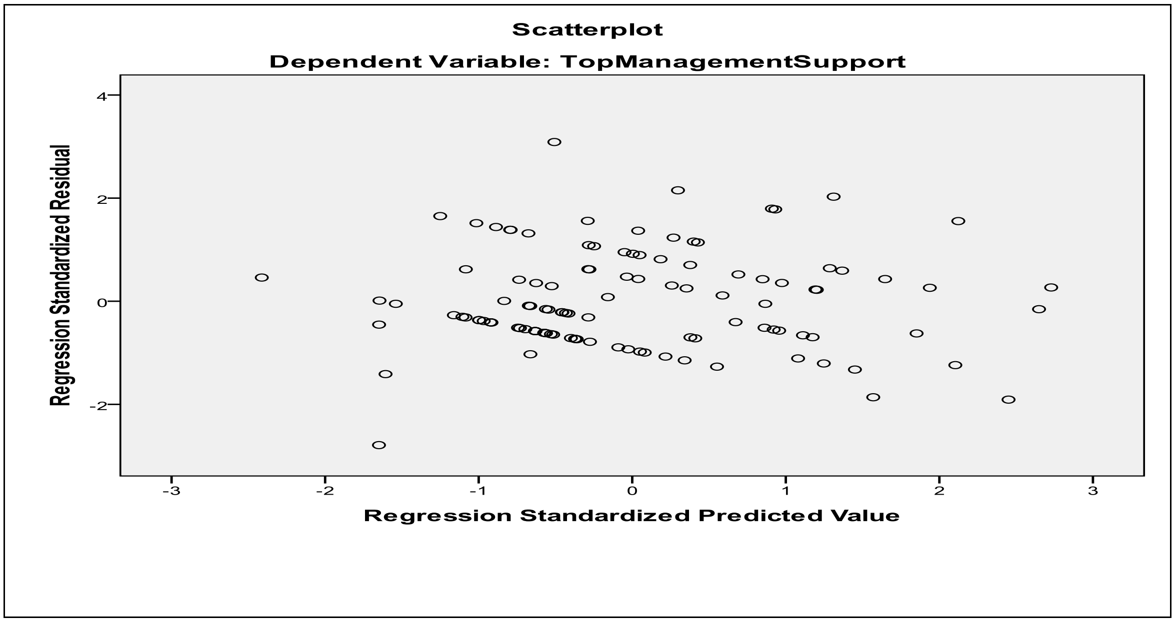

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: InvolvementandConsistency
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Histogram
Dependent Variable: InvolvementandConsistency
Mean = 5.72E-17
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual

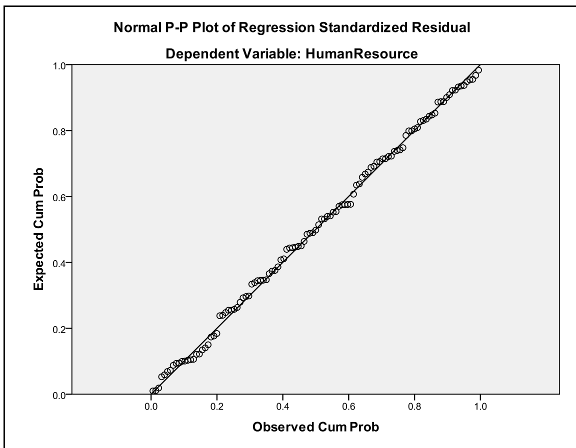

Scatterplot
Dependent Variable: InvolvementandConsistency
Regression Standardized Residual
Regression Standardized Predicted Value


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: TopManagementSupport
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

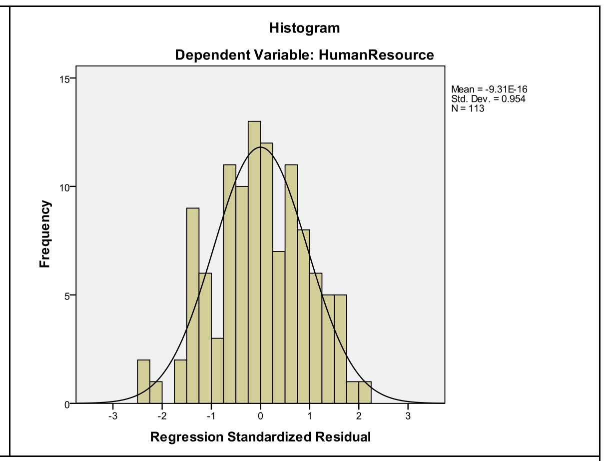

Histogram
Dependent Variable: TopManagementSupport
Mean = 9.02E-17
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual



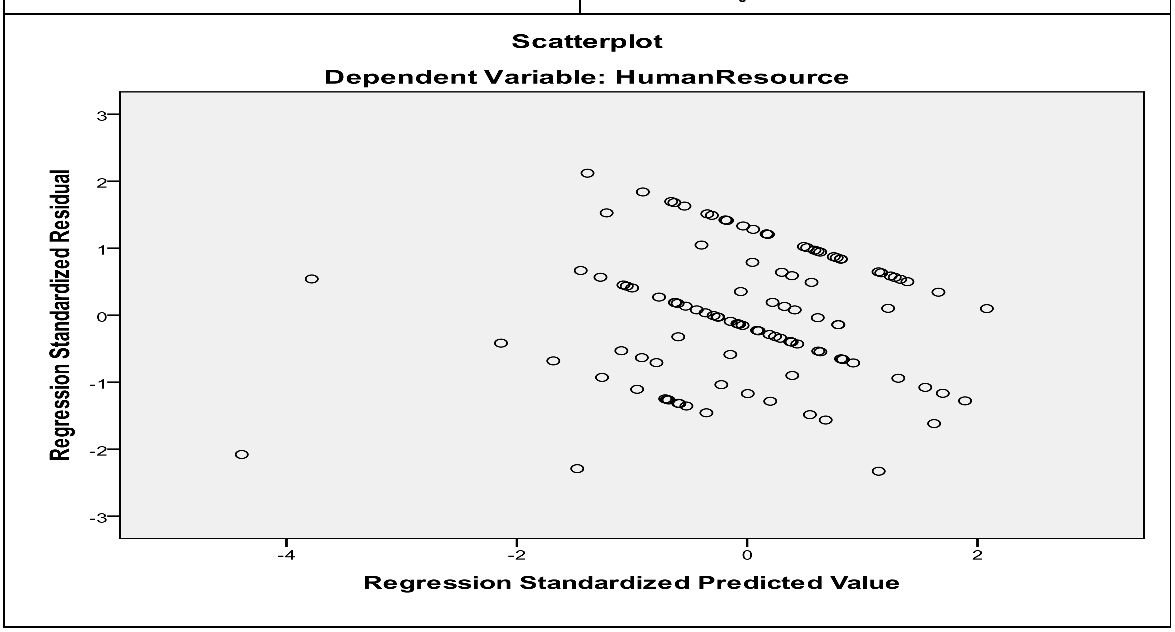
Scatterplot
Dependent Variable: TopManagementSupport
Regression Standardized Residual
4
2
0
-2
-3
-2
-1
0
1
2
3
Regression Standardized Predicted Value



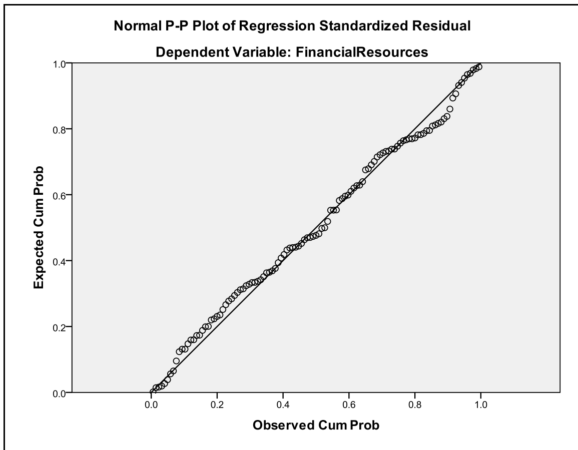
Normal P-P Plot of Regression Standardized Residual
Dependent Variable: HumanResource
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
Observed Cum Prob

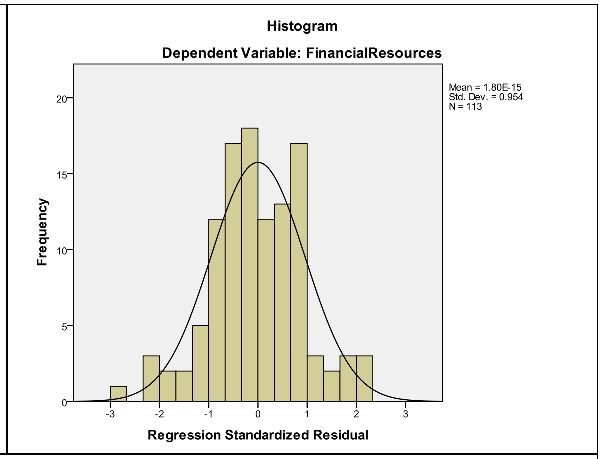


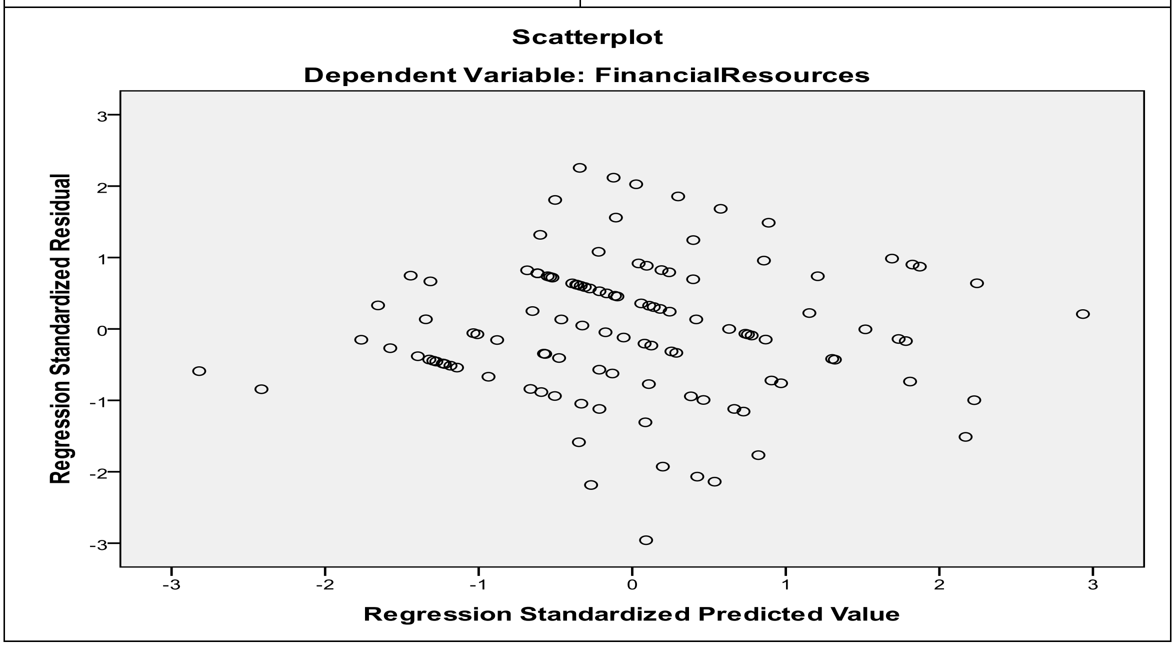
Histogram
Dependent Variable: HumanResource
Mean = -9.31E-16
Std. Dev. = 0.954
N = 113
Frequency
15
10
5
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual



Scatterplot
Dependent Variable: HumanResource
Regression Standardized Residual
3
2
1
0
-1
-2
-3
-4
-2
0
2
Regression Standardized Predicted Value


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: FinancialResources
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Histogram
Dependent Variable: FinancialResources
Mean = 1.80E-15
Std. Dev. = 0.954
N = 113
Frequency
Regression Standardized Residual
0
5
10
15
20
-3
-2
-1
0
1
2
3


Scatterplot
Dependent Variable: FinancialResources
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3

Appendix F

Hierarchical Cluster Analysis

Case Processing Summary[a,b]

Cases					
Valid		Missing		Total	
N	Percent	N	Percent	N	Percent
113	97.4	3	2.6	116	100.0

a. Minkowski (2) Distance used
b. Average Linkage (Within Groups)

Agglomeration Schedule

Stage	Cluster Combined			Stage Cluster First Appears		
	Cluster 1	Cluster 2	Coefficients	Cluster 1	Cluster 2	Next Stage
1	43	113	.000	0	0	68
2	41	112	.000	0	0	40
3	42	111	.000	0	0	71
4	76	109	.000	0	0	20
5	28	106	.000	0	0	99
6	37	102	.000	0	0	43
7	72	101	.000	0	0	24
8	81	100	.000	0	0	16
9	82	99	.000	0	0	62
10	25	97	.000	0	0	46
11	80	96	.000	0	0	17
12	77	95	.000	0	0	19
13	85	88	.000	0	0	85
14	86	87	.000	0	0	15
15	27	86	.000	0	14	57
16	45	81	.000	0	8	25
17	33	80	.000	0	11	59
18	70	78	.000	0	0	25
19	59	77	.000	0	12	30
20	48	76	.000	0	4	32
21	56	75	.000	0	0	32
22	54	74	.000	0	0	34
23	16	73	.000	0	0	70
24	46	72	.000	0	7	31
25	45	70	.000	16	18	28

26	58	69	.000	0	0	31
27	66	68	.000	0	0	28
28	45	66	.000	25	27	33
29	44	65	.000	0	0	65
30	59	64	.000	19	0	53
31	46	58	.000	24	26	37
32	48	56	.000	20	21	51
33	45	55	.000	28	0	50
34	12	54	.000	0	22	47
35	9	53	.000	0	0	48
36	51	52	.000	0	0	37
37	46	51	.000	31	36	39
38	47	50	.000	0	0	70
39	46	49	.000	37	0	49
40	40	41	.000	0	2	62
41	24	39	.000	0	0	47
42	14	38	.000	0	0	69
43	8	37	.000	0	6	45
44	26	36	.000	0	0	72
45	8	31	.000	43	0	54
46	6	25	.000	0	10	58
47	12	24	.000	34	41	52
48	5	9	.000	0	35	60
49	46	98	.222	39	0	56
50	45	57	.222	33	0	55
51	48	84	.333	32	0	61
52	12	67	.333	47	0	64
53	59	94	.400	30	0	66
54	8	35	.400	45	0	67
55	45	110	.451	50	0	63
56	32	46	.451	0	49	65
57	27	103	.500	15	0	74
58	6	92	.500	46	0	82
59	33	71	.500	17	0	77
60	5	61	.500	48	0	75
61	17	48	.544	0	51	73
62	40	82	.600	40	9	82
63	45	79	.619	55	0	80
64	12	107	.622	52	0	78
65	32	44	.623	56	29	76
66	10	59	.628	0	53	79

67	8	18	.628	54	0	85
68	43	108	.667	1	0	81
69	14	62	.667	42	0	87
70	16	47	.667	23	38	89
71	11	42	.667	0	3	91
72	26	30	.667	44	0	94
73	15	17	.732	0	61	86
74	1	27	.741	0	57	87
75	2	5	.741	0	60	83
76	32	89	.772	65	0	84
77	33	34	.824	59	0	98
78	12	13	.832	64	0	94
79	10	19	.848	66	0	88
80	29	45	.877	0	63	89
81	3	43	.902	0	68	91
82	6	40	.909	58	62	93
83	2	23	.922	75	0	90
84	32	105	.933	76	0	92
85	8	85	.935	67	13	99
86	15	83	.979	73	0	95
87	1	14	1.002	74	69	96
88	10	22	1.012	79	0	100
89	16	29	1.041	70	80	98
90	2	4	1.073	83	0	102
91	3	11	1.078	81	71	97
92	7	32	1.100	0	84	101
93	6	21	1.141	82	0	105
94	12	26	1.157	78	72	104
95	15	63	1.164	86	0	104
96	1	90	1.215	87	0	106
97	3	93	1.238	91	0	107
98	16	33	1.250	89	77	103
99	8	28	1.286	85	5	105
100	10	20	1.302	88	0	107
101	7	104	1.319	92	0	108
102	2	60	1.325	90	0	106
103	16	91	1.393	98	0	110
104	12	15	1.478	94	95	109
105	6	8	1.510	93	99	108
106	1	2	1.519	96	102	111
107	3	10	1.660	97	100	110

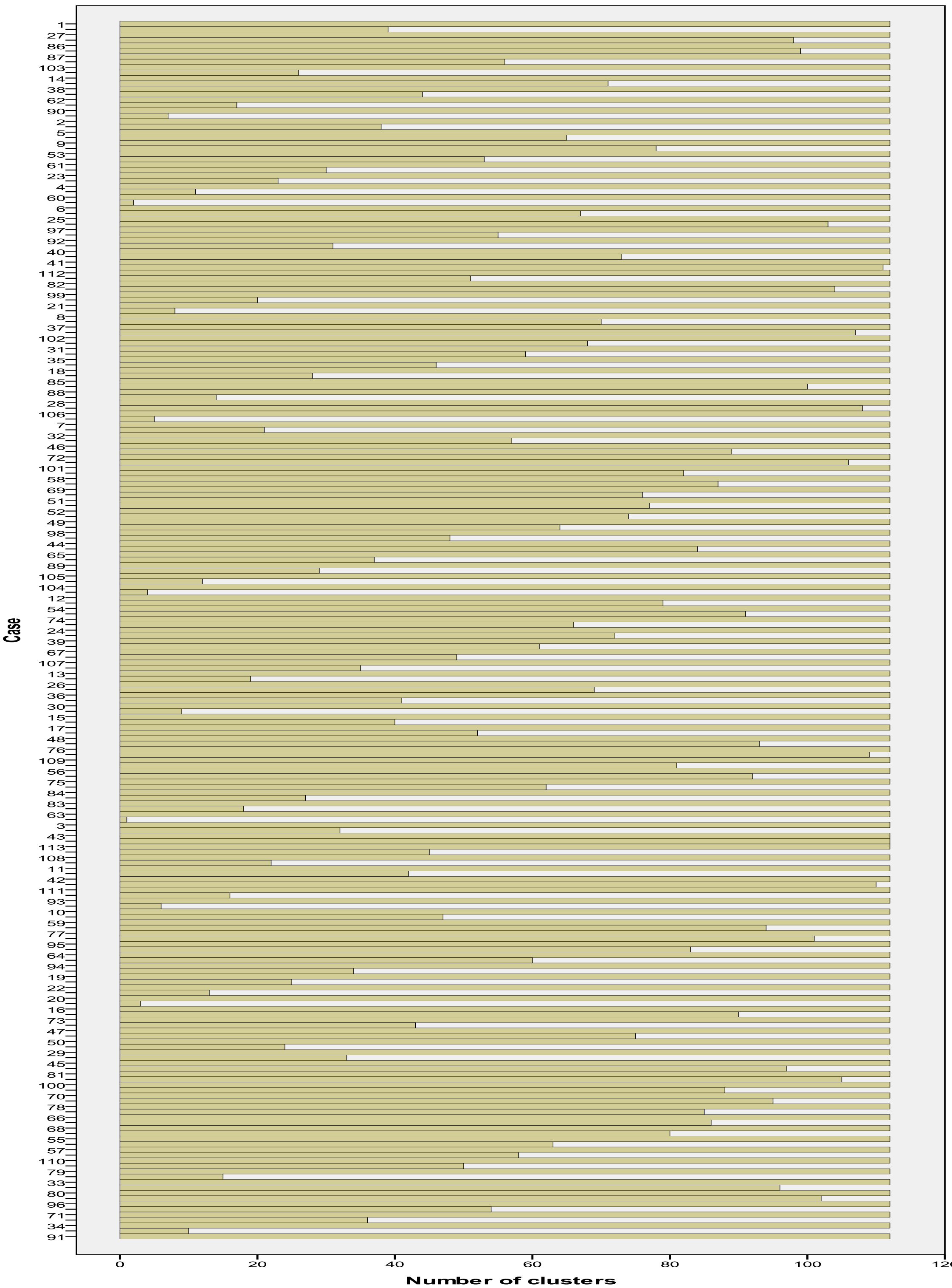
108	6	7	1.663	105	101	109
109	6	12	1.872	108	104	111
110	3	16	1.897	107	103	112
111	1	6	2.011	106	109	112
112	1	3	2.171	111	110	0

Cluster Membership

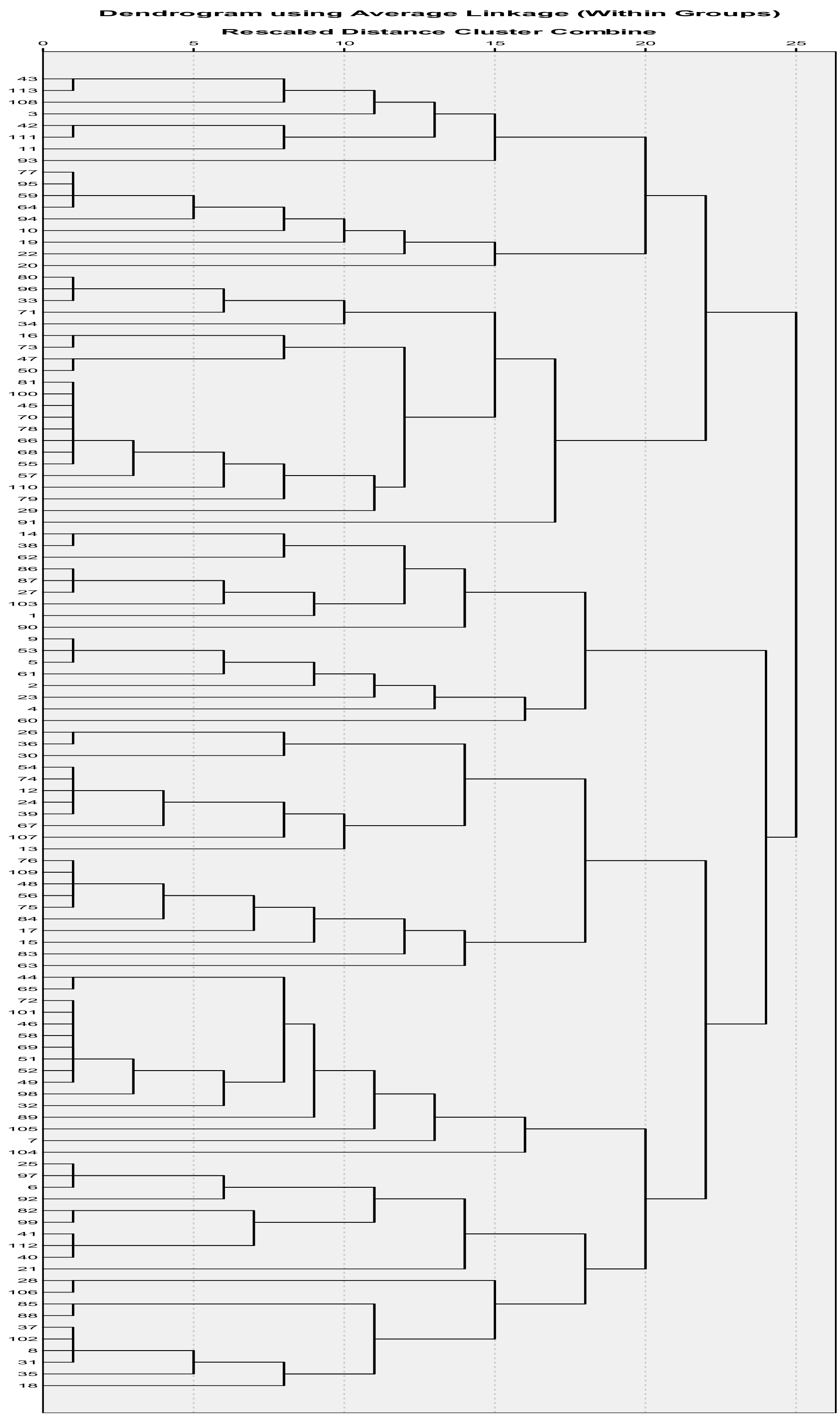
Case	2 Clusters
1	1
2	1
3	2
4	1
5	1
6	1
7	1
8	1
9	1
10	2
11	2
12	1
13	1
14	1
15	1
16	2
17	1
18	1
19	2
20	2
21	1
22	2
23	1
24	1
25	1
26	1
27	1
28	1
29	2
30	1
31	1
32	1
33	2
34	2
35	1

36	1	
37	1	
38	1	
39	1	
40	1	
41	1	
42	2	
43	2	
44	1	
45	2	
46	1	
47	2	
48	1	
49	1	
50	2	
51	1	
52	1	
53	1	
54	1	
55	2	
56	1	
57	2	
58	1	
59	2	
60	1	
61	1	
62	1	
63	1	
64	2	
65	1	
66	2	
67	1	
68	2	
69	1	
70	2	
71	2	
72	1	
73	2	
74	1	
75	1	
76	1	
77	2	
78	2	
79	2	
80	2	
81	2	

82	1
83	1
84	1
85	1
86	1
87	1
88	1
89	1
90	1
91	2
92	1
93	2
94	2
95	2
96	2
97	1
98	1
99	1
100	2
101	1
102	1
103	1
104	1
105	1
106	1
107	1
108	2
109	1
110	2
111	2
112	1
113	2



Case
Number of clusters


Dendrogram using Average Linkage (Within Groups)
Rescaled Distance Cluster Combine
0
5
10
15
20
25

Appendix G

Binary Logistic Regression Model

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	113	100
	Missing Cases	0	0
	Total	113	100.0
Unselected Cases		0	.0
Total		113	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value		Internal Value
dimension0	Basic	0
	Advance	1

Classification Table[a,b]

	Observed		Predicted		
			CurrentStatus		Percentage Correct
			Basic	Advance	
Step 0	CurrentStatus	Basic	74	0	100.0
		Advance	39	0	.0
	Overall Percentage				65.5

a. Constant is included in the model.
b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.641	.198	10.478	1	.001	.527

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	RelativeAdvantage	.105	1	.746

	Compatibility	1.010	1	.315
	ITInfrastructure	5.646	1	.017
	Security	3.895	1	.048
	Competition	.360	1	.549
	GovernmentSupport	.325	1	.568
	AdaptabilityAndMission	12.497	1	.000
	InvolvementAndConsistency	26.003	1	.000
	TopManagementSupport	2.245	1	.134
	FinancialResources	1.564	1	.211
	HumanResources	.455	1	.500
Overall Statistics		41.709	11	.000

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	58.099	11	.000
	Block	58.099	11	.000
	Model	58.099	11	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	87.531[a]	.402	.555

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Classification Table[a]

Observed			Predicted		
			CurrentStatus		Percentage Correct
			Basic	Advance	
Step 1	CurrentStatus	Basic	68	6	91.9
		Advance	12	27	69.2
	Overall Percentage				84.1

a. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)

Step 1[a]	RelativeAdvantage	1.286	.581	4.901	1	.027	3.617
	Compatibility	-.253	.449	.317	1	.573	.777
	ITInfrastructure	-1.398	.598	5.466	1	.019	.247
	Security	-.197	.490	.161	1	.688	.822
	Competition	1.246	.598	4.343	1	.037	3.477
	GovernmentSupport	-1.282	.509	6.340	1	.012	.278
	AdaptabilityAndMission	-.995	.436	5.205	1	.023	.370
	InvolvementAndConsistency	-2.006	.468	18.378	1	.000	.135
	TopManagementSupport	-.598	.569	1.107	1	.293	.550
	FinancialResources	.919	.463	3.945	1	.047	2.506
	HumanResources	-.530	.510	1.081	1	.299	.588
	Constant	7.649	3.585	4.552	1	.033	2097.731

a. Variable(s) entered on step 1: RelativeAdvantage, Compatibility, ITInfrastructure, Security, Competition, GovernmentSupport, AdaptabilityAndMission, InvolvementAndConsistency, TopManagementSupport, FinancialResources, HumanResources.

Appendix H

Value Grid of E-Government Initiatives

Performance Criteria / EG Dimensions	Efficiency	Effectiveness
Product	Low cost access to information and knowledge	Improved quality of the legislation Enhanced communication capacity Services adjusted to citizens needs Easier knowledge and understanding of the legislation in force
Time	Reduction of the time required to follow administrative steps Shorten time-to market of legislation Reduced time to access and obtain information	Available information on a 7 days · 24 h basis Enhanced support for citizen/ business activities Control of the process anytime
Distance	There is no need for accessing to offices Improved answers to questions Control of processes anywhere Reduced distribution and delivery costs, etc.	Standardize activities performed by disperse agencies Improved formation and training More frequent and better communication
Interaction	Reduced communication costs	Generation of suitable relationships to each sector needs Enhanced accessibility to legislation Decisions based on several information sources
Procedures	Better use of resources Redesign of the process with higher performance Avoidance of inconsistencies and anomalies Processes streamlining	Better decision making based on reliable information Reduced workflow fragmentation

Source: Montagna (2005)

Appendix I

E-Government Development Index Values and Ranks of the OIC Member Countries, 2007 vs. 2009

Country	Region	E-Government Development Index (EGDI)				
		EGDI, 2009	Rank, 2009	EGDI, 2007	Rank, 2007	Rank Change
Afghanistan	South Asia	0.2098	168	0.2048	167	▼1
Albania	Europe & Central Asia	0.4519	85	0.4670	86	▲1
Algeria	Middle East & North Africa	0.3181	131	0.3515	121	▼10
Azerbaijan	Europe & Central Asia	0.4571	83	0.4609	89	▲6
Bahrain	Middle East & North Africa	0.7363	13	0.5723	42	▲29
Bangladesh	South Asia	0.3028	134	0.2936	142	▲8
Benin	Sub-Saharan Africa	0.2017	173	0.1860	171	▼2
Brunei	East Asia & Pacific	0.4796	68	0.4667	87	▲19
Burkina Faso	Sub-Saharan Africa	0.1587	178	0.1542	176	▼2
Cameroon	Sub-Saharan Africa	0.2722	149	0.2734	149	0
Chad	Sub-Saharan Africa	0.1235	182	0.1047	182	0
Comoros	Sub-Saharan Africa	0.2327	160	0.1896	170	▲10
Côte d'Ivoire	Sub-Saharan Africa	0.2805	144	0.1853	173	▲29
Djibouti	Middle East & North Africa	0.2059	170	0.2279	157	▼13
Egypt	Middle East & North Africa	0.4518	86	0.4767	79	▼7
Gabon	Sub-Saharan Africa	0.3420	123	0.3228	129	▲6
Gambia	Sub-Saharan Africa	0.2117	167	0.2253	159	▼8
Guinea	Sub-Saharan Africa	0.1426	180	0.1402	180	0
Guinea-Bissau	Sub-Saharan Africa	0.1561	179	0.1521	177	▼2
Guyana	Latin America & Caribbean	0.4140	106	0.4375	97	▼9
Indonesia	East Asia & Pacific	0.4026	109	0.4107	106	▼3
Iran	Middle East & North Africa	0.4234	102	0.4067	108	▲6
Iraq	Middle East & North Africa	0.2996	136	0.2690	151	▲15
Jordan	Middle East & North Africa	0.5278	51	0.5480	50	▼1
Kazakhstan	Europe & Central Asia	0.5578	46	0.4743	81	▲35
Kuwait	Middle East & North Africa	0.5290	50	0.5202	57	▲7
Kyrgyzstan	Europe & Central Asia	0.4417	91	0.4195	102	▲11
Lebanon	Middle East & North Africa	0.4388	93	0.4840	74	▼19
Libya	Middle East & North Africa	0.3799	114	0.3546	120	▲6
Malaysia	East Asia & Pacific	0.6101	32	0.6063	34	▲2

Source: UNPAN (2010)