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DETERMINANTS OF SUCCESS USAGE OF INFORMATION SYSTEMS IN PUBLIC SECTOR IN THE STATE OF QATAR

BY

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COMMITTEE PAGE

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ABSTRACT

In the wake of current knowledge based global economy, information and communications technology (ICT) has remained the central focus in both developed and developing countries. This is because most of the activities conducted at both national and international realms are mostly leveraged through information systems. The Qatar government has recognized the importance of information technology in its service delivery to the public, and hence envisioning ICT integration in its 2030 vision. In this study, the factors affecting successful usage of information system in Qatar's public sector by the government are explored. An online survey was conducted with a sample of 151 participants from the various sectors in Qatar's public sector, which include health, education, public administration, and public security. The collected data were later analyzed using SPSS 23.0 software. From the results it was revealed that users' attitudes and system characteristics were fundamental determinants of their frequency of use and utilization of information system, which subsequently contributed towards successful usage of the information system. Among the key factors that were identified to affect the attitudes of employees in the Qatar public sector include performance expectancy, effort expectancy and facilitating condition. However, this study revealed that attitudes of the Qatar public sector towards information system were not influenced by service quality; because of the limited user-friendliness of the current information system in the public sector workplaces in Qatar as revealed in the findings in this study. The moderating roles of gender, age and computer confidence were also found to be significant on the results

obtained in this study. From the results obtained, the researcher pointed out that the Qatar government needs to adopt up-to-date information system, integrated easy-to-use technology, and train its employees on how to use the technology in order to promote efficiency and effectiveness of information system usage in the public sector.

Key Words: Information system, Qatar public sector, attitudes, performance expectancy, effort expectancy, facilitating conditions, service quality, system characteristics, information system success

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ABBREVIATIONS

ICT - Information and Communication Technology

UTAUT - Unified Theory of Acceptance and Use of Technology model

TAM - Technology Acceptance Model

PEOU - Perceived Ease of Use

SPSS - Statistical Package for the Social Science

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CHAPTER 1 – INTRODUCTION

Introduction to the Research Context

Qatar is one of the most rapidly developing countries in the Gulf region. Its economic potential has remained unmatched in the region (Niblock, 2015). Over the last decade, the Qatar government has recognized the importance of Information system as a result of the advancing globalization, where the ICT remains the central focus point for every developing economy. As such, the Qatar government envisioned the integration of the ICT platform in its service provision in its 2030 vision; and as a result the government seems to be much committed to advancing the IT infrastructure for private and public use (Supreme Council of Information & Communication Technology, 2013). This resulted into the creation of the Supreme Council of Information and Communication Technology (ictQATAR) whose key role is to develop information and communication technology (ICT) policies and champion the government's commitment in the development of ICT in Qatar.

As a result of the creation of ictQATAR, Qatar has experienced a high level of technology advancement in the ICT sector with the ICT market being valued at USD $2.1 billion by the year 2010 (IctQATAR, 2015). Based on a recent research by (Ministry of Transport & Communications, 2015), Qatar ranked first among the developing countries

in terms of internet penetration reaching as high as 91.5% in the year 2014. The 2015 National ICT strategy as pointed out by Hukoomi (2016) as one of the key milestones in the country towards the development of information technology in the country as it facilitates effective in the dissemination of public services. The rapid evolution of information system in Qatar has necessitated the government of Qatar to leverage over 50% of its services to the public on information technology (Ministry of Transport & Communications, 2013).

Hukoomi (2016) reported that, part of the ICT strategy adopted by the ministry of Transport and Communications in Qatar is to guarantee the installation of affordable, and high-speed broadband network in the country by developing innovative, entrepreneurial ICT strategy to foster the usage and relevance of information system both in the private and public sector. As reported by Hukoomi (2015), the adoption of information technology as spearheaded by the ministry of technology and communication has been necessitated by the need to improve access and effectiveness of public service delivery through the creation of an effective digital platform.

By leveraging affordable, responsive and high speed information system, the Qatar government is opening new opportunities for further economic growth of the country since with high rate of connectivity at high efficiencies, new opportunities in the corporate and entrepreneurial world is opened and this promotes increased effectiveness in the economy. Gamelto (2014) also observed that developing new security infrastructure by the Qatar government means a closer interaction between the

government and the public (including the private sector organizations); and hence contributing towards increased efficiency in public administration. However, despite the development in the ICT sector in Qatar, very little empirical evidence is available for the divers of successful public administration using information systems.

As observed by Aggrawal and Kaur (2013), successful ICT implementation necessitates that stakeholders be aligned to suit and accommodate the end-users needs and expectations. This is because when the technology being introduced to the people is not suitable and relevant to them, then Al-Farsi and E- Haddadeh (2015) observed that such technology may not be successful. While some past studies (e.g. Gemalto, 2014; Aggrawal and Kaur, 2013) have tried to explore how electronic government (e-government) services have been influenced by factors like public employees' inefficiencies, attitudes and incapacities; very little is known of the success factors of information system (IS) usage in the public sector.

Significance of the study

With regard to the infiltrating knowledge-based economy in Qatar and other developing countries, the need to invest in the ICT development has been on the rise. Both citizens and the corporate sector are actively embracing the modern technology and hence this provides new opportunities for the government to leverage its services in the information systems. Though Qatar is still a developing country, it has made significant milestones in the development of its communication infrastructure as reflected in the high

rate of internet penetration in the country reaching as high as 91%. This is an implication that, Qatar has been committed in the offering outstanding IT infrastructure in line with its 2030 vision. Reports have also shown how ICT has played significant role in the economic development of Qatar, as it gears up in service delivery to the people.

The current research is mainly concerned with the identification of the factors affecting successful usage of information system in the Qatar government with regard to the public employees. The need to focus on government employees was orchestrated by the fact that it is the government employees who act as mediators of service delivery between the government and the public; and hence any factors that would inhibit their effectiveness can largely derail the entire ICT implementation process (Al-Farsi & E-Haddadeh, 2015). Considering that relies on technology from the developed countries, its adoption by the end users (government employees for the purpose of this study) is largely influenced by various factors ranging from attitudes, perceived usefulness, effort expectancy and technology characteristics among others.

Conducting this study is therefore expected to bring new insights into the factors that can derail or promote the usage of information system in the government by focusing on its employees. As such, the results obtained in this study are expected to have practical implications to the government of Qatar with regard to its IT usage initiatives in offering its services to the public. On the other hand, this study is expected to contribute to the existing knowledge and theory by bringing new insights on the key factors that influence information system usage in Qatar. With very limited empirical evidence in the context of

Qatar on the key factors that influence the adoption of information system in the government, this study is expected to act as a springboard in understanding what influences the Qataris in the adoption of information system, and explain how it varies from the mainstream knowledge with regard to the existing theories.

Purpose and Research Questions

The main purpose of this study is to investigate the determinants that facilitate success usage of information systems in Qataris public sector. In line with Qatar 2030 vision, the government of Qatar is committed to ensure the transformation of the country into a knowledge-based economy by investing heavily on information technology (Ministry of Transport & Communications, 2016). Unlike the private sector which 50% of its capital investment is contributed by foreign investors, which have leveraged highly sophisticated technology from their West-based mother countries; Information system used in the government is still evolving compared to the private sector (Soman, 2015). By focusing on the government sector, the researcher will be in a position to establish the challenges and the milestones made by the Qatar government with regard to the usage of its information system agenda.

This is done by focusing on the end-users of information system in the government sector. As such, this study aims at establishing the specific factors that determine the public employees' successful usage of the information system in the public sector. As such, the UTAUT2 (Unified Theory of Acceptance and Use of Technology)

model by Venkatesh et al. (2003) is employed alongside the TAM (Technology Acceptance Model) by Davis (1985) as cited in Venkatesh, Thong and Xu (2012) and information system success model by DeLone and McLean (2003) to propose and test a theoretical model that explores the factors of successful usage of the information system in Qatar public sector. These models are built on the assumption that, for a technology to be acceptable by its target users, it must be able to contribute positively in their work while enhancing their ability to perform their duties.

This study is therefore expected to provide an understanding of what motivates Qataris to adopt and use technology, with respect to the government employees in the country. The tendency of technology to satisfy and create urge among the users for continued system usage is assumed in this study, to be among the key factors its successfulness in the Qatar government. Alongside the technical point of view, the social aspect of information system also brings into focus in this study where the researcher seeks to answer the following research questions:

RQ1: What are the factors influencing the Qatar government employee's attitude to use the information systems in the public sector?

RQ2: Do demographics such as gender, age and computer confidence moderates the hypothesized relationships affects?

RQ3: How can the Qatar government foster efficiency and effectiveness in its usage of information system aimed at offering services to the public

In order to facilitate a systematic research on the above research purpose and questions, this study is organized into five key sections as follows: After establishing the research context, significance and purpose of the current chapter, the next chapter presents a brief overview of the existing literature and theoretical models of the research problem. Chapter three presents the methodological approach employed in this study. Further, the fourth chapter presents the results obtained and a critical analysis of the results obtained in this study. Lastly, the final chapter concludes the research by providing the research implications of the findings obtained.

CHAPTER 2 – LITERATURE REVIEW

Introduction

Over the last decade, the advancement in information technology seems to have revolutionized not only the way people interact with the corporate society, but also the way governments disseminate various services to the citizens. In the currently knowledge-based economy, the adoption of information technology in executing various activities within the society has become a norm. According to Yildiz (2007), governments across the world have leveraged information system in their provision of various government services. Given the way information technology has proliferated into the society, adopting an information system by the government to reach its citizens is considered by Rosacker and Olson (2008) to be an innovative approach.

While there are numerous studies that have been conducted to establish the factors that influence the success of information systems usage where the end users are the public, limited literature is available on the success factors for usage of information systems in the government from the employees' perspective. In this review, a critical analysis of the success factors that influence success in the usage of information systems in the government/public sector are brought into focus where much of the focus is given to the government employees' perspective.

First, an overview of the concept of an information system is explored where its definition and the various roles it plays are discussed. Further, background information

and theoretical frameworks underpinning the use of information systems are explored. This is followed by an exploration of successful usage of IS in the public sector where definitions of aspects of the usage of IS are highlighted. The concept of user attitudes towards IS and how it is related to usage and satisfaction is further explored. Moreover, the relationship between aspects of performance expectancy (PE), effort expectancy (EE), information quality (IQ), system quality (SQ), service quality (SRQ) and facilitating conditions are brought into focus. The chapter concludes with the conceptual framework of the study, which guides the entire research study.

Overview of Information Systems

The concept of an information system (IS) is relatively a new concept which has emerged as a result of the advancing technology (Stair & Reynolds, 2015). While various researchers and scholars have tried to explain what information systems are, Moller and Chaudhry (2012) consider IS as the user-interfaced system used in accessing, processing, and sharing information in a network environment. Similarly, Mansour and Ghazawneh (2009) holds that IS comprises of people and information processing technologies which facilitate not only sharing of information, but also processes of various tasks and operations in a networked environment.

Fundamentally, it can be argued that information system helps in the processing of information which facilitates decision making both at individual and group levels. While there are various types of information systems, there are five key information systems that have been popular which include transaction processing, office information,

database management, decision-support, and knowledge management systems (Jessup & Valacich, 2008; Rosacker & Olson, 2008). Despite the various information system types, they are mainly used to maintain a coordinated flow of information, availing of services, and maintaining of relationships between geographically dispersed teams (Alawadhi & Morris, 2009). As a result, information system plays a vital role, capturing, transmitting and retrieving of information in a shared network.

On this basis, Rosacker and Olson (2008) consider the availability of information system of the target audience to be of critical importance in order to facilitate its effectiveness. When an information system is not availed to all its end users, Mansour and Ghazawneh (2009) argues that it is possible that it may not yield the intended results; and thus contributing towards its ineffectiveness. On this basis, providing information system solutions to an identified problem ought to be accompanied by the availability of the necessary infrastructure, and empowerment of people to acquire the necessary information technology devices which enable them to access or transmit data in an information system.

For instance, in most information systems, internet is a necessary infrastructure, and hence the availability of internet among the users of an information system is fundamental in ensuring the success of the information system. Past studies have established various propositions for some differences between information system with public and private sector organizations. As pointed out by Scholl et al. (2012), private organizations have a higher degree of market exposure, unlike public organizations which

are limited to the nationals of one country, and hence information systems in the private sectors are exposed to higher levels of regulations and legal constraints. However, Al-Farsi and E- Haddadeh (2015) observed that IS in the public sector are more open and thus are expected to be more involved in red tape.

While IS in the public sector are prone to control by political influence, and thus employees may be less involved in decision making regarding the adoption of information system in the public sector, unlike in the private sector where collaborative decision making before an information system is adopted may be exercised (Moller & Chaudhry, 2012). Moreover, considering that public information systems are more expansive and extensive, more extensive testing procedures and development systems need to be conducted than it is in the case of private systems. Since this study mainly focuses on the usage of information system in the public sector, the next section explores the theories underpinning the use and adoption of information system.

Theoretical Framework Underpinning the Adoption of Information Technology

Since the 1970s, when information technology started to proliferate in the consumer market, a wide range of theories has been formulated to explore and understand why consumers accept or reject information technology among which the theory of reasoned action, which was further, extended to the technology acceptance model (TAM). In the year 2003, Venkatesh and his colleagues (Venkatesh, Thong & Xu, 2012) extended the TAM model and came up with what is now referred to as the Unified

Theory of Acceptance and Use of Technology (UTAUT). Alongside the UTAUT Model, other models including Information System Success Model (DeLone & McLean, 1992) were also formulated to explain the success factors of information systems from the end-users' point of view. In the next sections, a critical analysis of each of these theoretical models is brought into focus.

The Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The first UTAUT model was established by Venkatesh et al. (2003) after an extant review of the previous theories on the acceptance of technology, where the technology acceptance model (TAM) and the theory of reasoned action forms the basis of the theory; and was later revised to come with the second and third models (Venkatesh et al., 2012). Technology acceptance model has gained popularity between the year 1990 and 2003 due to its applicability in explaining why people adopt technology using two key aspects which include perceived usefulness (PU) and perceived ease of use (PEOU).

The UTAUT model comprises of three main constructs which include the effort expectancy (EE), performance expectancy (PE), social influence (SI), and facilitating conditions (FC). As pointed out by Alawadhi and Morris (2009), the four constructs of the UTAUT model, play a central role in influencing user behavior towards technology, and the subsequent adoption preferences for the technology. As shown in figure 1 below, hedonic motivation, price value and habit are also considered to be having a significant impact on the behavioral intentions towards technology and subsequent actual behavior of the use of technology (Venkatesh et al., 2012). As reflected in figure 1, the moderating

effects of age, gender and experience are also considered to be impactful on the adoption of technology among the people.

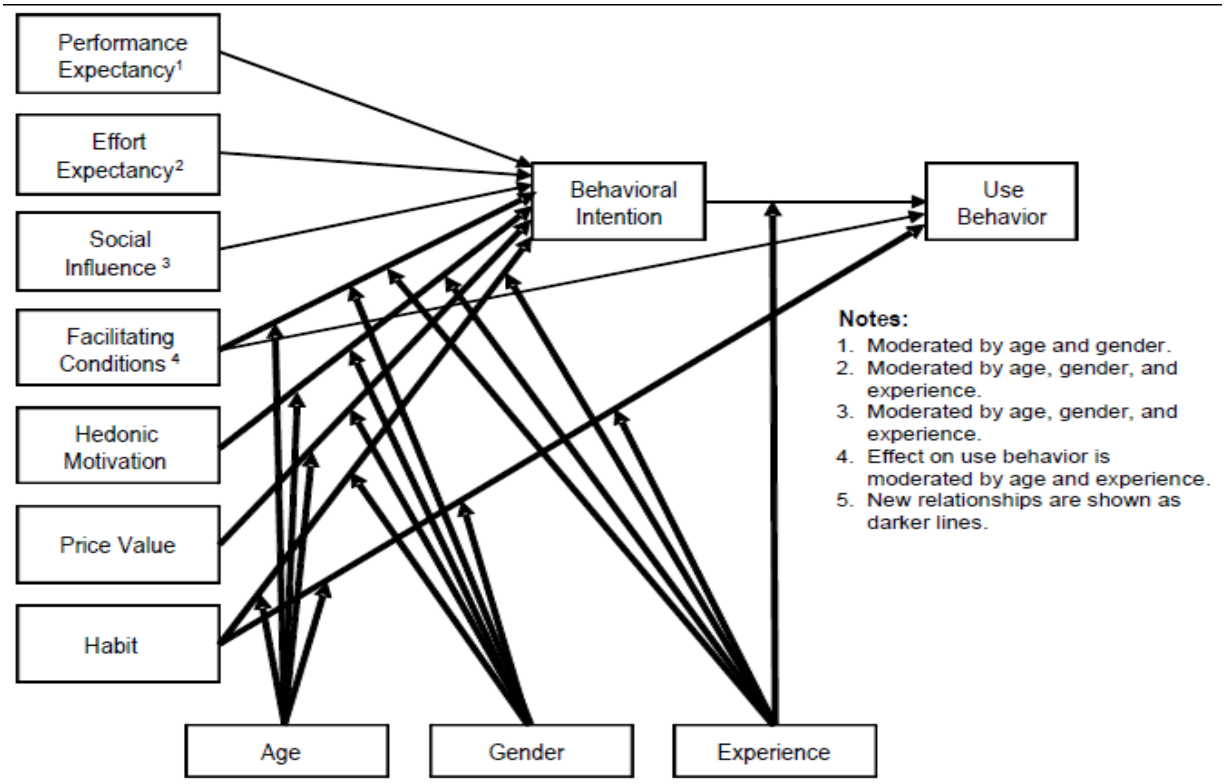


Figure 1 – The UTAUT Model

Source: Venkatesh et al (2012, p. 160).

Performance expectancy (PE) refers to the extent at which a technology helps users to perform various duties and tasks (Venkatesh et al., 2012). Fundamentally, performance expectancy inherently determines the perceived usefulness of technology, which is a key construct of behavioral intentions towards a new technology (Rosacker & Olson, 2008). As such, when a technology is perceived to be having superior performance than its predecessor, then the target users embrace it and this determines its success in the market (Venkatesh et al., 2012).

Though Venkatesh et al. (2012) observed that no technology is universally superior to another because people have different needs and expectations, the most important factor that determines the success of technology is its ability to deliver value and usefulness to its target users. As reflected in the above model, the aspect of effort expectancy (EE) is another key construct that influences users' attitude towards technology. According to Venkatesh et al. (2012), EE is characterized by the extent at which users use the technology with 'ease'. This brings in the concept of the perceived ease of use, which Gil-Garcia (2013) points out to be critical in determining the success of information technology.

When consumers are able to use technology with ease and more conveniently, Akkaya et al. (2012) observed that they are likely to adopt it and hence contributing towards its success. Though Zheng et al. (2013) argued that not all technologies that are easy to use are readily accepted by the target users, Calisir et al. (2014) pointed out that the ease of use contributes largely towards the adoption of the technology. With regard to

the UTAUT model, it can be argued that, when a technology is easy to use and convenient to the users, the target users are motivated to use it and hence enhancing their tendency to use it.

Moreover, the aspect of social influence has continued to gain acknowledgement by the previous models prior to UTAUT model, which is basically characterized by the extent at which subjective norms (friends, families, media, and celebrities) influence other people towards the use of technology (Venkatesh et al., 2012). The perceptions and opinions held by other people towards a particular piece of technology have significant influence on the other people's behavioral intentions towards the use of the technology (Calisir et al., 2014; Kumar, Mukerji, Butt and Persaud, 2007).

However, Wang (2012) argues that social influence of the use of technology is most effective when people have limited information about a particular technology, a study conducted by Calisir et al. (2014) revealed that the respect/weight given to a subjective norm is the key determinant of the influence that is given to the people towards the use of technology. This implies that, when a subjective norm is given relatively lower weight, it is possible that it will exert very little influence on the consumer behavioral intentions; unlike when the subjective norms are treated with more weight, which makes them more influential to the other people's behavioral intentions towards the use of technology.

The facilitating conditions are further identified to be a major factor that influences the users' attitudes and behavioral intentions towards the use of technology

(Venkatesh et al., 2012). These facilitating conditions comprise of the users' perceptions of the support resources available to enable the use of the technology (Jessup & Valacich, 2008). For example, the use of technology is usually accompanied by the availability of power and network infrastructure, and hence the availability of these resources has direct influence on the user's behavioral intentions towards the use technology. From this perspective, therefore, it can be argued that facilitating conditions can be hypothesized as one of the major players that influence consumer behavior towards the adoption of technology.

Moreover, the UTAUT included other factors like hedonic factors, price value and experience & habit to be critical factors that influence the users' behavioral intentions towards technology (Venkatesh et al., 2012). Hedonic motivation is basically defined as the perceived pleasure derived from adopting a technology, which in return influences the level of motivation by the consumers towards the use of the technology (Mansour & Ghazawneh, 2009).

In information system literature, Venkatesh et al. (2012) considered a hedonic motivation as being fundamentally characterized by the conceptualized enjoyment that people have towards technology, which predicts their future involvement with the technology. Some critics (e.g. Rosacker & Olson, 2008) have pointed out that information technology can mainly be gauged through its performance, rather than the pleasure derived from it because some technologies do not necessarily arouse a sense of pleasure in using them despite their usefulness. Nonetheless, Venkatesh et al. (2012)

points out that in every activity, there must be motivating factors and hence the aspect of hedonic motivation remains fundamental in explaining why consumers prefer a particular technology than another.

Moreover, experience and habit were among the constructs that were added by Venkatesh et al. (2012) as key influencing factors for the adoption of technology. Experience is basically conceptualized as a form of prior interaction with the technology (Jessup & Valacich, 2008); whereas habit is fundamentally as the extent to which behaviors are automatically exhibited over a particular period of time (Venkatesh et al., 2012). Though both experience and habit are closely related, they differ in the sense that people may have experience with technology, but have not developed a habit of using it.

An empirical study conducted by Mansour and Ghazawneh (2009) revealed that, when people have a high level of experience and subsequently lead to a habit, they easily adopt the technology than their counterparts who have no experience with the technology. Similarly, when people have high efficacy in the use of particular technology as a result of their long exposure to it, they tend to have stronger behavioral intentions towards it, compared to their counterparts who have less or no efficacy towards the technology. The UTAUT model further demonstrates the influence of moderating factors of age and gender on the relationship between facilitating conditions, hedonic motivation, price value and habit with behavioral intentions towards the use of technology.

Venkatesh et al. (2012) pointed out that, age and gender have moderating effects on hedonic motivation and its relationship with behavioral intentions in the sense that

young males are more affected than their older counterparts. The dependence on the facilitating conditions among females was also found to be stronger than in males, and hence impacting on the relationship between facilitating conditions the behavioral intentions towards the use of technology (Belanger & Carter, 2005; Yildiz, 2007). Further, Aggrawal and Kaur (2013) pointed out that the effect on facilitating conditions on behavioral intention towards the use of technology is stronger among the older women at their early stages of experience with technology.

The Information System Success Model

The information system success model was established by DeLone and McLean in the year 1992. This was the initial model whose central tenet was that, user satisfaction of information system is determined by the nature of the system and the information quality. In the year 2003, the authors extended the model where they asserted that information system acceptability is determined by three key important dimensions which include the service quality, information quality and the system quality (DeLone & McLean, 2003). As shown in figure 2, service quality, system quality and information quality contribute both towards user satisfaction and intentions to use the information system; contributing towards the net benefits acquired from the overall use of the information system.

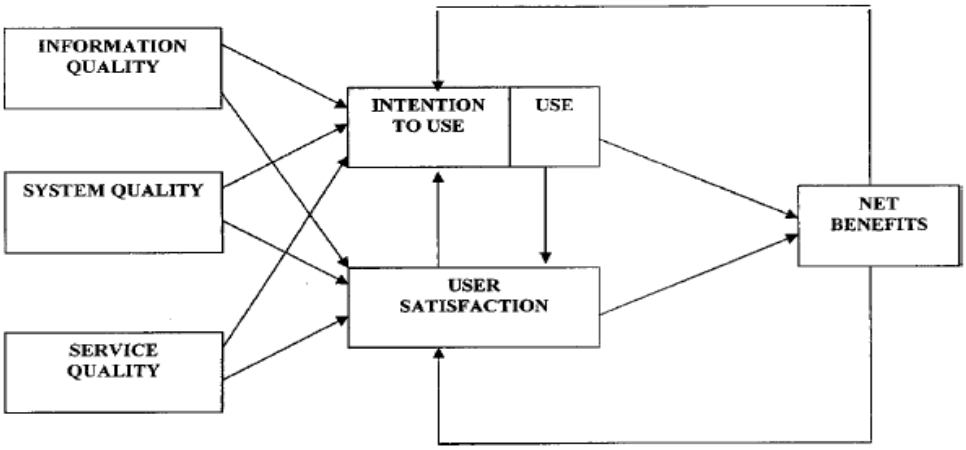


Figure 2 – The modified information system success model

Source: DeLone and McLean (2003, p. 24).

Past studies have demonstrated the importance of service quality in the information system; where DeLone and McLean (2003) suggested the SERVQUAL to explain how service quality in information system influences users' behavior towards the technology. The SERVQUAL model measures service quality using five key dimensions which include tangibles (up-to-date hardware and software), reliability (dependability of the information service), responsiveness (prompt response to customer inquiries), assurance (confidence on the service providers), and empathy (personalized customer service) (DeLone & McLean, 2003).

While the SERVQUAL model for evaluating the service quality in information has gained popularity and acceptance by researchers over the years (Zheng et al., 2013; Gupta, 2011); it has not been without any criticisms. According to Van Dyke et al. (1997) cited in DeLone and McLean (2003) criticized the SERVQUAL model by pointing out problems with the measurement of reliability metrics. Nonetheless, arguments that the service quality is a subset of system quality have been pointed out. Though the nature of services within an information system variation, a study conducted by Calisir et al. (2014) revealed that it is difficult to measure some service quality dimensions like assurance and reliability, arguments for the validity of all the SERVQUAL model constructs have continued to dominate the field of information technology (Aggrawal & Kaur, 2013).

Moreover, the aspect of information quality has been pointed out by numerous studies to be a key dimension of the system success model which is measured in terms of the accuracy, completeness, timeliness, and relevance of the information to the target audience (Calisir et al., 2014). This implies that, for an information system to be considered acceptable, the information accessed or relayed through it must be accurate, timely and relevant to the users. Though studies (Wang, 2012) has argued that information quality is usually determined by the users' awareness of its importance, a study conducted by Zheng et al. (2013) revealed that providing relevant information to the users through information system even if the users had previously not come across the information plays a central role in influencing their satisfaction with the information, and

subsequent intention to re-use the information system based on the benefits that they get from using the system.

Further, the aspect of system quality, which is associated with the processes of meeting the technology users' needs, is yet another very important aspect of the information system model which defines the success the success of the information technology (Gupta, 2011). This necessitate information technology implements to evaluate the design of an information system being implemented based on the target audience characteristics in order to make the technology relevant to the target audience. This is necessary because if the technology is unable to meet the specific needs of the target audience, then its system quality is considered to be low, and hence contributing towards its failure (Aggrawal & Kaur, 2013). As such, it can be argued that the accessibility and relevance of information systems to the end users are a key factor that influences its success.

Further, the information system success model suggests that an information system should deliver benefits to the end users, including saving costs, expanded reach, time saving, social networks, and convenience in accessing information (Zheng et al., 2013). This implies that, for an information system to succeed, in addition to meeting the three criteria, dimensions (service quality, system quality and information quality), it must be able to deliver benefits to the end users after using it; in order to make it not only relevant, but also success based on its intended aim or objectives.

Literature Review

System Success (SC)

System success is defined by Wang (2012) as the extent at which information system performs its intended roles and functions within the expected parameters. Successful usage of information system is usually characterized system usage and system characteristics.

System Usage (US)

System usage is determined by the utilization (UT) and frequency of use (FRQU) of the information systems by the end users (Zheng et al., 2013). System Utilization (UT): According to Barkin and Dickson (1997), system utilization is concerned with the extent at which the features of an information system are used by the target users. An information system is considered to be optimally utilized if the output generated from the information system is included in the decision making by an individual or group (Elmuti & Abou-Zaid, 2013). To a great extent, UT is also determined by the efficiency achieved with the use of technology by individuals, which is a critical indicator of information system success (Moller & Chaudhry, 2012). The success of IS can thus be defined using system utilization because when the target end users engage into the utilization of the technology to a large extent when making critical decisions affecting their organizations, then can be argued that the information system has been successful. This can be

explained in report by Al-Ali et al. (2013) where they reported that the degree of relying on the use of information system in Qatar health care system is one of the key indicators of the success of IS in the Qatar health care system.

Frequency of Use**:** Al-Farsi and E- Haddadeh (2015) considers the frequency of use as the regularity and incidental trends of using technology by the end-users. As such, Gliedman (2011) observed that when employees regularly use technology in their workplace, it seems that they consider the technology useful in their work; and hence implying success in the general implementation of the IS. This can be explained using the technology task fit model which postulates that when employees perceive that a technology is useful to them, they frequently use and this contributes towards its successful usage.

Another study conducted by Elmuti and Abou-Zaid (2013) revealed that when users of a particular technology get used to it, they find it difficult to change to another because of the control they have with the technology they are used to. As such, the following hypothesis was formulated in this study to investigate the relationship between IS success and usage (US) in the public sector of the state of Qatar.

H_1 – Employees' Usage (US) of IS has a positive effect on the system success (SC)

System Characteristics (SYC)

'System characteristics' (SYC) is defined as the nature of the technology based on its distinctiveness and properties (Khan and Pessoa, 2010). According to Zheng et al. (2013) information quality and system quality are the key indicators which influence the characteristics of the technology. With regard to information system success model by DeLone and McLean (2003), the quality of information system and system quality are pointed out to be among the major elements used to describe the characteristics of a certain technology.

Information Quality (IQ): The aspect of information quality has been pointed out by numerous studies to be a key dimension of the system success model which is measured in terms of the accuracy, completeness, timeliness, and relevance of the information to the target audience (Calisir et al., 2014). This implies that, for an information system to be considered acceptable, the information accessed or relayed through it must be accurate, timely and relevant to the users; which in return influence the users' attitudes towards it. Though studies (e.g. Wang, 2012) has argued that information quality is usually determined by the users' awareness of its importance, a study conducted by Zheng et al. (2013) revealed that providing relevant information to the users through information system even if the users had previously not come across the information plays a central role in influencing their satisfaction with the information, and subsequent intention to re-use the information system based on the benefits that they get from using the system.

System Quality (SQ): The aspect of system quality is considered by DeLone and McLean (2003) as an important construct of the information system success model which is characterized by aspects like system usability, accessibility, affordability, and availability to the users; which Khan and Pessoa (2010) considers to be a critical determinant of user acceptance of the information system, and hence its success. While system quality is mainly associated with the processes meant, at meeting the requirements of the service users (Gupta, 2011), the need to evaluate the design of an information system in the context of the target audience characteristics is necessary.

In the context of system quality in the government sector, the quality of the information system as perceived by the employees is pointed out by Stair and Reynolds (2015) as one of the major factors that largely contribute towards the tendency of target users to adopt it. Aggrawal and Kaur (2013) argued that the accessibility and usability of information systems to the end users are a key factor that influences its success. While the aspect of system quality can be perceived differently employees from different regions based on their technological background, Brown and Garson (2013) pointed out, information systems with similar qualities in different organizations from two distinct cultures may be interpreted differently by the employees in each organization.

For example, in Middle East countries where technology infiltrated a few decades ago, an information system which has been considered inferior by employees from developed countries may be perceived to be fit and of high quality (Sebina and Mazebe II, 2014). This brings in the subjective nature of system quality where employees from

different regions may interpret a particular technology to be high, whereas in another it is considered poor (Brown & Garson, 2013). The following hypothesis was formulated to investigate the relationship between system characteristics SYC and system success (SC):

H_2 – System characteristics (SYC) has a positive effect on the system success (SC)

Attitude (AT)

User attitudes towards information system are defined by Khan and Pessoa (2010) as the resultant expressions of a technology based on its perceived positive and negative effects by the user. Past studies (e.g. Amer & Iman, 2008; Smith & Salvendy, 2001) have pointed out that, system usage is largely influenced by the users' attitude towards technology. Fundamentally, Stair and Reynolds (2015) point out that attitude is one of the main factors that influence the way employees adopt technology in the workplace. Considering that attitude is basically associated with behavioral intentions based on the favorability or unfavorable assessment of an action (Brown & Garson, 2013); it defines the users' overall reaction towards using an information system.

Various studies have pointed out that AT has direct influence on usage (US) and system usage in the sense that, when employees have a positive attitude towards a technology, they actively and continuously use its leading to increased utilization and frequency of use (Scholl et al., 2012). This brings in the link between information system usage and attitude. As earlier pointed out, system usage is determined by frequency of use and utilization, and hence resulting into the relationship between system utilization and frequency of use as suggested by Sebina and Mazebe II (2014).

According to Wang (2012), the concept of attitude determines the level of motivation that people have towards a particular set of technology, since it defines the perceived usefulness or relevance of technology in their day to day activities. This implies that, when people have a positive attitude towards a technology, they easily develop increased usage intentions for the technology leading to frequency of use (FRQU). This is because according to Stair and Reynolds (2015); attitudes determine the acceptability of a particular piece of technology by the target users, and hence when the target users readily accept the technology, a subsequent frequent usage follows. As a result, it is important that users of technology develop a positive attitude towards a particular piece of technology targeted to them in order to enable them to actively use it more regularly.

With regard to a study conducted by Nabali and Department of Health Services Administration (1992), when people perceive a technology to be useful to them, they subsequently develop positive attitudes towards it which in return influence their frequency of using it. While the level of attitude towards a particular piece of technology may vary among users from different regions based on the perceived usefulness of the technology (Amer & Iman, 2008); Elmuti and Abou-Zaid (2013) argued that the bottom-line of frequency of use of technology is fundamentally the nature and level of attitude that the users have towards the technology. This reflects the critical link between AT towards the frequency of use.

The link between user attitudes and system usage has also been established by various studies (e.g. Barkin & Dickson, 1997; Moon, 2014). According to Mansour and Ghazawneh (2009), positive user attitude usually leads to increased utilization of technology. Considering that system utilization is determined by the extent at which users use technology almost what they do (Lu et al., 2012); positive attitudes are considered to be a key predictor of system utilization. For example, the aim of the Qatar Government is to achieve 100% online government services; whose success will mainly be attributed by system utilization by its employees and citizens.

Fundamentally, the perceived usefulness of the technology is pointed out to be a critical factor influencing user attitudes, which subsequently determines their tendency to utilize the technology (Khan & Pessoa, 2010). Though system utilization may be affected by other factors other than attitudes, Kurkinen (2013) argued that holding other factors constant, user attitudes play a fundamental role in influencing the utilization level of technology which further leads to the success of the technology. From the above, the following hypothesis is formulated in this study to investigate the impact of user attitudes towards system usage among employees in the public sector of Qatar.

H_3 – Employees' attitude towards IS has a positive effect on usage (US)

While the concept of attitude is considered to have direct influence on system usage which is determined by frequency of use and utilization; past studies have pointed out that attitudes towards information technology is influenced by a number of constructs. Based on the various models of information system acceptance including

UTAUT model, TAM, and information system success model, the concept of user attitudes for information is influenced by various variables including performance expectancy (PE), effort expectancy (EE), system characteristics (SYC), service quality (SQ) and facilitating conditions (FC). As such, it can be argued that user attitudes are a multi-dimensional factor which is influenced by a wide range of factors. In order to provide a comprehensive analysis of each of the above constructs of attitudes, the following sections discuss each of these factors by highlighting how each of them relates to user attitudes towards technology.

Performance Expectancy (PE)

Performance expectancy is one of the key factors that influence the adoption of technology, which basically refers to the extent at which a technology helps users to perform various duties and tasks (Venkatesh et al., 2012). This implies that, when a technology provides users with high performance expectancy, it is possible that the users will adopt it, unlike technologies with low performance expectancy. However, Wang (2012) observed that users of a similar technology can have diverse perceptions of the usefulness of the technology despite performing similar functions with the technology.

Though there is no exiting empirical evidence so far which explains why users of a technology can have different perceptions of its usefulness, Gupta (2011) argued that other factors like experience and self-efficacy with the technology play a significant role in influencing the user's perceptions of the performance effectiveness of a technology.

From this perspective, therefore, though consumers' perceptions of the performance expectancy of a technology largely influence their adoption of the technology, other factors influence their behavioral intentions towards the use of the technology. The construct of PE is further integrated into the concept of perceived usefulness which defines the perceived relevance and importance of technology to the users (Moller & Chaudhry, 2012).

Fundamentally, the performance expectancy (PE) of an information system by the government employees is among the most influential factors that influence the success of information system adoption by the government. According to Workman (2007), since the PU defines the perception that the use of a particular technology will facilitate or enhance job performance; government employees believe in the usefulness of a particular technology can be of fundamental importance in determining its success in the government sector. This implies that, the nature of information system that the government plans to use must promise usefulness to the users (government employees) for its successful usage.

As argued by Kim and Kim (2002), when a technology is perceived by its users to be having no added advantage to their work; they hardly adopt it and hence its usage would be a failure. From this point of view, therefore, it is important that the government policy holders evaluate the importance of a technology before enforcing it to its employees. This is evidenced in an empirical study conducted by Moon (2014) in the healthcare sector where the adoption of Smartphones by hospital employees in the

government was mainly influenced by the perceived usefulness of the technology to their job.

The perceived usefulness of information technology is also reflected in Rosacker and Olson (2008) ideas who argued that the ability of technology to enhance the performance of employees in government institutions is a key factor that largely plays a critical role towards enhancing its adoption. In cases where the technology is perceived to be having less impact on the employees' productivity in their job, Otieno (2010) argues that such technology is less likely to be embraced by employees because they develop a negative attitude towards it.

While the key aspect of behavioral intention as reflected in the TAM model which influences the perceived usefulness of the technology is the user attitudes (Smith & Salvendy, 2001), it can be argued that when employees perceive a technology to be having a positive impact on their job, they are likely to have a positive attitude towards the technology, which in return impacts on the ability of the technology to be successful in the government. From this point of view, therefore, it can be argued that the aspect of PE of an information system by the government employees is a fundamental factor that influences the success of using such technology in the government sector; and hence the following hypothesis were formulated for investigation in this study:

H_4 – PE has a positive effect on employees' attitude (AT) towards IS

Effort Expectancy (EE)

The aspect of effort expectancy (EE) is another key construct that influences users' attitude towards technology. According to Gliedman (2011), EE is characterized by the extent at which users use the technology with 'ease' (Venkatesh et al., 2012). When consumers are able to use the technology easily, they develop positive attitudes towards it which in return influences their behavioral intentions towards it (Gil-Garcia, 2013; Akkaya, Kremar & Wolf, 2012). While some studies (e.g. Zheng et al., 2013; Calisir et al., 2014) criticizes this approach by arguing that technology use is learnt, and hence prolonged exposure with it makes its use easier; and hence arguing that the ease of use of technology influences its acceptance is not enough, but the exposure to technology use is the key aspect.

Nonetheless, the aspect of EE in the adoption of technology has continued to gain popularity, where the prospects of the theory continue to argue that, when the technology is less complicated and fundamentally significant to the users, they embrace it in large numbers. This is explained in the adoption of mobile phone technology, where the largest proportion of the population across the world uses it; unlike other complicated technologies like the PC which have gained low proliferation across the consumer markets.

Moon (2014) further points out that EE is also referred to as perceived ease of use (PEOU) which is defined as the extent at which people believe that the use of a particular technology would be effortless; is another key factor that influences the adoption of

information system in the government sector. Considering that employees are usually afraid of changes, the perception that the adoption of a particular technology would ease their job or be free from effort can be among the major factors that promotes the successful usage of information system in the government (Workman, 2007; Dečman & Klun, 2015).

With regard Au and Cheng (2012) ideas, when people consider a technology to be making their work easier and not result into the use of more efforts to accomplish a particular task, they easily adopt the technology. This point of view can be used in explaining the success in the usage of an information system by the government where the employees' perception that the technology would result into reduced efforts in the completion of their tasks, they easily adopt it. In this regard, therefore, it can be argued that, the ability of the information system to make the work of government employees easier can be considered as one of the major factors that determines its success; since technologies which do not offer any added advantage among the users in terms of effort reduction may not be readily accepted (Cullen, 2010; Garson, 2006).

The aspect of convenience has also been pointed out by Rosacker and Olson (2008) as a factor influencing technology users' attitudes towards technology. When users of a technology perceive that the use of a particular technology increases their convenience of doing their job, they easily embrace it; unlike in a situation where a particular technology does not foster convenience among the users (Palvia & Sharma, 2007). With regard to the usage of information system in the government, when

government employees perceive that the proposed information system is likely to increase convenience in their job, Kumar et al. (2007) argues that it will be more likely for the employees to embrace the technology.

Though a study conducted by Kim and Kim (2002) revealed that employees might not have any idea about how a technology works, but due to enthusiasm and positive attitude towards it lead to its acceptance; it is important to note that users of technology are not always naïve about it, and thus their attitudes towards it are mostly influenced by its acceptance. From this point of view, therefore, it can be argued that when the technology proposed by the government to be used by its employees fosters a sense of convenience to their job, and then it is usually more likely that the technology will be accepted and this will facilitate its successful usage by the people. The perceived quality of services offered by government employees through information system is also pointed out by Ajami and Mohammadi-Bertiani (2012) to be a key determinant factor the acceptance of the technology by the employees.

Adam-Mahmood et al. (2000) observed that, when a particular technology promotes a sense of increased job efficiency, while offering outstanding client [public], service, then the employees tend to find the technology more useful. The perceived desire of government employees to serve the public better and more efficiently through the use of technology is considered by Alawadhi and Morris (2009) to be a key determinant of perceived ease of use; which in return facilitates increased positive attitudes towards the technology. From this perspective, therefore, it can be argued that the ability of a

technology to enable government employees to be in a position to offer outstanding customer service more efficiently, leading to high client [public] satisfaction can be considered as among the major factors that influence the perceived ease of use of technology; and hence its successful usage – and thus the hypothesis below was formulated for investigation in this study.

H_5 – EE has a positive effect on employees' attitude towards IS

Service Quality (SRQ)

Past studies have demonstrated the importance of service quality in the information system; where DeLone and McLean (2003) suggested the SERVQUAL in explaining how service quality plays an important role in influencing the users' behavior towards the technology. As earlier pointed out, the SERVQUAL model measures service quality using five key dimensions which include tangibles (up-to-date hardware and software), reliability (dependability of the information service), responsiveness (prompt response to customer inquiries), assurance (confidence on the service providers), and empathy (personalized customer service) (DeLone & McLean, 2003).

Service quality as reflected in the information system success model established by DeLone and McLean (2003) can be used to explain why employees develop positive or negative attitudes with the usage of an information system by their organizations. One of the dimensions that people use to evaluate the quality of a service offered through an information system platform is the tangibles which comprise of the evaluation on whether

the hardware and software employed by the service provider are up-to-date or not (Gil-Garcia, 2013; Adam-Mahmood et al., 2000).

When the information system being implemented comprises of modern and high quality, tangible components, it is possible that employees develop positive attitudes towards the technology which fosters its successful usage. This means that, for successful usage of an information system by the government, adopting the most updated technology (both hardware and software) is a key success factors which will influence the end-user's attitudes towards it. Further, the information system reliability, which is characterized by the consistency of an information system to offer its intended services, is also another key to success usage determinant (Palvia & Sharma, 2007).

According to Stair and Reynolds (2015), when employees perceive the technology being implemented by the government are highly dependable and consistent in providing services to the end users, Bwalya (2013) suggests that it is possible that the employee will develop positive attitudes towards it, leading to subsequent continued usage and satisfactions with the usage of the technology which in return influences the overall success of using the information system. On this basis, therefore, when using information system in the government sector, it is important to consider the reliability of the information system which influence the end-users' attitudes towards the technology. From this point of view, therefore, it can be argued that the service quality offered by an information system in the government plays a critical role towards influencing its employees' attitudes towards it.

Information system responsiveness is yet another critical usage success factor of information system embedded on the service quality aspect on the information system (Garson, 2006). Service responsiveness, characterized by the ability of service providers to offer quick response to the users (DeLone & McLean, 2003), plays an imp

ortant role in influencing user attitudes towards a particular information system, because the more responsive a technology is, the higher the positive attitude people develop towards it. However, when an information system is less responsive, employees have a negative attitude towards it and this can derail the success of using the entire information system. When using an information system in the government, therefore, it is important that a reliable and responsive technology be implemented in order to enhance its acceptability by the end users.

An empirical study conducted by Decman (2015) on the adoption of e-government services in Slovenia revealed that, the quality of service with regard to its responsiveness when needed to be used by the government employees was one of the most fundamental factors that influenced its adoption. It is therefore important for government policy makers to evaluate whether an information system proposed to be implemented is reliable and responsive in order to make its usage successful. The following hypothesis was therefore formulated to investigate this relationship with regard to employees in the public sector of Qatar.

H_6 – SRQ has a positive effect on employees' attitude towards IS

Facilitating Conditions (FC)

According to Smith and Salvendy (2001), facilitating conditions comprise of the factors provided by an organization which affect/facilitate the usage of the information technology and enhance its usage by the send-users. With regard to the UTAUT model, facilitating conditions (FC) play an important role in influencing the success of using information system in the government. According to Kim et al. (2012), one of the facilitating conditions that determine the success of an information system in the government is the availability of the required infrastructure for the implementation of the information system. The availability of the infrastructural aspects like the internet, power and information technology devices plays a critical role in influencing the success of a government service embedded on the internet as argued by Mansour and Ghazawneh (2009).

For instance, when the government plans to use an information system which makes employees to be able to work from their homes, the proliferation of electrical power to the employees in their homes is a key factor that largely influences the success of using the information system in the government. This implies that, when the facilitating conditions are availed to the users of an information system, it is possible that the information system will succeed, unlike in a situation where there is no facilitating infrastructure; and therefore it is very important for the government to ensure that they provide the needed infrastructure for any information system first before embarking on its usage.

Moreover, support systems, including complementary resources required to implement an information system are another key factor that Jessup and Valacich (2008) considers to be the critical success factor when using information system. One of the key facilitating conditions as suggested by Smith and Salvendy (2001) is the availability of qualified and reliable trainers for technology-based skills and knowledge. Considering that the availability of training facilities for a new form of technology is necessary in order to make employees better oriented to the use of the technology (Mansour & Ghazawneh, 2009; Kim & Kim 2002), lack of reliable training opportunities for government employees can negatively affect successful usgae of a technology which necessitates the training of employees in order to enable them to be in a position to use the technology more effectively.

Though Moon (2014) argues that before the adoption of any technology it is important to ensure that the available skills needed to run the technology is available, the rapidly changing face if technology necessitates the adoption of newer technologies, and thus the need to have employees trained on how to use new technologies. From this point of view, therefore, it can be argued that the availability of training facilities within the area where the government plans to implement a new technology is a key factor that influences the success in using the information system.

Further, a key support system that Prabhu (2012) considers to be necessary to facilitate the adoption of information system in the modern world is the availability of internet infrastructure which enables efficiency in the information system (Sharma &

Yetton, 2007). Moreover, Venkatesh et al. (2012) observed that availing support systems in organizations are critical in ensuring that the use of information system in the government is successful, since incomplete systems are received with a negative attitude by the users and this may largely derail the success in using the information system in the government.

With limited empirical evidence on the role played by the availability of skills and are experts on the acceptance of information system in the context of the Middle East countries, there is a need for an up to date study on how the availability of effective training facilities of modern day technology impacts of the adoption of information technology among the employees. On this basis, therefore, it can be argued that; availing support systems like training to the staff members and internet facilities are critical in fostering success in the usage of information system in the government, since they promote user efficiency and accuracy in using the information system. In the context of this discussion, the following hypothesis was formulated to investigate the impact of facilitating conditions on the users' attitudes towards information technology among the employees in the public sector in Qatar.

H_7 – FC has a positive effect on employees' attitude towards IS

Moderating Factors of Gender, Age, and Computer Confidence

Past studies have pointed out that demographic factors moderate the adopting of technology among individuals in various capacities (Venkatesh & Morris, 2003). Among

such demographic factors which Smith and Salvendy (2001) points out to be critical mediators of how users of technology perceive its usefulness and effort expectancy is gender and with it include gender age. Moreover, computer confidence which is mainly determined by the level of knowledge and education that consumers have been pointed out by Sabine and Mazebe II (2014) to be a key mediator of the relationship between consumer attitudes and system quality, service quality and information quality. The following section discusses the moderating role of the three demographic factors on the various constructs on user attitudes towards technology.

a) Gender

The aspect of gender has been pointed out by various past studies to be directly related to the patterns of technology adoption. According to Copper and Weaver (2003), gender plays a critical moderating role between performance expectancy and consumer attitudes. These assertions are further corroborated in an empirical study conducted by Rainer, Laosethakul and Astone (2003) in the Gulf Region where he pointed out that female users of technology perceived technology to be less useful in their job compared to their male counterparts because of the pre-conceived stereotypes that working with technology is mainly preserved for the males.

As a result, males' technology users tend to have higher expectations on the performance of technology than females, a situation which makes them to have stronger attitudes towards the technology (Amer & Iman, 2008). Statistics have shown that, more males in the Arab world are exposed to technology than females (Elnaggar, 2008), and hence the expectations on the performance of technology, which in return impacts on the users' attitudes can be considered to vary across the gender lanes. These assumptions can be used to explain the moderating role of gender in the relationship between PE and AT; and therefore the following hypothesis was formulated for investigation in this study.

H_8– PE has a stronger impact on attitude (AT) toward IS use for males

Moreover, the moderating role of gender on the relationship between FC and the AT has also been pointed out by a number of past studies (e.g. Khreisat, 2009). Since FC comprised of the support systems for a new technology, Laosethakul and Astone (2003) argued that males are more sensitive to the availability of facilitating conditions than females who may not be well informed of the complementary services/materials to be used with a new technology.

Moreover, Zheng et al. (2013) pointed out that, since male consumers are considered to be more used to technology and thus they are in a better position to evaluate the necessary complementary resources to be used with a particular technology than their female counterparts; an underlying effect of FC on AT seem to be moderated along the gender lanes. This implies that, in the context of public sector IS, male employees will be in a position to develop stronger relationships between FC and AT in

the event where new technology is being established than their female counterparts; and thus the following hypothesis were formulated to investigate this relationship:

H_9 –FC has a stronger impact on attitude (AT) toward IS use for males

b) Age

The impact of age of technology adoption has gained a lot interest among scholars and practitioners over the recent decades (Workman, 2007). The moderating role of age on the relationship between EE and AT towards technology at work has also been pointed out by Workman (2007). Since younger users of technology are so much used to it, they perceive it to be saving more time and energy to them, compared to the older users (Rosacker & Olson, 2008). However, middle aged users are considered to be more experienced and hence EE seem to be much more impactful on AT for employees above this age (Smith & Salvendy, 2001).

As a result, elder employees seem to be more used to working technology and thus are more likely to develop stronger EE and AT towards the technology compared to the younger users who might not be well versed with the technology at the workplace. Though this moderating relationship is considered by Smith and Salvendy (2001) to vary from the developed where the elder technology users are more experienced with it and hence the perceived EE and AT relationship would be stronger among the elder employees. The following hypothesis was formulated to investigate the moderating role of age on the relationship between EE and AT:

H_{10} – EE has a stronger impact on attitude (AT) towards IS use for older employees

Moreover, the moderating role of age on the relationship between service quality (SRQ) and user AT was also pointed out to be critical based on the past studies (Khreisat, 2009). Wang (2012) observed that more experienced users of technology impose a stronger relationship between SRQ and AT than the less experienced users. While age and experience with technology seem to be positively correlated (Venkatesh & Morris, 2003); a study conducted by Talet & Al-Wahaishi (2011) revealed that elder users of technology are more used to technology than the younger generation in the workplace; and hence elder employees are more likely to experience stronger relationship between SRQ and AT. As such, it can be argued that the relationship between SRQ and AT is stronger among the elder employees than their younger counterparts; and thus the following hypothesis were formulated for investigation in this study.

H_{11} – SRQ has a stronger impact on attitude (AT) towards IS use for older employees

b) Computer Confidence Level

Computer confidence level is defined by Stair and Reynolds (2015) as the self-perceived efficacy towards computer applications by users. Moreover, Brown et al. (2014) considered computer confidence as one's belief that he/she has the ability to succeed in using a computer to accomplish a particular set of task. According to Sebina and Mazebe II (2014), individual's perceived computer confidence plays a very important

towards influencing the approaches they take in solving new challenges related to information systems. In the context of the adoption of information system, Prabhu (2012) argued that employees' self-confidence on their capability to work with technology plays a critical role in influencing their attitudes towards the technology.

Stair and Reynolds (2015) observed that when users of technology have high computer confidence, their perception of service quality (SRQ) and IS attitudes also changes. This is because users with high exposure to technology are able to identify loopholes in system quality compared to their counterparts with low exposure; and thus when people have high computer confidence, a stronger impact of SRQ on AT is likely to be experienced. As such, the following hypothesis was formulated in this study to explore the moderating role of computer confidence on the relationship between SQR on user attitudes (AT) towards technology among the employees in the public sector of Qatar.

H_{12} – SRQ has a stronger impact on attitude towards IS use for employees with high computer confidence level

The moderating role of computer confidence on system characteristics (SYC) and system success (SC) has also been pointed out by a number of studies (Venkatesh & Morris, 2003). According to Khan and Pessoa (2010), when people have high computer confidence, they are more likely to point out the characteristics of the technology compared to those with low computer confidence. This is because as a result of high exposure to technology to technology, people are equipped with special skills which enable them to be in a position to point out whether a system has loopholes or it is doing

its role effectively, and hence determining the ultimate success of the technology (Prabhu, 2012). As such, the following hypothesis was formulated to investigate the moderating role of CC on the relationship between SYC and SC:

H_{13} – SYC has a stronger impact on system success for employees with high computer confidence level (CC)

Conceptual Model

Based on the key theoretical frameworks and concepts on how technology is accepted by the end-users, it can be drawn from these frameworks that for an information system to be successful, a wide range of factors come into play. As earlier pointed out in the review of literature, IS success is largely determined by US (FRQU and UT) and SYC (IQ and SQ). As reflected in this chapter, there are four key constructs which seem to influence employees' attitude towards technology, which include performance expectancy (PE), effort expectancy (EE), service quality (SRQ) and facilitating conditions (FC).

The relationships between these constructs and user AT towards IS were also found to be moderated by the factors of gender, age and computer confidence. Specifically, gender was found to moderate PE and FC on user AT, age moderated EE and SQR and AT; whereas CC was found to moderate the link between SRQ with user AT and SYC with SC. Figure 3 below shows the conceptual framework that was adopted in this study, which reflects the underlying success factors for using information system in the government).

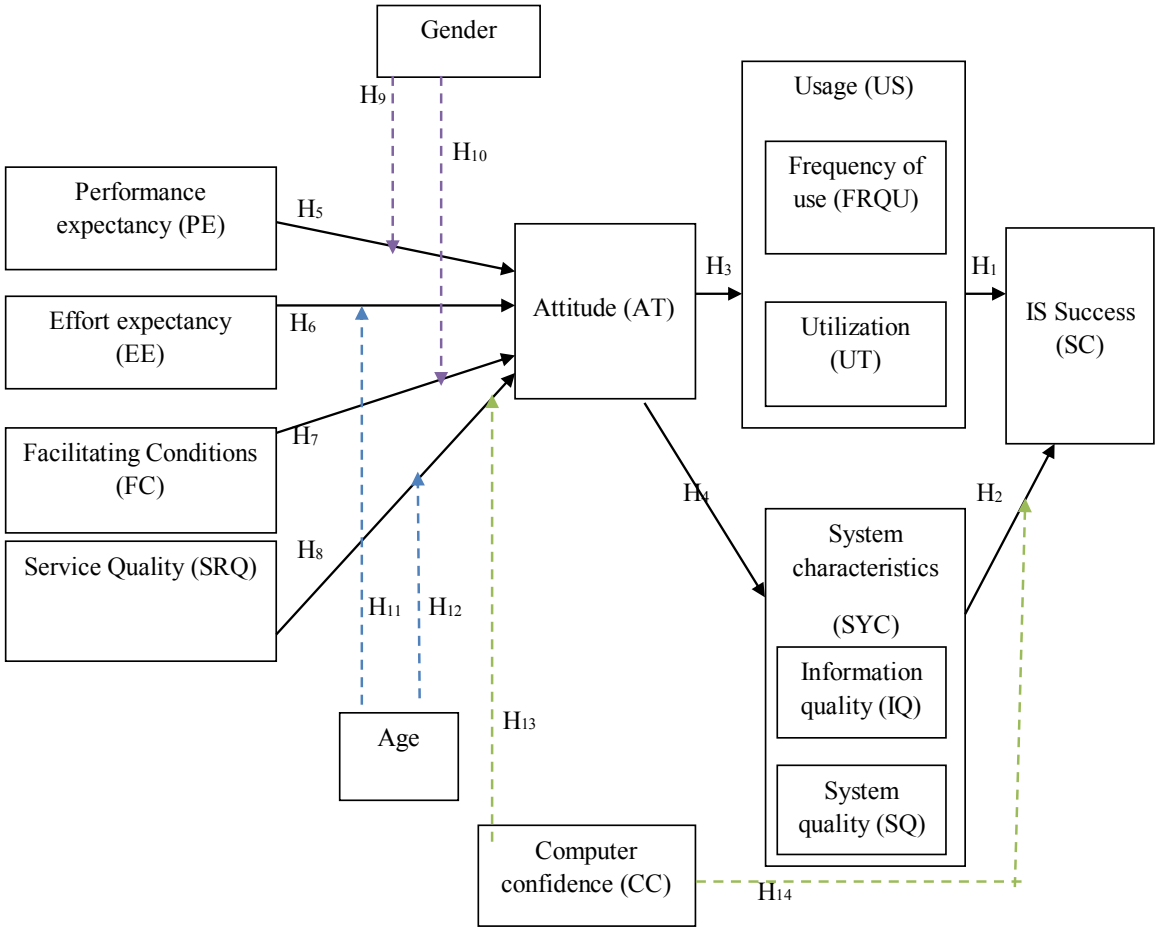


Figure 3– The conceptual framework of the study

Table 1.0 Summary of Hypothesis

H1	Employees' Usage (US) of IS has a positive effect on the system success (SC)
H2	System characteristics (SYC) has a positive effect on the system success (SC)
H3	Employees' attitude (AT) towards IS has a positive effect on the Usage (US)
H4	Employees' attitude (AT) towards IS has a positive effect on System characteristics (SYC)
H5	PE has a positive effect on employees' attitude (AT) towards IS
H6	EE has a positive effect on employees' attitude (AT) towards IS
H7	FC has a positive effect on employees' attitude towards IS
H8	SRQ has a positive effect on employees' attitude towards IS
H9	PE has a stronger impact on attitude (AT) toward IS use for male.
H10	FC has a stronger impact on attitude (AT) toward IS use for male
H11	EE has a stronger impact on attitude (AT) towards IS use for elder employees
H12	SRQ has a stronger impact on attitude (AT) towards IS use for elder employees
H13	SRQ has a stronger impact on attitude (AT) for employees with high computer confidence level (CC)
H14	SYC has a stronger impact on system success for employees with high computer confidence level (CC)

CHAPTER 3 – RESEARCH METHODOLOGY

Research Design and Instrument

In order to test the conceptual model established in chapter two, a descriptive research design was adopted. An online survey was designed and shared with the participants to collect data. The survey consists of 39 close-ended questions and 2 open-ended shared with the research participants through various electronic platforms. The online survey has many advantages, it allows using a wide range of electronic platforms to reach out to the participants, no paper and printing cost and can be exported to statistical packages.

The survey was divided into eleven sections. The first section of the survey items investigates the user attitudes (AT) towards using IS at the workplace which was adopted and modified from Shih and fang (2004). The second to the fifth section consists of the items that explores performance expectancy (PE), effort expectancy (EE) and facilitating condition (FC) that were adopted from Venkatesh et al. (2012).

The sixth section investigates the information quality (IQ), the system quality (SQ) and the service quality (SRQ) which was adopted from DeLone and McLean (2003), and Alshare and et al. (2011). The seventh and the eighth section investigate the usage of the IS at the workplace in term of frequency of use (FRQU) and utilization (UT)

of features. The FRQU questions were adopted and modified from Alshare and et al. (2010). The UT questions were constructed by the researcher.

Section nine explored IS success which consists of items obtained and modified from Alshare and et al. (2010). The tenth section is to collects demographic information in terms of gender, age, education, job nature, job title, nationality and in the computer confidence level which were designed with the help of my colleagues and supervisor. The last section of the survey explored the difficulties and challenges that the participants were experiencing with the use of information system in their workplace which was also constructed by the researcher. Alongside the online version of the survey, a copy of the survey is illustrated in Appendix A.

Sampling and Data Collection

For this research, the target participants were not limited to a particular occupation any employee in the public sector was a potential participant. The online survey was therefore designed on Survey Monkey (www.surveymonkey.com) and shared with participants through various platforms including emails, Twitter and WhatsApp to have a scattered sampling from the public sector of the state of Qatar. Which enabled the researcher to be in a position to conveniently share the online survey to the participants, and hence encouraging them to participate in this study.

The research participants were informed of the nature of the study, their roles and measures taken to ensure their anonymity and confidentiality of the information they

provide, by using participants' information sheet and consent forms. Before rolling out the actual survey, a pilot study was conducted with a sample of 5 participants selected from the researchers' twitter acquaintances in order to establish the validity and reliability of the survey. Much of the focus during the pilot study was made with the ability of the participants to answer all the questions accurately within the given period of time. As such, the online survey was shared with the participants and given five days to complete the survey.

Unexpectedly, all the participants had responded within 48 hours with all the completed surveys being fully answered without any significant anomalies. As a result, the researcher was necessitated to adopt the pilot study survey because it was deemed valid and reliable in terms of collecting relevant data for this study. After the pilot study was conducted, the actual data analysis process was conducted. The survey link was sent to the participants through three key online platforms which include personal emails, Twitter, and WhatsApp depending on the available platform to the selected participants.

Using a wide range of platforms to reach the participants was preferred because using a one platform may work for some of the participants while being unfavorable to others. The survey link was sent to employees in the public sector from the researcher network and after that it was distributed from one participant to the other to achieve the desired number of responses. A total number of 187 responses were received, 151 of them were usable and used. All 151 responses were Qatari's to ensure the sample homogeneity in term of culture.

Statistical Analysis

In this study, only quantitative data were collected, and hence only statistical data analysis method was employed. In essence, Statistical Package of Social Science (SPSS 23) package was used in analyzing the collected data. The frequencies, means, standard deviation, reliability coefficients, principal components were computed. Lastly, multiple regression models were used to test the hypothesis the study conceptual model.

1. The data collected was downloaded to an Excel sheet from the survey website.
2. The data were examined for missing and invalid values. Some missing data were replaced by the mean and if a response has a lot of data missing it was eliminated.
3. The data were exported to SPSS
4. The data were coded. For example, male (1) and female (2). Another example, strongly agree (5) strongly disagree (1)
5. Descriptive statistics were used for all scale-items: maximum, minimum, range, mean, frequency and standard deviation.
6. The reliability and validity of the collected data were tested by employing Cronbach's Alpha and corrected item-total correlation. The recommended value of Cronbach's Alpha is 0.70 or greater (Nunnally, 1978).

7. All measurement items were finalized and for each construct averages for the items were calculated. Four regression models were run. The first multiple regression model is between the dependent variable attitude (AT) and the independent variables performance expectancy (PE), effort expectancy (EE), facilitating condition (FC), and the service quality (SRQ). The second multiple regression model is between the dependent system usage (US) and the independent variable attitude (AT). The third multiple regression model is between the dependent variable system characteristics (SYC) and the independent variable attitude (AT). The fourth multiple regression model is between the dependent variable success (SC) and the independent variable system usage (US) and variable system characteristics (SYC), and for the moderator testing for regression models were used.

   The first multiple regression model is between the dependent variable attitude (AT) and the independent variables (PE_Gender) and (FC_Gender). The second multiple regression model is between the dependent variable attitude (AT) and the independent variables (EE_Age) and (SRQ_Age). The third single regression model is between the dependent variable attitude (AT) and the independent variable (SRQ_CC). The fourth single regression model is between the dependent variable attitude (SC) and the independent variable (SYC_CC).

8. All the assumptions of the regression model were taken into consideration and evaluated.

9. Lastly, the results of the regression analysis were obtained.

CHAPTER 4 – DATA ANALYSIS

Characteristics of Respondents

Based on descriptive statistics, results on the demographic variables shown in Table 1, One-hundred-fifty-one completed a 31-item survey. As can be seen in Table (2), 30% of the participants were males and 70% were females; 16% of the respondent were older than 40 years old, while 46 % were aged between 31- 40 years old. Similarly, 42% of the participants were aged below 31 years. Additionally, the highest qualifications of most of the participants were a bachelor's degree (68%). Regarding the work experience, 35% of the sample had work experience of less than 5 years, and 36% had experience within the range 5-10 years while 11% had experience greater than 16 years. Approximately 58% of the sample had a managerial role versus 24% without managerial role.

Table 2 Frequency and percentage for the demographic variables

	N	%
Total	**151**	**100.0%**
Gender		
Male	45	29.8%
Female	106	70.2%
Age		
Less 31 years	64	42.4%
31 - 40 years	63	41.7%
Greater than 40	24	15.9%
Educational level		
High school	9	6.0%
Diploma	17	11.3%
Bachelor degree	103	68.2%
Postgraduate	20	13.2%
Ph.D.	2	1.3%
Work experience		
Less than 5 years	53	35.3%
5 -10 years	54	36.0%
11- 15 years	26	17.3%
16-20 years	12	8.0%
Greater than 20 years.	5	3.3%
Managerial role		
Yes	88	58.3%

No	63	41.7%

Psychometric properties of measures

Reliability and validity

Content Validity

The researcher designed the survey and it was given to a panel of experts to give their comments on the content validity of the instruments and to suggest any deletions, additions, or modifications in the tool. Based on the panel comment, modification was done. A copy of the instrument is listed in Appendix (A).

Constructive validity

Based on the data collected from the survey, Table 3 were formulated and it shows that the minimum Cronbach's alpha (0.70) was met by all constructs (Nunnally, 1978) which means that the Instrument has very good reliability. Cronbach's alpha values ranged from 0.74 to 0.94. To reach such high Cronbach's alpha UT1 and FRQU3 were dropped because they resulted in Cronbach's alpha <0.70 and they are part of Usage (US) items to have a value of 0.744. all items were loaded on their construct. All items loaded om their intended construct. Moreover, the Corrected Item-Total Correlation values for all items show high correlation which was an indication of high convergent validity.

Table 3: Reliability and validity evaluation

	(AT)	(PE)	(EE)	(FC)	SRQ	(SYC)	(US)	(SC)	Corrected Item-Total Correlation
AT1	.939								.650
AT2	.960								.663
AT3	.938								.695
PE1		.936							.682
PE2		.953							.665
PE3		.938							.659
EE1			.926						.694
EE2			.953						.685
EE3			.924						.681
FC1				.896					.679
FC2				.904					.704
SRQ1					.880				.730
SRQ2					.906				.812
SRQ3					.875				.657
SRQ4					.905				.724
SYS1						.906			.801
SYS2						.906			.803
SYS3						.827			.709
SYS4						.876			.709
SYS5						.784			.669
SYC6						.807			.680
US1							.897		.729
US2							.907		.675
US3							.616		.326
SC1								.911	.789
SC2								.932	.796
SC3								.929	.833
SC4								.911	.811
Cronbach, s Alphas	0.94	0.94	0.94	0.77	0.86	0.93	0.744	0.94	

Results of the Study

The data collected were analysed using the well-known software, Statistical Package for Social Sciences (SPSS) computer program version 23.0 for window 7 with service pack version too. The researcher used the followings descriptive and inferential statistical techniques:

1. Descriptive statistics (Means, Standards Deviations and variance) in Appendix (B).

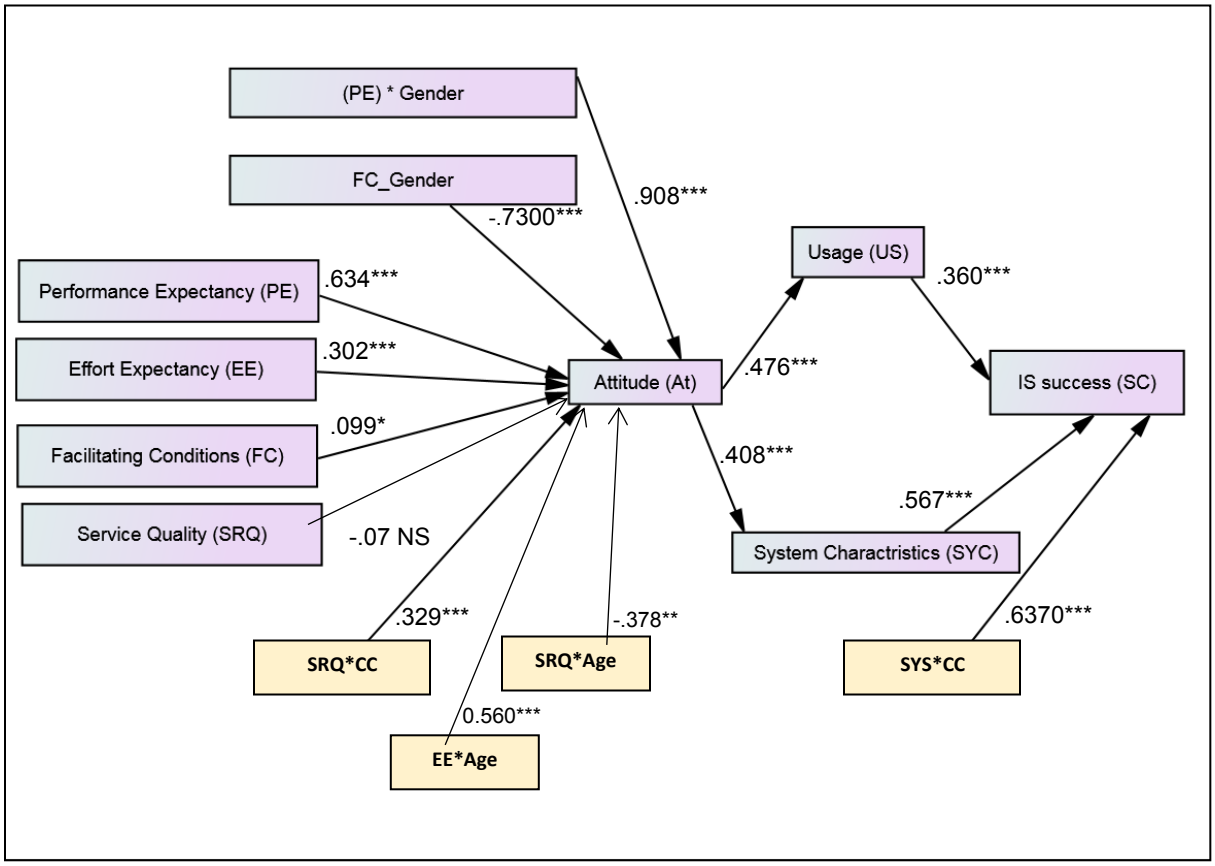
2. Inferential statistics: Single and Multiple Linear regression statistical analysis was conducted to test the research questions and hypothesis which are related to the impact of independent variables on the dependent variables shown in the model. An alpha level of 0.05 was used to test the significance level for each of the research hypothesis.

Several tests were performed to ensure the assumption for the multiple regression models, for example, multicollinearity was not a problem since the variance inflation (VIFS) were below 10 for eight regression models, From the Durbin Watson statistic test, the Autocorrelation was not an issue, since the D.W less than 2.1.

Table 4: Liner regression results

Model	Variables		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics		Durbin-Watson
	Dependent	Independent	B	Std. Error	Beta	t	Sig.	Tolerance	VIF	
1	**IS success (SC)**	Constant	.059	.217		.272	.786			
H1, 2	R2=0.70 , F=	US	.453	.071	.360	6.35	.000	*.636*	1.586	1.972
	170.54, Sig = 0.00	SYC	.603	.060	.567	10.00	.000	*.636*	1.586	
2	**Usage (US)**	Constant	2.054	.240		8.543	.000			
H3	R2= 0.23,	(At)	.364	.055	.476	6.598	.000	1.000	1.000	2.014
	F=43.53, p=000									
3	**System**	Constant								
H4	**Characteristics**		1.901	.295		6.434	.000			
	(SYC)									1.488
	R2= 0.17,	(At)	.370	.068	.408	5.455	.000	1.000	1.000	
	F=29.76 , p=000									
4	**Attitude (At)**	Constant	-.030	.170		-.178	.859			
H5,6,	R2= 0.845	PE	.667	.064	.634	10.348	.000	*.283*	3.527	
7,8	, F=198.42,	EE	.317	.064	.302	4.927	.000	*.284*	3.526	1.995
	p=000	FC	.110	.059	.099	1.864	.064	*.374*	2.672	
		SRQ	-.073	.055	-.070	-1.329	.186	*.381*	2.625	
5	**Attitude (At)**	Constant	4.085	.102		40.133	.000			
H9,10	R2= 0.12	PE *	.491	.119	.908	4.133	.000	*.124*	8.078	.494
	, F=9.74,	Gender								
	p=000	FC*Gend	-.466	.140	-.730	-3.325	.001	.124	8.078	
		er								
6	**Attitude (At)**	Constant	3.970	.130		30.522	.000			
H11,	R2= 0.08	EE * Age	.292	.091	.560	3.216	.002	*.206*	4.863	.632
12	, F=6.34,	SRQ*Ag	-.227	.104	-.378	-2.174	.031	*.206*	4.863	
	p=002	e								
7	**Attitude (At)**	Constant	3.389	.211		16.085	.000			
H13	R2= 0.11,	SRQ*CC								.847
	F=18.129,		.257	.060	.329	4.258	.000	1.000	1.000	
	p=0.000									

8	**IS success (SC)**	Constant	2.200	.170		12.945	.000			
H14	R2=0.41 ,	SYC *								1.790
	F=101.52,	CC ,	.493	.049	.637	10.076	.000	1.000	1.000	
	Sig =0.00									



*** =P <0.01, **= P<0.05, *= P<0.1, NS: not significant

Figure 4: Path Analysis

Hypothesis Testing

To answer the first research questions, four multiple regression analysis were performed. The Explanatory power of the models was examined using R^2 values for the dependent variables. The first regression model which was the relationship between the **IS success (SC)** and both **Usage (US) a**nd **System Characteristics (SYC)** was significant (p=. 00) with R^2 = 0.70. The second regression model which was the relationship between the **Usage (US)** and the Attitude (AT), was significant (p=0.0000) with R^2 = 0.23. The third regression model which was the relationship between the **System Characteristics (SYC)** and the Attitude (AT), was significant (p=0.0000) with R^2 = 0.17. The fourth regression model which was the relationship between the **Attitude (AT)** as dependent variables and **PE, EE, FC and SRQ** as independent variables was significant (p=0. 0000) with R^2 = 0.845.

The first model was used to test H1, H2 in which the dependent variable, **IS success (SC)**, was regressed against the US and SYC. The regression equation was significant (f= 175.25, Sig = 0.00) and explain 70% of the variance in the **IS success (SC)**, so H1and H2 were significant as shown in figure 4. To test hypothesis H3, single linear regression analysis was run (second model). The dependent variable **usage (US)** was regressed against the independent variable **Attitude (At)** The regression equation was significant and explained 23% of the variance in the **usage (US)** as shown in figure 4, H3 were significant. Another single linear regression analysis was run (third model) to test hypothesis H4. The dependent variable **System Characteristics (SYC)** was

regressed against the independent variable **Attitude (AT)** The regression equation was significant and explained 17% of the variance in the **System Characteristics (SYC);** as shown in figure 4, H4 was significant.

To test hypothesis H5, H6, H7 and H8 a fourth regression model was run. The dependent variable Attitude was regressed against independent variables: PE, EE, FC and SRQ. The regression model test revealed that there was a significant relationship between the attitude and PE with a standardized coefficient (.634) and sig. (0.00). Thus, H5 was supported. It should be noted that among the fourth independent variables included in the fourth model, PE was the most influential factor of all in the model, as indicated by the coefficient value of multiple regression between the fourth independent variables and dependent variables. In addition, H6 was significant with a standardized coefficient (0.302) and sig (0.00). H7 was also significant at 0.1 with standardizes coefficient (0.099). H8 was not significant (sig <0.1).

Moderating effects of Age, Gender and Computer Confidence

To answer the second question of the research which is "*RQ2: Do demographics such as gender, age and computer confidence moderates the hypothesized relationships?"* another four regression models were used. As shown in table 4 models from 5 to 8.

The fifth regression model in table 4 which was the relationship between the **Attitude (AT)** as dependent variable and **PE** with the moderating effect of **Gender** and

the relationship between **Attitude (AT)** and **FC** with the moderating effect of **Gender** as independent variables was significant (p=0. 0000) with R^2 = 0.12. Similarly, the sixth regression model in table 4 which was the relationship between the **Attitude (AT)** as dependent variable and **EE** with the moderating effect of **the Age** and the relationship between **Attitude (AT)** and **SRQ** with the moderating effect of **Age** as independent variables was significant (p=0. 002) with R^2 = 0.08.

The Seventh regression model in table 4 which was the relationship between the **Attitude (AT)** as dependent variable and **SRQ** with the moderating effect of **CC** as independent variables was significant (p=0. 002) with R^2 = 0.11. Finally, the eighth regression model in table 4 which was the relationship between the **Attitude (AT)** as dependent variable and **SYS** with the moderating effect of **CC** as independent variables was significant (p=0. 002) with R^2 = 0.41.

For testing H9 and H10, multiple regression analysis was run (Model 5) in table 4 which the dependent variable, **Attitude (AT)**, was regressed against the **PE with the moderating effect of gender** and **FC with the moderating effect of gender**. The regression equation was significant (f= 9.74, Sig = 0.00) and explain 12% of the variance in the **Attitude (AT)**, so H9 and H10 were significant as shown in figure 4. however, the coefficient sign for H10 was in the opposite direction (negative).

Similarly, for testing H11 and H12, multiple regression analysis was run (Model 6) in which the dependent variable, **Attitude (AT)**, was regressed against the **EE** with **the moderating effect of Age** and **SRQ** with **the moderating effect of the Age**. The

regression equation was significant (f= 6.34, Sig = 0.00) and explain 8% of the variance in the **Attitude (AT)**, so H11 and H12 were significant as shown in figure 4. however, the coefficient sign for H12 was in the opposite direction (negative).

The seventh regression model was used for testing H13 and revealed that there was a significant relationship between the **Attitude (AT)** and **SRQ with the moderating effect of CC** with standardized coefficient (0.329) and sig (0.00) as shown in figure 4. Thus **H13** was supported.

Finally, H14 was tested using single linear regression (Model 8) and the result presented that there was a significant relationship between the **IS success (SC)** and **SYC with the moderating effect of CC** with standardized coefficient (0.637) and sig (0.00). As shown in figure 3. Thus **H14** was supported.

Open ended questions Results

To answer the third question in the research which is "*: How can the Qatar government foster efficiency and effectiveness in its usage of information system aimed at offering services to the public?"* two open ended questions were used and the results were as follows:

Table 5: Open ended questions responses

What are the obstacles you are facing in using the information systems in the workplace?	Count	%
The system is hard to use	10	20%
Out dated systems	7	14%
Unreliable systems	6	12%
Lack of features that ease our work	5	10%
Hard to get the Data	5	10%
Slow systems	4	8%
Data are not accurate	4	8%
old pc's	3	6%
Old data	3	6%
The server always busy	1	2%
Not used to the system	1	2%
Lack of training	1	2%
I am not capable to use the systems	1	2%
	51	100%
What are your suggestions to remove those obstacles?		
Provide user friendly systems	10	18%
Provide up to date systems	9	16%
Give training courses	6	11%
Add new features that will help ease the work	5	9%
Provide more reliable systems	5	9%
Solve the slow system problems	4	7%
New PC's and computer equipment’s	4	7%
Provide accurate data	4	7%
Ease the way to get data and reports	2	4%
Employ only qualified IT staff	2	4%
Provide up to date data	2	4%
Stop network shutdown	1	2%
Test the systems before employing them	1	2%
	55	100%

Based on the data collected from open ended question *"What are the obstacles you are facing in using the information systems in the workplace?"* Several obstacles were mentioned. But, it can be seen from table 5 that the majority of the respondents stated that the IS in their workplace are hard to use (20%), a quarter of the responses complained about the data quality, 10% mentioned that the IS lack for some necessary features and 12% said that the IS are not reliable. Another 14% complained about the out dated systems.

For the open ended question "*What are your suggestions to remove those obstacles?"* Many suggestions were collected to solve the obstacles that were mentioned in the previous question as shown in table 5. However, most of the responses (18%) suggested to provide more user friendly systems, (16%) to provide more up to date systems, (11%) to give training courses and (9%) to provide more reliable systems and add more features that will ease their work.

CHAPTER 5 – DISCUSSION

Introduction

This chapter discusses the results obtained in this study with regard to the existing literature on past studies by other researchers. With regard to the research questions, the first part of this chapter explores the factors influencing the Qatar government employees' attitudes to use the information systems in the public sector. This is followed by an analysis of the ways through which the Qatar government can foster efficiency and effectiveness in using of information system in the public sector. Before the chapter concludes, the moderating roles of demographic factors of age, gender and computer confidence on the results obtained in this study are brought into focus.

Factors Influencing the Qatar Government Employee's Attitude to Use Information Systems

This study investigated the influence of performance expectancy (PE), effort expectancy (EE), facilitating conditions (FC) and service quality (SRQ) on the attitudes (AT) of public employees in Qatar towards information system. Based on the results obtained in this study, the regression results obtained revealed that only PE, EE and FC were significant at 99% and 90% confidence level ($P<0.01$ for PE and EE, $P<0.1$ for FC) with P value of 0.000 for PE*AT and EE*At, while FC*At had a significance value of

0.064. Unexpectedly, SRQ was not significant predictors of AT among the Qatar public employees, with a P value obtained being higher than 0. 1 (i.e. SRQ*AT = 0.186).

From these findings, it is evident that PE, EE and FC were directly related to government employees' attitudes towards IS, and hence the attitudes that the employees had on the IS systems being implemented by the government were directly linked to the perceived benefits and ease of use of the technology in their workplace. These findings seem to corroborate with a previous study conducted by Gupta (2011) which revealed that, when employees perceive a technology being beneficial in terms of enhancing performance at their workplace, they develop positive attitude towards such technology.

Similarly, a study conducted by Gliedman (2011) revealed that, when employees perceive a technology to be making their work easier (perceived effort expectancy - EE), they readily develop positive attitudes towards such technology. With the public sector being often associated with low employee morale, leveraging information system which makes employees work easier and more efficient, easily contributes towards positive attitudes towards the technology the employees (Moon, 2014; Calisir et al., 2014). As such, the findings in this study have confirmed that, introducing an information system which is perceived to improve the performance and reduce effort use in using it is a key strategy that contribute to the success of such technology because the target users would develop a positive attitude towards it; leading to high usage rate.

From the results obtained in this study, a positive relationship between user attitude and system usage which is determined by frequency of use and utilization was

established (P=0. 000, R2 = 0.23). These findings support a recent study conducted by Elmuti and Abou-Zaid (2013) which found that when employees perceive a technology to able to improve their performance while reducing their effort required, positive attitude usually develop leading to increased usage rate and reliance on the technology in their day to day activities. Moreover, a positive link between FC and AT obtained in this study implies that employees of Qatar have strong links to the facilitating conditions for IS at the workplaces and their attitudes towards the IS.

These findings seem to support a number of past studies (e.g. Mansour & Ghazawneh, 2009; Salvendy, 2001), which found out that facilitating conditions were significant predictors of employees' attitudes towards information system being implemented in their organizations. Similarly, Mansour and Ghazawneh (2009) argued that facilitating conditions like power and internet among others play an important role in influencing users' attitudes towards information system. The findings obtained in this study imply that, Qatar employees in the public sector do prioritize the relevance of FC, and thus it is important for the government to ensure that the necessary facilitating conditions are availed for successful usage of IS.

Nonetheless, this study also found that SRQ was an insignificant predictor of AT among the Qatar public sector employees which was unexpected. While a number of past studies (e.g. DeLone & McLean, 2003; Gil-Garcia, 2013) have pointed out that service quality (SRQ) is directly related to user attitudes (AT) of an information system; this study revealed otherwise where no significant relationship was found between SRQ and

AT among the participants. These findings can be explained using Palvia and Sharma (2007) ideas that, when an information system is user-unfriendly, it is possible that the users may not be able to link SRQ and their attitudes because the technology is unfamiliar to them to an extent.

From the results obtained, most of the employees revealed that the current information system at Qatar public sector is less user-friendly, and hence they find it difficult to relate their AT towards the information system to service quality, because in most cases service quality is evaluated on the performance of service providers in terms of tangibles, assurance, reliability, responsiveness, and empathy (Bwalya, 2013; Garson, 2006); and hence with low know-how of the technology the users may not be in a position to understand it better.

With all the information systems being internally managed, it is possible that SRQ may not be significant to the government employees, but rather to the citizens when accessing government services. This explains why the current study did not find a significant relationship between SRQ and AT towards IS among the public employees in the state of Qatar.

The Moderating Role of the Demographic Factors of Gender, Age, and Computer Confidence on the Results Obtained

The moderating role of the demographic factors on the results obtained was further analyzed in this study where it was revealed that gender, age and computer

competence moderates the results obtained. First, the moderating role of gender of the relationship between PE and AT was found to be significant with P value of 0.000. This implies that, the perception of the link between PE and AT of the participants towards IS varied across the gender lanes; which seems to support Dečman and Klun (2015) ideas that males exhibit stronger relationship between PE and AT towards information system than female employees because of the perceived dominance of males in the technical fields which has led to the males being more exposed to technology than their female counterparts in the developing world; and especially in Arab dominated countries where females were traditionally considered to be less equal to males (Elmuti and Abou-Zaid, 2013). As a result, it can be argued that male employees in Qatar public sector tend to exhibit stronger relationship between PE and AT towards information system than their female counterparts.

The moderating role of gender on FC and AT towards IS among the public employees in Qatar was also investigated in this study where the P value obtained of 0.001 indicated that gender was significant to this relationship. However, the relationship is negative since the value of the coefficient obtained (- 0.7300) reveals that gender negatively influences the relationship between FC and AT. Since the research hypothesis suggested that males exhibit stronger relationship between FC and AT, the findings in this study reveal that females seem to have stronger perception of FC and AT; since negative relationship on the research hypothesis was obtained. Though past studies (e.g. Khreisat, 2009; Laosethakul and Astone, 2003) indicated that males are able to establish a stronger link between FC and AT than females, unexpectedly the results obtained in

this study reveal otherwise since females seem to have stronger attachment for FC and AT in Qatar, which can be explained by Sebina and Mazebe II (2014) that, most of the working women in Qatar public sector are educated, and seem to have better understanding on how to work with technology; and this explains why they have stronger connection between FC and AT. Traditionally, males in Qatar have dominated the workplaces, until in the 21st century where females were empowered through education and subsequently absorbed in the conventional workplaces. Since the Qatari female workers relatively new to the workforce in Qatar; especially, in the IT sector, they need more technical and personal support, compared to the male workers. As such, the impact of FC was stronger on the female workers' attitude than for their male counterparts.

Further, the aspect of age was investigated on whether it moderates the relationship between EE and AT, and also SRQ and AT. With regard to the results obtained, age was found to statistically significant moderator of the relationship between EE and AT towards IS with a P value of 0.002, computed at 99% confidence level. These findings seem to be supported by Workman (2007) who pointed out that, older technology users are more experienced, and hence are able to establish a stronger relationship between EE and AT towards technology. Specifically, elder employees tend to be well versed with the nature of their job, and hence are in a better position to establish whether EE exerts higher attitude on them towards the technology (Smith and Salvendy, 2001). From these findings, it can be argued that older employees in Qatar public sector exert stronger relationship between EE and AT, compared to their younger ones.

Similarly, the regression tests obtained in this study also established the moderating role of age on SRQ and AT towards technology, with P value of 0.031 at 95% confidence level. However, the value of the coefficient obtained is negative (-0.378) which indicates a negative moderating role of age on the relationship between SRQ and AT, which is against the formulated hypothesis. Since SRQ is defined by the differences between the expected performance and the actual performance of technology (Khreisat, 2009); younger employees who seem to be more educated and exposed to modern technology than their older counterparts are in a better position to understand the extent of service quality in an information system based on their exposure to technology (Workman, 2007); and hence a stronger link between SRQ and AT can be considered to exist among the younger employees compared to the older ones. As revealed in the findings in this study, younger employees established stronger relationship between SRQ and AT, compared to the older employees; and hence it can be inferred that age is a key factor that moderates employees' perception of the service quality of IS and the subsequent attitudes they develop towards the technology in Qatar public sector, where younger employees who are have grown with technology seem to exhibit stronger link between SRQ and AT.

Moreover, the moderating role of computer confidence (CC) on the relationship between SRQ and AT was also investigated in this study where a P value of 0.000 and standardized coefficient of 0.329 were obtained. These findings seem to corroborate with a study conducted by Brown et al. (2014) which revealed that, when people's computer confidence changes, their perceptions of SRQ and IS also changes. This is because

computer confidence is related to how well an individual can use technology, and hence individuals with high computer confidence establish a high threshold for evaluating SRQ and hence their attitudes also changes (Sebina and Mazebe II, 2014). This is an implication that, CC among the public employees in the state of Qatar is a key factor that seems to influence how they interpret the SRQ and subsequent attitudes towards the technology.

Similarly, CC was also found to be significant moderator on the relationship between SYC and IS Success with P value of 0.000 and standardized coefficient 0.6370. With regard to a study conducted by Khan and Pessoa (2010), when people have high computer confidence, they are usually in a better position to point out the specific characteristics of the technology, and whether it has the capacity to perform its intended role effectively. This shows the moderating role that CC plays on the relationship between SYC and IS success, since when people have high computer confidence are capable of analyzing the information system more objectively, and hence impacting on its success (Khan and Pessoa, 2010). As such, from the results obtained in this study, Qatar public sector employees who have high computer confidence can be considered to being a position to better understand the system characteristics, which further influences their attitudes towards the information system and subsequent success of the information system in the public sector.

How the Qatar Government Can Foster Efficiency and Effectiveness in its usage of Information System?

With regard to the results obtained in this study, it was revealed that IS usage and system characteristics were positively related to IS success. Specifically, IS and SYC was found to be significant to system success based on the significant values obtained (P=0. 000 each), and correlation coefficients (R^2) of 0.360 and 0.567 respectively. From these findings, it is evident that the higher the system usage, the higher the chances of IS success in the government sector; which seems to corroborate with past studies conducted by Khan and Pessoa (2010) and Zheng et al. (2013) which revealed that high rate of usage of IS plays a significant role towards the success of the information system.

The government of Qatar can foster the efficiency and effectiveness in using IS system by designing workplace tasks which only necessitates the use of IS, in order to encourage employees to get used to information system to service the public better and more efficiently. By doing so, the government will be in a position to promote utilization and frequent use of IS, leading to its successful usage since everyone will be used to working with the technology.

Similarly, system characteristic (SYC), which is characterized by system quality and information quality was also found to be critical for IS success in the Qatar public sector. Past studies have revealed that, information quality and system quality play a critical role in the success of IS in the sense that, with high IQ and SQ, people are able to use the IS more efficiently and in a meaningful way (Calisir et al., 2014). As such, with

this study revealing that public employees in Qatar strongly link SYC with information system success in the public sector; it is important the government ensures the IS adopted in the sector is characterized by high information quality and system quality altogether.

This is because as suggested by Wang (2012), when employees engage in the use of information system of high quality, alongside high information quality; they develop a strong attachment to it leading to its success. On this basis, therefore, it is important that Qatar government procurement departments in the information system focus on adopting IS which are characterized by high information quality and system quality as well. The findings obtained in this study revealing that majority of the participants revealing that the systems in their workplace are hard to use (20% of the total participants), there is a need for the government to provide user-friendly systems as reflected in the suggestions made by the participants (18% of the participants).

Considering that Qatar is one of the developing countries whose adoption of technology has been recently, the need for the government to source for easy-to-use information systems is necessary. This is because with easy-to-use systems, the employees in the government sector will be in a position to have control of the processes executed through the system, and this will also increase their efficiency using the information system (Gupta, 2011). It is therefore very important that the Qatar government prioritize the adoption of simple technologies rather than benchmarking with the developed countries where people are used to working with complex technologies, yet in Qatar people have been exposed to technology in the last few decades.

Moreover, 14% of the participants indicated that most of the systems in the country are outdated, and hence the need for the provision of up-to-date systems as suggested by 16% of the participants. Given the way the world is moving rapidly with new technology, the need for government employees to be introduced with modern technology cannot be underestimated (Aggrawal & Kaur, 2013). This is because with outdated technology, the performance of the employees would be limited as a result of the inefficiencies created by the old technology. Moreover, Brown and Garson (2013) observed that hen the information system is considered by users to be outdated or out of order; they are most likely to develop negative attitudes towards it, and hence leading to their unwillingness to continue using it.

Therefore, the Qatar government needs to refurbish its public sector workplaces with new and modern information systems in order to make it more convenient and efficient for the employees to complete their tasks more competently. In order to ensure that the usage of the information system in the public sector is sustainably successful, Qatar government needs to prioritize on staff training, as suggested by 11% of the participants. According to Sebina and Mazebe II (2014), the success of every technology-based initiative necessitates the availability of highly skilled workforce to work with the technology; and hence in Qatar, the government needs to prioritize staff training.

Considering that Qatar is an adopter of technology, some of the employees may not be well exposed to technology, and hence offering them the necessary training opportunities in order to revamp their competence in terms of technology use is

necessary. By training staff members on new technology use, the government will be in a position to achieve higher success in the IS usage associated with highly efficient and competent staff members.

CHAPTER 6 – CONCLUSION AND RECOMMENDATIONS

This is the last chapter of this study, which presents the conclusions of the research study where a summary and implications of the research findings are brought into focus. Further, as the chapter concludes, the researcher presents directions for future research based on the current study's limitations.

Research Summary and Conclusions

With the aim of this study being to investigate the factors for success usage of information system in the public sector of Qatar, various research questions were formulated to help the research achieve this aim more comprehensively. The first research question was to identify the factors that influence the public employees' attitudes in Qatar towards information system. Based on the results obtained in this study, it was revealed that performance expectancy, effort expectancy, and facilitating conditions are among the key predictors of Qatar public employees' attitudes towards technology.

As a result, information system with high perceived performance expectancy, effort efficiency and favorable facilitating conditions are readily acceptable by the employees as a result of high positive attitude they have towards such technology, leading to frequent usage and utilization; and subsequent success of the technology into

the public sector. Though service quality was not found to be a predictor of employees' attitude; it can be argued that Qatar has already invested on technology which most of the employees find it less user-friendly and outdated, and hence making it difficult for the employees to link SRQ and their attitudes.

In line with the research questions, the researcher also investigated the moderating role of gender, age and computer confidence on the results obtained. From the research findings obtained in this study, gender was found to be a moderator for the relationship between user attitudes and performance expectancy and facilitating conditions. Similarly, age was found to directly moderate the relationship between user attitudes, and effort expectancy and service quality. Moreover, computer confidence was found to moderate the relationships between attitude and service quality, and system characteristics and information success.

With regard to the moderating role of these demographic factors on the various constructs related to the adoption and acceptance of information system among the public employees in Qatar, it is important that policy makers on issues related to the usage of IS takes into consideration these demographic factors among the public workers in order to foster success in the usage process. With regard to the results obtained in this study, the researcher has identified a number of ways through which the Qatar government can promote efficiency and effectiveness of usage of information system in the public sector, sourcing of user-friendly information systems with a higher promise of enhancing performance and easy to use by the employees is considered to be necessary.

Moreover, the adoption of up to date systems can be quite helpful to promote efficiency and effectiveness in the information system in the public sector. It is also critical for the government to train its current employees in order to foster their computer confidence and subsequent efficiency in working with technology.

Limitations and Future Research

Though this study has achieved the intended purpose, it has not been without some limitations and challenges. One of the limitations facing this study is that, only a small sample of 151 responses was analyzed in this study. Though the researcher acknowledges the time limitation was the ultimate reason for adopting only a small sample size in this study, the generalizability of the research findings is limited. The research recommends that future research on the research problem, adopts larger sample sizes which ought to be computed with respect to the actual population size in order to foster the external validity of the research findings. Selecting participants from more departments and sectors in the public sector can also be quite useful, since in this study only participants from health, education, public administration and public security were selected.

Moreover, though this study has been able to identify the key success factors for the adoption of information system in the public sector, the key gaps in the usage of information system in the country's private sector were not identified. As such, a study

comparing the success factors in the usage of information system in both the public and private sector would be beneficial in order to bring into focus any gaps that exist between information system usage in the public sector when compared to the private sector which past reports have shown that is dominated by expatriates from developed countries. By conducting a comparative study on how a successful usage of information system has been implemented in the Qatar's public sector against the private sector in the country, it will be easier to deduce the key areas that the government need to focus in order to be able to match the private sector in terms of service delivery to the public.

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APPENDIX A – QUESTIONARRE

DETERMINANTS OF SUCCESS USAGE OF INFORMATION SYSTEMS IN PUBLIC SECTOR IN THE STATE OF QATAR

Dear Participant;

My name is Sara Al-Noaimi and am a graduate student of MB and this questionnaire is part of my graduation research where I attempt to improve the understanding of how to successfully implement information systems and ensure their usage by the employees in in the Public Sector in the State of Qatar. Your input is an essential element in this study and will be kept strictly confidential. This information will be used for research purposes only. It will take approximately 10 minutes to complete the survey. Your participation is voluntarily and you may withdraw anytime. The time and effort you spend in answering this survey is highly appreciated. If you have any questions pertaining to this survey or research study, please feel free to contact me at my email address: 200561223@qu.edu.qa

Sincerely,

Sara ALNoaimi

MBA Student

عوامل الاستخدام الناجح لنظم المعلومات في القطاع العام بدولة قطر

عزيزي المشارك؛

أنا سارة النعيمي طالبة في ماجستير ادارة الاعمال بجامعة قطر و هذا الاستبيان جزء من بحث التخرج حيث يهدف لتحسين فهم كيفية تطبيق نظم المعلومات بنجاح وضمان الاستخدام من قبل الموظفين في الجهات الحكومية القطرية. مشاركتك عنصر أساسي في هذه الدراسة، وستحاط الاجوبة بالسرية التامة. وسوف تستخدم هذه المعلومات لأغراض البحث فقط. وسوف يستغرق تعبئة الاستبيان حوالي 10 دقائق.مشاركتكمطوعيةويمكنك الانسحابفيأيوقت. الوقت والجهد الذي تقضيه في الإجابة عن هذا الاستبيان هو محل تقدير كبير. إذا كان لديك أي أسئلة تتعلق بهذا الاسبيان أو الدراسة، لا تتردد في الاتصال بي على عنوان بريدي الإلكتروني: qu.edu.qa@200561223

كليه الإدارة و الاقتصاد في جامعة قطرتدعم ممارسة الحماية للمشاركين في البحوث والأنشطة ذات الصلة.

مع خالص التقدير،

سارة النعيمي

طالبة ماجستير إدارة أعمال

The definition of Information Systems in this survey

An information system (IS) is a computer-based tool used for storing, managing, using and gathering of data and communications in an organization that is provided by your organization to enable you to complete efficiently your work. An example of those systems could be HR applications, procurement systems, accounting systems, dashboards ...etc. that you use at your workplace only.

تعريف نظام المعلومات لغرض هذه الدراسة

نظام المعلومات هو أداة حاسوبية تستخدم لتخزين وإدارة وجمع البيانات والاتصالات في المؤسسة والتي يتم توفير هذه النظم من قبل المؤسسة ليتمكن الموظف من إكمال اعمالهم بكفاءة. مثال على هذه النظم يمكن أن تكون تطبيقات الموارد البشرية، نظم المشتريات ونظم المحاسبة، ... الخ. التي تستخدمها في مكان عملك فقط.

If you are an employee in the Public Sector, please complete this survey

إذا كنت موظف في القطاع العام الرجاء الإجابة على ملء هذا الاستبيان

Please indicate the extent to which you agree/disagree with the following statements 1–33, (1 – strongly disagree; 2 – disagree; 3 – neutral; 4 – agree; strongly agree).

يرجىالإشارةإلى مدى الموافقة /عدم الموافقة للعبارات التالية (1-33)، باستخدام (1 – لاأوافق بشدة، 2 – لا أوافق، 3 - محايد؛ 4 - أوافق،أوافق بشدة).

SECTION 1 – ATTITUDE					
Item	1	2	3	4	5
1. I feel using Information systems in work is a wise idea 1. أشعر أن استخدام أنظمة المعلومات في العمل فكرة حكيمة					
2. I like to use Information systems in my workplace 2. أنا أحب استخدام أنظمة المعلومات في مكان العمل					
3. I feel using Information systems in work is an exciting idea 3. أشعر أن استخدام أنظمة المعلومات في العمل فكرة مثيرة					
SECTION 2– PERFORMANCE EXPECTANCY					
4. I would find IS useful in my job 4. سأجد أنظمة المعلومات مفيدة في عملي					

5. Using IS enables me to accomplish tasks more quickly 5. استخدام انظمة المعلومات يخولني من انهاء المهام بشكل أسرع					
6. Using IS increase my productivity 6. استخدام أنظمة المعلومات يزيد من انتاجيتي					
SECTION 3-EFFORT EXPECATNCY					
7. My interaction with the IS at my workplace would be clear and understandable 7. تفاعلي مع نظام المعلومات في مكان العمل سيكون مفهوم وواضح					
8.It would be easy for me to become skillful at using the IS in the workplace 8. سيكون من السهل اتقان استخدام نظام المعلومات في مكان العمل					
9. I would find the IS easy to use at my workplace 9. سأجد نظام المعلومات في مكان العمل سهل الإستخدام					
SECTION 4– FACILITATING CONDITIONS					
10. I have adequate office set-up and equipment to use Information					

system at my workplace 22. لدي المكتب المجهز بالادوات اللازمة لإستخام أنظمة المعلومات في مكان العمل						
11. I can get help from others when I have difficulties in using Information system at my workplace 23.أستطيع الحصول على المساعدة عند مواجة المشكلات أثناء استعمال أنظمة المعلومات في مكان العمل						
SECTUION 5 – IS CHARACTERISTICS						
System quality						
	12. Information system is always available at the workplace 13. أنظمة المعلومات في مكان العمل دائما متاحة					
	13. Information system is user friendly at my workplace 14. أنظمة المعلومات في مكان العمل سهلة الاستخدام					
	14. The Information system has attractive features that appeal to users 15.أنظمة المعلومات لها خصائص جذابة تشد المستخدمين					
Information	15. The Information system at my workplace provides information that is exactly what you					

quality	need. 16. أنظمة المعلومات توفر االبيانات التي احتاجها بالضبط					
	16.The Information system provides information that is easy to understand 17. أنظمة المعلومات في مكان العمل توفر بيانات سهلة الفهم					
	17. The Information system provides up to date information at my workplace 18. أنظمة المعلومات في مكان العمل توفر بيانات حديثة جدا					
Service quality	18.Information system at my workplace has up to date hardware and software 19.تعمل أنظمة المعلومات على أحدث البرامج والأجهزة في مكان العمل					
	19. Information system is dependable at my workplace 20. أنظمة المعلومات في مكان العمل يعتمد عليها					
	20.Information system employees provide prompt service to users 21. موظفي نظم المعلومات يقدمون خدمة سريعة للمستخدمين					
	21. Information system employees have the knowledge to do their job well 22.موظفي نظم المعلومات لديهم المعرفة لعمل وظيفتهم على أكمل وجه					

SECTION 6 – SYSTEM USAGE					
22. I frequently use Information system at my workplace 27. أستخد أنظمة المعلومات كثيرا في مكان العمل					
23. I depend upon the information systems at my workplace 28. أعتمد على أنظمة المعلومات في مكان عملي					
24. I only use the information systems when it is absolutely necessary for work 29.استخدامنظمالمعلومات للعملفقط عند الضرورة القصوى					
SECTION 7– IS SUCCESS					
25. The information system at my workplace has positive impact on my work 30. أنظمة المعلومات في مكان العمل لها تأثير ايجابي على عملي					
26. overall, the performance of the information system at my workplace is good 31. بشكل عام، أداء أنظمة المعلومات في مكان العمل جيدة					
27. overall, the information system is successful at my workplace					

32. بشكل عام، أنظمة المعلومات ناجحة في مكان عملي					
28.the information system is an important and valuable aid to me in the performance of my work 33. أنظمة المعلومات أداه قيمة ومهمة لي في أداء العمل					
SECTION 8 -FEATURE UTILIZATION					
29. I use all the features available in the IS at my workplace أستخدم جميع الخصائص المتوفرة بأنظمة المعلومات المتواجدة في مكان عملي؟	• strongly disagree • Disagree • Neutral • Agree • strongly agree	• لا أوافق بشدة • لا أوافق • محايد • أوافق • أوافق بشدة			
30. What is the percentage of your usage of the IS features at your workplace?	• 0-25% • 26-50%				

كم نسبة استخدامك لخصائص نظام المعلومات بجهة عملك؟	• 51-75% • 76-100%
SECTION 9-DEMOGRAPHICS	
31.Gender الجنس	• Male ذكر • Female أنثى
32.Age العمر	• 18-20 ١٨ - ٢٠ • 20-30 ٢٠-٣٠ • 31-40 -٣١٤٠ • 41-50 ٥٠-٤١ • 51-60 ٦٠-٥١ • Above 60 أكثر من ٦٠
33.Educational level المستوى التعليمي	• High school الثانوية العامة • Two year college دبلوم • Bachelor's degree جامعي • Post-graduate level

	دراسات عليا • Doctoral درجةالدكتوراه • Others أخرى
34. Do you have a managerial role? هل لديك دور اداري .	• Yes نعم • No لا
35. What is your current job? ما هو مسمى وظيفتك الحالية؟	
36. The length of service in the present job? مدة الخدمة في وظيفتك الحالية	• Less than 5 years أقل من ٥ سنوات • 5-10 ١٠-٥ • 11-15 ١٥-١١ • 16-20 ٢٠-١٦ • 21-25 ٢٥-٢١ • 26-30 ٣٠-٢٦ • 31 years and above أكثر من ٣١ سنة
37.Nationality	• Qatari قطري

الجنسية	• Non-Qatari غير قطري
38.What is your "computer confidence" level (10-point scale from 1-Not at all confident to 10-Totally confident) "ما هو مستوى الثقة لديك في استخدام الحاسب الآلي" (مقياس من ١٠ نقاط يبدأ من 1-ليس لدي الثقة الكافية في استخدام الحاسب، إلى 10- لدي الثقة الكاملة في استخدام الحاسب)	• 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • 10

SECTION 10- Difficulties

39. Do you experience any difficulties in using information systems at your workplace?

41. هل تواجه أية صعوبات في استخدام أنظمة المعلومات في مكان عملك؟

Yes () نعم ()

No () لا ()

If your answer for the previous question is yes

إذا كان جواب السؤال السابق نعم

40. What are the obstacles you are facing in using the information systems at the workplace?

إذا كان جواب السؤال السابق نعم، ماهي العقبات التي تواجهك أثناء استخدام أنظمة المعلومات في مكان العمل؟

41. What are your suggestions to remove those obstacles?

ماهي مقترحاتك لتخطي هذه العقبات؟

Thank you very much for your time

APPENDIX B – DESCRIPTIVE ANALYSIS

Variables	item description	Items	Items2	Reliability	N	Mean	Std. Deviation	Variance
Attitude (At)	I feel using Information systems in work is a wise idea		AT1	0.94	151	4.28	1.224	1.498
	I like to use Information systems in my workplace		AT2		151	4.18	1.206	1.454
	I feel using Information systems in work is an exciting idea		AT3		151	4.16	1.12	1.255
Performance Expectancy (PE)	I would find IS useful in my job		PE1	0.937	151	4.24	1.118	1.249
	Using IS enables me to accomplish tasks more quickly		PE2		151	4.23	1.169	1.366
	Using IS increase my productivity		PE3		151	4.21	1.099	1.208
Effort Expectancy(EE)	My interaction with the IS at my workplace would be clear and understandable		EE1	0.937	151	4.04	1.119	1.252
	It would be easy for me to become skillful at using the IS in the workplace		EE2		151	4	1.183	1.4
	I would find the IS easy to use at my workplace		EE3		151	3.99	1.119	1.253
Facilitating conditions (FC)	I have adequate office set-up and equipment to use Information system at my workplace		FC1	0.766	151	3.62	1.107	1.225
	I can get help from others when I have difficulties in using Information system at my workplace		FC2		151	3.65	1.15	1.323
Service Quality (SRQ)	Information system at my workplace has up to date hardware and software		SRQ1	0.86	151	3.32	1.209	1.461
	Information system is dependable at my workplace		SRQ2		151	3.46	1.221	1.49
	Information system employees provide prompt service to users		SRQ3		151	3.49	1.182	1.398

	Information system employees have the knowledge to do their job well		SRQ4		151	3.55	1.237	1.529
System Characteristics (SYC)	The Information system at my workplace provides information that is exactly what you need.	SYC 1	IQ1	0.93	151	3.48	1.16	1.344
	The Information system provides information that is easy to understand	SYC 2	IQ2		151	3.52	1.177	1.385
	The Information system provides up to date information at my workplace	SYC 3	IQ3		151	3.43	1.219	1.487
	Information system is always available at the workplace	SYC 4	SQ1		151	3.47	1.204	1.451
	Information system is user friendly at my workplace	SYC 5	SQ2		151	3.5	1.21	1.465
	The Information system has attractive features that appeal to users	SYC 6	SQ3		151	3.36	1.157	1.34
Usage (US)	I frequently use Information system at my workplace	US1	FRQU 1	0.744	151	3.92	1.086	1.18
	I depend upon the information systems at my workplace	US2	FRQU 2		151	3.89	1.105	1.221
	What is the percentage of your usage of the IS features at your workplace	US3	UT2		151	2.95	0.968	0.938
IS success (SC)	The information system at my workplace has positive impact on my work		SC1	0.94	151	3.87	1.129	1.276
	overall, the performance of the information system at my workplace is good		SC2		151	3.72	1.178	1.389
	overall, the information system is successful at my workplace		SC3		151	3.59	1.207	1.457
	the information system is an important and valuable aid to me in		SC4		151	3.9	1.176	1.383

	the performance of my work							

APPENDIX C – SUMMARY OF KEY LITERATURES REVIEWED

Authors /Years	Countries/ samples	Method	Independent Variables	Dependent Variable(s)	Key Findings
Adam-Mahmood, Burn, Gemoets & Jacquez (2000)	45 end-user satisfaction studies published between 1986 and 1998	Meta-analysis	Perceived usefulness, ease of use, user expectations, user experience, user skills, user involvement in system development, organizational support, perceived attitude of top management	user attitude toward information systems (IS)	The most significant relationships were user involvement in system development, perceived usefulness, user experience, organizational support and user attitude towards IS
Aggrawal & Kaur (2013)	A sample of 32 empirical studies were reviewed	Systematic literature review	Service quality; System quality; Information quality; management support; Perceived ease of use; Perceived usefulness; training; User satisfaction; User involvement. Behavior intention	Information system use (actual use)	This research paper found out that, information quality, system quality and service quality influences management support, training and user involvement which in return fosters perceived usefulness and perceived ease of use, leading to behavioral intention, user satisfaction and actual use.
Ajami & Mohammadi-Bertiani (2012)	75 peer reviewed journal articles were reviewed	Meta-analysis	User training	User satisfaction with information system; attitudes	The findings in this research paper showed that, training has direct impact on user satisfaction and attitudes towards information system
Alawadhi &Morris (2009)	Kuwait; sample of 249 students at Kuwait University	Survey; focus groups	usefulness, ease of use, reforming bureaucracy, cultural and social influences, technology issues and lack of awareness	Information system adoption	This concluded that, the tendency of students to adopt e-government services is influenced by technical issues, information trust, and awareness
Al-Farsi & E-Haddadeh (2015)	Wide range of empirical studies were explored	Systematic literature review	Corporate governance	Information system success/ failure	This study revealed that, effective corporate governance is essential for successful information system implementation in the public sector.
Alshare, Freeze, Lane & Wen (2011)	674 college students	Survey	comfort with online learning and perceived Web self-efficacy	Student satisfaction with e-learning	This study found that comfort with learning and web efficacy were key predicators of student satisfaction with e-learning
Amer &Iman (2008)	Qatar; 600 faculty members of Qatar University	Survey	Database usability; service quality	Intentions to use university database	The results obtained in this study revealed that, the university's database was under-utilized because of low usability and lack of maintenance for good service quality
Au & Cheng (2012)	Sample of 320 employees from eight airlines	Survey	Actual/expected performance; fulfilment, equity sensitivity, and involvement	end-user satisfaction (EUS) with IS	The results obtained in this study indicated that expected/actual performance and equitable needs fulfilment have impact on EUS; equity sensitivity and involvement

			congruence		congruence have no impact on EUS.
Barkin & Dickson (1977)	United States; University of Minnesota	Experiment	Cognitive style	Data selection process	The results obtained in the experiment revealed a strong relationship between cognitive style and data selection
Belanger & Carter (2005)	United States, Virginia State; 136 undergraduate students	Survey	Perceived usefulness, perceived ease of use, image, relative advantage, compatibility, trust of intent, trust of government	Intent to use information system	From the findings obtained, it was revealed that compatibility, perceived ease of use, and trustworthiness were significant predictors of citizens' use of e-government services
Burton-Jones & Hubona (2006)		Survey	Perceived ease of use ; perceived usefulness – TAM	Frequency and volume of use	TAM seem to be better used for the prediction of frequency of use rather than volume of usage
Calisir, Gumussoy, Bayraktaroglu &Karaali (2014)	546 blue-collar workers in US.	Survey	Perceived content quality, image, perceived system quality, perceived ease of use, and perceived usefulness	Behavioral intention to use web-based learning system	The findings in this paper indicated that, perceived usefulness is the strongest predictor of behavioral intention to use web-based learning system
Davis (2004)	A sample of 106 customer service representatives	Longitudinal field experiments	Perceived ease of use; perceived usefulness,	Future usage intentions of IS	Based on the results obtained, perceived ease of use and perceived usefulness have positive impact on behavioral intention and usage of IS
Decman (2015)	Slovenia; Sample of 384 respondents	Survey	Performance expectancy; social influence	Behavioral intentions towards IS	The findings in this paper revealed that, performance expectancy and social influence were strong determinants of employees' behavioral intentions to adopt IS
Dečman & Klun (2015)	Sample of 170 executors	Survey	user training, user documentation, user support, system usability, user interface, system speed, and specific system functionalities	e-recovery information system	The findings indicated that e-recovery system was well accepted by members with good training and high system usability
DeLone &McLean (2003)	Review of various literature materials	Systematic literature review	Information quality, system quality, service quality	Information success	The findings in this paper conclude that, information quality, system quality and service quality are critical predictors of IS success
Elmuti &Abou-Zaid (2013)	Kingdom of Saudi Arabia; sample of 400 former expatriates in American-based multinationals	Survey	Industrialization efforts, transfer of technology, management expertise, technical skills	Success of implanting information system	The findings in this paper indicate that, Gulf states have a wide range of resources, but low industrialization, and low technology transfer have hampered successful implementation of IS in the region
Elnaggar (2008)	Oman	Survey	Socio-cultural norms, innate characters of females, access and training, and career	Adoption of ICT by women	The findings in this study revealed that, socio-cultural norms, innate characters of females, access and training, and lack of career

			counselling		counselling among women hampered their adoption of ICT
Fang & Shih (2004)	Taiwan; sample of 425 respondents	Survey	Perceived behavioral control; perceived trust, perceived ease of use, perceived usefulness	Behavioral intentions towards virtual banking	The findings in this paper revealed that, perceived behavioral control and perceived trust were the most influential factors for the adoption of e-banking
Khreisat (2009)	Jordan; sample of 230 women	Survey	Cultural norms; training and education opportunities	Efficiency in the use of IS	The results obtained in this study revealed that, as a result of under-representation of women in education, and patriarchy; very few women are efficient in the use of IS
Kim & Kim (2002)	China;	Online survey	Usefulness, usability, system quality and instant connectivity	Internet mobile usage	From the results obtained, perceived usefulness, instant connectivity, usability and system quality predicted usage of mobile internet
Kim, Chae, Kim, Ho, Kim & Park (2012)	Korea; sample of 213 users of CDSS	Survey	Reliability of information, decision supporting capability, and departmental support	user satisfaction with information system	The results obtained indicated that, the reliability of information, decision supporting capability, and departmental support predicted user satisfaction with CDSS
Loch, Straub & Kamel (2003)	The Gulf Region	Systematic literature review	Organizational social norms; technology cultivation;	Acceptance of the internet	The findings in this paper reveal that, culture can inhibit and encourage technological innovation
Lu, Wang &Hayes (2012)	China	Survey	user technology readiness, optimism and insecurity	User trust and satisfaction, platform functionality	The findings in this paper revealed that, user technology readiness, insecurity and optimism had direct impact on perceived trust, satisfaction, and platform functionality
Moon (2014)	Korea; sample of 122 professionals in the tertiary hospitals	Survey	users' attitude, social influence, intention of use	Smartphones acceptance and utilization	From the results obtained, personal attitudes and social influence have strong influence on the adoption and utilization of smartphones by healthcare staff members in Korea
Nabali & Department of Health Services Administration, American University of Beirut (1992)	Bahrain, Kingdom of Saudi Arabia, Kuwait, Qatar and the United Arab Emirates	Interview; focus groups	Policies and practices of information system	Adoption and success of information system implementation	The adoption of computer-based hospital information systems (CBHIS) in public and private hospitals within Arabian Gulf region was influenced by the existing health policies in each country
Rainer, Laosethakul&Astone (2003)	Britain	Cross-sectional survey	Gender related computer self-efficacy, computer anxiety	Usage of computers	The findings in this study revealed that gender gaps usage and attitudes from 1995 were lessening in 2002.
Rosacker &Olson (2008)	United States	Systematic literature review	Project leadership, organizational culture	Successful implementation of IS	The findings in this study revealed that successful implementation of projects involving IS largely depend on the competence of leadership and organizational culture
Sharma &Yetton (2007)	Wide range of literatures	Meta-analysis of literature	Training, technical complexity, task	Successful information	From the findings in this study, the effects of training on IS

			interdependence	system implementation	implementation is a function of task interdependence and technical complexity
Shih & Fang (2004)	Taiwan; sample of 425 banking customers	Survey	Subjective norms, facilitating conditions, attitudes, efficacy	Behavioral intentions; usage of online banking	The results indicated that, the intention to use internet banking is influenced by users' attitudes and self-efficacy
Venkatesh & Morris (2000)	Sample of 342 workers	Cross-sectional survey	Mediating role of gender on subjective norm, perceived usefulness, perceived ease of use	Technology usage	This study revealed that women were more strongly influenced by the perceptions of ease of use and subjective norm than males
Venkatesh, Thong & Xu (2012)	Hong Kong; sample of 1512 mobile internet users	Survey	habit, hedonic motivation, price value	Technology adoption	The results obtained in this study indicated that habit and hedonic motivation were the most powerful factors affecting the adoption of technology by mobile users
Wang &Liao (2008)	Taiwan; 119 users of G2C	Survey	Information quality, system quality, service quality, user satisfaction, and perceived net benefit	IS usage	Except for system quality, all the other factors predicted information system use
Workman (2007)	United States	Survey	Information quality, system quality, and service quality	Technology and information use	This study found that expert system is the most power factor influencing the use of technology and information
Zheng, Zhao & Stylianou (2013)	United States	Survey	Information system quality	Perceived individual benefits; user satisfaction	The findings obtained in this study indicated that information and system quality have direct impact on perceived user benefits and user satisfaction