UNIVERSITY OF SOUTHAMPTON

FACULTY OF PHYSICAL AND APPLIED SCIENCE

Electronics and Computer Science

An E-knowledge Sharing Adoption Model for Kingdom of Saudi Arabia in Higher Education

By

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Thesis for the degree of Doctor of Philosophy in Computer Science

December 2016

UNIVERSITY OF SOUTHAMPTON

Abstract

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In Saudi Arabian universities, knowledge management is often inadequate when it comes to knowledge sharing via Web technology, especially between academic staff. In order to encourage academics to use e-knowledge sharing, it is important to know why/where/when academics do or do not use the available system of e-knowledge sharing. Therefore, the purpose of this research is to investigate the factors that affect an academic's behaviour towards using an e-knowledge sharing system. The proposed model was constructed combining the affecting factors. The list of factors selected is a synthesis of established factors in the current technology acceptance theories, such as expectancy performance, effort expectancy and social influences, with minor changes in the construction of these factors, and two other factors, which are trust in knowledge

technology and time expended. These additional factors were included having examined previous research which confirmed that there are relationships between these factors and individual behavioural intention to use an electronic system for knowledge sharing.

The methods used in the exploratory study were interviews, expert reviews and questionnaires. Interviews were conducted with 10 academics in Saudi universities to identify factors that are unmentioned in previous studies, then expert reviews were conducted with 30 heads of departments and expert academics in Saudi universities to confirm the factors identified from the interviews. Then an e-knowledge sharing model was developed. The final method used in the exploratory study is the questionnaire, which was conducted with 74 academics from different universities in the western region, in order to confirm existing factors in the e-knowledge sharing model.

In the evaluation study, a new questionnaire was used for in-depth investigation of the relationships among factors to complete answering the research question "What is an appropriate model for the adoption of e-knowledge sharing amongst academics in Saudi Arabian universities?" The questionnaire was conducted with 213 participants from 29 Saudi universities. The key findings are as follows: that the relationships between factors were found to have both direct and indirect effects in the model and the result of this study showed that the proposed model fitted the data and applies to the Saudi context. Therefore, the validated model would be considered essential in order to assist Saudi universities in implementing an e-knowledge sharing system.

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Declaration of Authorship

I, **Hanan Alotaibi,**

Declare that this thesis and the work presented in it are my own and have been

generated by me as the result of my own original research.

AN E-KNOWLEDGE SHARING ADOPTION MODEL IN SAUDI ARABIA IN

HIGHER EDUCATION

I confirm the following:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
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- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.
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Alotaibi, H., Crowder, R. and Wills, G., 2013, September. Investigating Factors for Knowledge Sharing Using Web Technologies. In *Proceedings of the 13th International Conference on Knowledge Management and Knowledge Technologies* (p. 32). ACM.

Alotaibi, H., Crowder, R. and Wills, G., 2014. Investigating factors for E-knowledge sharing amongst academic staff. In, *Sixth International Conference on Information, Process, and Knowledge Management eKNOW 2014, Barcelona, ES,* 4pp.

Alotaibi, H., Crowder, R. and Wills, G., 2017. Adoption of Web based Knowledge Sharing system amongst Academic Staff. *Journal of Advanced Management Science*, 5, (1), 57-63.

Signed:

Date: 21/12/2016

Acknowledgements

Firstly, I would like to express my sincere gratitude to my supervisor Dr. Gary Wills and my second supervisor Dr. Richard Crowder for the continuous support of my Ph.D study and related research, for their patience, motivation, and immense knowledge. Their guidance helped me in all the time of research and writing of this thesis. I have learnt much about how to perform academic research. The production of this research work would not have been successful without their kind supervision.

Besides my advisor, I would like to thank the rest of my thesis Assoc. Prof. Lester Gilbert for his insightful comments in statistics analysis. I acknowledge the intellectual environment provided by the Electronics and Computer Science Department at the University of Southampton during my study.

My sincere thanks also goes to my parents, they encouragement, supportive and shown belief in me and my work, I am sad that my father, Marzoug Alotaibi, died before the thesis was finished. A big thank also goes to my sisters and brothers, my husband and my daughters for their patience and always energizing me with their indispensable love and providing moral support throughout my life and making my PhD less pressured during an extremely stressful time.

My sincere thanks also goes to my friends for their support and encouragements. Sincere gratitude is also conveyed to academics in Saudi universities who took part in this study for their valuable time and useful data. A big thank you to the editorial advice the thesis was edited by Jenifer Spencer for her patience in editing, suggesting and giving her valuable comments.

Definitions and Abbreviations

AVE	Average Variance Extracted
C	Compatibility
CFI	Comparative Fit Index
CR	Composite Reliability
DIT	Diffusion and Innovation Theory
EE	Effort Expectancy
EKS	E-Knowledge Sharing
GoF	Goodness of Fit
HEIs	Higher Education Institutions
ICT	Information and Communication Technology
KM	Knowledge Management
KS	Knowledge Sharing
KSS	Knowledge Sharing System
PE	Performance Expectancy
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modelling
SI	Social Influences
SRMR	Standardised Root Mean Square Residual
T	Trust in Knowledge Technology
TAM	Technology Acceptance Model
TE	Time Expended
TPB	Theory of Planed Behaviour
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology

Chapter 1. Introduction

Over the last few years, the majority of the largest global corporations have undertaken knowledge management projects to support their development and growth (Brown & Duguid 2001). It is widely recognised that organisations benefit by establishing appropriate knowledge management systems to increase their efficiency. The main processes of knowledge management are acquiring, sharing, reusing and storing the knowledge (Milton et al. 1999). It is recognised that the most crucial process of all is knowledge sharing, since most information is held as tacit knowledge by individuals (Nonaka and Takeuchi, 1995). However, knowledge management is often inadequate when it comes to knowledge sharing using technology, especially between staff members in organisations (Lin & Chen 2009). Thus, novice staff are unable to capture valuable information when there is no knowledge sharing mechanism between staff. This can affect staff performance, when tacit knowledge from experts is often lost, since the knowledge has not been made explicit or codified. This may then result in a poorer employee experience and lower staff achievement.

In the last few decades, the use of technology in supporting the knowledge management process has been widely recognised. Sharing and reuse of knowledge represents a highly visible solution, while information and communication technology (ICT) provides direct assistance in the processes of knowledge management (Silver 2000). Web technology is the most effective technology used in the area of knowledge management (Wagner 2006). Web technology is based on a particular set of technologies enabling users to interact and collaborate with each other through social media. This can be termed the 'Social Web', as it incorporates a strong social component (Bojars et al. 2008). Thus,

sharing knowledge among members of staff who work in universities or companies via web technology, such as using an e-knowledge sharing system based on web technology for knowledge sharing purposes, can be very effective. Using an e-knowledge sharing system based on web technology among academic staff for knowledge sharing purposes is one of the challenges of knowledge management technology in Saudi universities. The next sections present an overview of the education system in Saudi universities.

1.1 Saudi Arabian Higher Education Context

Higher education provision in Saudi Arabia consists of universities, colleges and institutions: universities are under the control of the Ministry of Higher Education, while colleges and institutions are under the control of the General Organisation for Technical Education and Vocational Training.

The kingdom of Saudi Arabia is a developing country and was founded in 1932. The Ministry of Education was established in 1952 for general education (Sedgwick, 2001). A few years later, in 1957, the first university in Saudi Arabia was founded, with twenty-one male students and nine members of staff and one faculty, which was Islamic studies (King Saud University, 1982). Within two decades, the number of Saudi universities had grown to reach seven universities with around 63,000 students and more than 6,000 academic staff (Saleh 1986). Currently, there are 26 public and 10 private Saudi universities (Ministry of Education, 2016); all these Saudi universities are listed in the Appendix A. Saudi Arabian education is segregated by gender, male and female, both sections following the same curriculum (Sedgwick, 2001).

Most of the public universities include a larger number of faculties than private institutions, although the structure of the faculties in both public and private universities is similar. All universities, both public and private, provide research centres and most also provide laboratories, computer workstations and Internet access for staff; however, some universities in rural areas do not support these facilities for staff. Most universities consist of colleges and departments that offer Bachelors, Masters and PhD degrees; some schools and departments provide distance learning. In Saudi Arabia, each university has two different sections, being separated into male and female departments.

Although public universities are geographically dispersed in more than 85 cities, most Saudi universities are structured in campuses that include related schools, subject specialisations and research projects. In big cities such as Jeddah and Riyadh, government universities have many campuses: for example, King Abdul-Aziz University in Jeddah has five campuses. There are some schools, for instance the Computer Science School, which exist in different campuses of the university, each campus having different academics, although they teach the same courses and modules in the university. Most novice academics work in the new campuses and expert academics work in the main, 'old' campuses. Novices are those who are new, in some cases, to the discipline, or to teaching, or to the Saudi academic process or to the university. In the separated sections, typically, male academics teach in male departments and female academics teach in the female departments. For some modules, there are no qualified female academics in the female departments; in this case the modules are taught in the female departments by male academics, through online lectures.

There are differences in faculty structure in some private universities, which do not support employment of Heads of Department, and, instead, the Deans of Faculties are responsible for managing their faculties and academics staff who are responsible for managing and teaching courses, so the content of the modules depend on academic staff, such as lecturers. In contrast, in public universities academic staff teach courses after the Heads of Department provide the instruction and the syllabus of modules, staff and courses are different.

In addition, private universities have a single campus, whereas most of the public universities have multi-campuses. Moreover, different levels of degrees are provided in public universities; although they provide Bachelor and Masters degrees, they rarely provide PhDs, whereas, private universities provide Bachelor degrees but rarely provide Master degrees and Diplomas.

Obtaining information about Saudi Arabian public and private universities in the areas of institutional and technologies is challenging because there are insufficient publications concerning these aspects. The researcher visited university websites and contacted staff in some universities directly to overcome these challenges and obtain information. As well as the list of Saudi Arabian universities provided in the appendix, the reader can visit the university websites, most of which provide English version webpages.

1.2 Information and communications technology in Saudi higher education

The first university in Saudi to be connected to the Internet was Fahd University of Petroleum & Minerals (KFUPM), in 1993. More than two decades later, the first e-learning & Distance Learning was established, in 2008 (Alturise and Alojaiman, 2013). However, the long period between first connecting with the Internet in the university and establishing e-leaning verifies that there was slow growth in providing Internet access and using ICT in universities and in public; moreover, Wheeler's study found that the growth in using technology in Saudi Arabia was slower than in other Arab countries (Wheeler, 2004). In that period there was no economic obstacle to providing Internet connection in higher education (Cappelen & Choudhury, 2000); rather, the issue of delay in using the Internet was attributed to mismanagement: "The main reason why usage of ICT is low in Saudi universities is lack the management commitment to promote ICT usage" (Ageel, 2011, p. 59). Moreover, the problem that can face higher education in relation to use of ICT in universities is that some academic staff are not willing to change the traditional method of teaching (Alturise and Alojaiman, 2013).

Saudi Arabia is a religious country and cultural issues are reflected where the religion of Islam is reflected in educational practices: this is clear from the structure of universities, in which they are separated into two sections, male and female. Using ICT for knowledge-sharing purposes in higher education helps academics to exchange knowledge between males and females to contact each other. Using an online system between academics (male, and female) enables them to communicate while respecting

(the culture and religion, this was found by Abdullah et al. (2006), when examining the culture factor in implementing ICT in e-government

Using ICT in Saudi higher education can benefit the system by increasing learning income, reducing expenses and saving time. Most Saudi universities have several campuses, in urban and rural areas, and sometimes academics have to travel from rural areas to the main campus in the city to obtain information and knowledge about modules or attend meetings; implementing ICT for knowledge sharing purposes will enable academics to attend e-meetings and obtain information and knowledge about modules without travelling, which reduces the cost (Alturise and Alojaiman, 2013). The Saudi economy may face challenges in encouraging the use of ICT in Saudi universities. Some academics may have insufficient skills to use a knowledge sharing system, so universities will be responsible for providing training courses for academics as well as providing technical support for ICT (Alturise and Alojaiman, 2013).

As explained above, ICT in Saudi universities is under-developed and more research is needed to consider this area. This research considers the use of technology in Saudi universities.

1.3 Research objective

From the situation in Saudi universities depicted above, that the most inexperienced academics work in the new campuses and expert academics work in the main ones; this means that the universities are pools of individual knowledge, and at the same time the universities are lacking in technology management systems for the academic process. Consequently, the tacit knowledge of expert academics is lost, as the knowledge is not

documented. Additionally, the universities are required to transfer knowledge between academics in different departments (male and female) and on different campuses. Thus, the universities need to implement a system to provide facilities for communicating among geographically dispersed academics who have common interests. A variety of data types and knowledge needs sharing among academics. These types include:

- NCAAA (National Commission for Academic Accreditation & Assessment) Academics use a quality assurance arrangement, the NCAAA form, for each course; however, it is not available online, so is not easily accessible for academics (see Appendix A).
- Projector Slides
- Research by academic staff
- Past examination papers
- Feedback from conference participation

Most Saudi universities need to supply online services for both academics and students. However, Balubaid explored the use of Web 2.0 technology for sharing knowledge between an academic department and its students and points out that "*several studies on knowledge management have been conducted, but studies pertaining to knowledge sharing in academic institutions in Saudi Arabia are rarely undertaken*" (Balubaid et al. 2013).

To sum up, there is growing recognition that knowledge management can enable higher education to develop in an interactive and dynamic environment(Robson et al. 2003). In view of this recognition and the objective of establishing technology centres in universities, together with the challenges identified above that face Saudi universities, this work considers the application of knowledge sharing amongst academics in

universities in Saudi Arabia. Implementing knowledge-based systems and popularising Web services may not effective without investigating user acceptance of using systems. User acceptance has been a major consideration for IS researchers because it determines the success or failure of systems (Davis, 1989, Al-Gahtani et al. 2007). However, studies of knowledge sharing among academics using e-knowledge sharing systems in Saudi universities have not yet been conducted. Thus, this study is the first specifically to examine academics' behaviour towards using an e-knowledge sharing system through exploring factors that encourage academics to use the system or prevent them from using it.

This research will meet its goals by answering the following questions.

RQ1: What is an appropriate model for the adoption of e-knowledge sharing amongst academics in Saudi Arabian universities?

To answer RQ1, four sub research questions are introduced.

1. What is the attitude of academics in Saudi universities towards using their universities' online systems in the workplace?
2. What is the attitude of academics in Saudi universities towards using knowledge sharing?
3. What are the factors affecting e-knowledge sharing among academic staff in Saudi universities?
4. What are the relationships among the factors affecting e-knowledge sharing amongst academic staff in Saudi universities?
5. Do gender and experience moderate relationships between the observed factor and behavioural intention?

1.4 Structure of the Thesis

The remainder of this thesis is organised as follows.

Chapter 2: *Literature Review* comprises an introduction to knowledge management and web technology. This chapter presents the process of knowledge management and aspects concerning knowledge sharing. There are discussions of web-based knowledge sharing and browsing and some technologies used for knowledge sharing. The chapter presents the theories and studies which have been used to investigate individual behaviour and acceptance of knowledge sharing technology.

Chapter 3: *Proposed Model* presents the e-knowledge sharing model, identifies factors involved in the model and provides the supportive theories and previous research for selecting these factors. The factors are required to construct an appropriate model for the situation in these universities.

Chapter 4: *Research Methods* presents the main research methods used in the initial study. Qualitative and quantitative methods are used, as both methods are considered suitable for validating this research. Finally, the chapter discusses the research methods used and how they were applied to the study.

Chapter 5: *Results and Findings and Discussion* presents the results of the mixed method research conducted with Saudi Arabian academics to identify the previously unmentioned factors. The findings of the expert reviews obtained from the interviews and the online questionnaire will be presented, and the analysis discussed. The second part presents the results of the online survey conducted to refine the e-knowledge sharing model.

Chapter 6: *The Discussion and Findings of the Exploratory Study* the study conducted in order to confirm factors affecting e-knowledge sharing among academics in Saudi universities that proposed the model. Three different methods were used: interviews, expert reviews and the questionnaire conducted with academics in Saudi universities in the western region.

Chapter 7: *Research methodology of Evaluation Study* provides an account of the second stage of the research. The research methods utilised to evaluate the proposed e-knowledge sharing model and their justification are presented in detail.

Chapter 8: *Data Analysis and Findings of Evaluation Study* presents an analysis of the results. First, the missing data from the collected data are discussed and then the data are analysed for demographic information. The reliability and validity of the instrument are shown in detail before analysing the model by structural Equation Modelling (SEM). SEM is an analysis technique which is utilised in two stages: first by measurement and then by the structural model. The chapter also provides an assessment of the proposed hypotheses

In Chapter 9: *The Discussion of Evaluation Study*, the findings and results of the evaluation study will be discussed, including possible reasons for each finding of relationships between factors in the conceptual model. In addition, studies are presented that support the findings and conclusions drawn by the author regarding the findings reported in Chapters 5 and 8.

Chapter 10: *Conclusions and Future Work* presents an overview of the study and addresses the main concept of the research. The research contribution will be discussed and then

the limitations of the study. Finally, recommendations for future work will be included in this chapter.

Chapter 2. Literature Review

This review primarily concentrates on knowledge sharing using the web, and the different approaches that have been used to adopt technology for knowledge sharing purposes. This chapter first introduces some of the different definitions of knowledge management, and the relationships between knowledge management and web technology based on previous research in this area.

2.1 Knowledge Management

The term knowledge management (KM) was first introduced by Wiig, one of the pioneers of KM, KM is a topic has been receiving consideration form scholars (Beckman, 1999). Wiig defined knowledge management as aiming "*To make the enterprise act as intelligently as possible to secure its viability and overall success. To otherwise realize the best value of its knowledge assets. To reach these goals, advanced organisations build, transform, organize, deploy, and use knowledge assets effectively*" (Wiig 1997, p.1). Since then, researchers have attempted a variety of definitions of knowledge management (KM), to date, there is no standard approach has commonly accepted (Wiig 1997). According to Davenport and Prusak, knowledge is "*a fluid mix of framed experience, values, contextual information, and expert insights and grounded intuitions that provides a framework for evaluating and incorporating new experiences and information*" (Davenport and Prusak, 1998). Coleman (1999) defines KM is a term includes a wide variety of interdependent actions, including different knowledge activities, the creation and sharing of knowledge; knowledge valuation and metrics; knowledge mapping and indexing, together with knowledge transport, storage and

distribution. KM is the use of methods that facilitate some human action, such as sharing, distributing, creating, capturing and understanding that is based on human experience (Davenport et al. 1997). KM is concerned in the planning, organizing, motivating, and controlling of employees; KM ensures that all knowledge in the organisation is effectively employed (King & Kraemer 1993).

Notably, the IT literature has addressed the nature and definition of knowledge management: it is a field composed of three different terms: Data, Information and Knowledge (Sveiby 2001; Alavi & Leidner 2011). Davenport et al. (1997) have defined data as a simple observation of states of the world. Information is introduced in similar ways by both Checkland (1981) and Drucker (1993), as referring to "*a combination of fact with context, meaning and relationships*" (Checkland, 1981), and also as "*data with attributes of relevance and purpose*" (Drucker, 1993). Knowledge is also defined as humans recreating action through their experience (Glasersfeld, 1988). From this definition of knowledge, it is clear that knowledge is implemented by individual understanding to make a decision.

From the several definitions, it can be seen that the knowledge management concept relies on different domains and functions and so it can be understood that the definitions also rely upon the goal of organisations' context. For example, an educational organisation has a different concept of knowledge management from business organisations. This particular research is concerned with considers to study the application of KM within the higher education context, so knowledge management in higher education will be explored in more detail in the following section.

2.2 The Knowledge Management-Based View of the Higher Education Institution

Birgeneau (2005) was the first researcher to mention KM in the context of higher education institutions (HEIs) by pointing out the gap in the field. He stated that HEIs face many challenges with the rapidly changing global environment and they need to implement the essential elements of knowledge management, which are knowledge, creativity, and innovation. Bloch also supported Birgeneau's claim by identifying the challenge to HEIs, which is the external pressure influenced by the rise of information and communication technologies (Bloom, 2005). To address the challenges in KM that they face, universities need to employ tools for academics in order to fill any gaps in the information-processing environment (Martin & Marion 2005).

The perspective of KM in HEIs can be divided into two different aspects: academic knowledge and organisational knowledge. Academic knowledge is the knowledge that results from academic experience and engaging in activities such as research and teaching, while organisational knowledge refers to all the required services provided by universities, e.g., the critical factor of success in using systems, and relationships with research centres (Coukos-Semmel 2003). Furthermore, from the scholars' point of view, KM can be of benefit in different aspects of management; academic staff services, the research process, curriculum development, student services, administrative services and strategic planning (Kidwell et al. 2000). It is noticeable that knowledge management in HEIs is provided to different stakeholder groups are academics and students (Nishad & Anjali 2014).Thus, based on this view and

challenging the definitions above, the concept of KM in HEIs and in general is based on three key fundamental components: people; technology and the knowledge process; Figure 2-1 shows the KM components (Marshall and Rossett, 2000). More details about these components will be discussed in the following sections. Firstly, in the next section, the knowledge process is discussed, then technology in the knowledge sharing & information and communication technology section, and finally, people will be discussed in the context of technology acceptance, in the theoretical background section.

The field of knowledge management is not new to the universities; however, KM in HEIs is a broad field and many scholars have mentioned the area of knowledge management in HEIs. Many studies have focussed on knowledge management for both students and academics. For example, Head and Eisenberg's study was concerned with using a knowledge management system amongst students during the course-related research process; similarly, other studies have examined the use of KM through HEIs among students for different purposes (Head and Eisenberg 2010, Weldon 2012; Balubaid et al. 2013; Ejaz 2014). However, there are insufficient studies in Arab countries that have been concerned with knowledge management for academic staff which provide a repository platform for academics to practise their activities. There is also a lack of studies concerning academics' behaviour in their use a knowledge management system(Balubaid et al. 2013). Thus, the aim of the current study is to examine Saudi academics' behaviour in their use of e-knowledge sharing system.

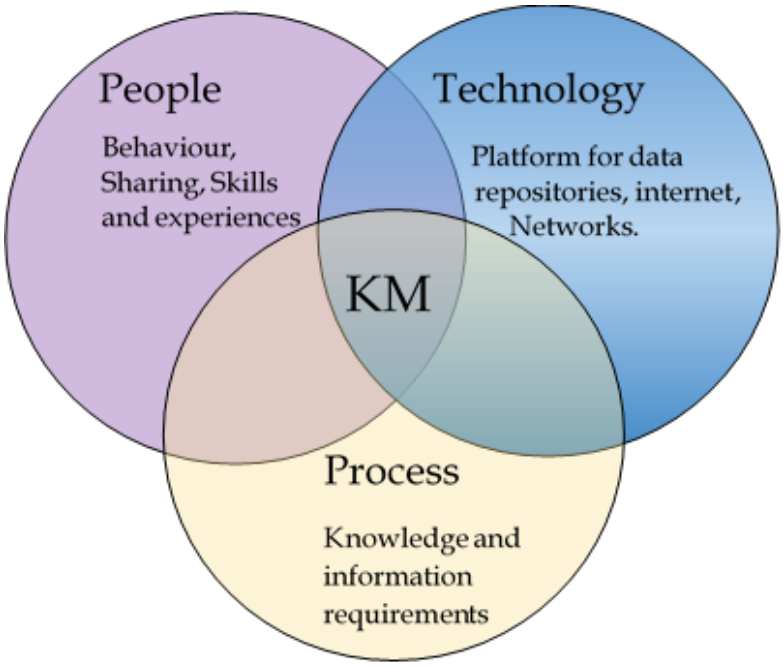

Figure 2-1 Knowledge Management Components

2.3 Knowledge Management Process

The knowledge management process refers to the degree to which the organisation manages three strategies: creating, sharing and using knowledge resources across functional boundaries (Chang & Chuang 2011). The KM process has received much attention from researchers. Beckman (1999) identified the KM process in four dimensions: knowledge choice, access, storage, and sharing. Ruggles (1997) defined the KM process as having three aspects: generation, codification and transfer. Another study introduced the process in four dimensions: conceptualisation, reflection; action and review (Wiig et al. 1997), whereas, O'Dell & Gayson (1998) categorised the process in seven dimensions: create, identify, collect, organise, share,

adapt and apply. Based on previous studies, Milton et al. (1999) developed a framework including the main processes as five activities: discovery, capturing, personalisation, creation and codification. It is clear from different studies that the KM process includes two concepts, sharing and reusing and knowledge. Knowledge sharing is the central process of knowledge management (Yang & Chen 2007; Hall & Kilpatrick 2011; Allameh et al. 2012). Therefore, the aim of organisations is to have successful knowledge sharing through different activities, between staff across the organisational boundaries. Knowledge sharing is considered in this study and more details about this process will be given later. Whereas, reuse of knowledge occurs when information has been recalled and stored in a location, whatever the system, or on paper, and this information is recognised to meet the seeker's needs (Lansdale 1988; Mcdonald & Ackerman 1998). In this case, the users can use the expertise of others by searching for the exact knowledge and selecting it. Knowledge reuse includes the following steps: "*defining the search question, the search for and location of experts or expertise, selection of an appropriate expert or of expert advice, and applying the knowledge*" (Markus 2001, p.61).

2.4 Knowledge categorisations

Nonaka (1991) has suggested two dimensions of knowledge, tacit and explicit knowledge. Tacit knowledge is knowledge inside an expert's head, it is all the things that people know and gain from experience but they do not know how to explain. An example of tacit knowledge is the 'Best means of dealing with a specific course' (teaching skills), whereas, explicit knowledge is defined as codification of general knowledge; it is documented knowledge, expressed and recorded. Explicit

knowledge is easy to manage, communicate, store, and distribute and is the knowledge found in printed documents, such as books, or on the web.

From the distinction between tacit knowledge and explicit, it is clear that tacit knowledge is hard to share because it is wider than the experience gained from work and it is deeply rooted in action. Tacit knowledge is also about attitudes, beliefs and skills; thus, tacit knowledge is very important (Nonaka & Takeuchi 1995; Polanyi 1997). Nonaka (1991) divided tacit knowledge to include two elements: cognitive and technical elements. The cognitive element refers to the "mental model" that forms the perspectives and belief of a human towards defending his world (Johnson-Laird, 1983). By contrast, the technical elements refer to human skills and know-how about what to do in a specific context.

Transferring tacit to explicit knowledge is the key of knowledge management, and some researchers have suggested patterns for transforming tacit and explicit knowledge in organisations. The next section deals with the most popular model of transferring knowledge from tacit to explicit.

2.5 The knowledge cycle

Nonaka & Takeuchi (1995) introduced a fundamental model that describes the four methods of converting knowledge between tacit and explicit, the conversion model, shown in Figure 2-2. This model has been useful as a guide for transferring knowledge in organisations. The idea of this model is that in the interaction of creating knowledge, whether tacit or explicit, throughout the interaction there are

four modes of knowledge conversion (Nonaka & Takeuchi 1995), and these are as follows:

Socialisation: through individual experiences the process of creating new knowledge takes action. This knowledge is difficult to articulate and it is shared through conversation between experts and non-experts.

Externalisation: this involves converting tacit knowledge to explicit; this knowledge is easy to share, because, after crystallizing tacit knowledge, and then articulating it, it becomes ready to be written down (codified).

Combination: gathering explicit knowledge from inside or outside organisations and then editing it to integrate into new knowledge. The combined explicit knowledge is ready for converting into tacit knowledge.

Internalisation: refers to "learning by doing", which is the process of utilising explicit knowledge and transferring it into personal tacit knowledge.

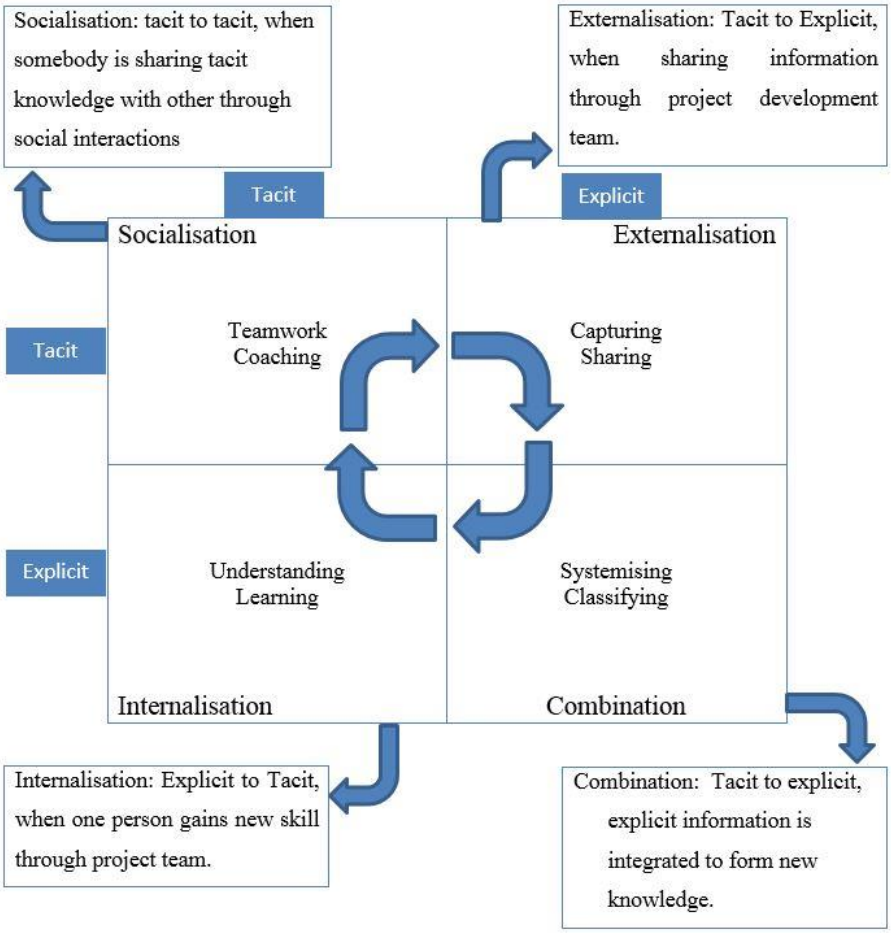

Figure 2-2 Model of Knowledge Conversion adopted from Nonaka & Takeuchi (1995).

In the present author's view Information Technology (IT) plays an important role of two processes of the model: externalisation and combination, "*That is the part where knowledge management will play an important role in facilitating the process of knowledge sharing"* (Gordeyeva 2010, p.5). Knowledge sharing and technology is discussed in detail in the next sections.

2.5.1 Knowledge Sharing

It is difficult to provide an accurate and a standard definition of knowledge sharing, but it is possible to explain the concept of knowledge sharing, which is an active

relationship between a sender or a group of senders, who provide and transfer knowledge, and receivers, who are searching for knowledge, to exchange information or knowledge that has been gained from experiences (Eisenhardt & Santos 2002). These processes are used in order to support an individual who is working toward a common or similar goal (Eisenhardt & Santos 2002). Knowledge sharing takes place between a two individuals or more up to a multiple number of individuals, teams or organisations (Paulin & Suneson 2012). Knowledge sharing contains three key elements, which are: objects, which refer to the thing that can be shared; the method of sharing the knowledge, which includes face to face, conference or a knowledge sharing based on Web technologies; and the level of sharing, which involves individuals, teams or organisations (Ho et al. 2009).

However, knowledge sharing is not easy to implement, due to the nature of knowledge, explicit and tacit; it is found that knowledge sharing is based on individual behaviour, where people do not believe in the value of sharing knowledge unless they think it is important. Individual behaviour is based on certain motivating factors and barriers that impact on their ability, so knowledge sharing by individuals is a challenge in knowledge management (Ruggles 1997). More details about the factors that influence individual behaviour will be discussed in section 2.8.

2.6 Knowledge Sharing & Information and Communication Technology (ICT)

Information and Communication Technology (ICT) is a network technology that provides a means of exchanging data, sharing knowledge and coordinating activities

in both public and private sectors (Liao 2003). Knowledge sharing technology refers to a class of ICT applied to managing organisational knowledge; in other words, it is an integration of knowledge management and information systems. In the last few decades, the power of technology in supporting knowledge management processes has been widely recognised and technology represents a highly visible solution while ICT supports the processes of knowledge management, which are the sharing and reusing of information (Silver 2000).

Alavi & Leidner (2001) claim that, there are difficulties an organisation may face with knowledge management, specifically sharing knowledge, effectively without using ICT, whether in a small or geographically large organisation. Thus, knowledge management requires a suitable ICT infrastructure for managing the processes of knowledge management (Van Heijst et al., 1998).

There are a variety of types of ICT that can be used with knowledge management: web technology provides one of the most popular platforms, providing services and tools which enable organisations to transfer and manage knowledge, and it also has become the most effective technology used in knowledge management. The next section will define the term e-knowledge sharing, then the following sections will address the current situation in the field of knowledge sharing through web technology.

2.7 E-knowledge Sharing

The concept of e-knowledge emerged through the universal adoption of the Internet, which has produced the opportunity for organisations to establish IT applications to

assist exchanging knowledge amongst staff in order to achieve valuable beneficial objectives (Warkentin & Sugumaran, 2001).

The term e-knowledge was introduced by Holsapple & Singh (2001), where e-knowledge refers to the electronic support of knowledge handling activities and the flows that connect them in the e-commerce area. This definition of e-knowledge is general and is not explored in depth here. However, there is no standard definition of e-knowledge, so an explanation of e-knowledge in the higher education area will be provided in the next paragraph.

E-knowledge is the combination of learning and knowledge management by collaboration of e-contents with the interactive educational environment engaged in advanced technological application for knowledge sharing, where the e-contents could be digitised data, information and knowledge (Robson et al. 2003).

2.7.1 E-knowledge sharing system based on web technology

The Web is an online technology that has had three generations: Web 1.0, Web 2.0 and the Semantic Web. In 1990 the first web pages were realised containing a collection of online pages that enabled users to browse websites. A few years late, the Web began to grow and developed to introduce Web 2. 0 (W3C). Web 2.0 is the second generation of World Wide Web, based on a combination of technologies allowing users to interact and collaborate with each other in social networks; thus it can be called a 'social Web', as it incorporates a strong social component (Liao 2003; Bojars et al. 2008). The Semantic Web is the latest version, enabling a computer

machine to do more tasks on behalf of the human's job and also enabling users to contribute to create data stores on the Web (W3C).

The key to using web technology for knowledge management is that data can be made accessible by creating online storage of information and that it can be searched, reused and updated as often as required. An e-knowledge sharing system based on web technology has been defined as a private interactive portal based on data communication and technologies to provide content and enable users to exchange knowledge and information (Bauckhage et al. 2007). According to Tiwana & Ramesh (2001), a system based on web technology is highly appropriate for use as a tool within the domain of knowledge management in organisations, due to its ability to support distribution among staff, connectivity, and publishing, and to maintain communication among employees and facilitate working. An e-knowledge sharing system based on web technology can be used for two main functions: where knowledge is shared by employees, and where employees may retrieve and utilise already available knowledge (Brelade and Harman 2003).

2.7.2 Social Media Tools

Social media is the term used to describe online interactive applications of web-based technologies that allow users to communicate and share ideas and personal information or any other contents (Asur & Huberman 2010). A wide range of features and capabilities have mentioned for social media in the purpose of knowledge sharing. These characteristics and capabilities are as follows:

- *User-generated content*: through social media, users can create, edit, remove and distribute content, which might be information, data and knowledge, so social media encourage users by providing online environments for interaction (Bowley 2009).
- *Peer to peer communication*: a few decades ago, users of the Internet were readers and surfing web pages, but nowadays users are connecting to other users in interactive ways, which is an essential difference between Web 1.0 and Web 2.0. Thus, these connectivity features enable users to share their knowledge through different effective channels (social media platforms) for conversation between users (Panahi et al. 2012).
- *User-friendly:* social media applications are easy to use platforms and users do not need a high level of experience in computer usage (Elefant and Black 2010). The platforms ensure easy access to the features that are provided and it is easy to participate with dynamic, attractive webpages (Elefant and Black 2010).
- *Multimedia-oriented:* this feature provides an opportunity for users to share, store and reuse multiple formats of contents, such as videos and text (Panahi et al. 2012). For example, YouTube is one of the most popular websites, where the users can upload and comment on videos.

The combination of these functions has made social media suitable to be used as educational tools, because the functions enable learners to interact together by sharing and reusing knowledge and information. Examples of using social media for knowledge sharing in different contexts are given in the next sections

The Wiki platform, in which applications are web-based, allows one or more individuals to build up communities online and communicate for sharing knowledge in a set of interlinked web pages that can incorporate text, sound, images and videos (Franklin & Harmelen 2007). The interesting fact is that users can freely share, modify, store and capture contents (users' knowledge) in the web-based-application.

As example of a social network, Weblogs is another form of web technology that can be useful in managing data. A blog is a type of website, maintained individually, which enables users to share and store contents as such a graphic or video, and provide their opinion (Franklin & Harmelen 2007).

Facebook is one of the most commonly used social networks: users can create a group discussion so that members of the group share their knowledge and decision making. Members can be in a different geographical location or in the same location (Chan et al. 2013). Facebook is a motivational tool for learning and enhancing knowledge sharing among the members' group (Wong et al. 2011).

2.7.3 SharePoint System

SharePoint is a web application platform available in Microsoft Office which provides multi-functions that assist users in managing and organising the storage, such as the knowledge and documents library (Weldon 2012). The application is an enterprise management platform that allows users to format their server into a variety of Web.2.0 tools that enable users to communicate with each other (Weldon 2012). The tools can be social media tools, and the application also provides other services, such as e-alert and RSS feeds (Weldon 2012).

Furthermore, although the system users are allowed to share their ideas and capture information and knowledge, users are also able to provide discussion and checking of electronic documents in a group of communities. One of the essential functions that can be used across the application is capturing the tacit knowledge of experts, which works as bridge between printed documents and know-how (Weldon 2012). In addition, the system provides different services: one of these is a search engine to allow users to find the documents or knowledge they need in a huge bank of contents, and the multilingual sites service provides a machine translation service application to assist users in translating existing knowledge and information into different languages.

Although the SharePoint system includes a variety useful functions, the system has several drawbacks. System customisation need to be implemented in the organisational context by highly skilled IT engineers. Furthermore, regarding SharePoint's repository, this may include huge contents and classification of documents and includes some sophisticated tools; thus, users need a training course to deal with the system (Weldon 2012).

2.8 Theoretical background

The success of the implementation of an e-knowledge sharing system among academics is dependent on the academics adopting the new technology. Many studies concerning the adoption of various systems have utilised technology acceptance models. Users' acceptance is typically affected, either positively or negatively, by certain factors that influence individual behaviour. Hence, this study will identify factors that influence Saudi academics' behaviour towards using an e-

knowledge sharing system, where the term e-knowledge sharing means using a web-based system for knowledge sharing purposes. Thus, the next sections provide a review of theories and previous studies that have examined individual acceptance of new technology and knowledge sharing.

2.8.1 The Theory of Reasoned Action

The Theory of Reasoned Action (TRA) model predicts human behaviour. In 1975, Fishbein and Ajzen introduced a theory which considers individual behavioural intentions (BI) in a particular manner, as a function of two determinants, one the individual attitude and the other the subjective norm (Fishbein & Ajzen 1975). The model for this theory is shown in Figure 2-3. In this model, attitude towards behavioural performance is identified as the individual's positive or negative view towards performing a particular behaviour, while subjective norms refer to the individual's perception about performance to do or not do the behaviour.

TRA can be used to understand and predict user behaviour as has been proved by a large amount of empirical research across wide range of domains (Davis et al. 1989). Researchers in the field of information systems have examined user behaviour to investigate the effect of different factors on the acceptance of technology usage (Williams et al. 2011). However, the construct of the TRA model has been criticised as it includes only two predictors, which are inadequate to examine user behaviour, and also the two predictors of behavioural intention are overlapping (Miniard & Cohen 1981; Conner & Armitage 1998). Although the TRA model has disadvantages, the model is still widely used in examining user behaviour in the area of information systems.

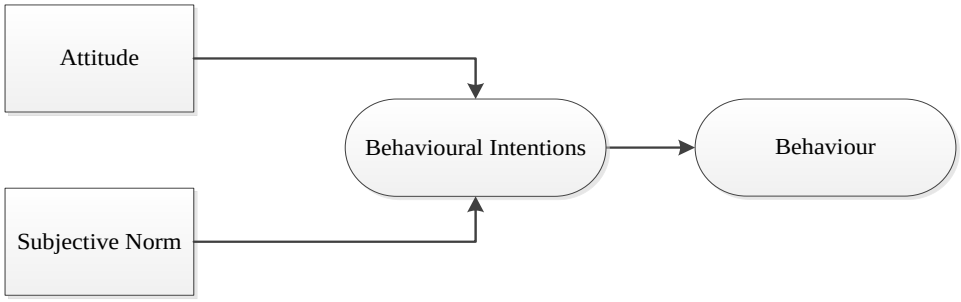

Figure 2-3 The Theory of Reasoned Action model adopted from Fishbein & Ajzen (1975).

2.8.2 Theory of Planned Behaviour (TPB)

TBP is an expanded version of the theory of reasoned action (TRA), devised to address the limitations of TRA, developed by Ajzen (Ajzen 1991). The difference between TRA and TPB is the added element "perceived behavioural control", which is identified as the individual's perception of how easy or difficult the task is to perform, i.e. the person's behaviour reflects the past experience and skills of that person. Furthermore, behavioural intentions indicate the intensity of personal intention and the will to act the goal behaviour (Dillon and Morris 1997). Figure 2-4 shows the TPB model.

Ajzen discovered significant relationships between the three factors in the model and also found them to be highly correlated; these conclusions were reached through 16 studies (Ajzen 1991). Thus, the model has become one of the most used models in evaluation user behaviour (Ajzen 2011).

TPB is widely used in the study of technology acceptance to understand and predict online user behaviour. For example, TPB has been applied in e-commerce studies to

examine the effects of trustworthiness and privacy on the online shopping and also in e-learning for examining student behaviour toward using podcasting technology and using a Web-based platform for academic learning (George 2004; Shih 2008 and Moss et al. 2010). However, TPB has also received criticism on the grounds that the three predictors are context based and cannot be generalised; therefore, some studies applied minor changes in the measurement factors to match the context (Ajzen 1991).

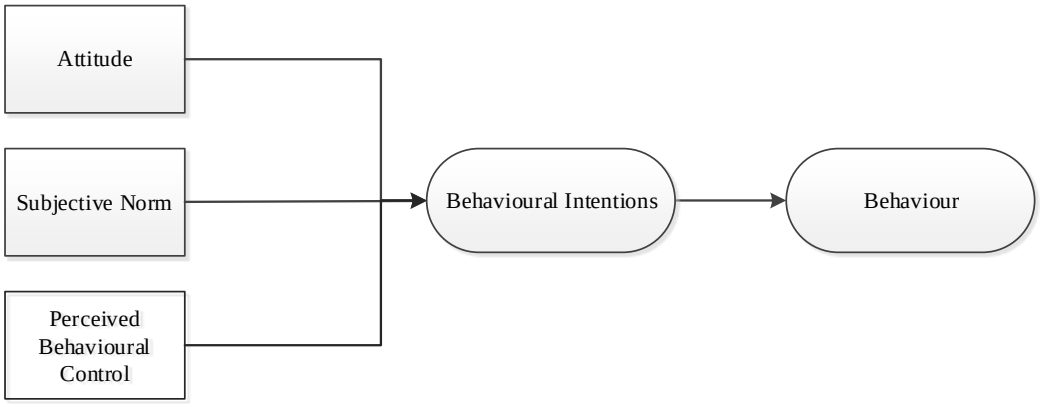

Figure 2-4 Theory of Planned Behaviour model adopted from Ajzen (1991)

2.8.3 Technology Acceptance Model (TAM)

Based on an examination of computer-usage behaviour, Davis (et al. 1989) developed the TAM, which is designed to investigate users behaviour toward using information technologies on their job. It has been widely applied to a variety of information system studies, see Figure 2-5 The TAM addresses users' behaviour and why they accept or reject the use of information system due to external variables that indirectly affect users' attitude toward using it.

In this theory, the users' attitude is based on two measurement items; the first item, 'perceived usefulness' is the measurement of the users' perspective of using the

system would enhance their job performance. The second item, 'perceived ease of use' is the measurement of the users' perspective of using the system without expending extra effort.

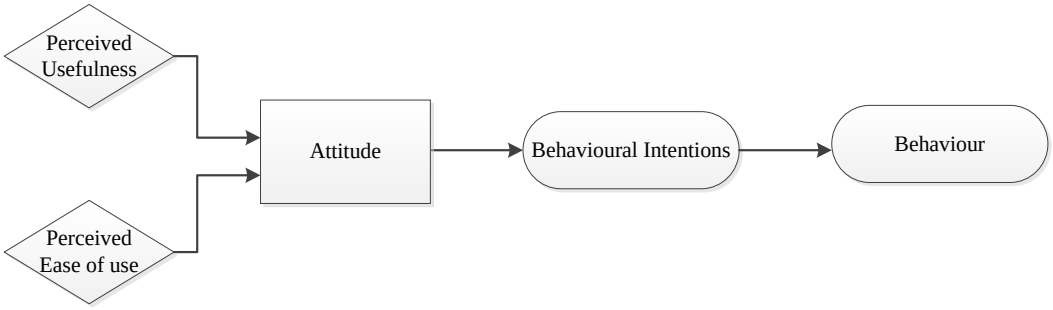

Figure 2-5 Technology Acceptance Model adopted from Davis (1989).

In the few last decades, the TAM model has been widely applied in information system studies and these have found significant positive relationships between the measurement items in the model. According to King & He, the TAM model consider is a strong construct which can be applied to predict user acceptance of technology; this result was based on the analysis of 88 academic studies (King & He 2006). However, in several studies which applied TAM, external factors were added to predict user behaviour towards technology acceptance. This suggests the TAM model is inadequate to examine user behaviour (Legris et al. 2003).

TAM has been further developed by Taylor and Todd to include two more factors, which are the subjective norm and perceived behavioural control: this model is known as the Augmented Technology Acceptance model, A-TAM (Taylor & Todd 1995).

2.8.4 Diffusion of Innovations Theory (DOI)

The diffusion of innovations (DOI) theory was introduced by Rogers in 1995. It is defined as "*the process by which innovation is communicated through certain channels over time among members of social system*" (Rogers, 1995). The model is used to describe user acceptance of new technologies in Information System research (Carter & Blanger 2005). The DOI model is constructed of five elements, as shown in Figure 2-6, which are defined by Rogers (1995) as follows:

- Relative advantage: "*The degree to which an innovation is perceived to be better than the idea it supersedes*" Rogers (1995).
- Compatibility: "*The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters*" Rogers (1995).
- Complexity: "*The degree to which an innovation is perceived as relatively difficult to understand and use*" Rogers (1995).
- Trialability: "*The degree to which an innovation may be experimented with on a limited basis*" Rogers (1995).
- Observability: "*The degree to which the results of an innovation are visible to others*" Rogers (1995).

The model has been widely applied to information system research especially studies concerning e-government. However, the model includes insufficient measurement factors to test user technology acceptance. However, some studies applied the model with external factors, such as trustworthiness and time, to investigate user behaviour

towards acceptance of technology, and the DOI and TAM models were also combined in some e-government studies (Gilbert et al. 2004; Carter & Blanger 2005; Carter & Weerakkody 2008).

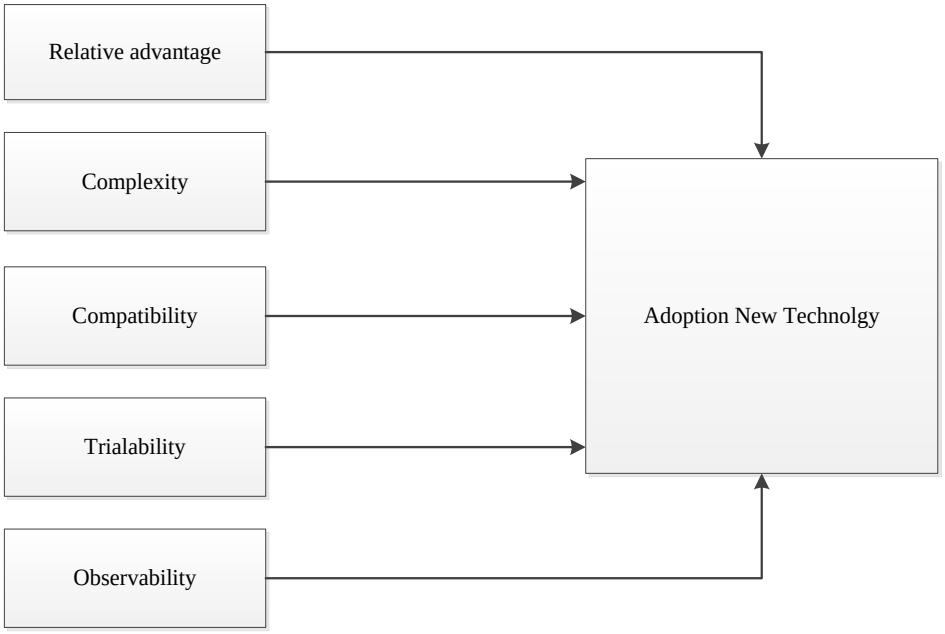

Figure 2-6 The Diffusion of Innovations Model developed from Rogers (1995).

2.8.5 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT was formulated by testing the previous models, presented above. (Carter & Belanger 2005). Venkatesh et al. (2003) introduced four measurement items of intention and usage, and also four moderators of key relationships. The four factors have a direct influence on user acceptance and usage behaviour. Figure 2-7 presents these factors, which are: performance expectancy, effort expectancy, social influence, and facilitating conditions.

According to Venkatesh et al. (2003), the first factor, performance expectancy "*is to measure individual beliefs that using IT will be helpful to improve performance*" (Venkatesh et al. 2003); it consists of three sub-factors; perceived usefulness; extrinsic motivation and job-fit.

Effort expectancy is the second factor, defined as "*the degree of ease associated with the use of the system*" (Venkatesh et al. 2003). It consists of three sub-factors: perceived ease of use, complexity, and ease of use.

Social influence is another factor, defined as "*the degree to which an individual perceives that important others believe he or she should use the new system*" (Venkatesh et al. 2003), it consists of three sub-factors: subjective norms, social factors and image.

Finally, facilitating conditions is defined as "*the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system*" (Venkatesh et al. 2003); this consists of three sub-factors: perceived behavioural control, facilitating conditions and compatibility.

UTAUT is considered to be the most appropriate model for most research because this model has been introduced by testing and integrating different models in regard to the adoption of technology for different purposes. Most studies have reported that there are relationships between the construct elements of UTAUT and users' acceptance of the use of information technology(Fang et al. 2008; Nistor et al. 2012). Thus, UTAUT can help researchers to give explanations regarding end users' acceptance of e-knowledge sharing. Although the UTAUT model has been widely used, tested and validated, the outcome of empirical studies cannot be generalised for all situations, so the original model may not have suited all their circumstances

(Williams et al. 2011). Many studies reported as using UTAUT actually made only partial use of it, and a low number of studies have made full use of the theory (Williams et al. 2011). Some studies have utilised only a few of the constructs in order to adapt to the situation in a case study (Jong and Wang 2009; Huser et al. 2010; Luo et al. 2010), whereas other studies examined external acceptance factors with UTAUT (Wu et al. 2007; Chang 2013).

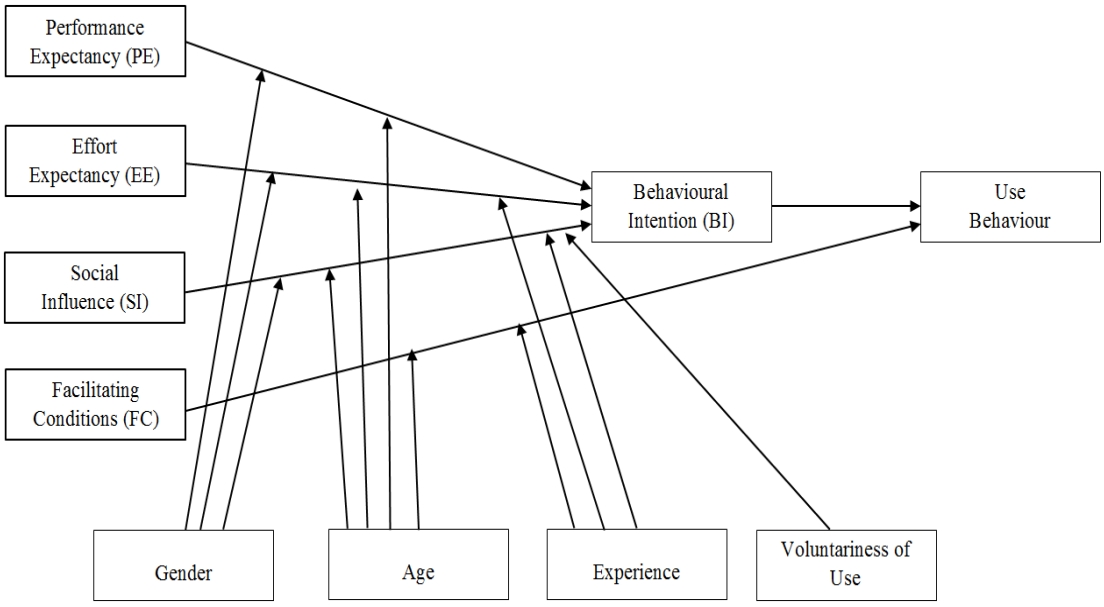

Figure 2-7 Unified Theory of Acceptance and Use of Technology Model adopted from Venkatesh et al. (2003).

2.9 Chapter Summary

This chapter has addressed the background of knowledge management and its processes. Knowledge sharing is essential for knowledge management; however, it is very challenging to change individual behaviour in knowledge sharing and some studies have concentrated on the area of knowledge sharing. The underlying theories

used to measure acceptance of new technologies have been presented. The purpose of presenting the theories is to attempt to find out what factors influence the adoption of technology in knowledge sharing. The effective factors will be discussed in detail in the next chapter.

Chapter 3. Research Methodology of the Exploratory Study

3.1 Introduction

This chapter presents details of the research methodology used in the exploratory study. Mixed methods, interviews, expert reviews and questionnaires, were utilised in the research design to confirm were utilised in the research to confirm the factors of the proposed model.

3.2 Research Design

Two very common methods of research can be used to validate a model. The first is a qualitative method, which is a technique that includes open-ended questions. In qualitative research, the method is designed to observe behaviour so that it is able to provide a better understanding of human opinions, attitudes, actions and decisions (Creswell and Clark, 2007). The researchers can obtain an explanation of social phenomena and their contexts rather than using theories to establish facts (Anderson 2010). Many researchers have utilised qualitative methods because they produce in-depth information about the experiences of people. Conversely, the sensitivity of this method in defining the data could be affected by the author's perspective (Ramona 2011).

The other method is through the quantitative, this method the researcher assesses a proposed hypothesis by variety of quantitative method, such as those in scientific

experiments, economic and financial calculations and surveys. The quantitative method used in this research is a technique that includes closed questions where the respondents are not allowed to qualify their answers but choose from a specific selection of answers (Creswell and Clark, 2007). This form of quantitative data can be used to measure variables related to the opinions, attitudes and beliefs and numerical analysis of the data collected can be carried out through different strategies (Mack et al., 2005). However, this method has drawbacks, like all other methods, in that there is no standard way to implement it and also the complexity of the method process.

As it is an exploratory study, applying only one method to provide the answers to the research questions puts the research at risk of a position in which it may not be reasonable to justify the hypothesis proposed in the study. Therefore, a mixed method approach, integrating the two types of methods, is used that provides an understanding of the problems in greater depth (Sandelowski 2000). Some researchers also use qualitative methods to explain the meaning of the results that are provided by quantitative methods, to support a better understanding of the implications of the quantitative data (Mack et al., 2005). Thus, by using these mixed research methods, more knowledge can be gained, and more accurate results are obtained when approaching a topic from different viewpoints. Also, in the information systems field, when a researcher seeks to adopt an applications system, the use of mixed method is suitable methods to collect the possible data that answer research questions (Saunders et al. 2009).

Different tools can be applied as qualitative and quantitative methods in the study. The following sections provided an overview of the tools that will be used in this research.

3.2.1 Interview

An interview is carried out as a conversation between two individuals, the researcher and the interviewee. The interview tool is usually associated with qualitative methods and can also be used as part of mixed methods (Britten 1995). There is a variety of ways of conducting the interview (Britten 1995 & Rogers et al. 2011); a structured interview is usually used to obtain more knowledge about the subject: the interviewees are asked a series of prepared questions in in-depth interviews, group discussions or focus groups. An unstructured interview is less equivalent to a guided conversation; this term has been argued over, as no interview lacks a structure of questions, and thus unstructured interview is an ambiguous term (Britten 1995). Semi-structured interviews consist of a set of predetermined open and closed questions, with other questions emerging from the dialogue during the interview, from either the interviewer or interviewee, in order to explore an idea in more detail (DiCicco, 2006). Although the interviewer may face difficulties in finding participants, the interview is a flexible method which provides more knowledge in the area of study (Britten 1995).

3.2.2 Expert review

Expert review is a method which consists of obtaining the point of view of an individual who is an expert and has a wide knowledge of the subject under study. The experts are given a set of predetermined questions, whether using qualitative or

quantitative methods. The questions may be related to evaluation of a model, suggestions about some points linked to the study or to different aspects of the area of study (Tessmer, 1993). Expert reviews can be applied in qualitative, quantitative or mixed methods (Tessmer, 1993). The advantage of this method is that it seeks information and knowledge about the study area from participants who have experience rather than from novices. However, in some cases expert review can be expensive to undertake (Tessmer, 1993).

3.2.3 Questionnaire

The questionnaire is a simple tool that includes lists of questions and spaces for answers. A structured questionnaire is often associated with the quantitative method and can also be used with a qualitative method to offer mix methods (Oppenheim, 1992). This technique is utilised in two different ways, self-administered, where the respondents complete the questionnaire by themselves, and interview-administrated where the respondents' answers are recorded by the researcher (Bourque and Fielder, 2003). Using the questionnaire technique enables the researcher to reach people who are spread across a wide geographical area and contact a large number of people. However, there are drawbacks to using a questionnaire, such as the fact that it is time-consuming for the researcher and there is little control over who completes an online questionnaire (Oppenheim, 1992).

3.3 Triangulation technique

A triangulation method is a technique used to validate the model by using a combination of two or more methods; data triangulation, investigator triangulation,

methodological triangulation, or theoretical triangulation (Runeson and Host, 2009). Data triangulation is a technique in which data is gathered from different people. The participants can be other researchers, departmental staff. This technique can also involve collecting data in different places, at different times or from different sources (Runeson and Host, 2009). This type of triangulation can be applied to in-depth interviews and focus groups (Guion et al., 2011). Investigator triangulation is also carried out. This involves using several different investigators in the collection, analysis and interpretation processes (Runeson and Host 2009). The findings from each investigator are compared and provide a deeper understanding of issues, while the findings can be obtained in different ways, from interviews, observations, case studies or focus groups (Guion et al., 2011). Methodological triangulation, involves data being collected using different methods, such as surveys, focus groups, and interviews, and the data from the methods used are then compared to see if they produce similar results (Guion et al., 2011). Theoretical triangulation brings multi-perspectives from different theories to understand a single set of data (Guion et al., 2011).

3.4 Research Methods of Exploratory Study

In exploratory study the researcher needs to collect initial data about a problem that is still not clearly defined. Generally, there is no agreed method, and no perfect research method that can assist in achieving all the goals of the research (Bryman 2001). In this research, to reach the goals of the study, different perspectives are required. Therefore, a mixed methodology within the framework of triangulation was used to investigate the factors for e-knowledge sharing in Saudi universities.

Collecting data through mixed methods in an exploratory study can be applied in Sequential Exploratory Design (SED), where data is collected over the period in different consecutive stages (Ivankova el at. 2006). The researcher collects data by applying one method, qualitative or quantitative depending on the purpose of the study, and then analysing the data. After data analysis of the first stage has been completed, the researcher carries out the second stage of collecting data, and so on (Ivankova el at. 2006).

The analysis of the two different types of data collected can be integrated in different ways, depending on the research purpose (Ivankova el at. 2006). In this exploratory study, the qualitative and quantitative data were integrated in the intermediate stage; intermediate stage data integration means the data is collected from the quantitative method after the qualitative data has been analysed and used for the development of some questions. These questions are grounded in the results from the first, qualitative stage, to investigate those results in more depth through collecting and analysing quantitative data in the second stage of the study. The final stage, which is also a quantitative method, is conducted after the second stage analysis has been completed. Figure 3-1 shows the stages of the sequential technique used in the exploratory study.

In order to refine and confirm the proposed e-knowledge sharing model, the author decided to apply two different types of triangulation in this study, which are theoretical triangulation and methodological triangulation. Theoretical triangulation comprised the use of technology acceptance models and factors gathered in previous studies, in the development of a set of factors influencing the use of knowledge

sharing technology. The findings from these sources confirmed the effectiveness of the factors influencing behavioural intention to use a knowledge sharing system.

Methodological triangulation in this research involved using three methods: interviews, expert reviews, and questionnaires. The data were gathered from semi-structured interviews including closed and open questions. The purpose of conducting these interviews was to assist the author to identify factors that have not mentioned in previous studies. Data was also gathered from expert reviews, which were conducted with experts as self-administered questionnaires, in order to refine and revise the factors that emerged from the interviews. In addition, the data were gathered from another set of online self-administered questionnaires, in order to confirm the model, which included factors derived from both the theories and the expert reviews.

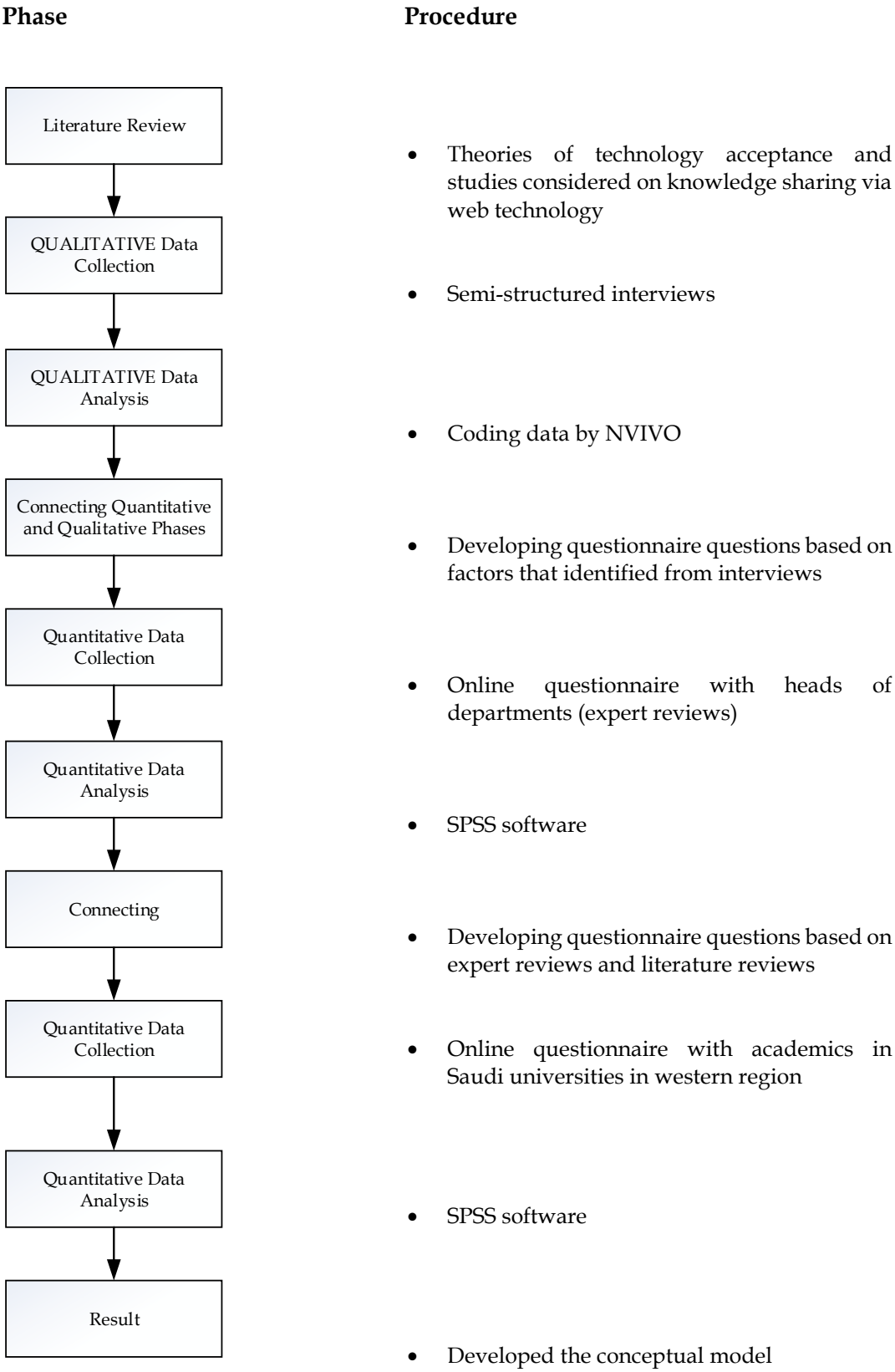

Figure 3-1 Research methods used in the exploratory study (Sequential Exploratory Design)

3.5 Determination of the required sample size

Sample size is the portion of a population which is studied; the population in this study is Saudi academics. Producing reliable and accurate results with a very low chance of error is crucial in this stage, so identifying the minimum sample size is the target (Banerjee et al., 2009). Type one error, which is called alpha (α), and type two errors, known as power (β), are required to calculate the minimum sample size (Banerjee et al., 2009). Type one error (α) means rejecting the null hypothesis when it is actually true: for 95% confidence level α = 0.05. Type two error (β) occurs when failing to reject the null hypothesis, conventionally set at 20%. Therefore, P-value = (1-β) = 0.80 (Banerjee et al., 2009).

Effect size is a measure that describes the amount of difference between two groups (Banerjee et al., 2009). Three parameters were identified for effect size by (Miniard & Cohen 1981; Cohen 1988). The largest effect size used in exploratory studies was chosen, which is 0.8. (Cohen 1988). This research used G* Power software to determine a minimum sample size by calculating certain parameters. The calculation was run under the t-test family to find the difference in mean from constant (one sample case). Table 3-1 provides the calculation of the sample.

Table 3-1 Sample size calculation by G power

t tests - Means: Difference from constant (one sample case)		
Tails	Two	
Effect size d	0.8	The largest effect size is used in exploratory studies.
α error probability.	0.05	The chance of accepting the null hypothesis in error
Power (1- β err probability)	0.8	The largest effected size of exploratory study
Minimum sample size	12	At least twelve participants

The G-power tool is used to help a researcher to determine sample size when data is collected from questionnaires. However, there are different suggestions for the sample size of data collection from interviews, and researchers may not strictly adhere to them. According to Creswell (1998), it is suggested that 5 interviewees to 25 is acceptable, whereas Morse (1994) recommends at least six participants in interviews. Strauss & Corbin claim that data saturation is a researcher decision "*if the researcher judges that theoretical saturation has been reached, it is assumed that further data collection will not bring incremental benefit to the theory development process and data collection will be halted*" (Strauss & Corbin 1998, cited in Robinson 2014, p.31). Moreover, Thomson's review of fifty studies concluded several points regarding sample size in interviews: increasing the number of interviews will repeat interviews, as saturation occurs between 10 and 30 interviews (Thomson, 2010).

The author considered these suggestions and continued conducting interviews until most of the responses were repeated and no new data had been added to the study.

3.5.1 Ethics approval

Before distributing the questionnaire to participants, it is necessary to plan to meet the ethical requirements of research. The ethical requirement of this research has been approved by the Ethics Committee at the University of Southampton under the Reference Number 6736.

3.5.2 Interview design

The initial research methods of the preliminary study were semi-structured interviews. The goal of the interviews is to identify factors that are not mentioned in previous studies, as well as investigating the extent to which academics use systems that are related to the website of their universities, and exploring the way that these are used to share knowledge among academics. This will enable the researcher to determine which online system academics prefer for knowledge sharing and identify academics' requirements and attitudes towards e-knowledge sharing.

Semi-structured interviews including open and closed questions were conducted with ten Saudi academics, experts or novices, from different Saudi universities and departments, in different locations. Some interviews were conducted on campus and others in cafes. To interact directly with the interviewees and provide further questions based on the interviewees' answers, face-to-face interviews were used (Valenzuela and Shrivastava, 2007). The sample would cover the complete range of experience from novices to very experienced academics, also they would have to have all three degree levels: Batchelor and Masters and PhD. These different criteria were considered in the interview method, in order to represent the target of all academics working in Saudi universities. The researcher sent emails in person to academics requesting their participation; when they agreed the appointment for the face-to-face interview was arranged. During interviews the participants were asked to read the participant information sheet, and, if they wanted to take part in this study, sign the consent form. An iPhone voice memo record was used in the interviews.

All of the interviews were conducted in the Arabic language, so the transcripts were translated from English to Arabic, and Arabic researchers at the University of Southampton were asked to confirm the accuracy of the translated questionnaire. Appendix B provides the interview questions in an English version. The closed questions are divided into three parts: knowledge sharing, using web technology and the importance of using e-knowledge sharing. The questions were constructed using a five point Likert-type scale with the following ratings: strongly agree = 5; agree = 4; neutral =3; disagree =2 and strongly disagree = 1. Additional comments were elicited in addition to the closed questions, to provide a qualitative element to this interview.

3.5.3 Expert Questionnaire

The experts in this study are the Heads of School, who are the academics responsible for managing courses and other academics, in addition to some other academics with experience in teaching The purpose of the expert review was to find out the opinions of experts and also to confirm the data obtained from the interviews by adding more factors or deleting insignificant factors. Thus, the questions were designed in relation to the responses from the previous interviews.

The questionnaire involves 20 closed questions, about the factors that were mentioned in the interviews, and one question asking participants to add more factors that may affect the use of an e-knowledge sharing system. The questions were constructed using a five point Likert-type scale with the following ratings: strongly agree = 5; agree = 4; neutral =3; disagree =2 and strongly disagree = 1. *Google drive* was used to deliver an online questionnaire, and then the link to the questionnaire

was distributed by sending explanatory emails to the participants and including the statement "the aim of the questionnaire is to investigate effective factors that assist in building electronic systems for knowledge sharing among academics in different campuses who have common interests." The respondents were thirty Saudi academics who were working as Heads of Schools and other academics with experience in teaching. Heads of Departments were selected as expert reviewers because they are responsible for managing their department by developing modules and research groups, as well as controlling the study plan of courses and modules and ensuring all other educational requirements are provided. The researcher sent emails in person to these academics requesting their participation and included the link to the questionnaire

The questionnaire was administered in Arabic and English; Appendix C shows the English and Arabic versions of the questionnaire. Arabic researchers at the University of Southampton were asked to confirm the accuracy of the translated questionnaire.

3.5.4 Online Questionnaire

After the analysis and findings of the expert reviews, the questionnaire was designed and conducted. The purpose of this questionnaire was to confirm existing factors in the e-knowledge sharing model and other factors that were identified from the expert reviews.

The questionnaire included 36 closed questions, and was divided into two sections: the demographic information section, and 32 statements about factors involved in the e-knowledge sharing model. The statements were constructed using a five point

Likert-type scale with the following ratings: strongly agree = 5; agree = 4; neutral =3; disagree =2 and strongly disagree = 1. *Google drive* was used to generate an online questionnaire, and then the link to the questionnaire was distributed by sending explanatory emails to the participants. The respondents were 74 Saudi academics in universities in the Western region of Saudi Arabia, as a pilot study. The questionnaire sample was selected randomly by obtaining academics' emails from the websites of Saudi universities in the western region, and then sending them e-mail requests to participate in a study.in order to achieve a sample that would accurately represent to an appropriate degree.

The questionnaire was administered in Arabic, Appendix D shows the English and Arabic versions. The English version of the questionnaire was checked and validated by some Arabic researchers at the University of Southampton to confirm the accuracy of the translated questions.

3.6 Reliability Analysis

The use of multiple measurement items for each factor requires establishing a reliability test to ensure that these multiple items are consistent within the same factor and that the result of a study is able to be repeated and is reliable (Bryman and Cramer, 2011). There are two reliability test methods that are widely used: internal consistency and the test-retest reliability (Pallant 2011). Internal consistency is the extent to which the items are interrelated and inter-consistent within a specific construct, whereas test-retest reliability refers to conducting the same test with the same group on different occasions, where the correlation between the two results indicates the degree of reliability (Pallant 2011).

This study utilised the internal consistency reliability test at the initial data analysis stage; the test was measured by using the most common method, Cronbach's Alpha (α). Cronbach's Alpha is a statistical measure that was calculated through the SPSS tool; the result provides the average correlation of all items in the same construct (Pallant 2011). Reliability scores using Cronbach's alpha range between 0 and 1: a result closer to 1 indicates higher reliability. A reliability score of 0.7 is considered acceptable (Pallant 2011 & Hair et al., 2007); however, Mitchell and Jolley (2012) suggest that 0.5 or higher is considered acceptable. Taking this broader view, 0.5 or above is accepted in the exploratory study.

3.7 Chapter summary

This chapter has provided details of the methods used to revise and confirm the factors of the e-knowledge sharing model. The appropriate methods for this stage of the research were considered to be mixed methods, and two different triangulation methods, the theoretical and methodological triangulation methods were used. Expert reviews were conducted after collecting and analysing data from semi-structured interviews with 10 Saudi academics. The interviews were conducted to identify factors not mentioned in the previous literature. The expert reviews were conducted through an online questionnaire to 30 Heads of School in Saudi universities and other expert academics, in order to confirm the factors identified in the interviews. The final quantitative stage consisted of an online survey conducted with a group of 74 academics in order to confirm the relevance of the factors in the e-knowledge sharing model.

Chapter 4. Proposed Model

The previous chapters discussed the theories used to investigate the factors influencing adoption of e-knowledge sharing and studies that have been carried out in this area. This chapter presents the e-knowledge sharing model to be employed in this study, identifies the factors involved in the model and provides the supporting theories and research background concerning these factors. The factors are those required in order to construct an adoption model in a Saudi university context.

4.1 E-knowledge Sharing Model

After the technology acceptance theories were reviewed, the research model was built to examine acceptance of e-knowledge sharing by academic staff in Saudis universities. Factors that will be included in the model are constructed from technology acceptance and knowledge sharing literature reviews.

The conceptual model has been constructed through different processes; first, published papers considered important in the field of technology acceptance and knowledge sharing were identified, and factors extracted from related studies; challenging factors in the field of study were re-identified and then the factors which have the most important effects on knowledge sharing via web technology were combined, and the relevant factors categorized and filtered based on the meaning of these factors. Figure 4-1 presents the model used in this study, the "E-Knowledge Sharing Model."

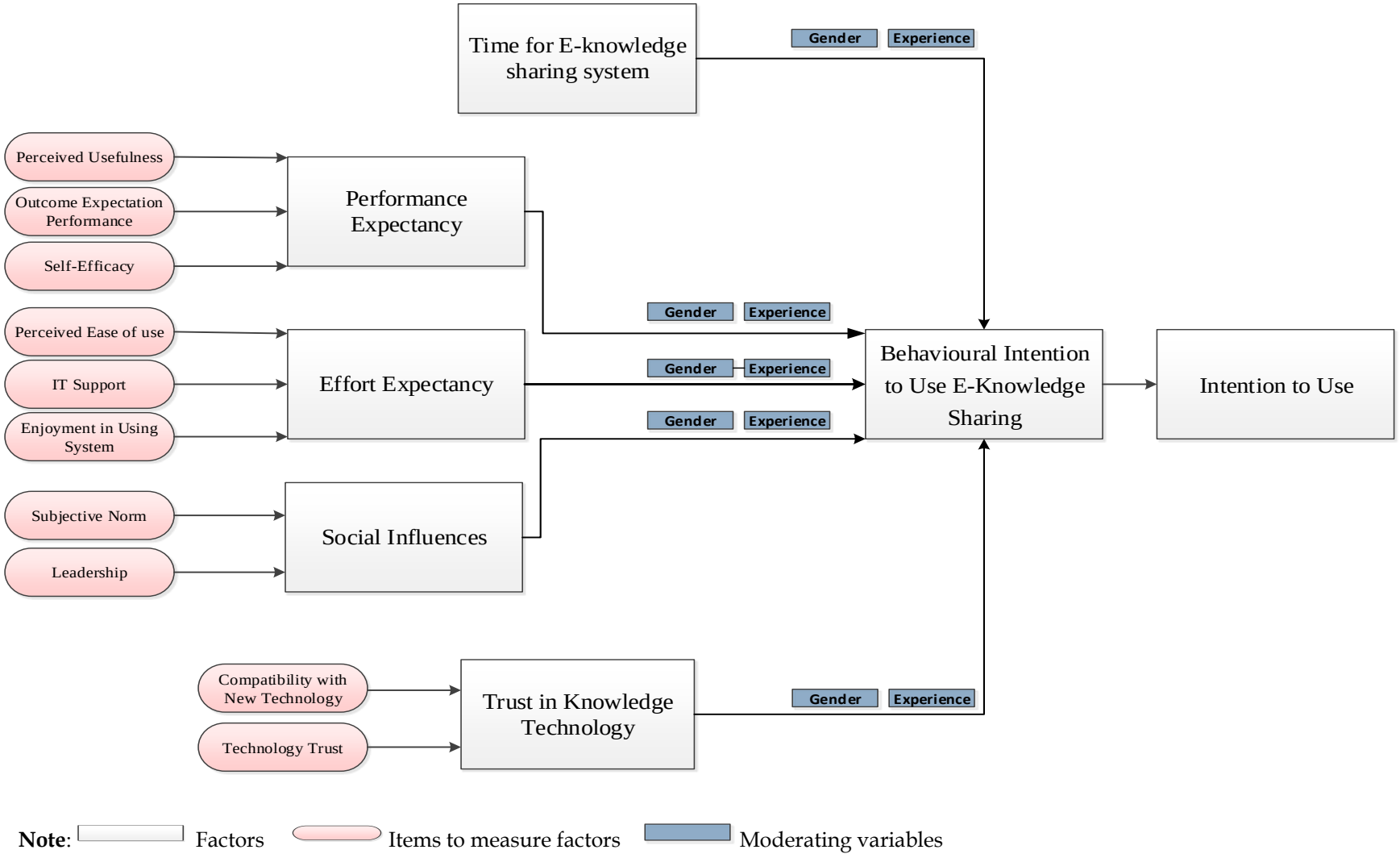

Figure 4-1 E-Knowledge Sharing Model

At the end of this phase, which is equivalent to the first stage of the triangulation technique, the requirements for the e-knowledge sharing model for the Saudi university context have been identified. The next section explains the factors involved in the e-knowledge sharing model. These factors are: performance expectancy; effort expectancy; social influences; trust in knowledge technology; time expended and behavioural intention to use e-knowledge sharing.

4.1.1 Performance Expectancy (PE)

Performance expectancy is defined as the extent to which using an e-knowledge sharing system is expected to help a member of academic staff to achieve gains in work place. The factor consists of three sub-factors; perceived usefulness, outcome expectation performance, and self-efficacy.

4.1.1.1 Perceived Usefulness

Perceived usefulness is the belief that academic staff using a system would enhance sharing of knowledge. Perceived usefulness is a crucial item for examining individual acceptance of a new technology (Ghorab 1997; Anandarajan et al. 2002). According to Davis et al. (1989), use of an electronic system occurs when users believe that improving their job trough using the system. It has been confirmed that the perceived usefulness factor has a strong impact on e-learning success (Park 2009).

The usefulness from using a knowledge sharing system may arise from different aspect, for example, it is easier to find and contact expert academics, and using systems also saves time. Moreover, academics obtain extra payment when they use the system: from the author's experience in the IT deanship at King Abdulaziz

University, when an IT worker provides services to other departments in the University, such as a workshop, they obtain extra payment. So, in this study it is expected that staff are more likely to use an e-knowledge sharing system if they feel that it is useful for transferring their knowledge.

4.1.1.2 Outcome Expectation

Outcome expectation is defined as the extent to which a member of the academic staff uses an e-knowledge sharing system because he/she expects to obtain valuable outcomes. In the study, outcome expectation refers to different types of rewards from universities, such as promotion and bonuses, or from their colleagues, such as new knowledge. According to Venkatesh et al. (2003), outcome expectation has a direct effect on behavioural intention, and a Saudi study which examined acceptance of IT in both North American and Saudi societies found that outcome expectation has a positive effect on behaviour (Al-Gahtani et al. 2007). Furthermore, Nistor et al. (2012) confirmed that outcome expectation influences academics' acceptance of the use of technology for knowledge sharing in academic virtual communities of practice. However, some studies found outcome expectation did not significantly influence employee attitude regarding knowledge sharing, whereas other investigations found no relationship (Bock & Kim 2002; Lin 2007). However, despite these critical findings, the author's view is that this factor should be involved in the model in order to examine whether there is an effect of outcome expectation on academic behaviour in using an e-knowledge sharing system. Moreover, the author believes that it is unrealistic to assume that academic staff will automatically use the system and contribute their knowledge. In fact, human beings will use online systems to offer their knowledge only when they expect a reward (Bock & Kim 2002; Lin 2007).

4.1.1.3 Self-Efficacy

Self-efficacy is defined as the academics' judgment of their capability to use an e-knowledge sharing system and gain positive outcomes. Some employees use technology to share their knowledge because of their self-abilities and experiences, and also from their belief that using technology can help towards work improvements. Employees who have high self-efficacy will be more likely to share their knowledge. Several studies have examined self-efficacy and found that it has influences on knowledge sharing intention and thus propose the factor as an intrinsic benefit (Bock & Kim 2002; Hsu et al. 2007; Lin 2007) The author believes that self-efficacy is a critical factor for user behaviour towards knowledge sharing through web technology; thus, self-efficacy is incorporated in the e-knowledge sharing model developed here.

4.1.1.4 Moderating Factors

Most studies have confirmed that the relationship between performance expectancy and behavioural intention to use technology will be moderated by gender (Venkatesh et al., 2003; Al-Gahtani et al. 2007). Research on gender differences shows that males tend to be highly task-oriented (Minton and Schneider, 1985). Thus, the study proposes that the relationship is influenced by gender, in relation to e-knowledge sharing among male and female departments in Saudi universities. In addition, with regard to the importance of transferring knowledge from experts to novices, experience is proposed as a moderating

variable in the relationship between performance expectancy and behavioural intention to use.

4.1.2 Effort Expectancy

Effort Expectancy is defined as the degree of ease associated with the anticipated degree of use of e-knowledge sharing system. This factor consists of three sub-factors: perceived ease of use, IT support, and enjoyment in using system.

4.1.2.1 Perceived Ease of use

Perceived ease of use is defined as the extent to which the academic staff believe using an e-knowledge sharing system would be free of effort. Perceived ease of use is one of the important factor in investigating individual acceptance of a new technology (Ghorab 1997; Anandarajan et al. 2002). TAM is the most widely applied model of user acceptance and usage (Davis et al. 1989). Studies, such as those by Lin et al. (2009) and Esmaeilzadeh et al. (2013) examined this factor and have shown evidence that it is highly correlated with intention to use and the acceptance of information technology. When staff find the technologies can be used in an easy way, it is more likely that they will share their knowledge, so ease of use will affect an academic's attitude towards the use of e-knowledge sharing. Therefore, the factor is selected in the model to examine the academics' acceptance of e- knowledge sharing.

4.1.2.2 IT Support

IT support is defined as the design of the IT application and subsequent supportive help to academics in using the e-knowledge sharing system. The organisation needs

to provide a budget to construct a strong technical infrastructure in order to encourage staff to adopt online services (Al-Sobhi et al. 2010). Additionally, IT support staff or "Knowledge Engineers" provide direct assistance for users in the processes and circumstances of creating knowledge (Bergeron 2003), and the successful adoption of a new system is commonly based on good implementation and installation of the IT application. Staff codifying and sharing knowledge through a system are required to be already familiar with using the system or there needs to be assistance for users who are unfamiliar with IT. In addition, among the fast growing technologies and the developing tools of the system, there is continual improvement, so users need supportive to be kept up-to-date with changes. Therefore, it is crucial that knowledge technicians connect with users, to help them understand the value of the technology and how to use it, also fixing any problem in the systems that may face users. If the knowledge worker provides assistance to the users (academics), then the users will find the technologies easy to use. Therefore, in the author's opinion, IT support will encourage academics to use e-knowledge sharing technology and is thus a factor included in the model.

4.1.2.3 Enjoyment in Using System

Enjoyment in using the system is defined as academic willingness to use the e-knowledge sharing system based on personal reasons and without expecting effort. (Lin 2007) examined the influence of enjoyment in using online systems as a factor in the knowledge sharing processes and found that it significantly influenced these processes. Furthermore, Teo et al. (1999) confirmed that perceived enjoyment had a significant effect on internet usage. Similarly, the study of (Lin et al. 2009) suggested that enjoyment in using blogs has influence on using a blog for knowledge sharing.

Moreover, some individuals enjoy helping others, especially in a virtual community of practice (Emmerik et al. 2005).

4.1.2.4 Moderating Factors

Studies based on UTAUT have confirmed the relationship between effort expectancy and behavioural intention to use. In the study this relationship will be moderated by gender and experience, which are issues relevant to the context of the present study.

4.1.3 Social Influences

Social influences are defined as the extent to which the academic believes that the important person encourages the use of the e-knowledge sharing system. Social influences consist of two sub-factors, subjective norms and leadership.

4.1.3.1 Subjective Norm

A subjective norm is defined as the academic perspective of whether social pressure affects behaviour in using an e-knowledge sharing system. Some studies emphasise that the subjective norm is one of the social influences that has a significant effect on individual behaviour, because of employees' exposure to social pressure to use or not to use the system (Ajzen 1991; Venkatesh et al. 2003).

4.1.3.2 Leadership

Leadership refers to the belief that leadership for team members enhances an e-knowledge sharing system by encouraging employees to use it. According to some studies (Bain et al. 2005; Fullwood et al. 2013)) a group working is more highly

developed when there is a leader guiding the group in regard to knowledge sharing technology and providing a good quality of new ideas and encouraging staff to use this technology. So, leadership has an influence on intention to use the system for knowledge sharing. The author believes that leadership will affect the situation in the context of the Saudi universities, where there are different campuses and separate male and female sections.

4.1.3.3 Moderating Factors

Studies based on UTAUT have confirmed that the relationship between Social Influences and intention to use will be moderated by gender and experience, which are issues relevant to the present study. A study by Gahtani et al. found that experience in Saudi IT workers had a significant effect on the relationship between SI and behaviour towards using systems (Al-Gahtani et al. 2007). However, the study also found that gender had no significant effect on the use of systems; the reason for this result may have been because the study included only a small number of female participants (Gahtani et al., 2007). The author believes that the relationship between SI and BI is moderated by gender, as suggested in other study (Alshehri, 2012).

4.1.4 Trust in Knowledge Technology

Trust in knowledge technology is defined as the belief of the academic staff in the reliability of the e-knowledge sharing system for knowledge sharing. The factor consists of two sub-factors: trust in knowledge technology and compatibility with new technology. Although this factor is excluded from most technology acceptance models, the author believes that trust in knowledge technology has a strong

relationship with the behavioural intention of academics, as has been confirmed by some studies. Examining trust is also important because knowledge sharing is a process which involves users and systems, and if the users do not trust the systems, they won't use them. According to Alsubhi, the electronic service is still unsuccessful in Saudi Arabia because "*the user confidence and information security is still very weak through the use of internet*" (Al-Sobhi et al. 2010). According to Supar et al. (2005), trust is also one of the most important factors in the use of knowledge sharing technology in higher education institutions, and Kim & Lee (2016) also confirmed this relationship when they examined staff behavioural intention toward knowledge sharing technology. Chen & Hung (2010) and Nemati et al. (2013) also indicate that trustworthiness has a significant effect on practices in transferring knowledge in the virtual community and digital world.

4.1.4.1 Trust in Technology

Trust in knowledge technology is defined as the academic or staff member's belief in the capability of an e-knowledge sharing system to provide accurate information. Trust in knowledge technology examines the trust of academics in two parts, trust in the knowledge of other academics and trust in the technology. Covey (2006) says: "*When someone has a high level of trust, they will work efficiently.*" Booth examined in depth successful online learning communities to understand ways in which knowledge sharing technology is trusted and found that building trust among staff leads to increased online knowledge sharing (Booth 2012). Also, trustworthiness has a significant influence on knowledge sharing behaviour by virtual team members (Alsharo, 2013).

4.1.4.2 Compatibility of New Technology

Compatibility with new technology is defined as the degree to which academic staff believe that the e-knowledge sharing system is compatible with the existing needs, experiences and values of adopters. The compatibility of the new technology is a factor that influences the use of knowledge sharing technology. Lack of compatibility between diverse IT systems and processes is one of potential barriers to using a system for knowledge sharing purposes (Riege 2005).

4.1.4.3 Moderating Factors

Trust in knowledge technology is proposed in the e-knowledge sharing model as a factor affecting behavioural intention. It is also proposed that the relationship is moderated by gender and experience in the context of Saudi universities: with separated campuses (male and female), it is required to investigate whether an e-knowledge sharing system would be trusted equally by women and men.

4.1.5 Time Expended

Time expended is defined as an academic's belief that using an e-knowledge sharing system is non-time-consuming, while information is available on an e-knowledge sharing system. Ford and Staples (2006) examined the influences of time on use of knowledge sharing technology and found that most staff who were unwilling to use technology in the area of knowledge management gave lack of time as a reason. Moreover, Haldin-Herrgard et al. (2000) claims that time is one of the barriers to knowledge sharing in organisations, as adding information to the system is time-consuming. There is very little research examining time as a reason for using

knowledge sharing, and time needs to be considered as a factor in this area (Riege 2005). However, the author's opinion is that knowledge sharing is definitely time-saving, once the information is available in the system. Thus, staff can reach the valuable information that has been previously placed in the system more quickly, rather than searching in other huge data sources (Alotaibi et al. 2017).

Time expended in knowledge technology is proposed in the e-knowledge sharing model as factor with an effect on behavioural intention; however, there have been insufficient studies to assess whether the relationship is moderated by gender and experience. Thus, this study also proposes that the relationship is likely to be moderated by gender and experience.

4.1.6 Behavioural Intention to Use E-Knowledge Sharing

Behavioural intention is defined as the overall affective reaction of an academic to using an e-knowledge sharing system. Previous studies have confirmed that behavioural intention will have a significant positive influence on technology usage (Venkatesh et al., 2003; Celik 2016).

Overall, based on the e-knowledge sharing model and some of the studies reviewed which pointed to other factors, it can be seen that each of the factors performance expectancy, effort expectancy, social influence, time and trust have a direct effect on behavioural intention towards e-knowledge sharing, a behavioural intention which has an influence on intention to use. These factors were investigated through different processes: published papers in both fields, technology acceptance and knowledge sharing, were considered in order to identify factors affecting user

behaviour. All available studies and published papers, whether Saudi Arabian studies or international studies, were used to construct the conceptual model and were presented in previous sections in the current chapter. The factors were extracted and combined, and categorised based on the relevance of meaning between factors. The factors were filtered to eliminate the redundant factors. Finally, the requirements for the e-knowledge sharing model for the Saudi university context have been identified.

Table 4-1 provides a summary for the construct of the conceptual model and provides the supportive sources.

Table 4-1 Summary of factors included in an e-knowledge sharing model

Factors	Definition	Items	References
Performance Expectancy	The extent to which using E-knowledge sharing will help a member of staff improve his or her performance	Perceived Usefulness	Davis, et al. 1989; Venkatesh et al. 2003; Wong & Huang 2015
		Outcome Expectation	Bock & Kim 2002; Al-Gahtani et al. 2007; Lin 2007.
		Self- efficacy	Bock & Kim 2002; Hsu & Lin 2008; Lin 2007.
Effort Expectancy	The degree of ease associated with the use E-knowledge sharing.	Perceived ease of use	Davis, et al. 1989; Venkatesh et al. 2003; Wong & Huang 2015
		IT infrastructure	Venkatesh et al. 2003; Al-Sobhi et al. 2010.
		Enjoyment using the system	Teo et al. 1999; Li & Li 2009.
Trust	The belief of the academic staff in the	Trust in technology	Al-Sobhi et al. 2010; Alateyah et al. 2012; Booth 2012; Alsharo 2013

Factors	Definition	Items	References
	reliability of the system for knowledge sharing	Compatibility	Roger 1995; Riege 2005 Venkatesh et al. 2003; Ahmed & Ward 2016
Time Expended	Academic's belief that using E-knowledge sharing is non-time-consuming while information is available on the online system	Time	Haldin-Herrgard et al. 2000; Riege 2005.
Social Influences	The extent to which the academic believes that their important person encourages the use of E-knowledge sharing system.	Leader	Bain et al. 2005; Riege 2005; Fullwood et al. 2013.
		Subjective norms	Ajzen 1991; Venkatesh et al. 2003; Celik 2016; Wong & Huang 2015
Behavioural Intention	Overall affective reaction of an academic to using E-knowledge sharing.	Behaviour	Venkatesh et al. 2003; Celik 2016

Chapter Summary

This chapter has provided the elements for constructing a research model based on the previous studies. The model includes some factors that have been reconstructed from other studies that have been mentioned in the Table 4-1, such as performance expectancy, effort expectancy and social influences, but with minor changes in the factors of construction to adapt the model for the context and purposes of this research. Other factors have been added, which are trust in technology and time expended, after examining previous research that confirmed that there are

relationships between these factors and behavioural intention. These are the factors that the author believes are required to construct a model of adoption of E-knowledge sharing for the context of Saudi universities.

Chapter 5. Results and Findings of the exploratory study

This chapter presents the results of the mixed methods conducted in the initial study. The findings from the interviews and the expert reviews are presented and discussed. The second step is the presentation of the results of the survey conducted to confirm acceptability of the e-knowledge sharing model developed in Chapter 3. The interviews and surveys in this study were conducted with academics in Saudi universities.

5.1 Result from the interviews

This stage is intended to identify factors that are not mentioned in previous studies, as well as to investigate the extent to which academics use systems that are related to the websites of their universities, and to explore the way that these are used to share knowledge among academics. The researcher obtained permission for these interviews to be recorded. The semi-structured interview included open and closed questions. The next sections present the results of the analysis of the qualitative and quantitative data.

5.1.1 Quantitative Data

The closed questions were designed according to three topics: part I: knowledge sharing, part II: using web technology, and part III: importance of using e-knowledge sharing systems. The frequencies and percentages of academics' responses to the closed questions are provided in Appendix B in analysis part. The quantitative data

were then analysed using the SPSS software and the hypothesis (statements in the questionnaire) was tested using the One-Sample T test for the test value 3. Likert-type scales provide interval data and means for each statement in the questionnaire to calculate and then represent participant attitude. The current research used five-point Likert-type scales; the value 3 is a mid-point of five Likert scale points (median), which indicates Neutral, and is compared to the mean for each hypothesis to measure to what extent each hypothesis is significant. This method is widely used in research for significant agreement of factors (Likert, 1932; Edwards and Kenney, 1946; Coakes and Steed, 2009).

Table 5-1 the analysis of the interviews responses of academics in Saudi universities.

One-Sample Statistics test value = 3		
Please provide your opinion about the following statements		Mean
Part I: the importance of knowledge sharing	1. Obtaining information for teaching new subjects is difficult.	4.40
	2. Obtaining information from expert academics is very useful.	4.70
	3. Sharing my knowledge with colleagues will improve academic performance in general.	4.50
	4. Novice academics struggle without sharing the knowledge of expert academics.	4.80
	5. Sharing my knowledge with colleagues helps me to accomplish tasks more quickly.	4.80
Part II: the importance of using Web technology	6. Do you use the internet in workplace?	4.40
	7. Do you use the internet to obtain information about subjects you teach?	4.00
	8. Do you find any difficulties accessing Webpages?	2.10
	9. Do you find the online systems of the university are easy to use?	4.30
	10. Is Web technology a useful source of appropriate knowledge?	2.80

One-Sample Statistics test value = 3		
Please provide your opinion about the following statements		Mean
	11. Do you have time to use the Web in your workplace?	1.80
	12. Have you shared your knowledge using the Web?	4.40
	13. Do you use a social network?	3.00
	14. Have you shared your knowledge through a social network?	3.40
Part III: importance of using the e-knowledge sharing	15. Using e-knowledge sharing among academics makes it easier to make contact with expert academics on other campuses.	3.20
	16. Using e-knowledge sharing among academics increases the productivity of academics.	4.80
	17. Using e-knowledge sharing among academics makes knowledge more accessible.	4.60
	18. Using e-knowledge sharing among academics is more important than having printed documents.	4.80
	19. Using e-knowledge sharing among academics can be trusted. (information trust)	5.00

Table 5-1 summarises the responses for Part I, which concerns the importance of knowledge sharing, and for Part II, which includes questions about using web technology in the workplace, to find out whether academics are familiar with web technology and with the online systems of their universities, and presents the respondents' opinions towards the use of e-knowledge sharing among academics.

The results of part I and part III show that the academics held positive attitudes toward knowledge sharing and use of e-knowledge sharing, as the respondents highly rated all the statements in these parts. The means are greater than 3 for all statements. Similarly, for part II the means of participants' responses on most questions are greater than 3. However, for some of the statements, the means of the

academics' opinions indicate areas of concern about knowledge sharing. The mean for time available to use university's website is 1.80 < 3, indicating that lack of time could be a barrier to using an e-knowledge sharing system. In addition, the means are also low for Web technology as a useful source of appropriate knowledge (2.80), and difficulties in accessing Webpages (2.10 < 3). All the academics strongly agreed with the statement that using e-knowledge sharing can be trusted, with a mean value of 5, the table 5-1 shows that and the means of four statements (4, 5, 16 and 18) were 4.80 which indicates the academics highly agreed with these statements. The results from the table also indicate that not all participants used social networks, whether at work or at home. These results are discussed further in the next chapter.

5.1.2 Qualitative Data

The open questions are divided into three different categories: knowledge sharing, using Web technology and factors influencing use of knowledge sharing technology. Nvivo software was used to analyse and code the academics' responses and the results are given in the following sections.

5.1.2.1 Knowledge Sharing

According to these results, 80% of the academics have used knowledge sharing among colleagues in two different ways: through electronic methods, using CDs that included documents related to courses and e-mails, and also through non-electronic methods, through workshops, informal chatting and hard copies. However, 9 out of 10 respondents confirmed that there is no online system for knowledge sharing among the academics in their universities. One respondent stated that there is an e-

knowledge sharing system among academics in that University, but it is not active and many academics have not used it. Below are some quotations when the interviewees were asked if they liked the methods used in their universities to share knowledge. Most of the respondents did not favour the traditional ways, as illustrated in these quotations.

Academic A: "*Not too bad to use traditional ways but it is a good idea to have an electronic system for knowledge sharing. I really hate knowledge sharing through meetings because I can't get wider knowledge*."

Academic B: "*Not too bad but I hope there is a knowledge sharing system for academics to share expertise that will help not just in teaching but to share their knowledge after attending conferences and training courses. It saves time if we get knowledge from others by using this system*."

Academic C: "*We share knowledge in the university by handing CDs over to heads of at the end of the semester, but CDs occasionally get lost. So I hate this way of sharing; if there is an electronic system, it would be better, to save information*."

5.1.2.2 Using Web Technology

All these academics use the internet in the workplace, so they are familiar with web technology. The question *Do you prefer to have an electronic system?* Was asked in the interview and 100% of the academics strongly agreed with the use of an e-knowledge sharing system for knowledge sharing purposes. They gave many reasons for believing that e-knowledge sharing is useful including:

Academic A: "*In my university most of the experts are in the male department; if there is an e-knowledge sharing system, it will work as a connection between academics in the male and female*

sections and different campuses. However, the platform will not be a success until there is encouragement."

Academic D: "*To be available and accessible for a long time and for academics who will teach similar subjects in later years and it is a very convenient resource to find what I want*."

Academic E: "*I am a new in teaching and I really need this system; it is really useful to find experts' knowledge*."

Academic F: "*Yes, I prefer using a specific platform for knowledge sharing: it is easier for searching for particular knowledge from an expert who I can't contact by phon*e."

In this category, the researcher included some questions about Web 2.0, especially social networks and the Wiki platform, in order to obtain the academics' opinions about using these as e-knowledge sharing systems for knowledge-sharing purposes. However, it was surprising that not all the respondents agreed with using a social network or Wiki platform for knowledge sharing among academics; they preferred to design and structure a specific knowledge sharing system based on web technology. Most of these academics believed that social networks websites are not suitable for academies and education, and that the Wiki platform is difficult to use and is not attractive because it includes too much text. Also, Nández and Borrego study (2013) indicated that academics do not gain a large amount of advantage from using social networks for knowledge sharing because of lack of institutional support.

Academic B: "*I use Facebook just to browse news but I have never shared my knowledge because there is no privacy and I really care about credibility of information that I post*."

Academic D: "*I use most of the social networks and I share my knowledge but I wouldn't prefer using SN for KS or Wiki, because Wiki is not easy and not attractive; it includes a lot of text, and SN is good for chatting but is not a suitable interface to share data among academics*."

Academic G: "*I don't think social networking is easier than others, and I prefer an electronic system because it is easier to design a very attractive interface, and extracting data from Wikipedia. Wiki is very good but not attractive and lots of text - a graphics interface is better, and extracting data from a wiki is a very good idea*."

5.1.2.3 Factors influencing use of knowledge sharing technology

This category is concerned with motivation and barriers to knowledge sharing technology. Academics were asked the question "*Can you provide the most important factors to be considered when academics want to share knowledge via Web technology*" The answers are summarised in Table 5.2.

Table 5-2 Factors suggested by academics

Motivation	Barriers
- The system is easy to use - The system includes a knowledge rating technique; it is very useful and will be trustworthy. (A knowledge rating technique is where academics have the ability to rate the knowledge of other academics that is included in the e-knowledge sharing system). - Encouragement by leadership	- Technical problems - Time consuming - Some academics fear that they will lose their own position - Some academics are unfamiliar with the Internet

Motivation	Barriers
- Making it mandatory to use e-knowledge sharing - Time spent in e-knowledge sharing is counted as working hours - IT is supportive and helps users - Attractive interface - Expectation of reward, such as getting promotion - Enjoyment in using system and helping others - Secure system	- Incompatibility with existing technology

5.1.3 Results from Expert Questionnaire

The expert questionnaire were conducted to confirm the factors identified from the interviews. There were 30 participants, who had either worked as heads of school or were experienced academics. The collected data were analysed using SPSS software to compute the participants' scale scores for the questionnaire. The results using SPSS software to compute frequencies and percentages of the responses are provided in Appendix C. The questionnaire data were then analysed using the SPSS software and the hypothesis was tested using the One-Sample T-test on the test value 3, as discussed earlier, in section 5.1.1, the value 3 is used to test all hypotheses (statements) in the questionnaire. All the statements are shown in Table 5-3, with the results of the analysis. The value 3 indicates Neutral on the five point Likert-type scales. The hypotheses for testing each factor are as follows:

- H0: If the mean rating of the proposed factor (i.e., of each statement) is significantly higher than 3, then the factor affects the use of e-knowledge sharing.

- H1: If the mean rating of the proposed factor (i.e., of each statement) is not significantly higher than 3, then the factor does not affect the use of e-knowledge sharing.

Table 5-3 Analysis of the questionnaire responses by the heads of departments.

Factors	To what extent do you agree with the following statements	Mean	Sig. (2-tailed)
Expect reward	Q1. A reward encourages academics to share their knowledge via e-knowledge sharing systems.	4.00	<0.001
Enjoyment in using the system	Q2. Academics share their knowledge via e-knowledge sharing systems because they enjoy using the system.	4.27	<0.001
Outcome expectation	Q3. Academics use e-knowledge sharing to acquire new knowledge and experience.	4.60	<0.001
Self-efficacy	Q4. Academics prefer to use e-knowledge sharing because they have a high-level knowledge and experience.	4.03	<0.001
Fear of Loss	Q5. Academics do not share their knowledge via e-knowledge sharing systems because they fear colleagues may get promotion before them.	2.80	0.405
Trust in others	Q6. Academics do not use e-knowledge sharing systems because they do not trust others' expertise knowledge.	3.60	<0.001
Mandatory	Q7. Academics do not use e-knowledge sharing systems unless it is mandatory.	3.00	1.000
Perceived ease of use	Q8. Academics are willing to use e-knowledge sharing if the system is easy to use.	4.00	<0.001
Attractive interface	Q9. Academics are willing to use e-knowledge sharing if the system has an attractive interface.	2.87	0.475
Knowledge rating	Q10. Academics are willing to use e-knowledge sharing if academics rate the knowledge in the system. (rating knowledge)	3.67	0.004
Perceived usefulness	Q11. Academics are willing to use e-knowledge sharing to accomplish tasks more quickly.	4.07	<0.001

Factors	To what extent do you agree with the following statements	Mean	Sig. (2-tailed)
Perceived usefulness	Q12. Academics are willing to use e-knowledge sharing in order to have contact with expert academics.	4.23	<0.001
Factors	To what extent do you agree with the following statements	Mean	Sig. (2-tailed)
Time	Q13. Using e-knowledge sharing to exchange knowledge is time consuming.	4.10	<0.001
Trust in technology	Q14. Academics do not trust e-knowledge sharing to share knowledge.	3.87	<0.001
Security	Q15. Academics do not use e-knowledge sharing if it is an insecure system.	4.20	<0.001
Compatibility with New Technology	Q16. Academics do not use e-knowledge sharing because they are not willing to change their existing routine.	3.57	0.007
Unfamiliarity with IT	Q17. Lack of familiarity with using technology tools inhibits sharing knowledge.	3.60	0.006
Leadership	Q18. Departmental superiors are essential for academics in knowledge sharing technology.	4.33	<0.001
IT assistance	Q19. IT support is essential to help academics in e-knowledge sharing.	4.70	<0.001
Working hours	Q20. Academics use e-knowledge sharing if it is counted as working hours.	4.10	<0.001

This study tested each of the 20 hypotheses separately, using level of significance $\alpha = 0.05$, so the probability of observing at least one significant result just due to chance is 0.64, which is calculated from $P = 1 - (1 - 0.05)^{20} = 0.64$, which results from multiple testing (Goldman 2008).

In order to avoid the probability of observing at least one significant result, finding numerous spurious positives and to protect collected data against the bias of frequent

hypothesis testing effects, the p-value needs to be adjusted to compute the number of comparisons being performed (Altman & Bland 1995). Thus, the Bonferroni correction was used, which is a simple method for correcting for multiple comparisons, used when dependent or independent statistical tests are being performed simultaneously on a single data test (Altman & Bland 1995).

However, although the Bonferroni correction is used for controlling false positives, it is excessively conservative and may fail to catch some significant findings, especially if researcher tests a large number of hypotheses (Simes 1986). This could result in large critical values because the test is based on the principle of dividing α by the number of hypotheses, which increases the chance of producing a false negative result (Altman & Bland 1995).

When using the Bonferroni correction the null hypothesis (H0) is only rejected if the probability (p-value) $\geq \frac{\alpha}{n} = \frac{0.05}{20} = 0.0025$, which is the probability that the difference is due to chance, where *n* is the number of statements included in the questionnaire. The factor (in this case the statements) is statistically significant if the p value < 0.0025; otherwise the factor is not statistically significant.

Table 5-3 displays the result of the descriptive analysis of the responses. The means of participants' responses for most statements are greater than 3 (test value), which is greater than the neutral value of the Likert scale used in the questionnaire. However, the mean of participants' responses on Q5 and Q9 is less than 3, which means the academics disagreed with these factors and the mean of participants' responses on Q7 is 3, which means they were neutral on this statement.

The p-values of the samples for all statements are also shown in Table 5-3. The p-values for most statements are less than 0.0025, which means these are statistically significant, whereas the p-values of Q5, Q7, Q9 and Q17 in the same table are greater than 0.0025, which means these variables are not statistically significant. These factors are therefore considered not to influence academic behaviour in the use of e-knowledge sharing.

However, the p-value for Q10 is slightly greater than 0.0025 ($p < 0.004$), with a slight difference between these p-values. Thus, this factor is not rejected, as this is an exploratory study. Also, 60% of respondents agreed that the knowledge rating technique was one factor affecting the use of an e-knowledge sharing system.

Furthermore, although the p-value for Q16 "compatibility with new technology" is greater than 0.0025 ($p < 0.007$), this factor not only emerged from the interviews but is also found in studies, confirming that this factor is one of the barriers to using a new system (Riege, 2005 and Moore and Benbasat, 1991). Thus, this factor will be kept in the model.

Not all experts answered the open question included in the questionnaire "*Could you provide more factors that affect academics' behaviour toward using e-knowledge sharing systems?*" Those experts who answered this question only repeated factors that already exist in the model.

5.2 Results of the Questionnaire

The purpose of this questionnaire was to confirm existing factors in the e-knowledge sharing model; these were the factors that were identified from technology

acceptance theories, and the expert reviews of this study. The online questionnaire was carried out between 1 April and 27 May 2014, the reliability instrument of the questionnaire is provided, following by the results of data analysis.

5.2.1 Reliability Instrument of the Questionnaire

The study applied a reliability test based on Cronbach's Alpha. The result shown in Table 5-4 shows that the Cronbach Alpha values of most factors are above 0.80, which indicates a very good internal consistency of items for the factors performance expectancy, effort expectancy, behavioural intention and intention to use.

Table 5-4 Reliability test of the questionnaire

Concept measured	Item used	Cronbach Alpha	Reliability results
Performance Expectancy (PE)	8	0.890	Very good
Effort Expectancy (EE)	5	0.873	Very good
Time Expended (TE)	4	0.118	Poor
Trust (T)	5	0.527	Moderate
Social Influences (SI)	4	0.793	Acceptable
Behavioural Intention (BI)	3	0.809	Very good
Intention to Use (IU)	3	0.944	Highly reliable

Another factor which exhibited an acceptable level of reliability is trust: the value is still higher than 0.5, which is moderate, as suggested by Mitchell and Jolley (2012). However, the value for time expended indicated poor reliability, but it was found that this value improved if two items from time expended were deleted (time expended 1 and time expended 2): it was then 0.88, which indicated a very good reliability, see Table 5-5; moreover, the factor time expended was confirmed by the experts and was highly recommended to include in the model.

Table 5-5 Reliability for Time expended when two item were deleted.

Items	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha for time expended (for two items)
Time expended 3	1.401	0.786	0.88
Time expended 4	1.345	0.786	

Thus, in the early stage of the research, time expended was not removed from the model; more discussion about this issue will be considered later in the next section.

5.2.2 Demographic Analysis Result

Table 5-6 Demographic Information

Variables		Frequencies	Percentage
Gender	Male	33	44.6%
	Female	41	54.4%
Experience	Just Started	7	9.5%
	Less than 2 years	24	32.4%
	2-5 Years	13	17.6%
	6-10 years	10	13.5%
	More than 10 years	20	27.0%
Higher qualification	Bachelor	17	23.0%
	Masters	37	50.0%
	PhD	20	27.0%
Shared their knowledge	Yes	56	75.7%
	No	18	23.3%

Table 5-6 presents the demographic results obtained from the questionnaire. A slight majority of the participants (54%) were female. The respondents' experience in teaching in universities ranged from (i) those with less than 2 years, who were considered as novices, followed by (ii) those with more than 10 years of experience,

who were considered as experts. Although the survey was randomly distributed online to academics, the largest group of participants comprised holders of Masters Degrees (50%). In total, 75.7% of participants reported that they had shared their knowledge with colleagues.

Table 5-7 The analysis of the questionnaire responses of the academics

One-Sample Statistics test value = 3		
Factors	**Mean**	**Sig. (2-tailed)**
Performance Expectancy (PE)		
Using e-knowledge sharing will help me accomplish tasks quickly.	4.08	< 0.001
Using e-knowledge sharing will improve the quality of my performance.	4.14	< 0.001
I will use e-knowledge sharing to share my knowledge because I expect a reward from the department.	3.68	< 0.001
I will use e-knowledge sharing to share my knowledge because I will receive additional points for promotion.	3.97	< 0.001
I will use e-knowledge sharing because I would like to engage in a bilateral exchange.	4.34	< 0.001
I will use e-knowledge sharing to acquire new experience.	4.28	< 0.001
I will use e-knowledge sharing to share my knowledge when I have valuable knowledge.	3.82	< 0.001
I will use e-knowledge sharing to share my knowledge, if I have high-level knowledge.	4.08	< 0.001
Effort Expectancy (EE)	**Mean**	**Sig. (2-tailed)**
I will use e-knowledge sharing if it is easy to find what I want.	4.28	< 0.001

One-Sample Statistics test value = 3		
Factors	**Mean**	**Sig. (2-tailed)**
I will use e-knowledge sharing if it is easy to connect with colleagues who have a common interest.	4.28	< 0.001
I will use e-knowledge sharing if there are no technical problems with accessing it.	4.24	< 0.001
I will use e- knowledge sharing because it is enjoyable work.	3.88	< 0.001
It feels good to help other members of the academic community by using e-knowledge sharing.	4.36	< 0.001
Trust in Knowledge Technology (T)	**Mean**	**Sig. (2-tailed)**
I trust the knowledge shared by academics in an e-knowledge sharing system.	3.69	< 0.001
I will use e-knowledge sharing when I trust the system.	3.95	< 0.001
Rating knowledge by users is important to identify valuable information that is available in the system.	4.12	< 0.001
I will use e-knowledge sharing if there is a rating knowledge technique in the system.	4.22	< 0.001
I will not use e-knowledge sharing because it is incompatible with my work.	3.97	< 0.001
Time Expended (TE)	**Mean**	**Sig. (2-tailed)**
I will NOT use e-knowledge sharing because I do not have time to use it.	3.76	< 0.001
I will not use e-knowledge sharing because it needs additional time to be spent answering follow-up questions.	3.66	< 0.001
I will use e-knowledge sharing if it is counted as working hours.	3.43	0.002
I will use e-knowledge sharing if it is a part of my job.	3.45	0.002

One-Sample Statistics test value = 3		
Factors	**Mean**	**Sig. (2-tailed)**
Social Influences (SI)	**Mean**	**Sig. (2-tailed)**
I will use e-knowledge sharing if my superiors support me in sharing it.	3.43	< 0.001
I will use e-knowledge sharing if my superiors say it will improve my performance evaluation.	3.41	0.004
I will use e-knowledge sharing to communicate with colleagues who are important to me.	3.42	0.003
Academic who influence my behaviour encourage me to use e-knowledge sharing.	4.19	< 0.001
Behavioural Intention (BI)	**Mean**	**Sig. (2-tailed)**
E-knowledge sharing is my favourite way to share the knowledge that I have.	3.59	< 0.001
E-knowledge sharing is worthwhile.	3.96	< 0.001
I like to use e-knowledge sharing to share my knowledge with colleagues.	3.72	< 0.001
Intention to Use (IU)	**Mean**	**Sig. (2-tailed)**
In the future I will use my knowledge in e-knowledge sharing.	4.01	< 0.001
I intend to use e-knowledge sharing.	3.99	< 0.001
I will make an effort to use e-knowledge sharing.	3.91	< 0.001

Table 5-7 shows the results of the analysis of the questionnaire data using the SPSS software. The hypothesis was tested using the One-Sample t-test with the test value

3. The value 3 indicates Neutral on the five point Likert-type scale. The hypotheses for testing each factor are as follows:

H0: If the mean rating of the proposed factor > 3, then the factor affects the use of e-knowledge sharing.

H1: If the mean rating of the proposed factor ≤ 3, then the factor does not affect the use of e-knowledge sharing.

The null hypothesis (H0) is only rejected if the probability (p-value) ≥ α/ (n) = 0.05/ (32) = 0.0015. The factor (statement) is statistically significant if the p-value < 0.0015, otherwise, the factor is not statistically significant.

Table 5-7 shows the results of the analysis of the collected data and shows clearly that all the means of the indicators in this table are significant and higher than 3, since most of the p-values are less than 0.0015 ($p < 0.0015$), which is statistically significant. Participants highly rated statements regarding two factors, performance expectancy and effort expectancy. The means of five statements of PE factors and the means of four statements of EE were higher than 4, and the p-values of all statements of these factors were less than 0.0015; thus, it can be concluded that the two factors were highly significant. However, the p-values of the statements highlighted in the table are greater than 0.0015, so these factors are not statistically significant.

According to the results shown in the table, a sub-factor related to time expended, which is working hours, is not statistically significant. This sub-factor is expressed by two statements and the p-values of the two statements are greater than 0.0015, however, this factor is not removed from the model because the values=are only

slightly higher than 0.0015 and it continues to be involved in the model for more tests in the evaluation study.

There are also, two sub-factors that refer to the social influences factor, which are leadership and the subjective norm. Each of these sub-factors is expressed by two statements and the p-value of one statement for each sub-factor is greater than 0.0015. However, these elements were not removed from the model due to the small differences between the p-values and 0.0015.

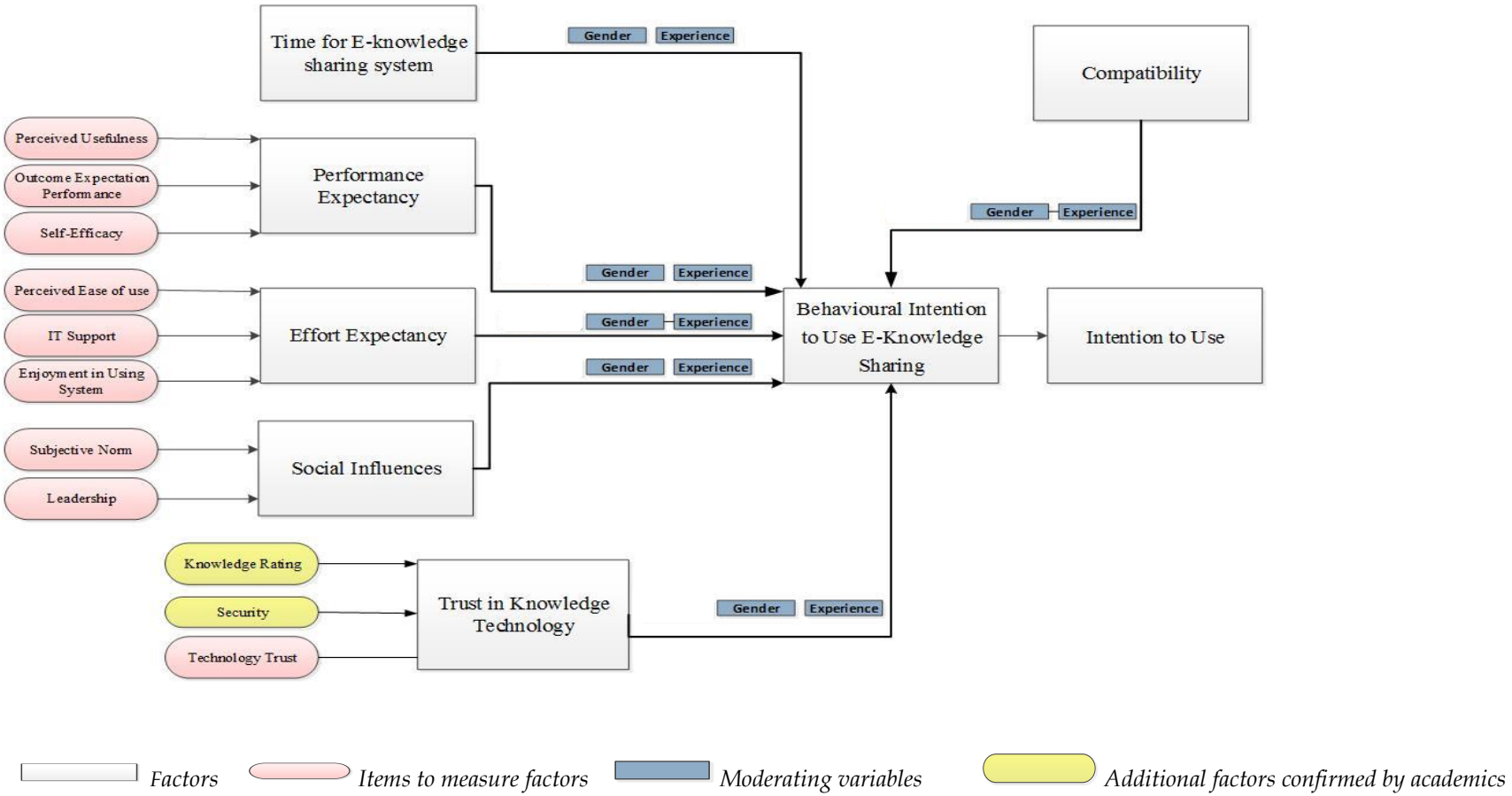

Figure 5-1 E-knowledge Sharing Model (EKS)

5.3 Chapter Summary

This chapter presented the confirmation of the factors of the e-knowledge sharing model in two phases: through expert reviews and an online questionnaire. It then presented and discussed the results of the descriptive and inferential analysis on the data collected through the expert reviews and questionnaires. The interviews identified further factors that were not in the e-knowledge sharing model, but the expert reviews confirmed all the factors that identified from interviews except three factors, which are mandatory, fear of losing own position and attractive interface. The model was then developed, followed by the final questionnaire in the exploratory study, which confirmed all the factors presented in the developed model.

Chapter 6. Discussion of the exploratory study

This chapter discusses the findings of the interviews, expert reviews and the questionnaire conducted with academics, in order to confirm the factors affecting e-knowledge sharing among academics in Saudi universities that were proposed in the model.

6.1 Findings Regarding Technology Acceptance Factors

In this section, academics demonstrated mixed opinions in their responses. The findings of the interviews (Table B2 from Appendix B) presented in the analysis of this part reveal that most of this group of academics always use web technology and are familiar with it. According to the results, 70% of academics always use the internet in the workplace and always find it easy to use the online systems of the universities, while the same percentage said they never face difficulties in using web technology. More than half of the respondents reported that they always find web technology a useful resource in academic teaching, although 50% of the academics sometimes reported that they do not have time to use the university website during working hours. However, half of the respondents reported that they always use social networks and share their knowledge, this result supportes the finding in another study (Lupton, 2014).

The findings presented in Table 3B from Appendix B, indicate that there is a positive attitude towards adopting an e-knowledge sharing system, in that none of the

respondents disagreed or strongly disagreed with the statements regarding the importance of e-knowledge sharing system, this supportes the finding of Goh and Sandhu's study (Goh. and Sandhu 2013) . Also, generally, these academics agreed with the reasons for using e-knowledge sharing. 80% of respondents strongly agreed that an e-knowledge sharing system provides an easier way to contact experts than connecting by traditional ways, such as by telephone and e-mail, and also that e-knowledge sharing is more accessible. All the academics preferred to use an e-knowledge sharing system rather sharing printed documents.

In the expert review, it is noticeable that IT support is regarded as a very important factor, as none of the experts disagreed that "IT support is essential to help academics to use e-knowledge sharing,", this finding supportes the earlier Saudi study (Al-Sobhi et al. 2010), while in the questionnaire responses, 63% the academics agreed with this statement, confirming the importance of the IT support factor.

Nevertheless, in the interviews, none of the academics supported the use with the use of social networks or Wiki platform applications for knowledge sharing purposes, although the researcher clarified the usefulness of a Wiki platform and K-blog. The reason they disliked the use of Wiki and social networks are the slight inconvenience of these ways of sharing knowledge, while in the interviews 40% of the academics claimed that they never use any social networks, either in their work or outside work. The reasons for disagreeing with the use of social networks may found in Nández and Borrego study found that academics do not deliver large amount of advantage from using social network for knowledge sharing because of lack of institutional support (Nández and Borrego 2013).

In addition, academics showed dissatisfaction about the methods of transferring knowledge used in their universities and they wished to improve tools for e-knowledge sharing in their universities. High levels of agreement were found for preferring to use an e-knowledge sharing system rather than knowledge sharing by traditional ways, for example printed documents, CDs and e-mail.

Through the interviews, the participants were asked to point to features they felt were needed. The following points describe the possible features of an e-knowledge sharing system based on web technology which could be implemented in Saudi universities. The basic proposed design of the structure is based on the academics' opinions provided through the interviews. A knowledge sharing system for data sharing among academics should include the following features:

- Academics' profiles, including a space to provide data such as their main areas of expertise, modules taught and research interests.
- Group profiles, based on
    - Communities of interest and practice, modules taught and their areas of research.
    - Providing sections in which everyone would contribute their own ideas to all sorts of well-known issues.
- Information space for modules and module information, such as slides and assessments; also providing relevant documentation and web links.
- A joint calendar where all activities of common interest would be included.
- A categorisation of pages and tagging features, to facilitate search and retrieval of relevant information within the e-knowledge sharing system.
- Chat facilities to allow interaction between academics.

6.2 Knowledge sharing Attitudes

The findings presented in Table B1 from Appendix B make it clear that these academics are conscious of the importance of knowledge sharing. A positive indication in the knowledge sharing area is that none of the respondents either disagreed or strongly disagreed with any of the statements on the importance of knowledge sharing. 80% of the academics strongly agreed that knowledge sharing helps to accomplish tasks more quickly and that an expert's information is very useful for a novice. Moreover, 50% of the academics strongly agreed that transferring knowledge between academics will improve academic performance, which is supported Venkatesh et, al. suggestion (2003). However, the results suggest that universities should facilitate a favourable environment for academics in the knowledge sharing area, as it is found that failer in using systems refer to that universities do not provide sufficient infrastructure and equipment (Al-alak and Alnawas 2011), as 80% of academics agreed that novices struggle without knowledge sharing by experts and 60% of academics agreed that, in teaching, finding information on a subject for the first time is difficult.

Overall, most academics in the interviews showed a positive attitude towards using knowledge sharing, where 80% of academics declared in the interviews that they had used knowledge sharing among colleagues in different ways, this supported the finding of Goh and Sandhu's study (Goh. and Sandhu 2013). Similarly, the questionnaire revealed that 75% of the academics had used knowledge sharing in their universities.

6.3 Suggested Factors for E-knowledge Sharing

From the analysis of the qualitative data in the interviews, it was found that most of the effective factors suggested by academics are those that already exist in the e-knowledge sharing model constructed from theories and previous studies. However, there are other factors that are not mentioned in the model. These factors are divided in two categories: motivation and barriers. The motivation factors are: mandatory use of e-knowledge sharing; the e-knowledge sharing system having an attractive interface; a knowledge rating technique; a highly secure system and counting time spent in e-knowledge sharing as working hours. However, the barriers are that some academics fear that they will lose their own position and some academics are unfamiliar with the internet. The findings in Table 5-3, the inferential analysis of participants' responses to the expert reviews, confirmed just three factors that emerged from the interviews. These factors are: a highly secure system, knowledge rating and working hours.

Most of heads of school agreed that a secure system will encourage academics to use an e-knowledge sharing system; in this case a secure system is required for the e-knowledge sharing system to be trusted. Regarding electronic systems, a highly secure system will generally be trusted by users (Blaze et al. 1999). It is therefore assumed that a secure system is a factor related to trust in knowledge technology factors.

Most of the academics agreed that a knowledge rating technique is a factor that affects e-knowledge sharing. Knowledge rating is where academics have the ability to rate the knowledge included in the e-knowledge sharing system, indicating that

this knowledge is reliable. Moreover, in e-commerce there is a correlation between using an online system and knowledge rating, in this case a high rating increases the use of online shopping and determining that item's rating also creates a relationship with the customers (Schafer et al. 1999). This means this knowledge is trusted; thus, knowledge rating is one element related to the trust in knowledge technology factor.

The results in Appendix C show that 73% of heads of school agreed with the factor of working hours, which means that using e-knowledge sharing becomes a part of an academic's job, in which they share and communicate with their colleagues. For example, the total of academics' working hours in Saudi universities is about 16 hours a week for lecturers; using e-knowledge sharing, the working hours would be 18 hours. Working hours is about time, so this factor is a sub-factor of time. However, in the results of the questionnaires to academics there were some disagreements that e-knowledge sharing should be counted as working hours and become a part of their job, and this factor was not found to be significant. Existing studies consider on "Time expended" regarding factors that influence knowledge-sharing are limited from the context of academics in universities. Lupton has mentioned to this issue "*Academics are negotiating social media use in a context in which many feel that there are increasing time pressures in their work*" (Lupton 2014)

Notably, trust in knowledge technology is a fundamental goal towards using an e-knowledge sharing system responsibly. In the interviews, academics disagreed with the statement that web technology is a useful source of appropriate knowledge. This is related to the issue of untrusted sources, and is not considered as a matter of concern, because there is a huge amount of information on the Web without evidence, whereas if there is a system for e-knowledge sharing related to their

universities, this would be a trusted source, as all academics strongly agreed with the importance of trust in e-knowledge sharing.

The positive indication towards adopting an e-knowledge sharing system is shown by the fact that the experts disagreed with the factor fear of losing position, which means that academics were not fearful of losing their higher positions. In addition, an attractive interface was not considered to be an essential component in using an e-knowledge sharing system.

The finding from the expert reviews regarding the leadership factor is that the leader is very important in encouraging academics to use e-knowledge sharing, where 60% of the sample strongly agreed that leadership of departmental superiors is an essential factor for academics in e-knowledge sharing, while no respondents strongly disagreed with this, as was suggested by studies (Bain et al. 2005, Fullwood et al. 2013). In contrast, in the results of the questionnaires administered to the group of academics, there were some disagreements as to whether the leadership factor is an effective factor in the use of e-knowledge sharing.

Compatibility is a factor related to the trust factor. However, according to several studies that have paid attention to compatibility, it is possible to evaluate the compatibility factor as an isolated factor, and thus, the researcher eliminated compatibility from trust. Compatibility refers to the degree to which using an e-knowledge sharing system is perceived as consistent with the one's academic responsibilities (Rogers, 1962), whereas, the trust perspective is the belief of the academic staff in the reliability of the knowledge sharing system for knowledge sharing. From these definitions of compatibility and trust, it is observed that there is

a distinction between the trust perspective provided previously and compatibility. At this stage of the study, it has been confirmed that compatibility is factor that influences academics' behaviour toward using an e-knowledge sharing system, so even if the compatibility factor is isolated from the construct of trust, it means it still has an influence on behaviour. Furthermore, the current stage of the study has not assessed the structure of the proposed model in terms of relationships and paths, and thus the researcher has the flexibility to make a slight modification in the structure of the conceptual model before the evaluation in the next stage. The proposed relationship between compatibility and behaviour intentions is based on previous research in the field of technology acceptance which indicated that a high level of compatibility has a direct relationship with behavioural intention (Chen et al. 2001 & Lee 2012).

As suggested by Karahanna et al. (2006), compatibility is constructed of four items; compatibility with existing work practices; compatibility with desired work style; compatibility with prior experience of using the system and compatibility with the values of using the system.

After considering the results and the findings the exploratory study, an e-knowledge sharing model was developed and is presented in Figure 6-1.

6.4 Limitations of the study

The study has a limitation in the questionnaire that was conducted with academics, consisting of 32 statements. In fact, the questionnaire included 36 statements, but four statements were deleted after data collection. This was because two statements had been written with typing errors which completely changed the meaning of these

statements. Two other statements were accidently duplicated, but the researcher had not noticed this before conducting the questionnaire. However, these statements were constructs of different factors, which meant there was no overall effect on the model.

Chapter 7. Research Methodology for Evaluation Study and Research Design

7.1 Introduction

The first stage of the research has been completed and presented in the previous chapters through confirming factors in the e-knowledge sharing model through in different methods. Other issues around the use of the e-knowledge sharing model need to be evaluated, so this chapter provides the second stage of the research. The research methods utilized to evaluate the proposed e-knowledge sharing model and their justification are presented in detail.

7.2 Research Design

The factors in the proposed model have been confirmed previously, as discussed in Chapter 6. Evaluating the e-knowledge sharing model by examining the path of relationships among factors will be undertaken in this chapter. The questionnaire strategy was considered most appropriate in this research, as it allows for in-depth investigation of relationships among factors to complete the answer to the research question ***"What is an appropriate model for the adoption of E-knowledge sharing amongst academics in Saudi Arabian universities?***

7.2.1 Questionnaire Development and Design

A self-administered questionnaire was designed in order to answer the research question and determine which hypothesis would be accepted or rejected (Taylor, 2005b). The constructs and statements of a questionnaire designed to validate the study were adapted from a literature review of the field of study. All the statements and questions are shown in Appendix E.

The questionnaire comprised four pages and a covering letter. The covering letter consisted of three parts: a welcome statement, the description of the e-knowledge sharing system and consent information. The other four pages covered the different parts of the study, and these are:

Part I: Demographic information: this part included a request for general information such as gender, level of education and employee experience. This part was important to give the researcher an overview of information that may be needed for the purposes of group comparison.

Part II: Internet usage information: this part was intended to give the researcher a general knowledge about participants' academic internet skills and hours of daily usage of the online services of their universities.

Part III: Knowledge sharing information: this part was designed to obtain knowledge about the methods used for knowledge sharing in the Saudi universities under study.

Part IIII: To what extent do you agree with the following statements? this final part was concerned with the empirical measurements for the suggested factors and their

relationships. The part was designed to include 38 statements regarding eight factors. iSurvey software was used to generate the English version of the questionnaire, and google drive was used to generate the Arabic version, with a five-level Likert scale implemented for all statements, with the following ratings: strongly agree = 5; agree = 4; neutral =3; disagree =2 and strongly disagree = 1. An online questionnaire was distributed electronically emails and posted on Twitter.

The questionnaire was administered in Arabic and English; Appendix E shows the English version. The English and Arabic versions of the questionnaire were checked and validated by three Saudi academics at the University of Southampton to confirm the accuracy of the translated questions.

7.3 Population and Sample Size

As the context of the study is academics' behaviour in Saudi universities towards using an e-knowledge sharing system, the research targets only Saudi academics. Selecting this sample was easier and quicker to manage in the time than using other sampling techniques. This technique is called accidental sampling. It is a non-probability sampling, in which the participants' responses are based on their willingness and availability (Gravetter & Forzano 2012).

A large number of researchers have claimed that there is no fixed number for sample size but an adequate sample size is required in order to ensure the reliability of the study and allow the possibility of generalising the results from the data collection (Saunders et al. 2009). Hair et al. (2010) suggest that a hundred respondents or more is an appropriate number to reach a credible result. Selecting the sample size is also

based on the test the researcher will consider (Saunders et al., 2009): in this case the study will be evaluated by Structural Equation Modelling (SEM). According to Kline (2011), the typical size of the sample if SEM is used is about 200. Furthermore, the number of participants of the study was established based on the observation that most published articles that use SEM as technique of analysis are based on 200 cases. The number of participants in the study was 213 Saudi academics.

7.4 Goodness of Instrument

After completing the design of the questionnaire, it was necessary to ensure that the statements in the questionnaire were measuring the factors in the proposed model accurately; thus, validity and reliability tests were considered to obtain accurate results from the instrument (Saunders et al. 2009). Validity and reliability tests are independent of each other; this means that if the instrument is valid it is not necessarily also reliable, and also that if it is reliable it is not necessarily valid (Field, 2013). There are different methods of establishing validity and reliability. In this study tests were conducted in two stages, before and after the data collection. The following sections discuss the validity and reliability tests in detail.

7.4.1 Validity of the instrument

Instrument validation is essential to ensure that the construct of the questionnaire is measuring what it is supposed to measure (Pallant 2013). The validity represents a high degree of confidence that the data collected and findings represent a scientific and truthful investigation. There is a variety of methods that are used to validate

studies, but this study uses the most common validation tests, involving content validity and construct validity.

7.4.1.1 Content Validity

Content validity refers to how accurately the instrument is representative of the construct of the items; this type of validity relies on the knowledge of experts, either in the particular content area or as researchers (Cronbach, 1971; Straub 1989). Content validity was established after designing the questionnaire and before conducting the survey. Without undertaking content validity, the instrument cannot be valid and the results of the study may be misleading (Garver and Mentzer 1999).

There are two stages in the process of assessment of content validity: the developmental stage and the judgment quantification stage (Lynn 1989). The developmental stage begins with measurement of the objective of the instrument and identification of the full content domain; this step can be accomplished through a literature review and consulting experts. Then the cognitive measure is to ensure that each item in the instrument is representing appropriately the scope of the content and it is obvious that: it is clear that generating many indicators is better than only one or two indicators for each construct; although three indicators are acceptable at minimum, it is better when the construct has four indicators or more(Hair et al. 2010). The next stage is adjustment of the indicators into useable form. In the last step, the indicators need to be refined and revised. If necessary, the last two steps can be justified personally by the main researcher (Lynn 1989). The instrument of the study was constructed and the statements in the questionnaire were adapted from previous studies related to the area of study (Venkatesh et al. 2003; Karahanna et al. 2006),

and additional statements were devised be the researcher. These statements referred to technology acceptance factors that were not included in previous studies within an academic context.

The second stage of judgment quantification is concerned with two concepts: that all indicators are content valid and that the developed instrument is content valid for the research context. This stage is accomplished through justification by experts (Lynn 1989).

Quantification of expert judgements was performed amongst Saudi researchers with expert qualifications in information system research and they had training course in building questionnaire as they were also doing PhDs in a similar subject to this research. Through this, the researcher was able to gain valuable suggestions from these different academics perceptions as well as verifying whether the respondents were able to understand and answer all the questions. The experts were a selection of seven Saudi academics who were researchers at UK universities. First, I contacted the experts to ask if they were willing to participate in the study to develop an instrument by validating its suitability for purpose; if they agreed then the appointment was arranged. In the face-to-face interview an explanation and definitions of terms, and a content review questionnaire were provided. At the end of the interview the experts were asked to suggest to the researcher further experts who were investigating a related topic and who might be willing to participate in this stage. The number of experts is hard to decide and there is no a standard number because it is based on the number of accessible people who consent to participate; however, the minimum acceptable number of experts is five (Lynn 1989).

The first step of judgment quantification involved a one and a half hour meeting with two researchers, during which they were asked to identify key issues in relation to which questions and statements could be developed or removed. Through their reading of the questionnaires some questions and comments emerged around ambiguous statements and repeated indicators. By the end of the meeting significant comments had been received; therefore, appropriate changes were made. A new version of the questionnaire was prepared to present to the next researcher. The following step of the stage were conducted in the same way, but through individually meeting with researcher, and adjustments to the statements were implemented during each meeting. During the last two meetings there was no significant adjustment. Overall, through the content validity instrument, about thirty statements and questions were reformulated, as well as the welcome statement.

7.4.1.2 Construct Validity

The construct validity ensures the accuracy of the research by defining "*the extent to which a set of measured items actually reflect the theoretical latent construct those items are designed to measure*" (Hair et al. 2010). Testing the validity is a primary step in SEM to evaluate the reasonability of the measurement items that were selected, together with their correlation, which was proposed by the theory, as a construct. The validity was established after the data were collected through three components: convergent validity, discriminant validity and nomological validity (Straub & Gefen 2004; Hair et al. 2010). More discussion about the three different validation will be presented in the data analysis chapter 8. The concept behind using a variety of validation methods in the study was that to avoid the confounding effects of random error and method

variance, construct validity must be estimated using multiple methods of validity (Bagozzi & Yi 1991).

7.4.2 Reliability of the instrument

The use of multiple measurement items for each construct requires establishing a reliability test to ensure that these multiple items are consistent in the same construct and the results of the study are able to be repeated and reliable (Bryman and Cramer, 2011). There are two reliability test methods which are widely used: internal consistency and test-retest reliability (Pallant 2013). Internal consistency is the extent to which the items are interrelated and internally consistent to a specific construct, whereas test-retest reliability refers to conducting the same test with the same group on different occasions; the correlation between the two results indicates the degree of reliability (Pallant 2013).

The study will use an internal consistency reliability test at the initial data analysis stage. The test will be measured by using the most common method, Cronbach's Alpha (α) test. The Cronbach Alpha (α) test is a statistical method calculated through SPSS. The results provide the average correlation of all items in the same construct (Pallant 2013). The reliability scores obtained by using Cronbach alpha range between 0 and 1; a result closer to 1 indicates higher reliability. However, the reliability scores rely on the size of the questions' scales: if the scales were ten or less, the minimum score of reliability accepted is 0.7 (Hair et al. 2010). According to Mitchell and Jolley (2012), a reliability value of 0.5 is accepted for item-to-total correlation. Table 7-1 shows the reliability score range and the level of acceptance of the study, based on the literature review.

Table 7-1 Cronbach's alpha reliability scores

Cronbach alpha	**Level of Internal Consistency**	**References**
α ≥ 0.9	Excellent	Pallant 2007.
0.9 > α ≥ 0.8	Good	Sekaran 2003; Hair et al. 2007.
0.8 > α ≥ 0.5	Acceptable	Sekaran 2003; Hair et al. 2007.
α < 0.5	Poor	Sekaran 2003; Hair et al. 2007.

In this research, the reliability analyses were conducted after collecting data through SPSS software to evaluate inter-item correlation and item-to-total correlation values by the Cronbach alpha value. In addition, the researcher applied composite reliability analyses; it is required to conduct these during the Structural Equation Modelling (SEM) analysis stage. More details of composite reliability are discussed in the Chapter 8.

7.5 Missing Data

A crucial problem that can face a researcher in the data analysis stage when using a questionnaire research method is missing data. Thus, before conducting data analysis, the missing data must be resolved. A variety of methods are used in resolving missing data, but the most common approaches used are multiple imputation (MI) and full information maximum likelihood (FIML) (Graham et al. 2007). MI is a statistical technique that works by the process of replacing missing values with estimated values (Graham et al. 2007), whereas in the FIML technique, the process works by estimating parameters directly from the raw data for each individual (Lin & Huang 2008). However, generating values for missing values by applying the MI method may lead to bias, and therefore invalid outcomes. The FIML

methods provide more accurate results but due to their computational complexity and sensitivity (Huang, 2008), this process is not applied in the present study. Similarly, Listwise Deletion (LD) is a method in which any case that contains single or multiple missing data from the analysis is eliminated. This method may affect the sample if there are many missing items in relation to the data size which can result in reducing the statistical power (King et al. 1998)

7.6 Structural Equation Modelling (SEM)

SEM is a statistical technique used to evaluate hypotheses, including interrelationships among different variables, to determine whether the data collected reflect the proposed hypothesis (Hair et al. 2010). Through SEM, the structural interrelationships are expressed by a set of equations suggesting all the relationships among the construct variables. Construct variables or latent variables refer to all unobserved factors in the model. These factors have multi-variables, also known as indicator variables and measured variables that include any variables are indirectly observed (Schumacker & Lomax 2010). SEM is a statistical method which defines complex relationships between construct variables and their measured variables in path diagrams, whether the variables are dependent or independent (Hair et al. 2010).

In this study it was decided to utilize the SEM technique in the evaluation model stage. This decision was made for several reasons. SEM deals accurately with a complex theoretical model that includes multiple variables, which are constructs, measured, dependent and independent variables and simultaneously analyses their relationships, while other approaches such as bivariate correlations and multiple

regression have limitations on utilizing different variables, and analyse the relationships of each variable singly (Bryne 2010; Schumacker & Lomax 2010). In addition, the SEM approach considers the measurement error of the observed variable during data analysis, which means the analysis of the relationship between variables is free of error, but some other statistical approaches deal with the measurement error separately (Schumacker & Lomax 2010). Another advantage of the SEM technique which may not be of concern to other researchers but is important to this research is that SEM includes advanced methods in analysing data with multiple groups, such as experience and gender (Schumacker & Lomax 2010).

SEM was used in the study in two steps: the measurement model and the structural model (Hair et al. 2010). Measurement analysis allows the researcher to evaluate how well observed variables logically and systematically represent hypothesized constructs (Hair et al. 2010). The measurement model is the primary step in SEM and without applying it the analysis will be misleading (Kline 2011). Through measurement analysis, the researcher needs to verify the factor structure of a set of indicators and this allows the researcher to define the relationship between a set of measured variables and a set of latent variables (Suhr 2006). Moreover, verification of construct validation and construct reliability is completed through the measurement model (Hair et al. 2010). A structural model or causal model is a model which represents and evaluates the structural relationships between construct variables, whether the exogenous latent (independent) variables or endogenous latent (dependent) variables (Hair et al. 2010). The process structural model involves several issues, the structural model's goodness of fit, assessment of latent variable

relations and the assessment of the hypotheses. More details about measurement and the structural model are discussed in Chapter 8

7.7 Ethics Approval

Before distributing the questionnaire to participants, the procedure needs to be checked and planned to meet the ethical requirements of research. The ethical requirement of this research has been approved by the Ethics Committee at the University of Southampton: reference number 16258.

7.8 Chapter Summary

This chapter has provided details of the methods applied in the initial study to evaluate the proposed model. The appropriate methods for this stage of the research were considered to be a survey strategy and the process of development has been explained in detail. The next section discussed the appropriate sample size, which was larger than 200 cases. The following section was presented in detail the goodness of the instrument, with discussion of the validation of the reliability and validity of the instrument. The reliability analysis in the study establishes reliability in two ways, via the Cronbach alpha and the composite reliability, and the study validation is verified by content validity and construct validity. Content validity was applied to the study before conducting the questionnaire in order to verify that the questions measured the factors accurately. Testing the model and hypothesis is the main objective of this stage which will be analysed through Structural Equation Modelling (SEM). Some reasons for utilizing SEM for evaluating the model have been discussed

and the most important advantage of SEM have been identified as dealing with multi-variables and identifying relationships among these multi-variables. Other reasons for using SEM are measuring errors and the ability to carry out an advanced analysis with multiple. The next chapter presents the details of the data analysis and the results.

Chapter 8. Data Analysis and Results

8.1 Introduction

Having identified and explained the research methodology in Chapter 7, this chapter presents the results and findings of the questionnaire that conducted in the evaluation study. First, the missing data from the collected data is discussed and then the data is analysed for demographic information. The reliability and validity of the instrument are shown in detail. SEM is an analysis technique which is utilized in two stages: measurement and the structural model and the chapter provides an assessment of the proposed hypothesis.

8.2 Missing Data

As was discussed earlier in the Chapter 7 regarding issues of missing data, the questionnaire was designed carefully and it was made mandatory to answer all the questions , to eliminate missing values. The researcher sent emails in person to academics requesting their participation and included the questionnaire link. The total number of respondents who answered the questionnaire was 219; a few incomplete questionnaires were deleted and two cases who had answered randomly were deleted from the data analysis. The number of responses used in analysis after removing data with incomplete and random answers was 213. Data was collected from respondents in 27 universities, 23 public universities and 4 private universities; Appendix A shows universities that were included in the data collection.

8.3 Questionnaire Analysis

This questionnaire was used to evaluate study and answer the research question: ***What is the appropriate model for the adoption of E-knowledge sharing amongst academics in Saudi Arabian universities?***

Firstly, analysis of the demography section is presented, then analysis of the reliability is shown. A major focus is on the analysis of the construct model and relationships through SEM.

Data was analysed using SPSS software to produce frequencies and percentages of demographic data and establish the reliability of the responses. Another test was completed using AMOS to assess the measurement model and the structural model.

8.3.1 Demographic Data and Data on Internet Usage

This questionnaire was conducted with 213 academics who were working in Saudis universities. There are 25 government-run universities and 8 private institutions in Saudi Arabia. In this study participants were from 27 Saudi universities 23 state-run and 4 private universities. Demographic questions were asked in the first part of the questionnaire. Table 8-1 provide percentages and frequencies of participant's answers, demographic information, Internet usage information and knowledge sharing information.

The majority of respondents held a master s degree, 60.1%, and the largest group of participants were aged between 30 and 34. The questionnaire also asked about participants' experience in academic teaching, academic experience in teaching is

needed for group comparisons, the result in the table shows that 36.2% of the respondents had experience of between two and four years and 23% had over six years' experience

Table 8-1 the demographic data of the participants' responses

Questions	Answer Options	Frequencies	Percentage
Highest qualification	Bachelor	35	16.4
	Master	128	60.1
	PhD	50	23.5
Age	Under 25	10	4.7
	25-29	48	22.5
	30-34	77	36.2
	35-39	43	20.2
	40-44	17	8.0
	over 44	18	8.5
Gender	Male	78	36.6
	Female	135	63.4
Experience in academic teaching	Just started	26	12.2
	Less than 2 years	38	17.8
	2-5 years	77	36.2
	6-10 years	33	15.5
	More than 10 years	39	18.3
Experience in administrative position	Less than 2 years	44	20.7
	2-5 years	36	16.9
	6-10 years	11	5.2
	More than 10 years	7	3.3
Held an administrative post	Yes	94	44.1
	No	119	55.9
Internet usage in workplace per day	Less than 15 minutes	4	1.9
	16-30 minutes	16	7.5
	31-60 minutes	35	16.4
	Between 1 and 2 hours	49	23.0
	Over 2 hours	109	51.2
Share knowledge with colleagues	Yes	165	77.5
	No	48	22.5

From this information, it is later argued that being experts in academic teaching has an effect on an e-knowledge sharing system adoption. This will be discussed in Chapter 9. Similarly, for questions regarding experience in administrative working it was found that 44.9% of the academics had worked in an administrative position.

For further information about usage of Internet the participants were asked to estimate the daily average amount of time spent on the Internet in their workplace. The results showed that the majority of respondents, 51.2%, spent over two hours on the Internet. In relation to the knowledge sharing acceptance, participants were asked if they shared knowledge with colleagues, and the result shows that 77.5% claimed to have shared their knowledge whether by electronic or non-electronic methods, as shown in Figure 8-1. E-mail was the most popular method used, reported by 36% of respondents, followed by informal chatting with 34%; other methods were workshops, printed documents and online tools such as Dropbox. 13% of academics who had shared their knowledge did so in formal presentations in a seminar, while some used CDs as a way to share course information, such as presentations and past exam papers.

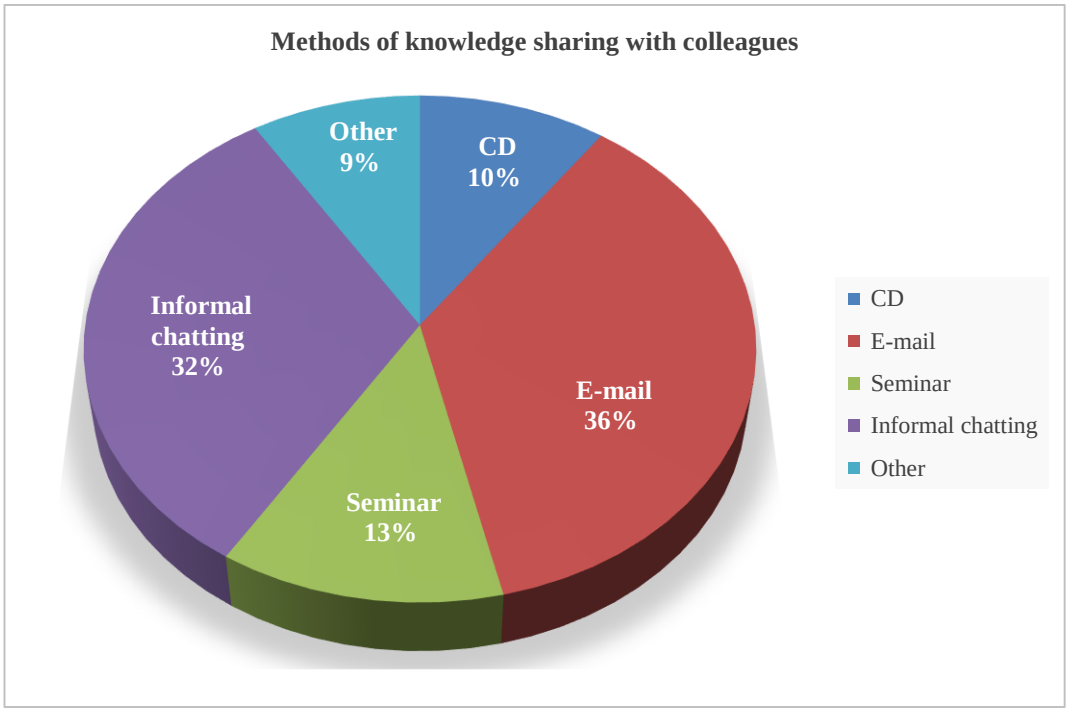

Figure 8-1 Methods of knowledge-sharing among academics

Table 8-2 Demographic data and data on internet usage

Qualifications	**Mean of using internet at workplace**
Batchelor	3.89
Masters	4.23
PhD	4.08
Years of experience	**Mean of using internet at workplace**
Just started	3.94
Over 3 years	4.23
Gender	**Mean of using internet at workplace**
Male	4.26
Female	4.07
Gender	**Percentage of academics sharing their knowledge with colleagues**
Male	75.6%
Female	78.5%
Years of experience	**Percentage of academics sharing their knowledge with colleagues**
Just started	70.3%
Over 3 years	80.5%

Table 8-2 presents a comparison of three groups in terms of their internet use and knowledge sharing practices. The first comparison is based on qualifications and use of the Internet in the workplace. From the means of the three groups, those with Batchelor's, Master's and PhD degrees; it can be seen that academics holding a Master's degree used the Internet in the workplace more than the other groups. The second comparison was based on length of experience and use of the Internet in the workplace: it is clear that the usage of the Internet increased with experience. Internet usage was also greater for males, whereas , females were more willing to share their knowledge with colleagues than males were. From Table 8-2 it might be inferred that, females share their knowledge through non-electronic methods, such as informal chatting and seminars, rather than communicating via the internet. Moreover, over 80% of more experienced experts in academic teaching were sharing their knowledge with colleagues, compared with about 70%of the less experienced academics.

8.3.2 Instrument reliability

The study applied a measure of construct reliability based on the Cronbach Alpha test.

Table 8-3 Reliability analysis by Cronbach alpha

Concept measured	**Item used**	**Cronbach Alpha**	**Reliability Results**
Performance Expectancy (PE)	6	0.777	Accepted
Effort Expectancy (EE)	4	0.858	Very good
Compatibility (C)	5	0.763	Accepted
Time Expended (TE)	5	0.435	Low
Trust (T)	9	0.885	Very good

Concept measured	Item used	Cronbach Alpha	Reliability Results
Social Influences (SI)	3	0.749	Accepted
Behavioural Intention (BI)	3	0.826	Very good
Intention to Use (IU)	3	0.882	Very good

The results presented in Table 8- 3 show that the Cronbach Alpha values for most constructs are above 0.80, which indicates very good internal consistency of items, whereas the Cronbach Alpha reliability of the constructs, performance expectancy, compatibility and social influences were between 0.80 and 0.70 which are acceptable. However, the Cronbach Alpha value of Time is less than the acceptable value, which is 0.435; if two items are deleted from the time construct, Time1 and Time2, the Cronbach Alpha of the construct is raised to 0.747 which is considered as an accept value. Furthermore, the items Time1, Time2 and Time3 were scored with low values of the squared multiple correlation (0.09, 0.11 and 0.226 respectively). However, further reliability tests need to be conducted in this study; thus, in the early stage of analysis the two items will not be deleted and internal consistency will be considered during the measurement model analyses, which is an essential stage in SEM (Kline 2011).

8.3.3 Structural Equation Modelling (SEM)

To determine whether the adopted model e-knowledge sharing systems was a good model for predicting academics' behaviour towards e-knowledge sharing system usage, it was tested using Structural Equation Modelling (SEM)

8.3.3.1 Measurement level analysis

The measurement model of the study was performed to eight latent variables (unobserved variables) that were measured by 38 measured variables (observed variables or indicators) in the proposed model (e-knowledge sharing model). Measured variables were adopted from previous studies on technology acceptance, and few a factors were added that have not been mentioned in previous studies, which were constructed by the researcher. The latent variables and their indicators are shown in Table 8-4.

Table 8-4 Latent constructs and indicator variables

	Latent Variable	**Items' Code**	**Items' used**
1	Performance Expectancy	PE	PE1, PE2, PE3, PE4, PE5, PE6
2	Effort Expectancy	EE	EE1, EE2, EE3, EE4
3	Compatibility	C	C1, C2, C3, C4, C5
4	Time Expended	TE	TE1, TE2, TE3, TE4, TE4, TE5
5	Trust	T	T1, T2, T3, T4, T5, T6, T7, T8, T9
6	Social influences	SI	SI1, SI2, SI3
7	Behavioural intentions	BI	BI1, BI2, BI3
8	Intention to use	IU	IU1, IU2, IU3

8.3.3.1.1 Composite reliability

Composite reliability or construct reliability (CR) is often used in conjunction with SEM to examine the reliability of the construct and "*it measures reliability and internal consistency of the measured variables representing a latent construct*" (Hair et al. 2010, p.662). The study has calculated the reliability by using Cronbach alpha (α), in fact α can be used for estimating reliability only when the number of indicators are equally loaded on a constructs' variable or for the model underlying a single construct

(Novick 1966), Moreover, if CR is not calculated with a heterogeneous inter-item model in SEM, the study would be misleading (Bentler, 2007). The next formula was used to calculate C.R., as suggested by Hair et al. (2010).

$$\text{Composite Reliability} = \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{\left(\sum_{i=1}^{n} L_i\right)^2 + \sum_{i=1}^{n} \boldsymbol{e_i}} \qquad (1)$$

The equation (1), is based on standardised factor loading L_i, where n is the number of items and there are $\boldsymbol{e_i}$ error variance terms for a construct.

A reliability of between 0.6 and 0.7 is acceptable, but a good reliability is higher than 0.7, and internal consistency is increased with high reliability (Hair et al. 2010). Table 8-5 shows the CR of the construct variables: it is clear that all constructs were reliable, while the reliability of each construct exceeded the minimum threshold.

Table 8-5 Composite Reliability test of the constructs

Latent Variable	**Observed variables**	**Standardised factor loading**	**Error Variance**	**Construct Reliability (CR)**
Performance Expectancy (PE)	PE5	0.664	0.43	0.769
	PE3	0.294	1.24	
	PE4	0.306	1.19	
	PE2	0.809	0.22	
	PE1	0.755	0.29	
	PE6	0.691	0.34	
Effort Expectancy (EE)	EE1	0.866	0.17	0.898
	EE2	0.863	0.15	
	EE3	0.757	0.27	
	EE4	0.631	0.51	

Latent Variable	Observed variables	Standardised factor loading	Error Variance	Construct Reliability (CR)
Compatibility (C)	C1	0.470	1.04	0.721
	C2	0.510	.60	
	C3	0.796	0.41	
	C4	0.847	0.31	
	C5	0.464	1.32	
Time Expended (TE)	TE1	0.236	0.55	0.709
	TE2	0.345	0.99	
	TE3	0.468	0.80	
	TE4	0.881	0.24	
	TE5	0.812	0.50	
Trust (T)	T1	0.755	0.27	0.895
	T2	0.688	0.46	
	T3	0.758	0.32	
	T4	0.711	0.38	
	T5	0.482	0.96	
	T6	0.676	0.54	
	T7	0.668	0.53	
	T8	0.767	0.38	
	T9	0.594	0.52	
Social influences (SI)	SI1	0.561	0.78	0.766
	SI2	0.782	0.30	
	SI3	0.802	0.33	
Behavioural intentions (BI)	BI1	0.643	0.16	0.865
	BI2	0.818	0.24	
	BI3	0.889	0.48	
Intention to Use (IU)	IU1	0.851	0.15	0.928
	IU2	0.841	0.18	
	IU3	0.843	0.18	

8.3.3.1.2 Construct Validity

The construct validity provides the accuracy of the research by defining "*the extent to which set of measured items actually repersent the theoretical latent construct those items are designed to measure*"(Hair et al. 2010, p.662). Establishing the validity is a primary step in SEM to evaluate the reasonability of measurement items that are selected together, as proposed by the theory, for a construct. To avoid the confounding effects of random error and method variance, construct validity must be estimated by using multiple methods of checking validity (Bagozzi & Yi 1991). Thus, the validity is established through four components, which will be explained below: convergent validity, discriminant validity and nomological validity (Straub et al. 2004; Hair et al. 2010).

8.3.3.1.3 Convergent Validity

The convergent validity is the extent to which set of measured variables in a construct are correlated and which variables show significant correlation with each other (Straub et al. 2004). A higher correlation between measured variables means the variables are measuring their proposed construct well (Hair et al. 2010). To evaluate the convergent validity of the model, Average Variance Extracted (AVE) will be calculated using the following formula (Hair et al. 2010)

$$\text{Average Variance Extracted (AVE)} = \frac{\sum_{i=1}^{n} L_i^2}{n} \quad (2)$$

In equation (2) (Li) represents standardised factor loading, and n is the number of items. Factor loading of variables (L_i) is an indicator of the path between measured

variables and its construct. In SEM there are two types of factor loading, standardised factor loading and unstandardized factor loading. In most cases, researchers pay attention to standardised factor loading in the above formula because the estimation of standardised factor loading ranges between -1 and +1, whereas unstandardized factor loading represents covariance, so its range has no bounds (Hair et al. 2010).

In the study a standardized loading on a factor equal to 0.7 or higher indicates a significant loading. However, 0.7 is the ideal and highest loading, so loading between 0.7 and 0.5 is still considered significant. As a rule of thumb, deleting an item (a measured variable) that is within less than 0.5 of the standardised factor loading will improve the AVE (Hair et al. 2010).

AVE is computed for each measured variables in a construct and the acceptable result is 0.5 or higher, as recommended by Hair et al. (2010). Composite reliability (CR) and AVE are indicators of convergent validity, CR must be computed before AVE Hair et al. (2010). Next Table 8-6 illustrates the standardised factor loading of measured variables of the model and AVE for all variables. It is clear that AVE of PE, C, TE and T is less than 0.5 which is below a recommended value this means error remains in the items, after removing items that loading dropped below 0.5, all AVE (revised) improved and scored were above 0.5.

Table 8-6 Convergent validity analysis

Latent Variable	Observed variables	Standardised factor loading	Items deleted when β<0.5	AVE	AVE (revised)
Performance Expectancy (PE)	PE5	0.664	PE3, PE4	0.387	0.536
	PE3	0.294 <0.5			
	PE4	0.306 <0.5			
	PE2	0.809			
	PE1	0.755			
	PE6	0.691			
Effort Expectancy (EE)	EE1	0.866			0.617
	EE2	0.863			
	EE3	0.757			
	EE4	0.631			
Compatibility (C)	C1	0.470 <0.5	C1, C5	0.409	0.537
	C2	0.510			
	C3	0.796			
	C4	0.847			
	C5	0.464 <0.5			
Time Expended (TE)	TE1	0.236 <0.5	TE1, TE2, TE3	0.366	0.718
	TE2	0.345 <0.5			
	TE3	0.468 <0.5			
	TE4	0.881			
	TE5	0.812			
Trust (T)	T1	0.755	T5	0.467	0.516
	T2	0.688			
	T3	0.758			
	T4	0.711			
	T5	0.482 <0.5			
	T6	0.676			
	T7	0.668			
	T8	0.767			
	T9	0.594			

Latent Variable	Observed variables	Standardised factor loading	Items deleted when β<0.5	AVE	AVE (revised)
Social influences (SI)	SI1	0.561			0.523
	SI2	0.782			
	SI3	0.802			
Behavioural intentions (BI)	BI1	0.643			0.624
	BI2	0.818			
	BI3	0.889			
Intention to Use (IU)	IU1	0.851			0.714
	IU2	0.841			
	IU3	0.843			

8.3.3.1.4 Discriminant Validity

Discriminant validity is "*extent to which a construct is truly distinct from other constructs both in term of how much it correlate with other constructs and how distinctly measured variables represent only this single construct*" (Hair et al. 2010, p.662). Discriminant validity is measured by comparing the Average Variance Extracted value (AVE) for a construct with the square correlation estimate between the construct and another construct, in other words, comparing the square root of AVE with the correlation estimate between these constructs (Hair et al. 2010). To pass the discriminant validity test, the value of AVE for each construct is higher than the square correlation estimate between constructs (Hair et al. 2010). In Table 8-7, the diagonal numbers indicate the AVE of construct factors: all AVE were higher than the square correlation estimate between the constructs for which values are presented below the diagonal. Therefore, this is sufficient evidence of discriminant validity of the constructs.

Table 8-7 Discriminant validity analysis

	T	SI	TE	C	EE	PE	BI	IU
T	**0.516**							
SI	0.162	**0.523**						
TE	0.182	0.159	**0.718**					
C	0.135	0.068	0.304	**0.537**				
EE	0.469	0.144	0.099	0.143	**0.617**			
PE	0.259	0.112	0.067	0.045	0.339	**0.536**		
BI	0.097	0.338	0.002	0.015	0.116	0.403	**0.624**	
IU	0.338	0.19	0.044	0.012	0.206	0.257	0.338	**0.714**

8.3.3.1.5 Nomological validity

Nomological validity examines the correlation between two constructs or more based on the theoretical support (Hair et al. 2010). To establish nomological validity in this study the construct variables should show a positive relationship, as proposed in the e-knowledge sharing model; thus, it is early to discuss relationships between factors (hypotheses) in this section. as all relationships will be evaluated through the structural model.

8.3.3.2 Analysis of the structural model

Previous sections have presented verification of construct validity and composite reliability; hence, structural model stage will assess the hypotheses that proposed the relationships among the construct variables that are represented as a causal path. Table 8-8 displays the hypotheses represented by the path's estimation.

Table 8-8 Hypotheses assessed in structural model

Construct	**Hypotheses**	**Hypothesised positive relationships**
Performance Expectancy (PE)	H1	PE → BI
Effort Expectancy (EE)	H2	EE → BI
Compatibility (C)	H3	C → BI
Time Expended (TE)	H4	TE → BI
Trust (T)	H5	T → UI
Social influences (SI)	H6	SI → BI
Behavioural intentions (BI)	H7	BI → UI

8.3.3.2.1 Structural model Goodness of Fit (GoF)

Goodness of Fit (GoF) is used to examine how well a proposed model fits the real data (Rabe-Hesketh et al. 2007). The GoF result is obtained by comparing the data collected by the researcher (sample covariance matrix) with the predicted model covariance (hypothesis). GoF measures are different and each measure indicates a different meaning; however, Hair et al. (2010) divided them into three ranges: absolute fit measures, incremental fit measures and parsimony fit measures.

To estimate the GoF result, a chi-square (χ^2) test will be reported, which is a fundamental a statistical test in SEM that evaluates the differences between the sample covariance matrix and the predicted model covariance matrix (Khine 2013). However, the chi-square (χ^2) is affected by sample size (Kline 2011): the x^2value increases with large sample size. Regarding the sensitivity of χ^2 to sample size, normed chi-square and degree of freedom (df) should be reported. Normed chi-square reduces the sensitivity, which is computed as $\frac{x^2}{df}$ (Kline 2011) degrees of freedom, based on the number of indicators (measured variables) in the model. Hair

et al., (2010) provided a better fitting model when the ratio of normed x^2 is less than 3, if the sample size less than 250: the study sample size is 213. However, many researchers argue that chi-square and normed chi-square tests are sufficient evidence of model fit and it is recommended that providing two to three fit indices, in addition to chi-square, is reasonable and adequate (Hair et al. 2010). Thus, the study will report the recommended GoF indices that are widely respected by information system researchers.

Root Mean Square Error of Approximation (RMSEA) comprise "*attempts to correct for the tendency of* x^2 *the goodness of fit test statistic to reject models with a large sample or large number of observed variables*" (Hair et al. 2010, p.642); it is a very popular index and widely used with complex models that include large numbers of measured variables and large sample sizes: the RMSEA value should be in the range 0 and 0.08 and a model is well-fitting when RMSEA is close to zero (Hair et al. 2010).

Root Mean Square Residual (RMR) and Standardised Root Mean Square Residual (SRMR). RMR is the difference between the residuals that are created by the covariance error of the sample covariance matrix and the hypothesised covariance model (Hooper et al. 2008). RMR is accepted with a value less than 0. 1 and indicates perfect fitting with a value of zero (Kline 2011). SRMR is a squared root of RMR and researches typically use the value less than 0.08 (Kline 2011).

Comparative Fit Index CFI is the ratio of differences in the sample covariance matrix and this null model with assuming that all measured variables are uncorrelated (Hooper et al. 2008). Researches typically use CFI value that ranging between 0 and 1, well fit model when the value is above 0.90 ; (Hu & Bentler 1999; Hair et al. 2010).

The Maximum Likelihood (ML) estimation technique was used to calculate the GoF indices using AMOS (version 22). The GoF statistics for the structural model are displayed in Table 8-9, and it is clear that the indices confirm that the model has a good fit with the observed data.

Table 8-9 Goodness of Fit indices for the structural model

Chi-square x^2 =676.505, p < .001	**The proposed model fit**	**Model fit indices for sample size < 250 (Hair et al. 2010)**
df	377	
Normed chi-square *X2/df*	1.79	<3.00
RMSEA	0.061	<0.08
CFI	0.911	≥ .900
RMR	0.057	< 0.1
Standardized RMR	0.067	<.09

8.3.3.2.2 Assessment of Construct Relations

Although it is confirmed above that there is a good fit between the proposed model and the observed data, a good fit alone is insufficient evidence to support the proposed structural model. Thus, the hypothetical relations among the construct variables will be assessed by examining the following variables: P-value, regression coefficients (standardized path coefficient β), Z- value and squared multiple correlations (R2) (Hair et al. 2010).

P-value is used to evaluate how statistically significant the relationship is between measured variables and latent variables at the level 0.05. The standardized path coefficient for each variable indicates the size of its effect on the model: standardized path coefficients with values less than 0.1 indicate a small effect, while values larger

than 0 indicate a large effect (Suhr 2008). Critical Ratio (CR, or T-value) refers to standard normal distribution; the T-value is computed through dividing the unstandardized regression coefficient by the standard error (SE.). A coefficient value is considered significant at the .05 level (1.96 or higher, -1.96 or lower) (Hair et al. 2010). The squared multiple correlations (R^2) represent "*the proportion of variance that is explained by the predictors of the variable in question*" (Bryne 2010), so through the R^2 value the strength of the structural relation will be defined: for a stronger relationship between two variables, it is close to 1, whereas a value close to 0 indicates to a weak relationship.

Table 8-10 shows the standardized path coefficient and T-values for all hypotheses. The paths estimated for hypotheses H1, H6, and H7 were positive and statistically significant and exogenous variables have strong relationships with endogenous variables. The path estimated for hypothesis H3 was statistically significant, with negative effect. The path estimated for hypothesis H5 was below the critical T-value of Type I error, 0.05, as the T-value was 0.339; also p-value was greater than 0.05, indicating a not statistically significant relationship between trust and behavioural intention. Furthermore, P-values of hypotheses H2 and H4 were above the critical value 0.05. with values of 0.732 and 0.735, respectively. Therefore, trust, effort expectancy and time expended had no direct relationship. By including the effects of the interacting variables, a larger proportion of the respective variances in behavioural intention (R2 = 0.69) and intention to use (R2 = 0.51) are accounted for, see figure 8-2. Table 8-11 shows correlation between construct variables in the model.

Table 8-10 Hypotheses analysis

Hypothesised Path	β	Critical Ratio (CR)	ρ
H1: PE → BI	.58	6.37	< 0.001
H2: EE → BI	-.03	-.34	.732
H3: C → BI	-.28	-3.58	< 0.001
H4: TE → BI	-.14	-1.72	.086
H5: T → BI	.03	.34	.735
H6: SI → BI	.53	6.58	< 0.001
H7: BI → UI	.61	8.07	< 0.001

Table 8-11 Correlation between construct variables

`Latent variables	Correlation
PE <--> EE	.582
PE <--> C	.212
PE <--> TE	.259
PE <--> SI	.333
PE <--> T	.490
EE <--> C	.377
EE <--> TE	.314
EE <--> SI	.378
EE <--> T	.675
C <--> TE	.551
C <--> SI	.261
C <--> T	.360
TE <--> SI	.399
TE<--> T	.425
SI <--> T	.412

8.3.3.2.3 Assessment of moderating variables

After assessment of the construct variables and their relationship has completed, the proposed model was still not fully assessed, as it is required to evaluate the moderating variables that affect other construct variables. As proposed in the EKS model, experience and gender are moderating effects on performance expectancy (PE), effort expectancy (EE), compatibility (C), time expended (TE), trust (T) and social influences (SI). Through multi-group structural equation modelling, these moderators were analysed and, as for the previous hypothesis, their moderating effects were evaluated by path coefficients, C.R over (over .95% confidence) and p-value at the level 0.05. The results of the analysis are shown in Table 8-12 and Table 8-13.

Table 8-12 Results for gender moderating the effects of variables for different population.

Hypothesis	**Male** **Number of population =78**			**Female** **Number of population =135**		
	β	C.R.	P	β	C.R.	P
H1a: PE →BI	0.5	2.93	0.003	0.65	5.24	<0.001
H2a: EE → BI	-0.08	-0.6	0.54	-0.04	0.26	0.79
H3a: C→ BI	-0.32	-2.04	0.04	-0.36	-3.72	<0.001
H4a: TE→ BI	-0.09	-0.55	0.58	-0.56	-0.55	0.58
H5a: T→ BI	0.19	1.3	0.19	-0.16	0.27	0.27
H7a: Si→ BI	0.49	2.19	0.02	0.63	6.37	<0.001

For the moderator (interacting) variables, statistically significant beta path coefficients were indicated. Gender had significant interactions with three predictor latent variables PE, C and SI. A positive interacting effect with PE and upon BI, also a positive interacting effect with SI upon BI, whereas, a negative interaction effect with C upon BI.

Table 8-13 Results for experience moderating the effects of variables for different population

Hypothesis	**Experts Number of population = 149 Experiences is 2 years or over**			**Novices Number of population =64**		
	β	C.R.	P	β	C.R.	P
H1a: PE →BI	0.61	5.58	<0.001	0.35	2.04	0.04
H2a : EE → BI	-0.01	-0.09	0.92	-0.06	-0.4	0.6
H3a: C→ BI	-0.36	-3.65	<0.001	0.14	0.11	0.9
H4a: TE→ BI	-0.07	-0.75	0.46	-0.29	-1.88	0.06
H5a: T→ BI	0.06	0.52	0.6	0.07	0.48	0.6
H7a: Si→ BI	0.42	4.35	<0.001	0.91	5.23	<0.001

From table 8-13 experience exhibited two interacting effects: a positive interacting effect with PE on behavioural intention; also a positive interacting effect with SI on behavioural intention. Surprisingly, with expert academics the experience exhibit that significant interactions with C upon BI, whereas, with novice academics did exhibit significant interactions with C upon BI.

8.4 Assessment of hypotheses

Path analysis was used in the study in examining the hypothesised relationship of the proposed model, through using the standardised path coefficients, as shown in the previous sections. The next sections will discuss in detail the proposed hypothesised relationships that have been tested and supported by the data. Path diagram for the proposed structural model is shown in figure 8-2.

H1: Performance expectancy (PE) will positively affect an academic's behavioural intention (BI) to use an e-knowledge sharing system.

Performance expectancy (PE) was found to have a significant direct influence and positive effect on behavioural intention (BI) to use an e-knowledge sharing system: the standardised regression weight of PE (β), 0.58, with T-value of 6.37, suggests that the path between PE and BI is statistically significant at the $P<0.001$ level. Therefore, this result indicates strong support for the hypothesis (H1), as suggested in the theoretical model. From the result it is clear that a one standard deviation increase in performance expectancy scores, is associated with increasing behavioural intention to use an e-knowledge sharing system, by .0.58 points (based on the standardised Beta coefficient value).

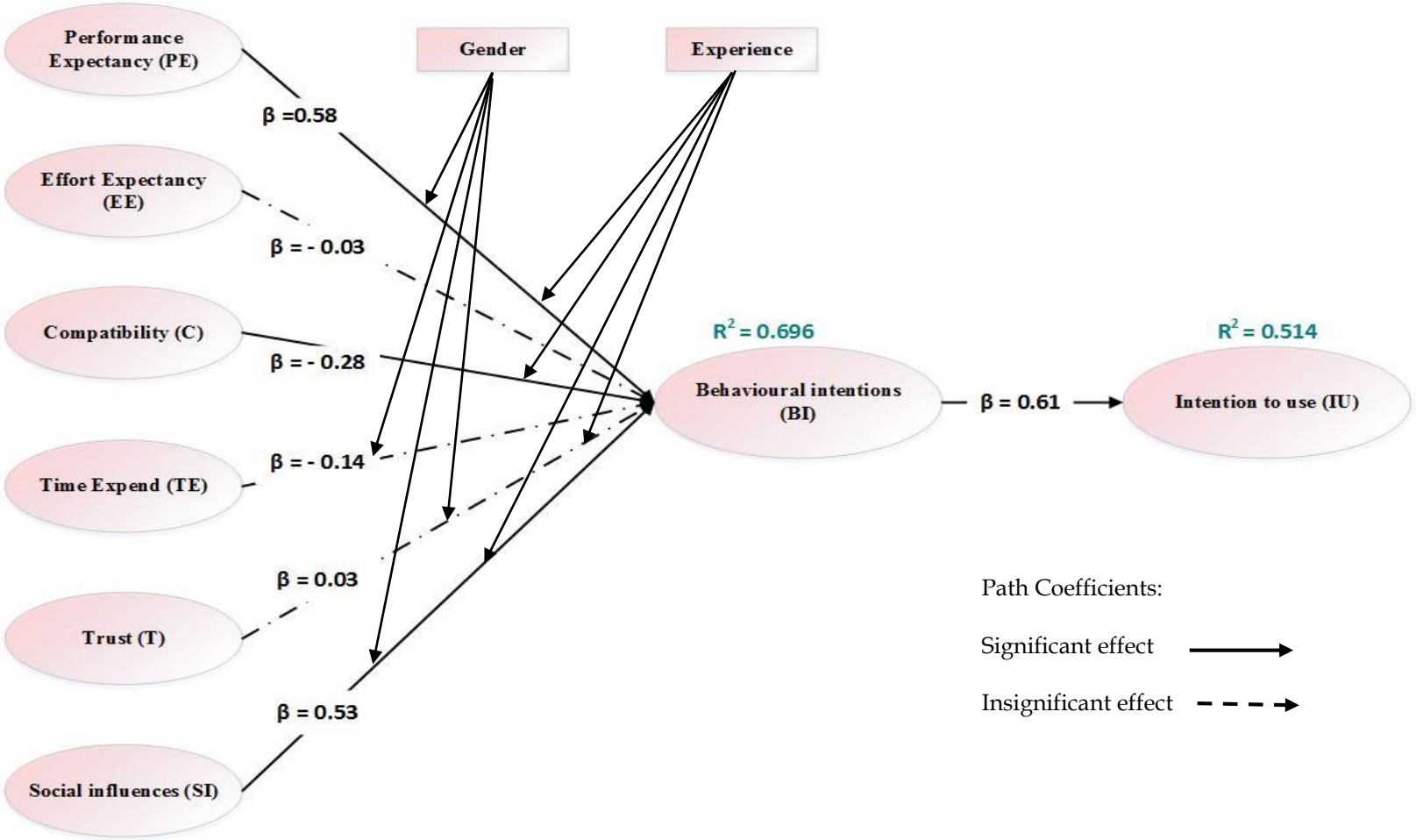

Figure 8-2 Path diagram for the proposed structural model.

H1a: Gender will moderate the relationship between performance expectancy and behavioural intentions.

There was a positive interaction between gender and PE on BI: female academics showed a slightly stronger effect than males, β= 0.65 for females and β=0.5 for males. Thus, hypothesis H1a was supported.

H1b: Experience will moderate the relationship between performance expectancy and behavioural intentions.

There was a positive interaction between experience on the relationship of PE and BI: being expert academics had a stronger effect than being novices in this relationship, β= 0.61 for experts and β=0.35 for novices. Thus, Hypothesis H1b was accepted.

H2: Effort expectancy (EE) will positively affect an academic's behavioural intention (BI) to use an e-knowledge sharing system.

Effort expectancy (EE) was found to have no direct effect on behavioural intention (BI) to use an e-knowledge sharing system, at level of p-value= 0.73 > 0.05. Thus, hypothesis H2 was not supported.

H2a: Gender will moderate the relationship between effort expectancy and behavioural intentions.

A negative effect of gender on the relationship between EE and BI was found: the value for male was β=-0.08 and for female was β=-0.06. The difference, which was about 0.02, was very minor, and this difference was not considered substantial. Thus, hypothesis H2a was not supported.

H2b: Experience will moderate the relationship between effort expectancy and behavioural intentions.

A negative effect of experience on the relationship between EE and BI was found. The difference was not substantial. Thus, hypothesis H2b was not supported.

H3: Compatibility (C) will negatively affect an academic's behavioural intention (BI) to use an e-knowledge sharing system.

Compatibility (C) was found to have a direct effect on behavioural intention (BI) to use an e-knowledge sharing system as it is shown in Table 8-9 that the standardised regression weight of PE (β) is - 0.28 with T-value of -3.58; unexpectedly, the path between C and BI is negatively significant, at the $\rho < 0.001$ level; thus, this result indicates there was a negative relationship. From the result, it is clear that a one standard deviation increase in compatibility scores, decreased behavioural intention to use an e-knowledge sharing system by 0.28 points (based on the standardised Beta coefficient value). Hence, compatibility has a significant negative relationship with academics' behaviour towards using an e-knowledge sharing system, H3 was supported.

H3a: Gender will moderate the relationship between compatibility and behavioural intentions.

A negative effect of gender was found on the relationship between C and BI, for male, $\beta = -0.32$ and for female, $\beta = -0.36$. The difference is not substantial. Thus, hypothesis H3a was not supported.

H3b: Experience will moderate the relationship between compatibility and behavioural intentions.

There was an interaction between the effect of experience and C on BI, positive interaction increasing with fewer years of teaching experience, $\beta = 0.14$, whereas there was a negative interaction with increasing years of experience, the effect was $\beta = -0.36$. So, H3b was approved.

H4: Time Expended (TE) for e-knowledge sharing will positively affect an academic's behavioural intention to use an e-knowledge sharing system.

Time Expended (TE) was found to have no direct effect on behavioural intention (BI) to use an e-knowledge sharing system, at level of p-value= 0.86 > 0.05. Thus, hypothesis H4 was not approved.

H4a: Gender will moderate the relationship between time expended and behavioural intentions.

A negative effect of gender on the relationship between TE and BI was found; path coefficients for both were negative and it is obvious that the negative effect was stronger with women, $\beta=-0.56$, compared with men, $\beta=-0.09$. Thus, hypothesis H4a was accepted.

H4b: Experience will moderate the relationship between time expended and behavioural intentions.

A negative effect of experience on the relationship between TE and BI was found; the negative effect was stronger with academics who were less experienced, ($\beta=-0.29$, for experts $\beta=-0.07$). Thus hypothesis H4b was confirmed.

H5: Trust (T) in knowledge technology will positively affect an academic's behavioural intention (BI) to use an e-knowledge sharing system.

Trust (T) was found to have no direct effect on behavioural intention (BI) to use an e-knowledge sharing system, at level of p-value= 0.73 > 0.05. Thus, hypothesis H5 was not supported.

H5a: Gender will moderate the relationship between trust and behavioural intentions.

There was an interaction between gender and T on BI: female academics show a negative effect (β= -0. 16), whereas male academics have positive interaction (β=0.192). Hypothesis H5a was confirmed.

H5b: Experience will moderate the relationship between trust and behavioural intentions.

There was a positive indirect effect of experience on the relationship between T and BI. The difference was not substantially between experts and novices. Thus, hypothesis H5b was not supported.

H6: Social influences (SI) will positively affect an academic's behavioural intention (BI) to use an e-knowledge sharing system.

Social Influences (SI) were found to have significant direct effect and positively influence behavioural intention (BI) to use an e-knowledge sharing system. As shown in Table 8-9, standardised regression weight (β) of SI is 0.53 with T-value of 6.58, suggesting that the path between SI and BI is statistically significant at the P<0.001 level. Therefore, this result indicates strong support for hypothesis H6, as suggested in the theoretical model.

H6a: Gender will moderate the relationship between social influences and behavioural intentions.

There was a positive interaction between gender and SI in influencing BI, women academics showed a slightly stronger effect than males, β=0.63 for females and β=0.49 for males. Thus, hypothesis H6a was supported.

H6b: Experience will moderate the relationship between social influences and behavioural intentions.

A positive interaction between experience and T on BI, the effect decreased with increasing years of teaching experience, β= 0.91 for novices and β=0.42 for experts. Hypothesis H6b was thus confirmed.

H7: Behavioural intention (BI) will positively affect an academic's intention to use (IU) an e-knowledge sharing system.

Behavioural Intention (BI) was found to be a factor that had a significant direct effect and positive influence on intention to use an e-knowledge sharing system (IU), as it can be seen in Table 8-9 that standardised regression weight of PE (β) is 0.61 with T-value of 8.07, suggesting that the path between BI and IU is statistically significant at the ρ< 0.001 level. Therefore, this result indicates strong support for the hypothesis H7, as suggested in the theoretical model. Assessment of hypotheses summery is shown in the Table 8-14.

Table 8-14 Assessment of Hypotheses

Hypotheses	Result
H1: Performance expectancy will positively affect an academic's behavioural intention to use an e-knowledge sharing system.	Supported.
H1a: Gender will moderate the relationship between performance expectancy and behavioural intentions	Supported, the strong positive effect increasing with female
H1b: Experience will moderate the relationship between performance expectancy and behavioural intentions	Supported, the strong positive effect increasing with experts.
H2: Effort expectancy will positively affect an academic's behavioural intention to use an e-knowledge sharing system.	Not supported. P- value= 073, which is greater than 0.05, so there is no a direct relationship
H2a: Gender will moderate the relationship between effort expectancy and behavioural intentions.	Not supported
H2b: Experience will moderate the relationship between effort expectancy and behavioural intentions.	Not supported
H3: Compatibility will negatively affect an academic's behavioural intention to use an e-knowledge sharing system	Supported, there is a negative relationship. The path coefficient is -.28; this means there is a negative relationship at level $p < 0.001$
H3a: Gender will moderate the relationship between compatibility and behavioural intentions	Not supported, negative effect is not significant between male and female.
H3b: Experience will moderate the relationship between compatibility and behavioural intentions	Supported. Refuted, negative effect slightly increased with experts and a positive effect increased with novices.
H4: Time expended will positively affect an academic's behavioural intention to use an e-knowledge sharing system.	Not supported, P- value = 086, which is greater than

Hypotheses	Result
	0.05, so there is no direct relationship
H4a: Gender will moderate the relationship between time expended and behavioural intentions	Supported, negative effect increased with female
H4b: Experience will moderate the relationship between time expended and behavioural intentions	Supported, negative effect increased with novices.
H5: Trust in knowledge technology will positively affect an academic's behavioural intention to use an e-knowledge sharing system	Not supported, P- value = 0.73, which is greater than 0.05, so there is no direct relationship
H5a: Gender will moderate the relationship between trust and behavioural intentions	Supported, negative effect with female and positive effect with male.
H5b: Experience will moderate the relationship between trust and behavioural intentions	Not supported
H6: Social influences will positively affect an academic's behavioural intention to use an e-knowledge sharing system.	Supported
H6a: Gender will moderate the relationship between social influences and behavioural intentions	Supported, the strong positive effect increasing with female gender
H6b: Experience will moderate the relationship between social influences and behavioural intentions	Supported, the strong positive effect increasing with novices
H7: Behavioural intention will positively affect an academic's intention to use an e-knowledge sharing system	Supported

8.5 Chapter summary

This chapter has provided the results findings of the initial study. Analysis of the proposed model was divided into two stages, measurement and structural analysis. Through the measurement analysis the composite reliability and construct validity

were verified. However, it was observed that some constructs, performance expectancy, compatibility, time expended and trust indicated lower validity values; therefore, items with low factor loadings in these constructs were removed from the model. This resulted in high validity. In the structural analysis it was found that there were direct and indirect effects among construct variables. Through standardised path coefficients it was found that there were positive influences among behavioural intention two factors, performance expectancy and social influences, and compatibility factor had a negative influence on behavioural intention, and that these relationships were moderated by gender and experience. In contrast, indirect relationships were found between effort expectancy and behavioural intention, trust and behavioural intention, and time expended and behavioural intention. The next chapter will discuss the findings in detail.

Chapter 9 Discussion

9.1 Introduction

The findings and results of the evaluation study will be discussed in this chapter, including possible reasons for each finding of relationships between factors in the conceptual model. In addition studies are presented that support the findings and conclusions drawn by the author regarding the findings reported in Chapters 5 and 8.

9.2 Discussion of the evaluation study result

The findings for the evaluation study will be discussed, including those for each factor in the model, supporting a review of the relevant theories and the researcher's view.

9.2.1 Performance expectancy

PE is the extent to which using e-knowledge sharing system is expected to help a member of academic staff to achieve gains in work place. The result showed that this factor has a statistically significant influence on behavioural intention, and that there is also a strong association between the factor and BI (β=0.58). The positive relationship between these two factors is supported by different studies (Venkatesh et al. 2003; Alawadhi & Morris 2008). Al-Gahtani et al. (2007) also found a positive relationship

between these factors when they examined knowledge workers' behaviour towards technology acceptance in Saudi Arabian organisations. In this study, the relationship increased with length of experience in academic teaching (β = 0.61); so for expert academics, PE has a stronger effect than for novices (β = 0.35). For the gender moderator there was a slight difference in with influence, with β=0.65 for women and β =0.5 for men; this suggests PE is a stronger factor for women.

As transferring experts' knowledge was one of the concerns of the study, this finding is crucial, because it investigated a factor that encourages experts to use an e-knowledge sharing system and therefore has important implications for e-knowledge sharing system implementation and for developers. In this case, it suggests that Saudi universities need to consider the benefits that they are expected to provide when academics when they use the system, especially for expert academics.

9.2.2 Effort expectancy

EE is the degree of ease associated with the anticipated degree of use E-knowledge sharing. The results revealed that EE had an indirect effect on BI; this result is validated by some other studies (Venkatesh et al. 2003; Al-Gahtani et al. 2007; Wu et al. 2007). A further finding is that there was an interaction between EE and gender in influencing BI, which indicated that the effect of ease of use was less for men (β = -0.08) than for women (β = -0.04., There was also an interaction between EE and experience in influencing BI: ease of use had little differences in influence on behavioural intention for either experts (β = -0.01) or for novices (β = -0.06). While there were slight differences in the influence on women and men, and between

experts and novices, it can be concluded that there is no interacting effect between EE and either gender or experience in influencing BI. Surprisingly, EE has no significant direct effect and ease of use was found to be not important not important in order for academics to accept using the system, which is understandable, in that academics are considered to the difficulties of using complicated systems. Nevertheless, this hypothesis was not supported in the study, the EE factor should not be ignored, due to the confirmation of its importance from previous studies in the field of technology acceptance (Alkhunaizan & Love 2012; Talib et al. 2013).

9.2.3 Compatibility

C refers to the degree to which using an e-knowledge sharing system is perceived as consistent with the academics' responsibilities. It was found that C was a statistically significant factor and had a negative direct effect on BI. This result was supported by (Karahanna et al. 2006) when the study examined technology acceptance in the context of a large bank. There was no difference between women and men in the impact of C on BI to use the system; thus, the gender moderator had no influence on the relationship. However, the negative relationship increased with years of experience in academic teaching (β = - 0.36) and had a positive interacting effect with less experience (β = 0.14). Although Rogers (1995) claimed that compatibility has a positive effective on BI to adopt a new system, the result of the present study is different from this suggestion.

There is one reason related to the negative effect, which could be related to the closed Saudi society. C is a critical factor and Saudi universities need to evaluate carefully

how an e-knowledge sharing system fits with the current practices of academics before implementation and developed strategy and management

9.2.4 Time expended

Time is defined as academic's belief that using e-knowledge sharing system is time saving while information is available on an e-knowledge sharing system. From the result in Chapter 8, it was found that there was no significant direct effect and there was negative relationship between TE and BI; this result was supported by Becker et al. (2013) in a study of learner perspectives on barriers to e-learning, and the factor had a significant effect on the future use of e-learning systems. However, gender and experience affected the relationship between TE and BI: the negative interaction between TE and gender in influencing BI indicated that using an e-knowledge sharing system, women thought e-knowledge sharing system would be time consuming (β = -0.55), while for men, the path coefficient, β = -0.09. There is also a negative interacting effect of less experience in teaching (β = -0.29), while the path coefficient for experts is β = -0.07. Although TE is an indirect factor, it plays an important role in developing a negative opinion towards using an e-knowledge sharing system, while it was highly correlated with C (0.551).

Regarding to Uddin (2003) study, it found that there was insufficient time for academics to use the internet for seeking information and communication needs, which means time expended on the internet is a barrier factor; this matches academics' behaviour towards an e-knowledge sharing system, where there was a negative indirect effect. So, it is not reasonable to ignore this factor and it is important

for heads of departments to provide sufficient time for academics to adopt e-knowledge sharing systems.

9.2.5 Trust in technology

T refers to the belief of the academic staff in the reliability of the system for knowledge sharing. The result shown in Chapter 8 indicated that there was an indirect effect of trust on BI to use an e-knowledge sharing system. This result is supported by Alkhunaizan & Love (2012), whose study found that trust had no direct effect on behavioural intention toward m-commerce. A further finding is that for women, there was a negative interacting effect of gender (β = -0.16) and trust in an e-knowledge sharing system on BI, whereas there was positive interacting effect for men (β = 0.19), but there was no interacting effect on intention between T and experience. As shown in table 8-10 (Chapter 8), T factors had a correlation with both PE and SI (0.49 and 0.41, respectively).

This finding is unexpected, as earlier studies confirmed that trust is a significant factor which influences behavioural intention. Regarding the study by Alateyah et al. (2012) on adoption of e-government in Saudi Arabia, the finding was that a high level of security and trust would result in increasing online service usage, which assists organisations to adopt a system. Similarly, in a study investigating factors that affect cloud learning in Saudi universities, security and privacy were the major factors to ensure successful system usage (Areshey et al. 2012). Perhaps the explanation for the conflicting findings is that academics may not have had sufficient awareness about the level of security awareness about trust to communicate and

share their knowledge. From the finding, the researcher suggests that future study should be concerned with awareness of trust issues in e-knowledge sharing system.

9.2.6 Social influences

SI represents the extent to which the academic believes that their important person encourages the use of an e-knowledge sharing system. The results confirm that SI is a statistically significant factor and had a positive direct effect on BI ($\beta = 0.53$) and it is the second most effective factor in the proposed model; this result is supported by research studies in the field of technology acceptance (Venkatesh et al. 2003; Alawadhi & Morris 2008; Al-Gahtani et al. 2007).

There was a positive interaction between SI and both gender and experience in their effect on BI: the positive interaction was greater for females ($\beta=0.63$) and also for novices ($\beta = 0.91$), as expected, the influence decreasing with increasing years of experience.

Regarding Saudi social culture, this finding is expected and academics may interact with the system when their leaders or colleagues are using the e-knowledge sharing system. The implication of this finding is that Saudi universities should consider engaging academics who are effective leaders to encourage other staff in using an e-knowledge sharing system, especially novice academics.

9.2.7 Behavioural intention towards e-knowledge sharing systems

BI refers to the overall affective reaction of an academic to using e-knowledge sharing systems. The result presented in Chapter 8 found that BI was a significant factor that influenced the acceptance of using an e-knowledge sharing system. BI was found to be the most effective factor compared with other factors in the proposed model. This finding agrees with the findings of a number of studies which examined user acceptance of technology and this result was confirmed by Venkatesh et al. (2003), who found a significant direct effect of behavioural intention to use the system. In a study on use of e-learning systems, it was also concluded that BI had a positive direct effect on using a system (Ejaz 2014). Hwang, & Yi (2002) found that BI is one of the intrinsic motivations to use of web-based information systems. This finding confirmed that a positive behavioural intention leads to use of the system.

9.3 Research questions

This research has addressed the following research question through different methods that were used in the exploratory study and evaluation study: ***What is an appropriate model for the adoption of e-knowledge sharing amongst academics in Saudi Arabian universities?*** This research question is divided into five sub-questions

- What is the attitude of academics in Saudi universities towards using their universities' online systems in the workplace?

- What is the attitude of academics in Saudi universities towards using knowledge sharing?
- What are the factors affecting e-knowledge sharing among academic staff in Saudi universities?
- What are the relationships between the factors affecting e-knowledge sharing amongst academic staff in Saudi universities?
- Do gender and experience moderate relationships between the observed factor and behavioural intention?

The following sections will present the summary of the answers to the research sub-questions.

Q1: ***What is the attitude of academics in Saudi universities towards using online systems in workplace?***

This question aims to explore whether academics were aware of using the internet for working duties. The result in Table B2 from Appendix B shows that the majority, 51.2%, of academics were using the internet in the workplace for more than two hours a day for the purpose of their duties, and also a higher percentage, 60.1%, were using the internet at home for work purposes. Furthermore, most academics considered themselves to have high skills in using the internet, rating their computer abilities as excellent, 55.4%, or good, 39%. Using the internet is not difficult for academics when most of them have been using the internet for more than a decade: this result is also supported by the interviewees' responses (Table 2 in Appendix B) where 70% of the academics said they had never found difficulties in using web technology. In addition, the academics reported that they tend to use Web-based technology to find resources to support the teaching courses. The above results and

findings indicate that these academics have positive attitudes towards using web technology during working hours.

Q2: ***What is the attitude of academics in Saudi universities towards using knowledge sharing?***

The aim of this question is to explore the academics' attitudes towards knowledge sharing either with or without the means of technology, because if academics do not have a favourable opinion about transferring knowledge among colleagues, it would not be possible to implement e-knowledge sharing systems. This question was answered through conducting interviews, in which the academics demonstrated a highly positive attitude towards knowledge sharing, and most stated that they have previously shared their knowledge. All the academics found that novices struggled without the sharing of knowledge by experts, which means that the academics agreed there is an issue with not sharing knowledge. The answer was also investigated from two subsequent questionnaires in which academics were asked "Have you shared your knowledge with colleagues?" and over 75% answered Yes for both questionnaires. Very few academics reported that they have not shared their knowledge, perhaps they were novices and they did not have enough knowledge of the courses.

Q3: what are the factors affecting e-knowledge sharing among academic staff in Saudi universities?

The aim of this question was to investigate factors affecting academics' behaviour towards using e-knowledge sharing systems. This question was answered in four stages. In the first stage, factors were identified from theory and previous studies.

Interviews were then conducted through which two sets of factors were identified, motivation and barriers. Next, expert reviews were carried out to confirm the factors identified from the interviews and refine the e-knowledge sharing model. Expert reviews were crucial at this stage in this exploratory study, in order to confirm the important factors that emerged from the interviews with the academics. The findings from the expert review was that three factors were not significant: fear of loss of their position, being mandatory to use the system and having an attractive interface of the system; thus, these factors were removed from the study. Finally, online questionnaires were conducted to confirm all the factors of the developed model, which involved merging two sets of factors, those from previous studies and from the expert reviews. That factors that were confirmed from the methods of interviews, expert reviews and questionnaires are shown in Figure 6-1. These factors were performance expectancy, effort expectancy, compatibility, time expended, trust in the system, social influences and behavioural intention.

Q4: What are the relationships between factors of e-knowledge sharing amongst academic staff in Saudi universities?

This question was answered through the final questionnaire in the study. According to the findings and discussion presented above, the factors in the model have different priority and different relationships, Table 9-1 shows all the different relationships and their priority and further information about the results has been discussed in the previous section.

Table 9-1 Summary result of the factors' relationships: the paths are shown in Chapter 8.

Hypothesised Path	(β)	P-value	Findings	Priority	References support hypotheses
H1: PE → BI	0.58	< 0.001	Positive direct effect	High priority	Al-Gahtani et al. 2007; Alawadhi & Morris 2008.
H2: EE → BI	-0.03	0.732	Negative indirect effect	Low priority	Al-Gahtani et al. 2007; Wu et al. 2007.
H3: C → BI	-0.28	< 0.001	Negative direct effect	Mid-priority	Ahmed & Ward 2016.
H4: TE → BI	-0.14	0.086	Negative indirect effect	Low priority	Becker et. Al 2013.
H5: T → BI	0.03	0.735	Positive indirect effect	Low priority	Alkhunaizan & love 2012.
H6: SI → BI	0.53	< 0.001	Positive direct effect	High priority	Celik 2016; Wong & Huang 2015; Al-Gahtani et. al 2007.
H7: BI → UI	0.61	< 0.001	Positive direct effect	High priority	Ejaz 2014; Celik 2016.

Q5: Do gender and experience moderate relationships between observed factors and behavioural intention?

This question was investigated through the final questionnaire. As discussed in section 9-2, gender and experience have an effect on the relationship between some factors and behavioural intention. Table 9-2 shows the summary of the discussion presented in section 9-2.

Table 9-2 the effect of gender and experiences on the relationships between factors and behavioural intention

Hypothesis	Findings	Comments	References
Gender and experience will moderate the relationship between performance expectancy and behavioural intentions.	Supported.	Both moderators have positive effect, the effect being greater for females and experts.	Venkatesh et al., 2003; Ghalandari, 2012; Abu-Al-Aish and Love, 2013.
Gender and experience will moderate the relationship between effort expectancy and behavioural intentions.	Not supported	Both moderators have a negative effect and no substantial difference was found between men and women, or experts and novices.	Al-Gahtani et al., 2007.
Gender and experience will moderate the relationship between compatibility and behavioural intentions.	Not supported/ supported	No difference in the effect between men and women (both have negative effect), whereas for novices there is a positive effect and for experts there is a negative effect.	There is insufficient empirical study for this hypothesis regarding compatibility in the technology acceptance area. So this is a crucial contribution of this research.
Gender and experience will moderate the relationship between time expended and behavioural intentions.	Supported	Both moderators have a negative effect; the negative effect is stronger with women and novices.	There is insufficient empirical study for this hypothesis compatibility in technology acceptance area. So

Hypothesis	Findings	Comments	References
			this is a crucial contribution of this research.
Gender and experience will moderate the relationship between trust and behavioural intentions.	Supported/ not supported	Men experience a positive effect, whereas women experience a negative effect. Experience has a positive effect but there are no differences between experts and novices	Sivarajah and Sritharan, 2014.
Gender and experience will moderate the relationship between social influences and behavioural intentions.	Supported	Both moderators have positive effect, the effect being greater for females and novices.	Al-Gahtani et al., 2007; Ghalandari, 2012.

9.4 Chapter summary

This chapter addressed research question and discussed the findings of the research from both the exploratory and evaluation study. The key findings are as follows: that the relationships between factors were dependent in the model. Two factors had a direct positive effect on behavioural intention: performance expectancy and social influences; however, there was a direct negative effect between compatibility and behavioural intention. Other factors had an indirect effect. These were behavioural intention, effort expectancy, time expended and trust in technology.

Chapter 10. Conclusions and Future Work

10.1 Research overview

E-knowledge sharing systems provide data, information and knowledge electronically to academics. The definition of an e-knowledge sharing system which has been used in this research is that it is a web-based application that allows academics in the university to build up communities online and to communicate for sharing, seeking and using knowledge. For the successful implementation of knowledge sharing systems, the objective which was established for the research was to investigate factors that influence academics towards the acceptance of a knowledge sharing system.

In order to understand academics' behaviour, from the literature review a number of factors were identified as being important in encouraging knowledge sharing and technology acceptance. These factors were reconstructed and filtered to avoid duplication and regrouped to accommodate the culture in Saudi universities, and the selected factors were developed into a conceptual model.

The conceptual model was proposed from previous studies and then the model was confirmed by different triangulation methods: interviews, expert reviews and questionnaires. The data gathered from the semi-structured interviews were assessed to identify additional influencing factors that were not mentioned in previous studies. Data were also gathered from expert reviews, which were conducted with experts as self-administered questionnaires, in order to refine and revise the factors that emerged from the interviews. In addition, data were gathered from a further self-administered online questionnaire, in order to confirm the new model, which included factors derived from both the theories and the expert reviews. The e-knowledge sharing model was then evaluated through a new questionnaire and by analysing the data by Structural Equation Modelling (SEM). A summary of the research methodology of the study is presented in Figure 10-1.

The SEM technique was established to test the hypotheses because the model contains items which included unobserved factors that were measured by observed items. After the data collection, the model was evaluated in two stages: by a measurement method and structural method (Hair et al 2010).

In the measurement method, the model was examined through measuring construct reliability, content validity, convergent validity and discriminant validity, whereas the structural method examined the model through assessing hypothesised relationships amongst unobserved variables.

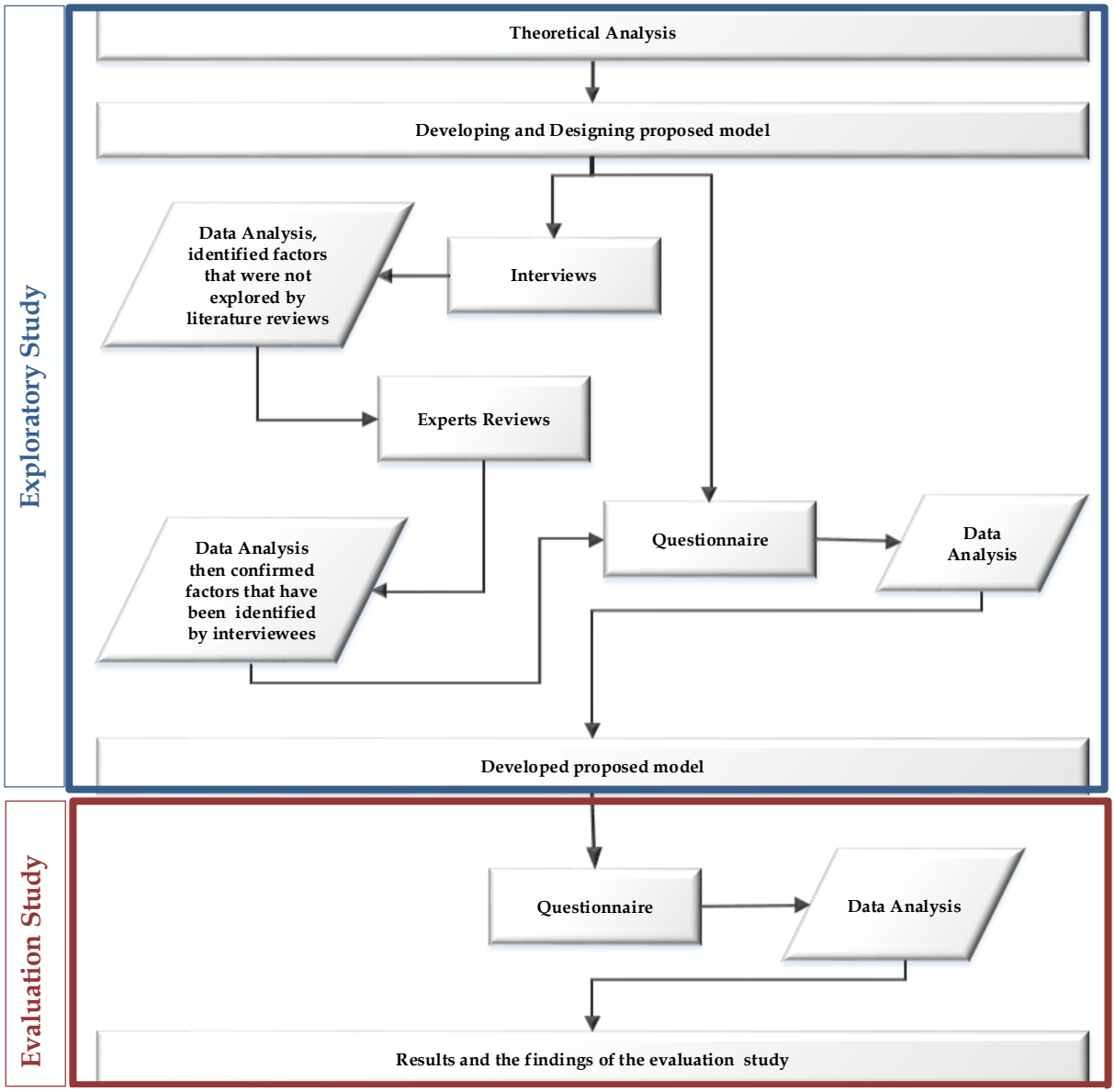

Figure 10-1 Research Methodology of the Study

From the data analysis of the evaluation study presented in Chapter 8, it was clear that the model fit indices were good. Some measurement items were removed from the model, which were two items from the performance expectancy factor, PE3 and PE4, also two items from the compatibility factor, C1 and C5, three items from time expended, TE1, TE2 and TE3, and finally an item from the trust factor, which was T5. This decision was made to improve construct validity, as recommended by Hair et

al. (2010): removing items from the model if that item's loading was less than 0.5. Overall, 19 hypotheses of the structural model were examined and the results supported 8 of the proposed hypotheses. These hypotheses are:

H1: Performance expectancy will positively affect an academic's behavioural intention to use an e-knowledge sharing system.

H1a: Gender will moderate the relationship between performance expectancy and behavioural intentions.

H1b: Experience will moderate the relationship between performance expectancy and behavioural intentions.

H3: Compatibility will negatively affect an academic's behavioural intention to use an e-knowledge sharing system.

H6: Social influences will positively affect an academic's behavioural intention to use an e-knowledge sharing system.

H6a: Gender will moderate the relationship between social influences and behavioural intentions.

H6b: Experience will moderate the relationship between social influences and behavioural intentions.

H7: Behavioural intention will positively affect an academic's intention to use an e-knowledge sharing system.

Other results showed that 11 hypotheses were not supported. All the following hypotheses were not supported:

H2: Effort expectancy will positively affect an academic's behavioural intention to use an e-knowledge sharing system.

H2a: Gender will moderate the relationship between effort expectancy and behavioural intentions.

H2b: Experience will moderate the relationship between effort expectancy and behavioural intentions.

H3a: Gender will moderate the relationship between compatibility and behavioural intentions.

H3b: Experience will moderate the relationship between compatibility and behavioural intentions.

H4: Time expended will positively affect an academic's behavioural intention to use an e-knowledge sharing system.

H4a: Gender will moderate the relationship between time expended and behavioural intentions.

H4b: Experience will moderate the relationship between time expended and behavioural intentions.

H5: Trust in knowledge technology will positively affect an academic's behavioural intention to use an e-knowledge sharing system.

H5a: Gender will moderate the relationship between trust and behavioural intentions.

H5b: Experience will moderate the relationship between trust and behavioural intentions.

Effort expectancy and time expended were found to have negative indirect effect on behavioural intention. Trust was found to have positive indirect effect on behavioural intention.

Finally, the study investigated positive and negative factors, and direct and indirect influences. It can be concluded that the proposed model can be used for predicting and explaining academics' acceptance of e-knowledge sharing. Thus, this investigation will assist knowledge workers to have a better understanding before implementing an e-knowledge sharing system.

10.2 Research contribution

The study has contributed to the research field in three areas: the contribution of the model, the contribution to the theory and the contribution of the instrument used.

The main contribution of the study is the model contribution; this study was seeking to find an appropriate model for the adoption of e-knowledge sharing amongst academics in Saudi Arabian universities. The e-knowledge sharing model was developed to examine the use of e-knowledge sharing systems. The model was constructed from the literature review on technology acceptance and knowledge sharing, and also, during interviews, the relevant factors were identified and then completed through expert reviews; through the exploratory questionnaire, the factors were confirmed. In the final stage of the study there was an evaluation questionnaire to identify the relationships between factors. Answering the question

"***What is an appropriate model for the adoption of E-knowledge sharing amongst academics in Saudi Arabian universities?*** "**?** resulted in a knowledge-sharing system model that includes the affecting factors: performance expectancy; effort expectancy; compatibility; social influences; time expended and trust in technology. These factors were investigated through different processes: published papers in both fields, technology acceptance and knowledge sharing, were considered to identify influencing factors. The factors were combined, categorised and filtered, based on the relationships of meaning of meaning between factors. Finally, the requirements for the e-knowledge sharing model for the Saudi university context had been identified which would enable workers in IT department in Saudi universities to have a better understanding of academics' behaviour towards using e-knowledge sharing systems and assist them in predicting success factors and barriers before implementing a system for knowledge sharing. This research contributes to understanding and encouraging academics acceptance of e-knowledge sharing systems in Saudi Arabian universities.

The research fills the gap in examining academics' behaviour before implementing e-knowledge sharing systems. As the e-knowledge sharing model combines factors related to both technology acceptance and knowledge sharing, the research has presented and reviewed a variety of existing publications on technology acceptance and knowledge sharing, and also has contributed in identifying gaps in the understanding of the reasons for acceptance to consider in developing existing models or constructing new models.

The theoretical contribution is that, from the review of literature, it was found that no study in Saudi Arabia has yet theoretically combined the two fields of technology

acceptance and knowledge sharing in an academic context. In addition, the factors of trust in technology and time expended in using technology have not received sufficient attention in the area of knowledge sharing technology, from the part of construction of the e-knowledge sharing model, the study is one of few studies that has examined user behaviour towards knowledge sharing technology combining these two factors. Also, this study is a useful resource for technology centres in Saudi universities: as mentioned in the research objective in Chapter 1, technology centres aim to employ technology for transferring knowledge within the university society. This study provides a rich source of information for existing studies and to future researchers on technology acceptance in the area of knowledge management or higher education.

The instrumental contribution is that the study has introduced an appropriate set of instruments that can be used in future to test academics' likely acceptance of systems before implementation. The process of building the instrument has been completed from different methods: in the exploratory study the different methods used were interviews, expert reviews and questionnaires. Interviews were conducted to identify factors that are unmentioned in previous studies, then expert reviews were conducted to confirm the factors identified from the interviews. An e-knowledge sharing model was then developed. The final method used in the exploratory study was the questionnaire, in order to confirm existing factors in the e-knowledge sharing model. After the exploratory study had been completed, the instrument was also developed from literature reviews and Saudi expert researchers. These processes of building the instrument resulted in a well-designed instrument that can be used in the future in academic contexts.

10.3 Limitations of the Research

Participants in the final questionnaire were from 29 different Saudi universities; this means that, although the researcher collected data from the majority of Saudi universities, there are still four universities which were not included in the data collection.

The small number of interviews carried out to identify unexplored factors was another issue in the study. Increasing the number of interviewees would give a better opportunity in understanding the situation and result in detecting more influencing factors.

Another limitation of the research is in the translation. The questionnaire and interview guide and questions were written in English then translated into Arabic; the translations were verified by Saudi researchers who were students in the UK. This process resulted in a few misleading questions, and these question were removed from the study.

10.4 Future work

In this research, the model examined only user acceptance behaviour; the research was not constructed including factors to determine whether the information systems meet user needs, such as the model for Task−Technology Fit (TTF). The addition of further factors would enrich understanding of academics' needs. Thus, future work would be to conduct a study scoping the TTF model.

The higher education system in other Arab countries is similar to that in Saudi Arabia and also in other aspects, such as language and culture. Thus, the validated model could be able to be applied in other Arab countries not just in Saudi Arabia. One area of future work would be to conduct research using the instrument of the study in some other Arab countries.

The current study only considered the academics' behaviour towards acceptance of technology; another future study would be to consider wider uses and to include factors that have an influence on the knowledge worker when implementing a system, to answer the question "What are the challenges of implementing an e-knowledge sharing system in Saudi universities?"

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Appendix A

Kingdom of Saudi universities

Universities under the control of the Ministry of Higher Education

Kingdom of Saudi universities	**Universities Websites**	**Public/Private**	**Participate in the study**
King Saud University	www.ksu.edu.sa	Government	Yes
Princess Nora bint Abdul Rahman University	www.mohe.gov.sa (in Arabic)	Government	Yes
Imam Muhammad bin Saud Islamic University	www.imamu.edu.sa	Government	Yes
King Saud bin Abdulaziz University for Health Sciences	www.ksau-hs.edu.sa	Government	Yes
Sattam bin Abdulaziz University	www.psau.edu.sa	Government	Yes
Majmaah University	www.mu.edu.sa	Government	Yes
Shaqra University	www.su.edu.sa	Government	Yes
Saudi Electronic University	www.seu.edu.sa	Government	Yes
King Abdulaziz University	www.kau.edu.sa	Government	Yes

Umm Al-Qura University	www.uqu.edu.sa	Government	Yes
Taif University	www.tu.edu.sa	Government	Yes
King Abdullah University of Science and Technology	www.kaust.edu.sa	Government	No
University of Jeddah	http://uj.edu.sa/Home.aspx?Lng=EN	Government	Yes
King Fahd University for Petroleum and Minerals	www.kfupm.edu.sa	Government	Yes
University of Dammam	www.uod.edu.sa	Government	No
King Faisal University	www.kfu.edu.sa	Government	Yes
Taibah University	www.taibahu.edu.sa	Government	Yes
King Khalid University	www.kku.edu.sa	Government	Yes
Qassim University	www.qu.edu.sa	Government	Yes
Al Jawf University	www.ju.edu.sa	Government	Yes
Jazan University	www.jazanu.edu.sa	Government	Yes
University of Hail	www.uoh.edu.sa	Government	Yes

Al Baha University	www.bu.edu.sa	Government	No
Najran University	www.nu.edu.sa	Government	Yes
Northern Borders University		Government	Yes
Tabuk University	www.ut.edu.sa	Government	Yes
Prince Sultan University private	www.psu.edu.sa	Private	Yes
Arab Open University private	www.arabou.org.sa	Private	Yes
Al Yamamah University, private	www.alyamamah.edu.sa	Private	No
Dar Al Uloom University private	www.dau.edu.sa	Private	No
Alfaisal University private	www.alfaisal.edu	Private	No
Effat University private	www.effatuniversity.edu.sa	Private	Yes
Dar Al-Hekma College private	www.daralhekma.edu.sa	Private	Yes
Prince Mohammad University private	www.pmu.edu.sa	Private	No

Fahd bin Sultan University private	www.fbsu.edu.sa	Private	No
University of Business and technology Private	http://www.ubt.edu.sa/	Private	No

National Commission for Academic Accreditation & Assessment 'NCAAA'

NCAAA to manage courses; it includes the following eleven specified standards:

Mission and Objectives

1. Governance and Administration
2. Management of Quality Assurance and Improvement
3. Learning and Teaching
4. Student Administration and Support Services.
5. Learning Resources
6. Facilities and Equipment
7. Financial Planning and Management
8. Employment Processes
9. Research
10. Institutional Relationships with the Community

The previous criteria are filled on a form by academic after the end of courses.

For more information, please visit the link below

http://www.psu.edu.sa/colleges/aapc/Files/Handbook3_QAASA.pdf

Appendix B

Interview Questions

(English version)

Rubric:

The main aims of this interview are to gain an understanding of the attitude of academics towards knowledge sharing, and also to identify factors that are not mentioned in previous studies, as well as to investigate the extent to which academics use systems that are related to the website of their universities, and explore the way that it is used to share knowledge among academics. The results of these questionnaires will be used to investigate what are the most effective types of websites for the purposes of academic knowledge sharing. I would appreciate your responses to the following questions. Your information will be used for this research purpose only. Thank you very much for your time in completing this questionnaire.

Part I: The statements below describe the importance of knowledge sharing. Please provide your opinion					
How far do you agree/disagree with the following statements in knowledge sharing?	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Obtaining information for teaching new subjects is difficult.					
Obtaining information from expert academics is very useful.					
Sharing my knowledge with colleagues will improve academic performance in general.					
Novice academics struggle without sharing the knowledge of expert academics.					
Sharing my knowledge with colleagues helps me to					

accomplish tasks more quickly.					
Part II: The statements below describe the importance of using Web technology. Please provide your opinion					
Use of Web technology	**Always**	**Often**	**Sometimes**	**Seldom**	**Never**
Do you use the internet in workplace?					
Do you use the internet to obtain information about subjects you teach?					
Do you find any difficulties accessing Webpages?					
Do you find the online systems of the university are easy to use?					
Is Web technology a useful source of appropriate knowledge?					
Do you have time to use web in work place?					
Have you shared your knowledge using the Web?					
Do you use a social network?					
Have you shared your knowledge through social network?					
Part III: The statements below describe the importance of using the Web for knowledge sharing. Please provide your opinion					
How far do you agree/disagree with the following statements about using the Web for knowledge sharing purposes	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Using e-knowledge sharing among academics makes it is easier to make contact with expert academics in other campuses.					
Using e-knowledge sharing					

among academics increases the productivity of academics.					
Using e-knowledge sharing among academics makes knowledge more accessible.					
Using e-knowledge sharing among academics is more important than having printed documents.					
Using e-knowledge sharing among academics can be trusted. (information trust)					

1. Is there e-knowledge sharing system among academics in your university?

□ Yes □No

2. If yes, Could you describe it?

3. How do you share your knowledge with colleagues in the university?

□Seminar □Workshop □Previous documents □Informal chatting □Telephone

□Other methods of knowledge sharing please specify :_____)

4. What Social Network you have been used? (You can choose more than one)

□Facebook □Twitter □Weblog □Wiki □LinkedIn □Keek

□Other social network (please specify :_____)

5. What tools do you need in KS system?

6. Why some academics do not share?

7. What makes you want to share your knowledge?

8. When Expert academics want to share?

9. What technical problem do you face?

10. Why you never use social network?

11. Do you think SN easy to use?

12. What do you prefer to use in knowledge sharing social network or a specific system?

13. Why do you prefer it?

14. In your opinion, what difficulties do academics find in using Web technology?

15. Can you provide the most important factors to be considered when academics want to share knowledge via Web technology?

Analysis

The results of using SPSS software to compute frequencies and percentages of academics' responses to closed questions (The quantitative data of interviews)

Table 1B Part I: Responses on the importance of knowledge sharing

Questions	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Obtaining information for teaching new subjects is difficult	4	40%	6	60%	0	0%	0	0%	0	0%
Information from academic experts is useful	8	80%	1	10%	1	10%	0	0%	0	0%
KS improves academic performance	5	50%	5	50%	0	0%	0	0%	0	0%
Novices struggling without sharing knowledge of expert.	8	80%	2	20%	0	0%	0	0%	0	0%
academics accomplish tasks more quickly with KS	8	80%	2	20%	0	0%	0	0%	0	0%

Table 2B Part II: Responses on use of web technology										
	Always		Often		Sometimes		Seldom		Never	
Use Internet in workplace	7	70%	1	10%	1	1%	1	10%	0	0%
Use electronic information in teaching	4	40%	3	30%	2	20%	1	10%	0	0%
Difficult to use web technology	1	10%	0	0%	2	20%	0	0%	7	70%
Easy to use online systems of the university	7	70%	1	10%	1	10%	0	0%	1	10%
Web technology a useful source for academics	6	60%	2	20%	2	20%	0	0%	0	0%
Have time to use web in work place	0	0%	2	20%	5	50%	2	20%	1	10%
Share knowledge using Web technology	4	40%	0	0%	2	20%	0	0%	2	20%
Use social network	5	50%	1	10%	0	0%	1	10%	3	30%
Share knowledge through social networking	5	50%	0	0%	1	10%	0	0%	4	40%

Table 3B Part III: Respondents' views on importance of using e-knowledge sharing										
	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Easier to contact experts through e-knowledge sharing systems	80	80%	2	20%	0	0%	0	0%	0	0%
e-knowledge sharing increases productivity of academics	7	70%	2	20%	1	10%	0	0%	0	0%
Knowledge more accessible with e-knowledge sharing system	8	80%	2	20%	0	0%	0	0%	0	0%
Prefer e-knowledge sharing system to printed documents	10	100 %	0	0%	0	0%	0	0%	0	0%
Trust e-knowledge sharing system	80	80%	2	20%	0	0%	0	0%	0	0%

Appendix C

Experts' Questionnaire

(English version)

Rubric:

The questionnaire helps the researcher to investigate effective factors that assist in building electronic system for knowledge sharing among academics in different campuses who have common interest. Your information will be used for this research purpose only to adopt e-knowledge sharing system for each university. Thank you for your time in completing this questionnaire.

To what extent do you agree with the following factors	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Q1. A reward encourages academics to share their knowledge via e-knowledge sharing systems.					
Q2. Academics share their knowledge via e-knowledge sharing systems because they enjoy using the system.					
Q3. Academics use e-knowledge sharing to acquire new knowledge and experience.					
Q4. Academics prefer to use e-knowledge sharing because they have a high-level knowledge and experience.					
Q5. Academics do not share their knowledge via e-knowledge sharing systems because they fear colleagues may get promotion before them.					
Q6. Academics do not use e-knowledge sharing systems because they do not trust others' expertise knowledge.					
Q7. Academics do not use e-knowledge sharing systems unless it is mandatory.					
Q8. Academics are willing to use e-knowledge sharing if the system is easy to use.					

Q9. Academics are willing to use e-knowledge sharing if the system has an attractive interface.					
Q10. Academics are willing to use e-knowledge sharing if academics rate the knowledge in the system. (rating knowledge)					
Q11. Academics are willing to use e-knowledge sharing to accomplish tasks more quickly.					
Q12. Academics are willing to use e-knowledge sharing in order to have contact with expert academics.					
Q13. Using e-knowledge sharing and to exchange knowledge is time consuming.					
Q14. Academics do not trust e-knowledge sharing to share knowledge.					
Q15. Academics do not use e-knowledge sharing if it is insecure system.					
Q16. Academics do not use e-knowledge sharing because they are not willing to change their existing routine.					
Q17. Lack of familiarity with using technology tools inhibits sharing knowledge.					
Q18. Departmental superiors are essential for academics in knowledge sharing technology.					
Q19. IT support is essential to help academics in e-knowledge sharing.					
Q20. Academics use e-knowledge sharing if it is counted as working hours.					
21. Could provide more factors that affect academic's behaviour toward using e-knowledge sharing system					

Arabic & English online Versions

E-Knowledge Sharing

* Required

To what extent do you agree with the following factors for e-knowldge sharing

إلى أي مدى تعتبر ما يلي من العوامل مؤثرة لتبادل الخبرات بين الأكاديميين الكترونيا

1. A reward encourages academics to share their knowledge via e-knowledge sharing systems. *

المكافأة التشجيعية تحفز الأكاديميين لتبادل المعلومات و الخبرات مع زملائهم من خلال نظام مشاركة الخبرات الالكتروني.

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

2. Academics share their knowledge via e-knowledge sharing systems because they enjoy using the system. *

الاكاديمين يتبادلون المعلومات و الخبرات من خلال نظام مشاركة الخبرات الالكتروني لانهم يستمتعون باستخدام النظام و الاستمتاع بمساعدة الأخرين.

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

3. Academics use e-knowledge sharing to acquire new knowledge and experience. *

الاكاديميون يستخدمون نظام مشاركة الخبرات الالكتروني للحصول على الخبره و معلومات جديدة

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

4. Academics prefer to use e-knowledge sharing because they have a high-level knowledge and experience *

الأكاديميين يفضلون استخدام النظام تبادل المعلومات مع الأكاديميين لان لديهم معرفة وخبرة رفيعة المستوى.

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

6. Academics do not share their knowledge via e-knowledge sharing systems because they fear colleagues may get promotion before them. *

بعض الأكاديمين لايشاركون بمعلوماتهم عن طريق النظام خوفاً من أن يحصل زملائهم على ترقية وتحسن مستواهم الوظيفي

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

7. Academics do not use e-knowledge sharing systems because they do not trust others' expertise *

الأكاديمين لايستخدمون النظام لتبادل الخبرات والمعلومات لانهم لايثقون بمعلومات بعض الاكاديمين الآخرون

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

8. Academics do not use e-knowledge sharing systems unless it is mandatory *

الأكاديمين لا يستخدمون نظام مشاركة المعرفة والمعلومات الالكتروني الا إذا كانت مشاركة المعلومات متطلب من متطلبات العمل

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

9. Academics are willing to use e-knowledge sharing if the system is easy to use. *

الأكاديميين يرغبون باستخدام نظام مشاركة الخبرات الالكتروني إذا كان النظام سهل الاستخدام

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

10. Academics are willing to use e-knowledge sharing if the system has an attractive interface. *

الأكاديميين على استعداد لاستخدام نظام مشاركة الخبرات الالكتروني إذا كان النظام لديه واجهة جذابة.

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

11. Academics are willing to use e-knowledge sharing if academics rate the knowledge in the

system. (rating knowledge) *

الأكاديميين على استعداد لاستخدام نظام مشاركة الخبرات الالكتروني إذا تمكن الأكاديميين من تقييم المعلومة في النظام الالكتروني

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

12. Academics are willing to use e-knowledge sharing to accomplish tasks more quickly. *

الأكاديميين على استعداد لاستخدام نظام مشاركة الخبرات الالكتروني لأن ذلك يساعد في إنجاز المهام بسرعة أكبر.

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

13. Academics are willing to use e-knowledge sharing in order to have contact with expert academics *

الأكاديميين على استعداد لاستخدام نظام مشاركة الخبرات الالكتروني من أجل الحصول على اتصال مع الأكاديميين الخبراء المتواجدون في حرم جامعي آخر

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

14. Using e-knowledge sharing and to exchange knowledge is time consuming. *

استخدام نظام مشاركة المعلومات والخبرات مع الزملاء يستهلك الوقت

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

15. Academics do not trust e-knowledge sharing to share knowledge *

الأكاديمين لايثقون بنظام مشاركة الخبرات الالكتروني للمشاركة بخبراتهم

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

16. Academics do not use e-knowledge sharing if it is insecure system. *

الأكاديمين لايستخدمون نظام مشاركة الخبرات الالكتروني اذا كان النظام غير آمن

	1	2	3	4	5	
Strongly Disagree لا أوافق بشدة	○	○	○	○	○	Strongly Agree أوافق بشدة

17. Academics do not use e-knowledge sharing because they are not willing to change their

existing routine *

الأكاديمين لايستخدمون نظام مشاركة الخبرات الالكتروني لانهم لايريدون تغير الروتين في العمل

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

18. Lack of familiarity with using technology tools inhibits sharing knowledge *

عدم معرفة التعامل مع الأدوات تقنية يعيق بعض الاكاديمين من مشاركة معلوماتهم عن طريق الموقع الالكتروني المخصص لمشاركة المعلومات

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

19. Departmental superiors are essential for academics in knowledge sharing technology *

من الضروري أن رؤساء الاقسام يشجعون الأكاديمين باستخدام نظام مشاركة الخبرات الالكتروني

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

20. IT support is essential to help academics in e-knowledge sharing *

من الضروري وجود الدعم الفني لان ذلك يساعد الأكاديمين في استخدام نظام مشاركة الخبرات الالكتروني

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

21. Academics use e-knowledge sharing if it is counted as working hours *

الاكاديميون يبادرون بمشاركة معلوماتهم وخبراتهم مع الزملاء عن النظام الالكتروني اذا احتسبت المشاركة من ساعات النصاب في العمل

1 2 3 4 5

Strongly Disagree لا أوافق بشدة ○ ○ ○ ○ ○ Strongly Agree أوافق بشدة

Could provide more factors that affect academic's behaviour toward using e-knowledge sharing system

هل هناك أي عوامل أخرى تؤثر على الأكاديمين لاستخدام نظام مشاركة الخبرات الالكتروني

« Back Submit

100%: You made it.

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Analysis

Using SPSS to provide the percentages of questions' answers

Q1			
	Frequency	Percent	Valid Percent
Strongly Disagree	1	3.3	3.3
Disagree	3	10.0	10.0
Neutral	4	13.3	13.3
Agree	9	30.0	30.0
Strongly Agree	13	43.3	43.3
Q2			
Disagree	1	3.3	3.3
Neutral	6	20.0	20.0
Agree	7	23.3	23.3
Strongly Agree	16	53.3	53.3
Q3			
Neutral	4	13.3	13.3
Agree	4	13.3	13.3
Strongly Agree	22	73.3	73.3
Q4			
Disagree	2	6.7	6.7
Neutral	7	23.3	23.3
Agree	9	30.0	30.0
Strongly Agree	12	40.0	40.0
Q5			
Strongly Disagree	7	23.3	23.3
Disagree	5	16.7	16.7
Neutral	7	23.3	23.3
Agree	9	30.0	30.0
Strongly Agree	2	6.7	6.7
Q6			
Disagree	2	6.7	6.7
Neutral	15	50.0	50.0
Agree	6	20.0	20.0

Strongly Agree	7	23.3	23.3
Q7			
Strongly Disagree	5	16.7	16.7
Disagree	5	16.7	16.7
Neutral	9	30.0	30.0
Agree	7	23.3	23.3
Strongly Agree	4	13.3	13.3
Q8			
Strongly Disagree	1	3.3	3.3
Disagree	1	3.3	3.3
Neutral	5	16.7	16.7
Agree	13	43.3	43.3
Strongly Agree	10	33.3	33.3
Q9			
Strongly Disagree	1	3.3	3.3
Disagree	6	20.0	20.0
Neutral	12	40.0	40.0
Agree	7	23.3	23.3
Strongly Agree	4	13.3	13.3
Q10			
Strongly Disagree	1	3.3	3.3
Disagree	5	16.7	16.7
Neutral	6	20.0	20.0
Agree	9	30.0	30.0
Strongly Agree	9	30.0	30.0
Q11			
Strongly Disagree	1	3.3	3.3
Disagree	1	3.3	3.3
Neutral	4	13.3	13.3
Agree	13	43.3	43.3

Strongly Agree	11	36.7	36.7
Q12			
Strongly Disagree	1	3.3	3.3
Neutral	5	16.7	16.7
Agree	9	30.0	30.0
Strongly Agree	15	50.0	50.0
Q13			
Strongly Disagree	1	3.3	3.3
Disagree	1	3.3	3.3
Neutral	6	20.0	20.0
Agree	7	20.0	20.0
Strongly Agree	15	50.0	50.0
Q14			
Strongly Disagree	4	13.3	13.3
Disagree	5	16.7	16.7
Neutral	12	40.0	40.0
Agree	9	30.0	30.0
Q16			
Disagree	1	3.3	3.3
Neutral	5	16.7	16.7
Agree	11	36.7	36.7
Strongly Agree	13	43.3	43.3
Q16			
Strongly Disagree	1	3.3	3.3
Disagree	3	10.0	10.0
Neutral	11	36.7	36.7
Agree	8	26.7	26.7
Strongly Agree	7	23.3	23.3
Q17			
Strongly Disagree	2	6.7	6.7
Disagree	2	6.7	6.7
Neutral	8	26.7	26.7
Agree	12	40.0	40.0

Strongly Agree	6	20.0	20.0
Q18			
Disagree	2	6.7	6.7
Neutral	4	13.3	13.3
Agree	6	20.0	20.0
Strongly Agree	18	60.0	60.0
Q19			
Neutral	2	6.7	6.7
Agree	5	16.7	16.7
Strongly Agree	23	76.7	76.7
Q20			
Disagree	5	16.7	16.7
Neutral	3	10.0	10.0
Agree	6	20.0	20.0
Strongly Agree	16	53.3	53.3

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Expect Reward	30	4.00	1.145	.209
Enjoyment	30	4.27	.907	.166
Outcome Expectation	30	4.60	.724	.132
Self -Efficacy	30	4.03	.964	.176
Fear of Loses	30	2.80	1.297	.237
Trust in others	30	3.60	.932	.170
Mandatory	30	3.00	1.287	.235
Easy to Use	30	4.00	.983	.184
Attractive Interface	30	2.87	1.008	.190
Knowledge Rating	30	3.67	1.184	.216
Usefulness	30	4.07	.980	.179
Usefulness	30	4.23	.971	.177
Time	30	4.10	1.062	.194
Trust in Technology	30	3.87	1.008	.184
Security	30	4.10	.923	.168
Compatibility new technology	30	3.57	1.073	.196
Unfamiliarity with IT	30	3.60	1.102	.201
Leadership	30	4.33	.959	.175
IT assistance	30	4.70	.596	.109
Working Hours	30	4.10	1.155	.211

One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Expect Reward	4.785	29	.000	1.000	.57	1.43
Enjoyment	7.648	29	.000	1.267	.93	1.61
Outcome Expectation	12.105	29	.000	1.600	1.33	1.87
Self- Efficacy	5.869	29	.000	1.033	.67	1.39
Fear of Loses	-.844	29	.405	-.200	-.68	.28
Trust in others	3.525	29	.001	.600	.25	.95
Mandatory	.000	29	1.000	.000	-.48	.48
Easy to Use	5.574	29	.000	1.000	.63	1.37
Attractive Interface	-.724	29	.475	-.133	-.51	.24
Knowledge Rating	3.084	29	.004	.667	.22	1.11
Usefulness	5.960	29	.000	1.067	.70	1.43
Usefulness	6.954	29	.000	1.233	.87	1.60
Time	5.674	29	.000	1.100	.70	1.50
Trust in Technology	4.709	29	.000	.867	.49	1.24
Adequate Knowledge	6.528	29	.000	1.100	.76	1.44
Compatibility with New Technology	2.894	29	.007	.567	.17	.97
Unfamiliarity with IT	2.983	29	.006	.600	.19	1.01
Leadership	7.616	29	.000	1.333	.98	1.69
IT assistance	15.624	29	.000	1.700	1.48	1.92
Working Hours	5.216	29	.000	1.100	.67	1.53

Appendix D

Academics' Questionnaire (English Version)

(English version)

Rubric:

The purpose of this questionnaire is to confirm existing factors that influence academics' behaviour toward using e-knowledge sharing. Investigating the factors will assist in building electronic systems for knowledge sharing among academics in different campuses who have common interests. I would appreciate your responses to the following questions. Your information will be used for this research purpose only. Thank you very much for your time in completing this questionnaire.

1. Gender
   - Male
   - Female

2. Work experience in academic teaching
   - Just started
   - Less than 2 years
   - 2-5 years
   - 6-10 years
   - More than 10 years

3. Qualification
   - Bachelor
   - Master
   - PhD
   - Other

   (Please specify_____)

4. Have you shared you knowledge with colleagues in the University
   - Yes

□No

To what extent do you agree with the following factors	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Using e-knowledge sharing will help me accomplish tasks quickly					
2. Using e-knowledge sharing will improve the quality of my performance.					
3. I will use e-knowledge sharing to share my knowledge because I expect a reward from department.					
4. I will use e-knowledge sharing to share my knowledge because I will receive additional points for promotion.					
5. I will use e-knowledge sharing because I would like to engage in a bilateral exchange.					
6. I will use e-knowledge sharing to acquire new experience.					
7. I will use e-knowledge sharing to share my knowledge when I have valuable knowledge.					
8. I will use e-knowledge sharing to share my knowledge, if I have high-level knowledge.					
9. I will use e-knowledge sharing if it is easy to find what I want					
10. I will use e-knowledge sharing if it is easy to connect with colleagues who have a common interest					
11. I will use e-knowledge sharing if there are no technical problems with accessing it.					
12. I will use e- knowledge sharing because it is enjoyable work.					
13. It feels good to help other members of the academic community by using e-knowledge sharing.					
14. I trust the knowledge shared by academics in an e-knowledge sharing system.					
15. I will use e-knowledge sharing when I trust the system.					
16. Rating knowledge by users is important to identify valuable information that is available in the system.					
17. I will use e-knowledge sharing if there is a rating knowledge technique in the system.					

18. I will not use e-knowledge sharing because it is incompatible with my work.					
19. I will use not e-knowledge sharing because I do not have time.					
20. I will not use e-knowledge sharing because it needs additional time to be spent answering follow up questions.					
21. I will use e-knowledge sharing if it is counted as working hours.					
22. I will use e-knowledge sharing if it is a part of my job.					
23. I will use e-knowledge sharing if my superiors support me in sharing it.					
24. I will use e-knowledge sharing if my superiors say it will improve my performance evaluation.					
25. I will use e-knowledge sharing to communicate with colleagues who are important to me.					
26. Academic who influence my behaviour encourage me to use e-knowledge sharing.					
27. E-knowledge sharing is my favourite way to share the knowledge that I have.					
28. E-knowledge sharing is worthwhile.					
29. I like to use e-knowledge sharing to share my knowledge with colleagues.					
30. In the future I will use my knowledge in e-knowledge sharing.					
31. I intend to use e-knowledge sharing.					
32. I will make an effort to use e-knowledge sharing.					

Arabic online version

النظام الالكتروني لمشاركة الخبرات بين الأكاديميين في الجامعات السعودية

الهدف من الإستبيان هوالتأكد من المؤثرات التي تؤثر على الكاديمين في استخدام النظام الالكتروني لمشاركة المعلومات بين الاكاديميين. معرفة أراء الاكاديميين حول المؤثرات الفعاله التي تساعد في بناء نظام الكتروني لمشاركة الخبرات بين الأكاديميين و يساعدهم على الاتصال بالاكاديميين من نفس التخصص في الفروع الأخرى من الجامعة.
أقدر لكم حسن تعاونكم

Required *

1- الجنس *

- ذكر
- أنثى

2- سنوات الخبره في التدريس *

- مبتدئ
- أقل من سنتين
- بين سنتين و 5 سنوات
- بين 6 و 10 سنوات
- أكثر من 10 سنوات
- Other:

3- المستوى التعليمي *

- Bachelor بكالوريوس
- Master الماجستير
- PhD الدكتوراه
- Other:

4- هل سبق وشاركت بخبراتك مع زملائك الاكاديمين *

- نعم
- لا

إلى أي مدى توافق الرأي في التالي *

	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
سأستخدم نظام مشاركة المعلومات الإلكتروني لأنه يسهل الوصول	○	○	○	○	○

للمعلومة التي أحتاجها					
وجود نظام مشاركة المعلومات الإلكتروني بين الأكاديميين سيساعد في انجاز المهام بطريقة أسرع	○	○	○	○	○
وجود نظام مشاركة المعلومات الإلكتروني بين الأكاديميين سيطور من جودة أداء الاكاديميين	○	○	○	○	○
الية تقييم المعلومة في النظام الالكتروني لمشاركة المعلومات سيساعد على ايجاد المعلومة القيمة في النظام	○	○	○	○	○
سأستخدم النظام الإلكتروني لمشاركة المعلومات اذا كان هناك الية لتقييم المعلومة	○	○	○	○	○
سأستخدم نظام مشاركة المعلومات الإلكتروني إذا لم يوجد مشاكل تقنية بالنظام	○	○	○	○	○
إنشاء نظام مشاركة المعلومات الإلكتروني يسهل للأكاديميين التواصل مع الأكاديميين في ذات التخصص	○	○	○	○	○
سأستخدم نظام مشاركة المعلومات الإلكتروني إذا لم يوجد مشاكل تقنية	○	○	○	○	○

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	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني إذا كانت الجامعة ستكافئني	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني إذا كانت المشاركة تساعد في ترقيتي الوظيفية	○	○	○	○	○
سأستخدم نظام مشاركة المعلومات الالكتروني لتبادل الافكار مع الأكاديميين	○	○	○	○	○

سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني لأني سأكتسب خبرة جديدة	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني لأني أمتلك معلومات قيمة	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني لأن لدي ثقة في القدرة على دعم الأخرين بمعلوماتي	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات لأنه عمل ممتع	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات لأنه من الجيد مساعدة الأخرين	○	○	○	○	○

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	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات إذا حصلت على دعم من رئيس القسم	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات إذا كان رئيس القسم سيحسن تقييم إدائي	○	○	○	○	○
سأشارك بخبراتي من خلال نظام مشاركة المعلومات مع الأكاديميين ذوي الأهمية	○	○	○	○	○
مشاركة الأكاديميين للنظام ستؤثر ايجابيا للمشاركة بخبراتي من خلال النظام	○	○	○	○	○

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	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
سأشارك بخبراتي من خلال نظام مشاركة	○	○	○	○	○

المعلومات بين الأكاديميين لأنني أثق بالنظام					
المعلومات التي شارك بها الأكاديميين من خلال نظام مشاركة المعلومات الإلكتروني من الممكن الوثوق بها	○	○	○	○	○
سأستخدم نظام مشاركة المعلومات إذا كان النظام آمن	○	○	○	○	○
سأمتنع عن استخدام نظام مشاركة المعلومات الإلكتروني لأنه لايتوافق مع طريقة عملي	○	○	○	○	○
Row 5	○	○	○	○	○

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	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
سأمتنع عن مشاركة خبراتي عن طريق نظام مشاركة المعلومات الإلكتروني لأنه ليس لدي وقت	○	○	○	○	○
سأمتنع عن مشاركة خبراتي عن طريق نظام مشاركة المعلومات الإلكتروني لأنه يحتاج وقت إضافي لإجابة أسئلة الزملاء	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني إذا كانت ستحسب من ساعات عملي	○	○	○	○	○
سأشارك بخبراتي مع الأكاديميين من خلال نظام مشاركة المعلومات الالكتروني إذا كانت جزء من عملي	○	○	○	○	○

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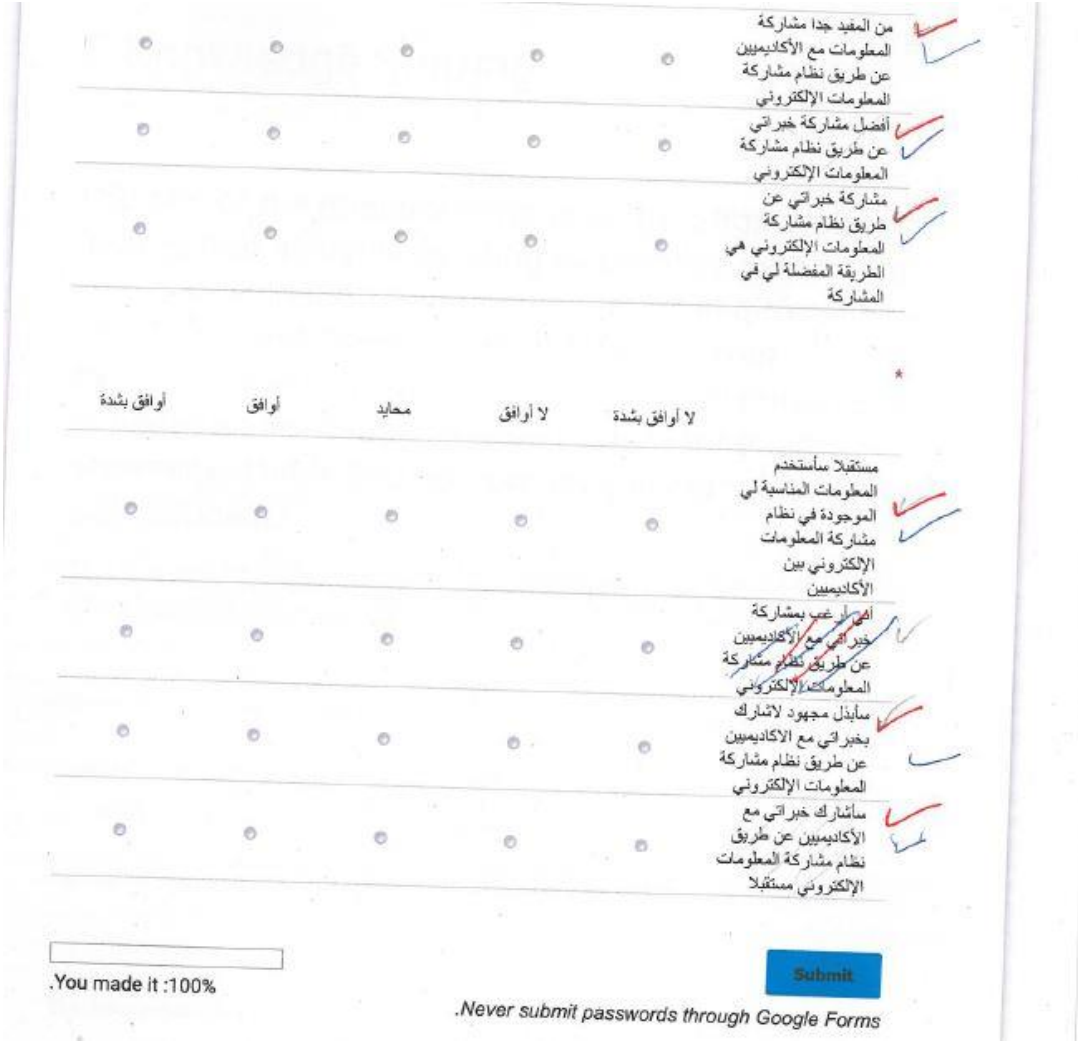
	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
أفضل طريقة لمشاركة خبراتي مع الأكاديميين هي عن طريق نظام مشاركة المعلومات الإلكتروني	○	○	○	○	○



	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
من المفيد جدا مشاركة المعلومات مع الأكاديميين عن طريق نظام مشاركة المعلومات الإلكتروني					
أفضل مشاركة خبراتي عن طريق نظام مشاركة المعلومات الإلكتروني					
مشاركة خبراتي عن طريق نظام مشاركة المعلومات الإلكتروني هي الطريقة المفضلة لي في المشاركة					

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	لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
مستقبلا سأستخدم المعلومات المناسبة لي الموجودة في نظام مشاركة المعلومات الإلكتروني بين الأكاديميين					
أنا راغب بمشاركة خبراتي مع الأكاديميين عن طريق نظام مشاركة المعلومات الإلكتروني					
سأبذل مجهود لاشارك بخبراتي مع الاكاديميين عن طريق نظام مشاركة المعلومات الإلكتروني					
سأشارك خبراتي مع الأكاديميين عن طريق نظام مشاركة المعلومات الإلكتروني مستقبلا					

.You made it :100%

Submit

.Never submit passwords through Google Forms

Analysis

The questionnaire data were then analysed using the SPSS software and the hypothesis was tested using the One-Sample T-test in the test value 3

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Perceived easy to use 1	74	4.28	.884	.103
Perceived easy to use 2	74	4.28	.929	.108
Perceived of usefulness 1	74	4.08	.947	.110
Perceived of usefulness 2	74	4.14	.816	.095
IT support 1	74	4.24	1.004	.117
Outcome expectations 1	74	3.68	1.160	.135
Outcome expectations 2	74	3.97	1.072	.125
Outcome expectations 3	74	4.34	.848	.099
Outcome expectations 4	74	4.28	.914	.106
Self- efficacy 1	74	3.82	.912	.106
Self- efficacy 2	74	4.08	.918	.107
Enjoyment in using system 1	74	3.88	1.006	.117
Enjoyment in using system 2	74	4.36	.872	.102
Leader 1	74	3.43	1.086	.126
Leader 2	74	3.41	1.181	.137
Subjective norm 1	74	3.42	1.194	.139
Subjective norm 2	74	4.19	.839	.097
Trust Technology 1	74	3.69	.920	.107
Trust Technology 2	74	3.95	1.121	.130
Knowledge Rating 1	74	4.12	.921	.107
Knowledge Rating 2	74	4.22	.969	.113
Compatibility with New Technology	74	3.97	1.033	.120
Time1	74	3.76	.904	.105
Time2	74	3.66	.955	.111
Working hours 1	74	3.43	1.160	.135
Working hours 2	74	3.45	1.184	.138
Behavioural Intention 1	74	3.59	.920	.107
Behavioural Intention 2	74	3.96	.801	.093
Behavioural Intention 3	74	3.72	.929	.108
Intention to use 1	74	4.01	.785	.091
Intention to use 2	74	3.99	.868	.101
Intention to use 3	74	3.91	.894	.104

One-Sample Test

	Test Value = 3					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Perceived easy to use 1	12.493	73	.000	1.284	1.08	1.49
Perceived easy to use 2	11.884	73	.000	1.284	1.07	1.50
Perceived of usefulness 1	9.817	73	.000	1.081	.86	1.30
Perceived of usefulness 2	11.962	73	.000	1.135	.95	1.32
IT support 1	10.650	73	.000	1.243	1.01	1.48
Outcome expectations 1	5.011	73	.000	.676	.41	.94
Outcome expectations 2	7.805	73	.000	.973	.72	1.22
Outcome expectations 3	13.564	73	.000	1.338	1.14	1.53
Outcome expectations 4	12.077	73	.000	1.284	1.07	1.50
Self- efficacy 1	7.775	73	.000	.824	.61	1.04
Self- efficacy 2	10.131	73	.000	1.081	.87	1.29
Enjoyment in using system 1	7.510	73	.000	.878	.65	1.11
Enjoyment in using system 2	13.289	73	.000	1.356	1.15	1.56
Leader 1	3.424	73	.001	.432	.18	.68
Leader 2	2.953	73	.004	.405	.13	.68
Subjective norm 1	3.019	73	.003	.419	.14	.70
Subjective norm 2	12.197	73	.000	1.189	.99	1.38
Trust Technology 1	6.441	73	.000	.689	.48	.90
Trust Technology 2	7.257	73	.000	.946	.69	1.21
Knowledge Rating 1	10.478	73	.000	1.122	.91	1.33
Knowledge Rating 2	10.797	73	.000	1.216	.99	1.44
Compatibility with New Technology	8.100	73	.000	.973	.73	1.21
Time1	7.203	73	.000	.757	.55	.97
Time2	5.966	73	.000	.662	.44	.88
Working hours 1	3.208	73	.002	.432	.16	.70
Working hours 2	3.241	73	.002	.446	.17	.72
Behavioural Intention 1	5.557	73	.000	.595	.38	.81
Behavioural Intention 2	10.300	73	.000	.959	.77	1.15
Behavioural Intention 3	6.630	73	.000	.716	.50	.93
Intention to use 1	11.106	73	.000	1.014	.83	1.20
Intention to use 2	9.778	73	.000	.986	.79	1.19
Intention to use 3	8.713	73	.000	.905	.70	1.11

Appendix E

Questionnaire for Evaluation Study

An E-knowledge Sharing Adoption Model in Saudi Arabia in Higher Education

We would like to invite you to participate in a study to investigate the factors that influence Saudi academics' behaviour toward using e-knowledge sharing systems.

An e-knowledge sharing system is a web application inter-university system which allows Saudi academics to create, store, share and reuse a variety of data and knowledge. Using e-knowledge sharing system allows academics to share their data and knowledge with colleagues who are located in different geographical areas in the same university but have common areas of interest. Data is documents uploaded in the system, such as slides and past exam papers, whereas knowledge is mix of information obtained from experience, for example your knowledge could be shared as feedback on conference participation, through uploaded documents or in discussion forum. The discussion forums available in the system allow academics to share their common problems, areas of concern and experience with colleagues.

The results of this study will provide an empirical evidence regarding to what extent e-knowledge sharing system is accepted by academics in Saudi Arabia which would support the development of such electronic systems on Saudi universities.

This research is under direction of the School of Electronic and Computer Science, University of Southampton. I would appreciate your responses to the following questions. Your information will be used for this research purpose only and your responses are voluntary and will be confidential. Individual responses will not be identified. All responses will be compiled together and analysed as a group. It should take about five minutes of your time. Thank you very much for your time in completing this questionnaire.

If you have any questions or concerns, please contact the researcher or supervisors.

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Gary Wills: gbw@ecs.soton.ac.uk

Richard Crowder: rmc@ecs.soton.ac.uk

Would you like to take part in this research?

❒ Yes, I agree to take part in this research and I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected.

❒ No, I disagree

Part I: Demographic information

1. What university do you work in?

   …….

2. What faculty do you work in?

   …….

3. Highest qualification
   - ❒ Bachelor
   - ❒ Masters
   - ❒ PhD
   - ❒ Other

(Please specify…….)

4. Have you worked in an administrative position?
   - ❒Yes (go to Q.5)
   - ❒No (go to Q. 7)

5. What administrative position do you work in, or have you worked in?

   - ❒Head of Department
   - ❒Researcher in the university
   - ❒ Other

(Please specify…….)

6. Work experience in administrative position
   - ❒ Less than 2 years
   - ❒ 2-5 years
   - ❒ 6-10 years
   - ❒ More than 10 years

7. Work experience in academic teaching
   - ❒Just started
   - ❒ Less than 2 years
   - ❒ 2-5 years
   - ❒ 6-10 years
   - ❒ More than 10 years

8. Gender

❒Male

❒Female

9. Your Age

❒Under 25

❒25-29

❒30-34

❒35-39

❒40-44

❒Over 44

Part II: Internet usage information

10. How many years you have been using the Internet

❒Just started

❒ Less than 2 years

❒ 2-5 years

❒ 6-10 years

❒ More than 10 years

11. How would you rate your own computer abilities?

❒ Weak

❒ Fair

❒ Good

❒ Excellent

12. How do you estimate the daily average amount of time spent on the Internet, in your workplace, to support your duties

❒Less than 15 minutes

❒16-30 minutes

❒31-60 minutes

❒Between 1 and 2 hours

❒Over 2 hours

13. How do you estimate the daily average amount of time spent on the Internet, in your home, to support your duties

❒Less than 15 minutes

❒16-30 minutes

❒31-60 minutes

❒Between 1 and 2 hours

❒Over 2 hours

Part III: Knowledge sharing information

14. Have you shared your knowledge of your field with colleagues in your University

❒Yes (go to Q. 15)

❒No (go to **part IV**)

15. What methods have you used to share knowledge with colleagues in your University (you can select more than one)

❒ CD

❒ E-mail

❒ Seminar

❒ Informal chatting

❒ Other

(Please specify…….)

Part IV: To what extent do you agree with the following statements?

	S. A	**A**	**N**	**Dis. A**	**S. Dis. A**
16. Using an e-knowledge sharing system will help me accomplish tasks quickly					
17. Using e-knowledge sharing will improve the quality of my performance.					
18. I will use e-knowledge sharing to share my data and knowledge because I expect a reward from the department.					
19. I will use e-knowledge sharing to share my data and knowledge because I will receive additional points for promotion.					
20. I will use e-knowledge sharing because I would like to engage in a beneficial exchange.					
21. I will use an e-knowledge sharing system to share my data and knowledge when I have valuable knowledge in my field.					
22. I will use an e-knowledge sharing system if it is easy to find the data and knowledge that I need.					
23. I will use an e-knowledge sharing system if it is easy to connect with colleagues who have a common interest.					
24. I will use an e-knowledge sharing system if there are no technical problems with accessing it.					
25. I will use e-knowledge sharing system if there is an IT assistance to support me					
26. Using e-knowledge sharing system will be new experience for me. Ex-use					

27.	I will use an e-knowledge sharing system if I can obtain more data and knowledge from the system than from the existing methods. prac-use					
28.	I will use an e-knowledge sharing system if the system does not require significant changes to my existing routines. Prac-ease					
29.	I will use an e-knowledge sharing system if the system is compatible with my past computer experience. Exp-eas					
30.	I will **NOT** use e-knowledge sharing system because the system is not appropriate to conduct my job val-use					
31.	I will use an e-knowledge sharing system if data and knowledge are accessible at any time to authorised users.					
32.	I will use an e-knowledge sharing system if data and knowledge are protected from unauthorised access.					
33.	I will use an e-knowledge sharing system if the data and knowledge are in their original form and unauthorised modification will be prevented.					
34.	I will use an e-knowledge sharing system if users have to authenticate to access to the system, e.g. user ID and password.					
35.	I will use an e-knowledge sharing system only if the user, who has a common interest, is authorised by the system to access my data and knowledge.					
36.	I will use an e-knowledge sharing system if the system includes digital signatures. (a digital code is attached to an electronically shared document to verify its contents and the sender's identity)					
37.	I will use an e-knowledge sharing system if I have the ability to control the future use of my data and knowledge.					
38.	I will use an e-knowledge sharing system if my data and knowledge will be shared with others with my consent.					
39.	Knowledge rating in an e-knowledge sharing system is important because ratings will reflect the worth of the knowledge.					
40.	I will use e-knowledge sharing because I believe it will save time when data and knowledge is available on the system.					
41.	I will **NOT** use e-knowledge sharing because I believe it will need additional time to be spent answering follow-up questions from others.					
42.	I will use an e-knowledge sharing system because using existing methods to share my knowledge is time-consuming.					
43.	I will an use e-knowledge sharing system if the time spent in using the system is included in working hours					
44.	I will use e-knowledge sharing system if it is a part of my job.					

45. My manager's support is important to me to use an e-knowledge sharing system.					
46. I will use an e-knowledge sharing system to communicate with colleagues who are important to me.					
47. Use of an e-knowledge sharing system by academics who influence my behaviour will encourage me to use the system.					
48. I like the idea of using an e-knowledge sharing system.					
49. I believe an e-knowledge sharing system would become worthwhile.					
50. I will use e- knowledge sharing system if it is an enjoyable system to use.					
51. An e-knowledge sharing system may become my favourite way to share data and knowledge that I have.					
52. In the future, I expect to put my data and knowledge into an e-knowledge sharing system.					
53. I intend to use an e-knowledge sharing system.					
54. I will make an effort to use an e-knowledge sharing system.					

The conceptual model in AMOS

(Structural Equation Modelling) before removing items with low Standardized factor loading