Adoption of Web based Knowledge Sharing Systems amongst Academic Staff

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Abstract- **Knowledge sharing has been considered a significant component of success in Knowledge Management (KM). However, in most organizations KM is often inadequate when it comes to knowledge sharing. In order to encourage knowledge sharing using Web technology, it is important to know why staff do or do not use web based knowledge sharing systems (WKSS), when communicating internally and sharing knowledge via Web technology, and when and where this happens. Very few models have paid attention to examining user acceptance of omitting WKSS specifically in the academic context; therefore, the purpose of this research is to investigate the factors that affect academics' behavior in accepting the use of WKSS. The WKSS model which has been developed model, and uses as its core the Unified Theory of Acceptance and Use of Technology (UTAUT), involving performance expectancy, effort expectancy and social influences. Minor changes in these factors are adopted, to enhance our understanding of WKSS acceptance and usage and additional factors are synthesized, which are trust in the technology and time expended. User acceptance of the developed WKSS model was tested and all the factors were confirmed.**

Index Term–Knowledge management, Knowledge sharing technology, Web based Knowledge Sharing System (WKSS), Unified Theory of Acceptance and Use of Technology (UTAUT).

I. INTRODUCTION

Over the last few years, the majority of the largest global corporations have knowledge management (KM) systems to support their development and growth [1]. It is widely recognized that organizations benefit by establishing an appropriate knowledge management system to increase their efficiency. The main activities in KM [2] are acquiring, sharing, and storing the knowledge. It is recognized that the most crucial activity of all is knowledge sharing since most knowledge is held as tacit knowledge by individuals [3].

However, KM is often inadequate when it comes to knowledge sharing, especially among staff [4]. Thus, where there is no knowledge sharing mechanism among staff novice staff are unable to capture valuable information. This can affect staff performance, when tacit knowledge from experts is often lost, as such knowledge has not been made explicit (codified) which may result in a poorer employees experience and lower staff achievement.

This paper is structured as follows. Sections II and III provide additional background to the work. The conceptual model that is used to understand knowledge sharing in universities in Saudi Arabia describes in section IV. Then the research methods explains in section V. Section VI presents and discusses the result followed by the conclusion in Section VII.

II. PROBLEM STATEMENT

Most universities in Saudi Arabia are structured in campuses, although geographically dispersed, each campus having a group of related schools with their associated majors and research projects. Thus, universities need to implement a system to provide facilities for communicating among geographically dispersed academics, who have common interests. However, The Universities are lacking in management technology systems for the academic process. Consequently, the tacit knowledge of expert academics is lost, as the knowledge has not been documented. Thus, the novice academics are unable to use useful information, as no knowledge has been shared among academic staff. There are few studies regarding the academics perspective on using WKSS [5] in Saudi Arabia universities. The majority of existing studies are conducted in international commercial organizations. The aim of this research is to investigate factors that influence academics' behavior toward using web based knowledge sharing system (WKSS).

III. LITERATURE REVIEW

A. Knowledge Sharing

Knowledge sharing is a mutual relationship between a sender, who provides knowledge, and receivers, who are seeking knowledge, in which exchange of information gained from experiences is used to support an individual who is working towards a common goal [6]. According to Allameh et al., [7], sharing and distributing knowledge is positively linked to knowledge management, and knowledge sharing is based on individual behavior, as people do not accept the value of sharing knowledge unless they think it is important. Thus, changing people's behavior is the challenge in KM [8] and knowledge sharing behavior is the central process of KM.

Knowledge sharing behavioral is typically affected by certain factors, either positively or negatively, hence this research focuses on knowledge sharing using Web technology behavioral factors.

B. Web-Based Knowledge Sharing Systems

In the last few decades, technology represents a highly visible solution while information technology provides direct assistance in the processes of KM [9]. Web technology is the most effective technology used in KM [10]. Web technology is based on a particular set of technologies enabling users to interact and collaborate with each other in social media: it can be termed the 'Social Web', as it incorporates a strong social component [11]. The key to using web technology for KM 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. Communicating internally and sharing knowledge via a Web which is known as the Intranet is becoming the most commonly used technique in many organizations [12].

According to Tiwana and Ramesh [13], an intranet is highly appropriate for use as a tool within the domain of KM in organizations, due to its ability to support distribution among staff, connectivity and publishing and to maintain communication among employees and facilitate working. Intranets can be used for two main functions: as locations where knowledge is shared by employees, and where employees may seek out and retrieve knowledge [14]. These mechanisms enable employees to communicate via the intranet and use it as an information-sharing system. Using an intranet for knowledge sharing can be via social networks or as a specific internal website.

The success of the implementation of an intranet portal for knowledge sharing among academics is dependent on academics adopting the new technology. Many studies concerning the adoption of various systems have utilized technology acceptance models. Users' acceptance is typically affected, either positively or negatively, by certain factors that influence individual behavior. Hence, this study will identify factors that influence Saudi academics' behavior towards using WKSS, where the term WKSS means using an Intranet for knowledge sharing purposes. Thus, the next sections provide a review of basic theory that have been used to examine individual acceptance of using new technology in knowledge sharing purpose.

C. The Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. [15] introduced four core determinants of intention and usage. The four factors that have direct influence on user acceptance and usage behavior, which are: performance expectancy, effort expectancy, social influence, and facilitating conditions.

UTAUT is considered to be the most appropriate model for this study because this model has been introduced by testing and integrating different models in regard to adoption of technology in different purposes; these models are: the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), Diffusion of Innovations Theory (DOI), the Motivational Model (MM), Model of PC Utilization (MPCU), and Social cognitive theory (SCT) [15].

Most studies have reported that there are relationships between the construct elements of UTAUT and users' acceptance of using information technology [16] [17]. Thus, UTAUT can help researchers to give explanations regarding end users' acceptance of WKSS.

IV. THE CONCEPTUAL MODEL

Previous authors have synthesized factors affecting knowledge sharing; some of these factors already exist, in previous models, while other factors, such as trust in knowledge technology and time expended that are not included. Overall, based on researchers' reviews and the Unified Theory of Acceptance and Use of Technology (UTAUT), a model for adoption of Web based Knowledge Sharing Systems (WKSS model) was developed, as shown in Figure 1.

A. Performance Expectancy

Performance expectancy is defined as the extent to which using WKSS will help a member of staff improve his or her performance. The factor consists of three sub-factors; perceived usefulness, outcome expectation performance, and self-efficacy.

According to Davies [18], individuals tend to use an electronic system when they believe that using the system will help in improving their ability to do their job. It has been confirmed that the perceived usefulness factor has a strong impact on e-learning success [19]. Similarly, in the present study it was found that staff are more likely to use a WKSS if they feel that it is useful for transferring their knowledge.

According to the UTAUT model, outcome expectation has a direct effect on behavioral 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 behavioral [20].
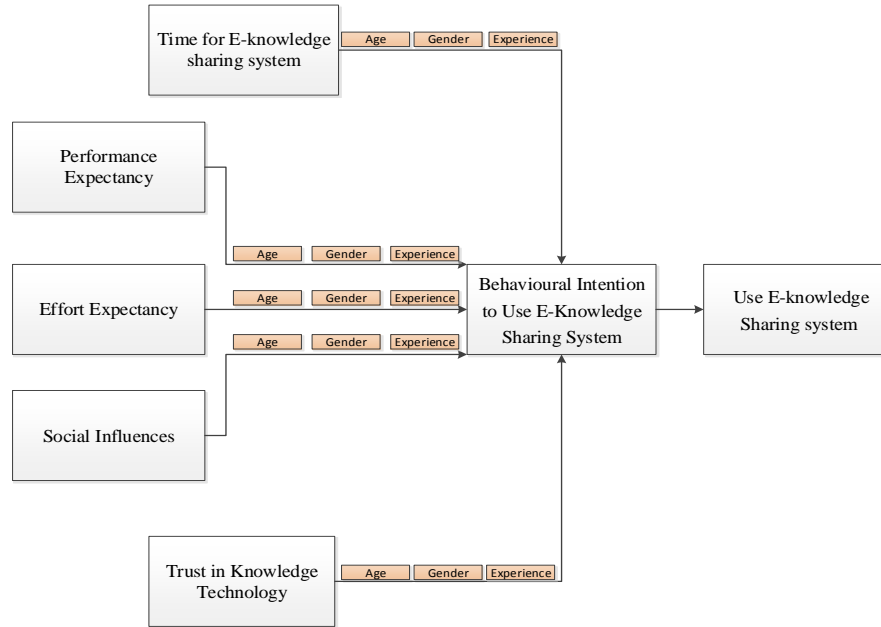
Figure 1model of the Adoption Web based Knowledge Sharing systems (WKSS)

Effort Expectancy is defined as the degree of ease associated with the use WKSS. This factor consists of sub-factors: perceived ease of use and IT support

Perceived ease of use has been found plays a key role in investigating individual acceptance of a new technology [21] and [22]. The most widely applied model of user acceptance and usage is TAM [22]. Studies, such as those by Lin et al [23] and Al-Sobhi et al [24], examined the factor and found evidence that this factor is strongly correlated with intention to use and the acceptance of information technology. Thus, in order to encourage staff to adopt online services, an organization needs to provide a budget to build a strong technical infrastructure [25].In addition, IT support or "Knowledge Engineers" provide direct assistance in the processes and circumstances of creating knowledge [26], and, thus, 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 changing tools of the system, there is continual improvement, so users need 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 new technology and how to use it.

C. *Social Influences*

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

B. *Effort Expectancy*

UTAUT emphasizes that the subjective norm is one of the social influences that has a significant effect on individual behavior, because of employees' exposure to social pressure to use or not to use the system.

According to some studies, a team's expertise is more highly developed when there is a leader controlling the team in regard to knowledge sharing technology and providing good quality new ideas and encouraging staff to use knowledge sharing technology [27] and [28]. Thus, leadership has been found to have an influence on employees' use of the WKSS.

D. *Trust in Knowledge Technology*

Trusting knowledge technology is defined as the belief of the academic staff in the reliability of the system for knowledge sharing. The factor consists of two sub-factors: trust in the knowledge technology and compatibility with the new technology. Although this factor is excluded in UTAUT, the author believes that the degree of trust knowledge technology has a direct effect on the behavioral intention of academics, as has been confirmed by some studies. According to Norizah et al. [29], trust is one of the most important factors in the use of WKSS in higher education institutions, and another study [30] examining staff behavioral intention toward knowledge sharing via Web technology also confirmed this relationship. Chen and Hung [31], also found that trustworthiness has a significant effect on practices in transferring knowledge in the virtual community.

Compatibility with new technology is a factor that influences 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 [32]. So this factor is incorporated in the developed WKSS mode.

E. Time Expended

Time expended is defined as the academic's belief that using WKSS is non-time-consuming while information is available on the online system. Ford and Staples [21] examined the influences of time on the 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. Haldin-Herrgard [33] also claim that time is one of the barriers to knowledge sharing in organizations, as adding information to the system is time consuming. There is very little research examining time as a reason for using or not using WKSS sharing, and time must thus be considered as a factor in this area [32]. However, the authors' opinion is that knowledge sharing is definitely time-saving, once the information is available in the system. Thus, staff can reach valuable information that has been previously placed in the system more quickly, rather than searching in other extensive sources.

V. RESEARCH METHODOLOGY

In this research, different perspectives are required to reach the goals of the study. Therefore a mixed methodology within the framework of triangulation was used to investigate the factors for using WKSS in Saudi universities; the design of the research process is shown in Figure 2. In order to refine and confirm the proposed model for use WKSS model, the author decided to apply two different types of methods in this study, which are theoretical and methodological methods, as many studies that reported using UTAUT actually made only partial use of it, utilizing only a some of the constructs, in order to adapt to a situation in a case study [34, 35 and 36].
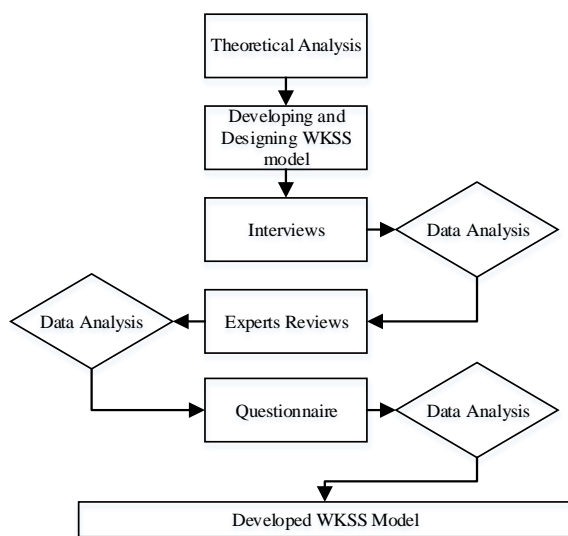

Figure 2 Research Methods

Moreover, in the previous studies examined, other acceptance factors were used, not only the factors described in the UTAUT model, and in the results these factors were shown also have influence on the adoption and use of new systems for e-knowledge sharing.

Therefore, the authors believe that other determinants affecting the adoption of WKSS should be included in this study. Thus, the theoretical method of this study includes using the partial UTAUT model together with factors gathered in previous studies in the development of a set of factors influencing the use of knowledge sharing technology. The findings from [34, 35 and 36] confirmed the effectiveness of the factors influencing behavioral intention to use WKSS.

The methodology in this research involved using three methods: interviews, expert reviews, and questionnaires. The data were gathered from semi-structured interviews which included both closed and open questions, conducted with ten Saudi academics, experts or novices, from different Saudi universities and departments, in different locations. The purpose of conducting these interviews was to assist the authors in identifying affecting factors that were unstated in previous studies. Data was also gathered from expert reviews, which were conducted as self-administrated questionnaires, in order to refine and revise the factors that emerged from interviews. The respondents were thirty Saudi academics who were working as Heads of Schools or departments. In addition, the data were gathered from online, self-administered questionnaires, in order to confirm the refined model, which includes factors derived from the theories and from expert reviews. The respondents were 74 Saudi academics in universities in the Eastern region of Saudi Arabia.

VI. RESULTS, DISCUSSION AND IMPLICATIONS

This section discusses the findings and summary of results of interviews, expert reviews and the questionnaire conducted with academics, in order to investigate factors affecting use of WKSS among academics in Saudi universities.

A. Findings Regarding Technology Acceptance Factors

The academics demonstrated mixed opinions in their responses. They reported that they 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 their university's online systems, while the same percentage said they never face difficulties in using web technology. More than 50% percent of the respondents reported that they always find web technology a useful resource in academic teaching, although 50% of the academics sometimes do not have time to use the university website during working hours. However, only half of the respondents reported that they always use social networks and share their knowledge. The answers of interviewees indicated that there is a positive attitude towards adopting a WKSS, in that none of the respondents disagreed or strongly disagreed with the statements regarding the importance of WKSS. Also,

generally, these academics agreed with the reasons for using WKSS 80% of respondents strongly agreed that a WKSS provides an easier way to contact experts than traditional ways, such as telephone and e-mail, and also that the system is more accessible. The findings showed that all the academics preferred to use a WKSS rather sharing printed documents.

Nevertheless, in the interviews, all the academics disagreed with the use of social networks (SN) or Wiki platforms as intranet applications for knowledge sharing purposes, although the researcher clarified the usefulness of a Wiki platform and K-blog. The reasons they gave for disagreeing with the use of Wiki and SN are their slight inconvenience, while, in the interviews, 40% of the academics claimed that they never use any SNs, either in or outside work. The reasons for disagreeing with the use of SNs are that these types of webpages are too informal to use in the universities, and Wiki is difficult to use and is not attractive because it includes too much text, despite the finding from expert reviews that an attractive interface system is not important.

In addition, academics showed dissatisfaction with the methods of transferring knowledge used in their universities and said that they wished to improve tools for knowledge sharing via Web technology in their universities. High levels of agreement were found for preferring to use a WKSS rather than knowledge sharing by traditional ways, such as printed documents, CDs and e-mail.

B. Knowledge sharing Attitudes

A positive indication of the attitude to knowledge sharing 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 respondents 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 academics strongly agreed that transferring knowledge between academics would improve academic performance. moreover, the results suggest that universities should facilitate a favorable environment for academics in the knowledge sharing area, as 80% of respondents agreed that novices struggle without knowledge sharing by experts and 60% 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 toward using knowledge sharing, where 80% of respondents declared in the interviews that they had used knowledge sharing among colleagues in different ways. The questionnaire also revealed that 75% of the academics had used knowledge sharing in their universities.

From the analysis of the qualitative data in the interviews, most of the influential factors suggested by these academics are those that already exist in the WKSS model constructed from theories and previous studies. However, other factors emerged in the interviews that are not mentioned in the model. These factors are divided in two categories: motivation and barriers. The motivation factors are: mandatory use of WKSS; the system having an attractive interface; a knowledge rating technique; a highly secure system and counting time spent in WKSS as working hours. The barriers are that some academics fear that they will lose their own position while some are unfamiliar with the Web technology. The inferential analysis of participants' responses to the expert reviews, confirmed three motivating factors that emerged from the interviews. These factors are: a highly secure system, knowledge rating and working hours.

Most of the experts agreed that a secure system will encourage academics to use a WKSS; as a secure system is required for the system to be trusted. As reported elsewhere regarding electronic systems, a highly secure system will generally be trusted by users [37]. It is therefore assumed that a secure system is a factor related to trust in knowledge technology factors. Moreover, the results of the questionnaire conducted with academics also emphasize the importance of a secure system.

Most of the academics agreed that a knowledge rating technique is a factor that affected their acceptance of the use of WKSS. Knowledge rating is where academics have the ability to scale the knowledge included in the WKSS, indicating that this knowledge is reliable; thus, knowledge rating is one element related to the trust in knowledge technology factor.

The results from the expert reviews agreed with the importance of the factor of working hours, which means that using WKSS 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 16 hours a week for lecturers; using WKSS, 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 using WKSS should be counted as working hours and become a part of their job, and this factor was not found to be significant.

Notably, trust in knowledge technology is a fundamental goal towards using the system responsibly. There are just two confirmed factors related to trust in knowledge technology: a secure system and knowledge rating, and these factors have been added to the developed model. Moreover, 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 on the Internet, there is a huge amount of information without evidence, whereas if there is a WKSS related to their universities, this would be a trusted source, as all academics strongly agreed with the importance of trust in WKSS.

The positive attitude towards indication towards adopting a WKSS is shown by the fact that the experts disagreed with the factor fear of losing their position, which means that academics were not fearful of losing their higher position. Also, the attractive interface of the system was not considered to be an essential component in using a WKSS.

The findings from the expert reviews regarding the leadership factor show that the role of the leader is very important in encouraging academics to use WKSS, where 60% of the sample strongly agreed that leadership of departmental superiors is essential for academics in using WKSS, while no respondents strongly disagreed with this. 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 use of WKSS.

In terms of the data collected from online questionnaire, a very interesting result was noticed, as shown in Table I, which was that the interpretive attitudes toward accept using WKSS were that respondents agreed and strongly agreed with all factors.

TABLE 1 DESCRIPTIVE STATISTICS OF ONLINE QUESTIONNAIRE

Factors	N	Mean	Attitude
Performance Expectancy	74	4.97	Strongly agreed
Effort Expectancy	74	4.22	Strongly agreed
Social Influences	74	3.61	Agreed
Trusting in Knowledge Technology	74	3.92	Agreed
Time Expended	74	3.57	Agreed
Behavioural intention to use WKSS	74	3.75	Agreed

VII. CONCLUSION AND FUTURE WORK

A model of user acceptance of use of WKSS has been developed using components from models used in previous studies. This model includes some factors already existing in the UTAUT model, such expectancy performance, effort expectancy and social influences, but with minor changes the next sentence which tells us the new factors.. Other factors that have been added are trust in the web technology and time expended, after examining previous studies that confirmed that there are relationships between these factors and behavioral intention. These are the factors that the authors believe are required to construct a model of adoption of WKSS for the context of Saudi universities. The study confirmed the factors of the WKSS 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 are not in the developed model, and the expert reviews confirmed three of these factors, which are secure systems, knowledge rating and working hours, while the final questionnaire confirmed only a secure system and knowledge rating as influencing factors that should be included in the developed WKSS model.

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