Sudan University of Science & Technology
College of Graduate Studies

A Proposed Model to Identify The Factors Affecting Knowledge Sharing in Sudanese Universities

نموذج مقترح لتحديد العوامل المؤثرة على مشاركة المعرفة في الجامعات السودانية

A thesis submitted as partial fulfilment for the requirement of the M.Sc. degree in Computer Science

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Dedication

I would like to dedicate this research to my supervisor Dr. Niseren Beshir

Osman she always support and help me to complete this thesis.

Wholeheartedly this research dedicated to my mother she source of inspiration and

Give strength when me thought of giving up.

Dedicated this research to my father's soul I wish he was with me to be proud of me

To my sister, friends, and classmates who shared their words of advice and

Encouragement to finish this study.

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Last, but not least, I would like to express my heartfelt thanks to my mother , my sister for unconditional support and encouragement to pursue my interests, for listening to my complaints and frustrations, and for believing in me, my friends and colleagues for their help and wishes for the successful completion of this study.

Abstract

Knowledge is the most important resource in universities. Universities/Academic institutions are the places where there is a great possibility of sharing knowledge more than any other organization. Knowledge sharing (KS) has become an important process to develop new knowledge and retain it in the organizations. It has been observed that academics in Sudanese universities do not share knowledge effectively.

This research aims to investigate the factors the affect knowledge sharing in Sudanese universities and a proposed a model for these factors. A questionnaire was employed to collect data that investigate of the status of knowledge sharing in Sudanese universities. The collected data was analyzed. The results found that positive relation between KS and attitude and expected contribution, organizational Structure, while factors such as expected rewards , leadership support, information technology had negative relation between these factors and KS . This research will contribute to knowledge sharing among academics in Sudanese universities

المستخلص

المعرفة هي المصدر الأكثر أهمية في الجامعات، والمؤسسات الجامعية هي الأماكن التي توجد فيها إمكانية كبيرة لمشاركة المعرفة اكتر من أي منظمة أخرى، أصبحت مشاركة المعرفة عملية مهمة لتطوير المعرفة الجديدة والاحتفاظ بها في المنظمات. من الملاحظ ان تشارك المعرفة بين أعضاء هيئة التدريس للجامعات السودانية لا يتم بكفاءة. يهدف هذا البحث الي التحقق من العوامل التي توثر علي مشاركة المعرفة في الجامعات السودانية، واقتراح نموذج لهذه العوامل . تم استخدام الاستبيان لجمع البيانات الي التحقيق من حالة مشاركة المعرفة في الجامعات السودانية. تم تحليل البيانات التي تم جمعها. نتائج الدراسة وجدت علاقة إيجابية بين مشاركة المعرفة وموقف الاكاديميين من مشاركة المعرفة والاسهام المتوقع والهيكل التنظيمي بينما العوامل مثل الجوائز المتوقعة ودعم الإدارة وتقنية المعلومات لديها علاقة سلبية مع مشاركة المعرفة .

يسهم هذا البحث في تطبيق مشاركة المعرفة بين الاكاديميين في الجامعات السودانية .

Table of Contents

List of figures

List of tables

Chapter 1: Introduction

1. 1 Background

Knowledge is an important tool to accomplish tasks in the workplace but is not a tangible product which can be easily transferred from knowledge owners to knowledge seekers[1]. Knowledge in an organization is often classified into two types: explicit and tacit. Tacit knowledge is the knowledge that people have in their minds or in their possession. It generally requires extensive personal contact and trust to share it effectively. Explicit knowledge can be obtained from learning and understanding through formal education and can be easily transferred and shared among users[2].

Knowledge management became very important because it is a systematic process of acquiring, organizing, sustaining, applying, sharing and renewing both tacit and explicit knowledge in order to enhance performance, increase adaptability, and increase values. Universities as institutions are generally very suitable for the application of knowledge management principles and methods One substantial part of managing knowledge is a knowledge sharing. Knowledge sharing may be vertical or horizontal or both. It can take place inside, as well as outside the organization. (Ks). means the exchange of skills, knowledge, and experiences among individuals and groups . Universities and colleges are generally considered significant platforms for sharing ideas. Most researchers report that knowledge sharing improves education through teaching activities and creating knowledge through the conduction of scientific research. They also report that knowledge sharing   improves educational curricula. It has been argued that there is lack of research in the Sudanese universities on the requirement of successful knowledge sharing implementation, This reaserch aims to propose a model for the application of the principles of knowledge sharing in Sudanese universities.

1.2 Problem Statement

It has been observed that academics in Sudanese universities do not share knowledge effectively. The reason for the lack of appropriate knowledge sharing among Sudanese academics need to be identified and there is a need to investigate the factors that influence knowledge sharing among academics in Sudanese universities.

To the knowledge of the reseachers there is no studies that addressed the identifying factors that influence knowledge sharing among academics in Sudanese universities

1.3 Research Objectives

This objectives of this research are follow**:**

(1) -To investigate the principles of knowledge sharing used in Sudanese universities.

(2) -To investigate the factor that affect of knowledge sharing in Sudanese universities.

(3) - Propos amodel for the factor that affect knowledge sharing in Sudanese universities

1.4 Research Methodology

This research used   descriptive and analytical methodology for data collection. The population of this study are academics working in public and private Sudanese universities. Secondly ,propose Model for kowlege sharing in Sudanese universities.

The following steps represent the basic timeline for the methodology used in the research.

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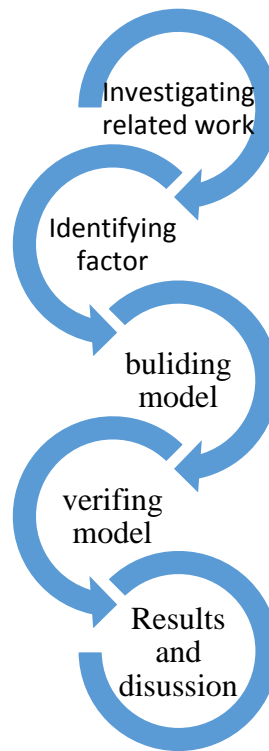
Figure (1.1): research methodology

1.5 Research Significance

This research is significant for the following reason :

➢ It identify is future research opportunities for other researchers who are interested in investigating the concept of KS in Sudanese universities

➢ It helps management at academic institutions in sudan it could be use as a guide to plan and apply ks among sudanses academics.

➢ It adds to the body of literature and research study is that focus on factors that influence knowledge sharing in Sudanese universities

1.6 Research Scope

The main purpose of this research is to identify the factors that affect knowledge-sharing practices in governmental and private Sudanese universities. The sample of the study included more than six different governmental and private Sudanese universities.

1.7 Research Organization

This research is organized into five chapters. **Chapter One** is an introduction: It provides the background, problem statement, objectives, research significance, scope, and methodology. **Chapter Two** is Literature Review and which presents and reviews the previous studies relared to area of investigation. **Chapter Three describes the** research methodology. **Chapter four** contains results and discussion and **Chapter five** contains conclusions and recommendations.

Chapter 2: Literature Review

2.1 Background

Knowledge is a powerful resource. Thus, we need to manage and develop knowledge resources to sustain their competitive advantage.

Managing knowledge is as significant for the organization as the management of other assets. KM could be effective once knowledge is shared among organizational members. Researchers have found links between adopting knowledge management practices and positive organizational outcomes that include increased innovativeness, and competitive advantages. This study attempted to understand how knowledge is shared, including the factors, and motives that lead university members to share their knowledge.

Universities are knowledge-intensive environments and play a central role in knowledge creation through research, and in knowledge dissemination through publication. Universities also hold a key role in the transfer of knowledge through working with businesses and other organizations to support innovation. Increased knowledge sharing specifically in higher education can initiate improved decision-making processes that could speed up curriculum development and research.

Section 2.2 describes an overview of knowledge, knowledge management, and types of knowledge while section 2.4 describes KM in higher education institutes , and also discusses ways and strategies of knowledge sharing, section 2.5 discusses knowledge-sharing challenges, and factors affecting knowledge sharing.

2.2 Knowledge and Knowledge Management

Knowledge is a valuable asset which can increase organizational performance and create a competitive advantage for business organizations.

Knowledge can be found in various sources and is available in different forms such as books, documents, repositories, databases, search engines and people's minds. It is demonstrated through their actions and behaviours. While knowledge is an important resource for organizations, knowledge workers particularly are an important contributor to the knowledge society. Knowledge workers are people with the motivation and capacity to create new insights, communicate, coach, and facilitate the implementation of new ideas.

2.2.1 Knowledge Management Definition

KM is defined as a systematic way of creating, managing, sharing and using knowledge and information of an organization. It has been an established discipline since 1995 with a body of university courses and both professional and academic journals dedicated to it. The necessity of managing knowledge is as powerful as the knowledge itself; therefore, the field of KM has gained recognition in both business and HEI fields.

Three reasons why organizations implement KM practices and initiatives. First, access to tacit and explicit knowledge would be easier throughout the organization. Second, KM helps to improve and support the sharing of individual knowledge. Finally, it encourages the creation and collaboration of organizational knowledge effectively.conducted an empirical study in which they aimed to explore the relationship between KM processes and the job performance of the academics within HEIs. They tested seven constructs of the KM process: knowledge identification, creation, collection, organization, storage, dissemination, and application. Their study findings showed that there was a significant relationship between KM processes and job performance[1].

The categorization of organization-wide KM activities is given below:

1) Knowledge creation
2) Knowledge retention
3) Knowledge sharing
4) Knowledge innovation

2.2.2 Categorization of Knowledge

Knowledge is either subjective or objective. In other words, it is made up of explicit (objective) and tacit (subjective) knowledge.[2] suggested that knowledge can be classified into two types:

1) **Explicit knowledge**: is a kind of knowledge that is formal, systematic, and can be codified into records such as databases and libraries. It could be easily communicated and shared through mediums[3]. The unique features of explicit knowledge are that it can be easily kept, moved, disseminated, and retrieved through widely available means.

2) **Tacit knowledge** is based on the human mind. It includes a wide variety of experiences, including cultural beliefs, an individual's values, expertise, and the capabilities they have

developed. As a result, tacit knowledge is challenging to transfer through electronic communication platforms in business organizations. On the other hand, it is considered a competitive advantage for educational institutions because it can be shared through face-to-face conversations and meetings.

classifies knowledge into two types: academic or scholarly knowledge, and non-academic (organizational knowledge). The production and dissemination of academic knowledge represent the primary purpose of universities, while organizational knowledge is found in administrative units of an organization. [4]

2.2.3 Knowledge Sharing

People in the organization are considered to be the primary sources of knowledge. They create, share, and use knowledge throughout the organization, which can leverage that knowledge only if the individuals share it[4]. Numerous authors have identified knowledge sharing as a key component of knowledge management.

KS refers to the 'process of capturing knowledge or moving it from a source unit to a receiver unit [5]. According to [6] knowledge sharing is a process where an individual exchanges his or her knowledge and ideas through discussions to create new knowledge or ideas. The information shared among peers involved visions, aims, opinions and questions besides the work aspects that would enhance his or her job performance and at the same time increased the organizational performance. Many studies noted that KS is critical to knowledge creation, organizational learning, and performance achievement.

Knowledge sharing can occur via written correspondence or face-to-face communication through networking with other experts, documenting, organizing and capturing knowledge for others .KS enables teams and individuals to develop efficient solutions to problems in the workplace by reducing duplications of effort, saving time, creating innovative solutions, and by establishing a cooperative continuous learning environment. Some studies presented KS initiatives and practices in HEIs from an individual level or an organizational level. According to Haque et al.[7] KS at a personal level is defined as a process of exchanging experiences, events, and collaboration between academics, students, or administration, whereas, at the organizational level KS means to capture, organize, reuse, and transform expertise within the institution.

2.2.4 Knowledge Management and Sharing in Higher Education

pointed out that universities can benefit from KM implementations in five areas; academic research, curriculum development, managing the academic strategies administration and enhancing students' outcomes[8].

Higher Education Institutions are bestowed with the important responsibility of managing knowledge production and distribution while efficiently responding to the constantly changing environment. Thus, KS is inevitably a challenging and important task for members of HIEs engaged in knowledge work.

The universities need to achieve two main objectives of KM implementations to maximize r44the outcomes of learning processes; (i) to share knowledge between employees so that they can maximize the efficiency of employees' skills, expertise and information, and (ii) to reflect the university strategies, plans and visions on tacit knowledge through explicit knowledge.

HEIs have several distinct organizational features. They have high levels of autonomy, a distinctive structure, unique leadership, and a tendency towards strong disciplinary sub-cultures [8]. Knowledge management and sharing environment in higher education institutions (HEIs) are intrinsically different from organizations in the commercial, industrial and public sectors, It can be argued that these distinctive features influence the way academics share knowledge with internal stakeholders.

The typical structure of a university involves the existence of many physically segregated colleges, schools, departments, and programs. The organization can create physical and psychological barriers to knowledge management and sharing activities. Type of structure would spur academics to work in isolation from each other and promote individualism rather than orientation to the needs of the whole .

2.2.5 Ways of Knowledge Sharing

According to Adamseged [9], ways of knowledge sharing are mediators which facilitate a sharing of knowledge to be easier, faster, clearer and more detailed. In general, ways of knowledge sharing facilitate information to reach the target people.
The ways of knowledge sharing can be categorized into speaking, writing and information technology.

Some of the means through which spoken knowledge-sharing strategies are used include conferences, lectures and presentations, workshops, conversation sessions, and meetings.

Some of these written documents include research publications and technical reports, hot briefs, book and book chapters, newsletters, media advisories and releases.
Also the number of information technology mechanisms facilitate smooth knowledge sharing for example websites, discussion forums, Wikis and email listservs.

Two non-exclusive ways of knowledge sharing, i.e. closed-network sharing (person-to-person sharing) and open-network sharing (sharing through a central open repository) .In the closed sharing model, the individual has the freedom to decide the mode of sharing and choose partners to share his or her knowledge. This type of interaction allows more personal touch and more directed sharing.

2.2.6 Knowledge Sharing Strategies

According to Faul et[10] the following KS strategies are commonly used..

(a)Communities of Practice: - refers to 'groups of people who do some sort of work together (online or in person) to help each other by sharing tips, ideas and best practices.

(b)Retrospect: – this refers to 'an in-depth discussion that happens after completion of an event, project or an activity, to capture lessons learnt during the entire activity at the end of the session.

(c)Storytelling:– this refers to a storytelling session whereby the person who attends an event or training session is allowed to disseminate the information/knowledge gained to others within the organization

2.2.7 Types of Knowledge Shared in Higher Education

comparable themes of knowledge types: research knowledge and activities, teaching and learning resources, university processes and procedures, and social and work new. On the other hand, knowledge exchanged in HEI was classified into academic explicit knowledge and academic tacit knowledge[11].

The following table summarizes the types of knowledge exchanged in higher education[12].

Table (2.1): types of knowledge exchanged in higher education.

Type	Explicit	Tacit
Academic	Course outline	Knowledge delivery
	Teaching slides	Course management
	Textbooks	Teaching style-learning by doing
	Assessment strategies	Course design

2.2.8 Knowledge Sharing Challenges in Higher Education

the reluctance to share knowledge due to loss of status or power can be a significant factor in academia because of the emphasis on publishing primary research. Another barrier to knowledge sharing can be attributed to highly individualistic undertaking[12].

Several obstacles are found to impede KS. A principle barrier dominating at individual level concern is lack of trust [13]. As emphasized, the lack of trust, and fear among academic staff towards KS and their resistance to change are barriers for KS. Researchers outlined the main organizational barriers to KS:

(1)lack of top management support and participation

(2) no rewards or rather lack of transparent rewards in monetary and non- monetary terms for encouraging the sharing of knowledge

 (3) existing organizational culture that does not provide sufficient support for sharing practices [14].

The lack of awareness about the importance of knowledge sharing hinders knowledge sharing. Also identifies power relations between superiors and subordinates, low level of education, differences in experience levels and age as a factor that may hinder knowledge sharing[16].

Lack of effective communication between staff and management can also slow down the process of knowledge sharing. When management fails to facilitate communication among employees they create a communication gap which holds back knowledge-sharing practices. The

study found   no knowledge sharing without communication, people socialize through communication; therefore, a lack of communication lowers the level of knowledge sharing which decreases the value of knowledge [16].

Technology is an enabler for knowledge sharing; if it is not properly designed and managed it becomes a barrier to knowledge sharing. This happens when there exists a lack of technological infrastructure when technology is complex to use, and lack of skilled staff to design applications, make use of, and also support the technology.

The barriers to KS include lack of communication skills and social networks, differences in culture, lack of time and lack of trust, hierarchical organization structure, and lack of leadership support[16].

2.2.9 Factors Affecting Knowledge Sharing

Many factors influence KS. These factors can be divided into positive and negative factors.

(1) Individual Factors

The process of knowledge sharing itself often takes place on a one-to-one basis between individuals. This is particularly the case with tacit knowledge, which is rooted, in the cultural and social context of the institution . Consequently, the influence of individual factors that affect knowledge sharing has been widely emphasized.

(2) Expected Rewards and Associations.

Expected rewards and associations positively influence an individual's KS behaviours. Alternatively, a lack of motivators and reward systems can impede KS in organizatios.

 the reward system encouraged academics to share their knowledge. They noted that faculty members valued tangible rewards such as course reductions, more time and financial support for research, seminars and other financial incentives[8]. Consequently, the enhancement of such reward systems helps to strengthen university competitiveness in the education market.

intrinsic motivators such as associations with others were significantly linked to knowledge-sharing behaviour whilst extrinsic benefits such as organizational rewards did affect sharing[15].

(3) Attitude Towards Knowledge Sharing.

The attitudes of UK academics towards KS. They profiled the academics' views on some of the factors that might be expected to impact KS practices within the universities. Their research findings showed positive attitudes towards KS. They argued that this significant result is because academics think KS can improve relationships with other members as well as offer more internal and external opportunities.

(4) Trust

Trust is defined as "an expectancy held by an individual or group that the word, promise, verbal, or written statement of another individual or group can be relied on.

The academics in universities are willing to share knowledge if they trust each other. Management, therefore, requires the existence of trust to respond openly and comfortably, when sharing knowledge

The interpersonal trust between co-workers and their administration had a significant effect on employee experiences in sharing knowledge throughout the organization[16].

investigated factors such as trust, cultural alignment, and openness to diversity and their impact on the effectiveness of KS from large corporations to their subsidiaries. They argued that KS becomes easier when trust is greater among employee[17].

(5) **Expected Contribution**.

Expected contribution refers to a belief by employees that their knowledge sharing will result in enhanced organizational performance. the study argued that the differences in the expected contribution that each employee provide are therefore likely to enable benefits such as competitive advantage and improved performance.and will gain confidence in their capability to provide knowledge that is valued by the organization[18].

(6) Organizational Factor

Several organizational factors such as leadership, organizational structure, information technology platform, and organizational culture are among the enablers that give the HEIs the ability to influence their KS initiative

(7) Leadership.

Many researchers suggested that the role that leaders play could impact KS positively, by facilitating communication between employees.

research findings indicated that team climate and empowering leadership significantly influence individuals' KS behaviour by affecting their attitude toward knowledge sharing[19]. Managers contribute to the development of IT systems, reward systems, opportunities for interaction, and the availability of time for knowledge-sharing.

suggest two types of leadership in universities. An academic leader is professionally recognized and respected for their knowledge of their discipline and accepted by the team based on personal power; accordingly, PhD supervisors and eminent scholars can also be perceived as leaders in academia .In contrast, managerial leadership accentuates hierarchical position, job responsibilities, control and authority and power is embedded in the position rather than the person.

(8) **Organizational Culture**.

Culture is widely understood as a set of shared values, beliefs, customs, practices, principles and routines that underpin the behaviour of an organization and its members, usually cultivated steadily over a long period. The willingness to communicate and share knowledge is influenced by cultural dynamics such as external environment (national culture) and internal environment (university and individual culture).

Also discussing the role of organizational culture in promoting knowledge sharing.

Stuided pointed impact of the different types of organizational cultures such as innovative, competitive, bureaucratic and communal on the employees' KS behaviours within multinational corporations[20]. Their research findings showed that all four types of organizational culture differently affect employees' KS behaviour and processes. They argued that strong top management support is necessary to enable relationships among employees to share knowledge[21].

(9) Organizational Structure.

Organization structure is defined by Liao, Chuang the formal allocation of work roles and administrative mechanisms to control and integrate work activities. The organisational structure includes division of labour departmentalisation and distribution of power and responsibilities are formally separated. The studied address state that knowledge sharing can be facilitated by having

a less centralized organisational structure, where employee work is segmented into structures which enable them to share knowledge freely and efficiently[22].

Some research on KS emphasized that the organizational structure is a key factor that impedes the sharing of tacit knowledge in the organization. Due to the rule and purpose of HEIs. University structures invariably differ from those of most public and commercial institutions). the organizational structure of HEIs
 have an impact on KS and could be a significant barrier to KS practices.

(10) **Information Technology (IT) Platform**.

Technology consists of the infrastructure of tools, systems, platforms and automated solutions that improve the development, application and distribution of knowledge. The study noted the IT platform was developed to support and enhance the organizational processes of knowledge creation, storage, transfer, and application. They argued that many KM initiatives rely on IT as a significant enabler that increases KS extending an individual's reach beyond formal lines of communication[22]. Their study findings showed a positive impact of IT in KS practices in organizations. They argued that organizations can improve the individual's willingness to share their knowledge through careful investment in IT.

Table (2.2): Factors Affecting on Knowledge Sharing

Dimension	Factors
Individual level	Attitudes
	Expected contribution
	Trust
Organizational level	Leadership
	Culture
	management support
	organizational structure

2.3 Related Works

Maiga [23] investigated the status of knowledge sharing in universities in Tanzania. The findings of his study revealed that universities in Tanzania generally promoted a culture of knowledge sharing among academics through other ways: seminal presentations, publications, public lectures, conferences and colloquia, and universities did not have formal organization structures and policies for promoting knowledge sharing. The findings identified funding, enabling knowledge sharing strategies, incentives and rewards as some of the critical success factors that would promote a culture of knowledge sharing among academics, as indicating that the academics are aware of knowledge management and knowledge sharing.

Shahzadi [24]stuied individual motivational factors (outcome expectations, self-efficacy, and enjoyment in helping others) that contributed to knowledge sharing behaviour of the University of Pakistan study and found that all the stated individual motivational factors are positively and strongly associated with optimistic knowledge-sharing behaviour in University academia, and also discovered that knowledge-sharing intention mediates the relationship of knowledge-sharing attitude.

Mulu [25] examined knowledge-sharing behaviour and identified factors that affect knowledge-sharing behaviour among Assosa University academic staff. A cross-sectional study with both quantitative and qualitative approaches was conducted among 6 Faculties of Assosa University. The study revealed that the association between commitment and knowledge sharing behaviour is significant and shows that there is a significant association between reward system and knowledge sharing behaviour and a significant association between technology and knowledge sharing behaviour.

Huda [26] determined the factors affecting knowledge-sharing behaviour among academics in United Arab Emirates universities and identify the effect of university type on academics' behaviour**.** Data were collected from academics in public and private universities using a questionnaire, The results found a significant difference in academics' knowledge-sharing behaviour between public and private universities. Results also revealed that intention is the main determinant of knowledge-sharing behaviour, and that attitude, subjective norms, and self-efficacy have a significant influence on intention

Attallah et al. [27], proposed five constructs to influence the success of KM implementation in educational institutes. Organizations' strategies and culture are considered

essential factors of KM. in addition, ICT infrastructure, and a clear systemic process of acquiring, applying, utilizing and protecting knowledge are proposed to be critical influential factors that affect the implementation of KM.

Ab Kadir et al. in [28]. The purpose of this study is to investigate the relationships between trust, communication, information system, reward system and organization structure and knowledge sharing among staff in the library context. The findings showed that trust, communication between staff, information system and organization structure are positively related to knowledge sharing in the library .

The study [29] examines the impact of trust, attitude, and ICT use on knowledge sharing among degree students of universities in Vehari. The findings show that trust, attitude and (Information and communication technology) use are the key factors to boost knowledge sharing amongst students. This study is restricted to the students and therefore it cannot be generalized to all other organizations.

The study [30] proposed a conceptual framework for knowledge sharing for enhanced performance in the UK higher education institution, highlights the relationships and interplay between identified four eminent factors for enabling knowledge sharing processes in the HEIs such as leadership vision, staff motivation, technological innovation and organisational culture

2.2.1 Summary of Related Works

Table (2.3): Summary of Related Works

Study	Research factors	Research Limitation
Sheikh Zain **et al**[29]	Indicated that attitude, subjective norm, and self-efficacy were positively and significantly related to knowledge-sharing intention	- restricted to academic staff in public higher education institutions - did not consider the type of knowledge shared among academics and how it was shared

Chandran et [31]al	Knowledge-sharing individual factors (such as openness in communication, and interpersonal trust), technology acceptance significantly influence the adoption of knowledge-sharing activities in Saudi universities	restricted to public universities in Saudi Arabia, which may affect the generalization of the study
AZHAR [32]	Five factors that can positively affect knowledge sharing: the nature of knowledge, staff attitude, social interaction, supportive leader and working culture	Important roles of knowledge sharing in the public sector are not determined by the education sector.
(Zwain et ., 2014)	Leadership Commitment Strategic Planning Continuous Improvement Training Learning Reward Recognition	Questionnaire survey on 41 Iraqi colleges

Chapter 3 : Research Methodology

3.1 Introduction

The goal of this research was to explore what factors contribute to an academic willingness to share knowledge and develop a proposed model of the current knowledge sharing of academics within Sudanese universities. Based on a review of literature, survey research was an effective approach for collecting baseline data from a broad range of Sudanese universities. The survey included questions aimed to collect closed data. Survey questions were used to identify KS factors, including attitude toward KS, expected rewards and associations, trust, expected contribution, leadership, organizational structure, and information technology platform. A total of 102 full-time academics from different universities in Sudanese completed the survey.

3.2 Methodology

Investigating related work

Identifying factor

Building model

verifing model

Results and disussion
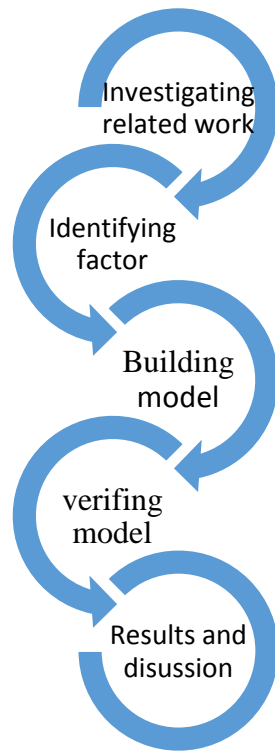
Figure (3.1):shows the methodology

3.2.1 Investigating the Related Work

Based on the related work in the previous chapter, the list of factors that affect knowledge sharing in universities were identied.these factors are described in detail in the section below

3.2.2 Identifying Factors

These are the factors that affects knowledge sharing in academics within Sudanese universities.

Attitude: the individuals' feelings on knowledge sharing reflect their readiness of whether they want to be involved in the process of knowledge sharing

Contribution :is defined as "a belief by employees that their knowledge sharing will result in enhanced organizational performance[33].

Expected Reward: (ER) ER is defined as " the degree to which one believes that one will receive extrinsic incentives for one's knowledge sharing[34].

organizational structure OS is defined as " a traditional structure that usually characterized by complicated layers and lines of responsibility with certain details of information reporting procedures[34]

Information Technology: IT is defined as "systems that enable the integration of information and knowledge in the organization as well as the creation, transfer, storage and safe-keeping of the firm's knowledge resource[]
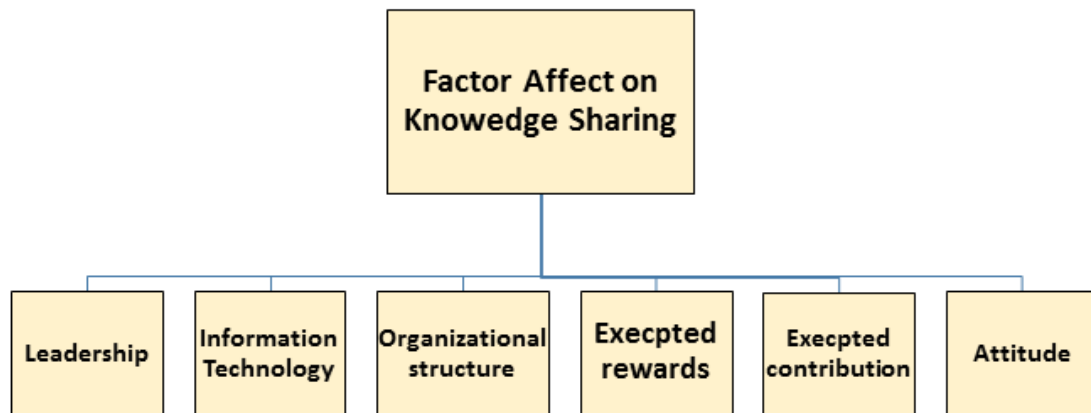
Figure (3.2) :identifying factors affecting knowledge sharing

These factors were chosen because they are the best suitable for sudanese universities which did't reach a level of maturity in knowledge management

3.2.3 Building model

The model was built from the factors shown in the Figure below

3.2.4 Verifying model

In order to verify the model , the following step were perfomed

3.2.4.1 Questionnaire Design

A questionnaire-based survey method was used to collect KS data include closed questions to enable participants to provide a more specific responses. The questionnaire was distributed to the targeted Sudanese universities. The quantitative data analysis helped to answer the research questions that investigated the relationships among the knowledge sharing(ks) (independent variable) and factors the include leadership (L), organizational structure (OS), information technology (IT), expected rewards and associations (ERA), and expected contribution (EC)((dependent variable)

3.2.4.2 Sampling

The population of this study is academics working in Sudanese universities irrespective of whether they are public or private academic institutions.,
The survey sample consisted of academic staff including (professors, assistant professors, assistants lecturers, teaching assistants and lecturers) ,who are currently working full-time in Sudanese universities. The survey was distributed to the targeted population working in Sudanese universities. A total of 102 completed surveys were received.

A sample of 102 participants has been chosen from five main Sudanese universities namely, Sudan University of Science and Technology, Bakht Alruda University, University of Science & Technology, and Omdurman Islamic University.

3.2.4.3 Instrument Development

The research population to which the findings of this study would be generalizable were comprised of academics who are working full time as(professors, assistant professors, lecturers, senior lecturers, and teaching assistants) in Sudanese universities The survey instrument was created by, Google Forms. SPSS software was used to analyze the collected data..

19

3.2.4.4 Data Collection

The questionnaire consists of two sections. The first section collects demographic information such as age, gender, and job. The second section gathered information about sharing knowledge processes within Sudanese universities. The questionnaire was distributed to academics from the sample population. The sample population included academics (i.e., professors, assistant professors, lecturers, senior lecturers, teaching assistants, researchers, and associates) working full-time at a Sudanese university.

The responses are about how to use and share knowledge. The study used structured questions closed to collect the data from respondents. Data were collected from a survey questionnaire distrusted to a total of 102 academics.

3.2.4.5 Data Analysis

The main task of this stage is to sort and classify data in mathematical form and then apply various statistical operations using SPSS to get a clear and accurate result. The first step of the data analysis process was the pre-analysis data screening to ensure the accuracy of the data collected. The pre-analysis data screening identified the response rate as well as addressed the outliers before data analysis.

Descriptive analysis was performed using SPSS statistical package to summarize the demographic information as well as to perform all pre-analysis data screening to check for response rate and missing data.

Chapter 4: Results and Discussion

4.1 Introduction

This chapter presents the procedure of the study which consists of the sample population of the study, steps of procedures of the research, and statistical techniques used in the study.

4.1.1 Population of the Study

The population of the study consists of all the academic staff in public and private Sudanese universities, in the academic year 2021-2022.

Sample of the study:

Usining purposive sampling, (102) academic staff including professors, associate professors, assistant professors, teaching assistants and lecturers were selected from public and private Sudanese universities during the academic year 2021-2022.

Data analysis of Personal Information

Table (4-1): distribution of the sample members according to gender

Sex	Frequency	Per cent
Male	66	64.7
Female	36	35.3
Total	102	100.0
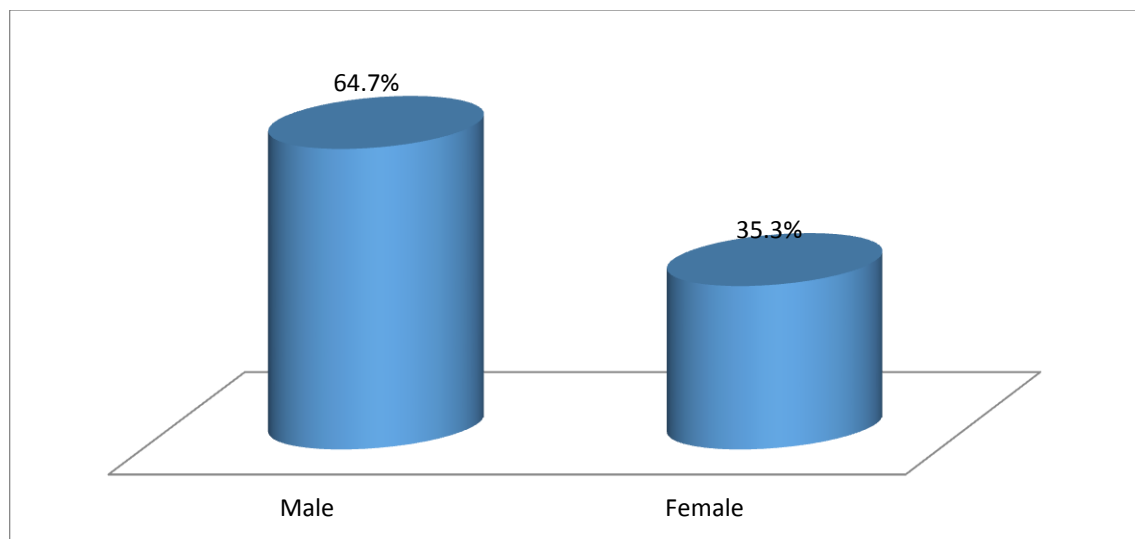
Figure (4.1): Sample member's distribution according to the gender

 Table (4.1) , and Figure (4.1) show that 64.7% of the respondents were males, while 35.3% were females.

Table (4.2) :Distribution of the sample members according to their ages

Age	Frequency	Per cent
from 20 to30	16	15.7
from 30 to 40	49	48.0
above 40	37	36.3
Total	102	100.0
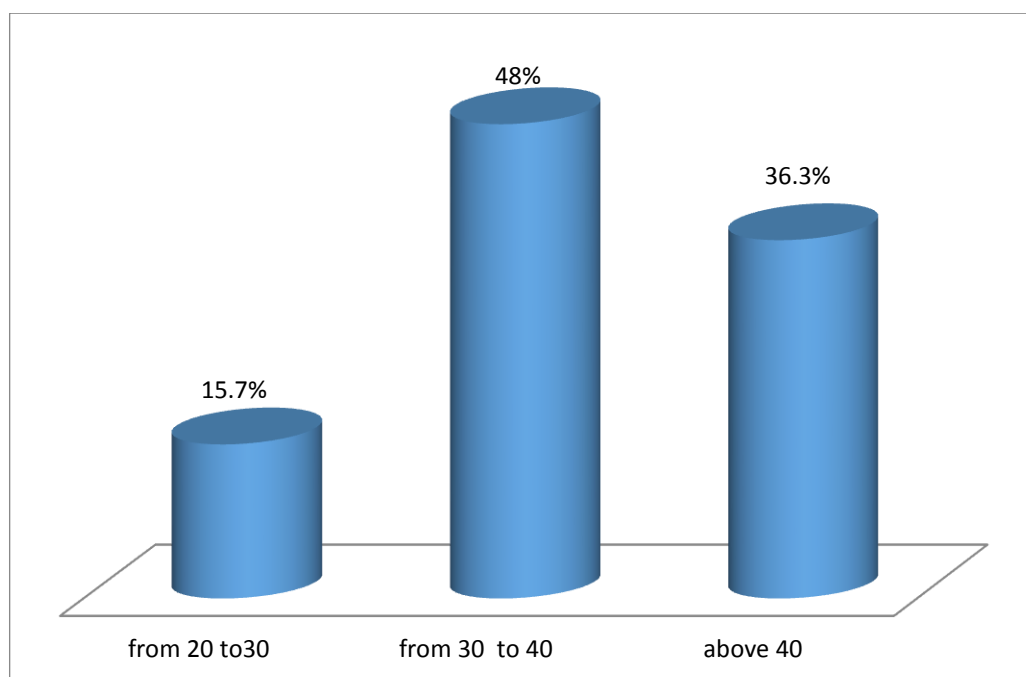
Figure (4.2): The distribution of the sample members according to their ages

Table (4.2), and Fig(4.2) show that 15.7% of the respondents' ages are from 20 to 30 years old, 48% are from 30 to 40 years old, and 36.3% are more than 40 years old. l

Table (4.3) :Distribution of the sample member according to qualifications

Qualification	Frequency	Per cent
Professor	3	2.9
Associate professor	21	20.6
Assistant professor	34	33.3
Lecturer	38	37.3
teaching assistant	6	5.9
Total	102	100.0
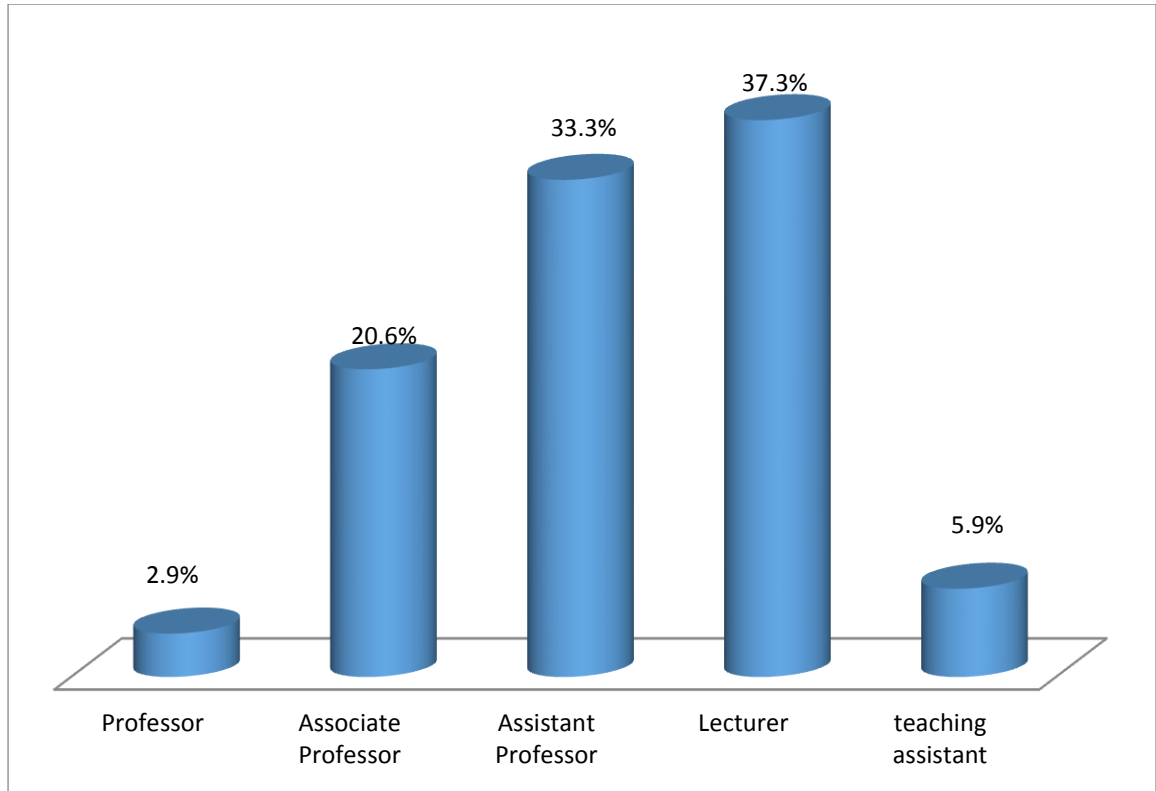
Figure (4.3) :Distribution of the sample member according to qualifications

Table (3.3), chart (3.3) show that 2.9% of the sample members are professors, 20.6% are associate professors, 33.3% are assistant professors, 37.3% are lectures, and 5.9% are teaching assistants.

Table (4.4) Distribution of the sample members based on years of experience

Years of experience	Frequency	Per cent
From 2 to5	12	11.8
From 5 to 10	33	32.4
From 10 to 15	26	25.5
Above 15	31	30.4
Total	**102**	**100.0**
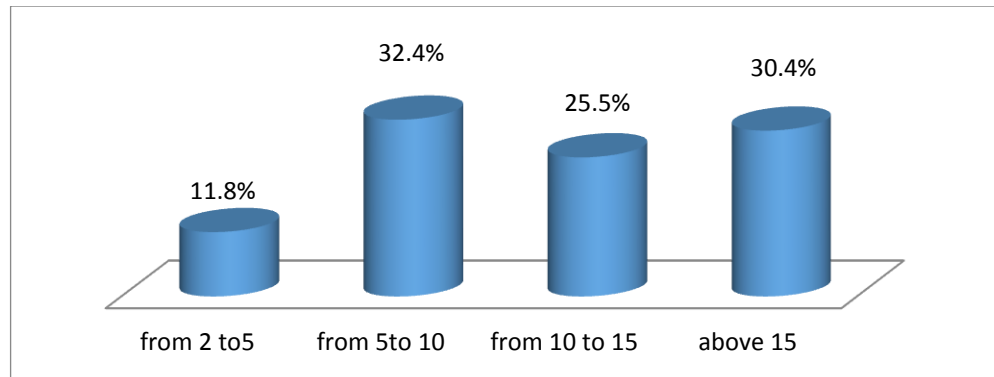
Figure (4.4): Distribution of the sample members based on years of experience

Table (4.4), Figure (4.4) show that 11.8% of respondents' have 2 to 5 years of experience", 32.4% "have 5 to 10 years of experience", 25.5%" have 10 to 15 years of experience, and 30.4% have more than 15 years of experience.

4.1.1.1 Reliability Coefficient:

To compute the reliability of the questionnaire, Alpha Cronbach's method, was used. This is shown in the table below

Table (4.5): Reliability based on Alpha Cronbach's method

N of questionnaires	N of items	Cronbach's Alpha
10	23	0.89

Table (4.5) above shows that the reliability coefficient of 0.89 is greater than 0.60, denoting that the instrument is well developed.

4.1.1.2 Validity Coefficient :

Validity Coefficient $= \sqrt{reliability\ coefficient}$

$$= \sqrt{0.89}$$

$$= 0.94$$

Both the reliability and validity coefficient are high, denoting that the instrument is well developed.

4.1.1.3 Spilt half method:

The questionnaire distributed among the pilot sample (10 participants), and the correlation coefficient equals 0.90. The reality coefficient computed as a formula:

Reliability $= \frac{2r}{1+r}$, r = correlation coefficient

$$= \frac{2*0.90}{1+0.90} = 0.95$$

24

Validity Coefficient =

$$\sqrt{reliability\ coefficient}\ ,\ \sqrt{0.95} = 0.97$$

4.1.1.4 Statistical Techniques

Analyzing the data with the aid of statistics usually makes the research more manageable.. The statistical process is the discipline, which has developed a variety of techniques for analyzing numerical data efficiently and accurately. It is worth demonstrating that all the items of the questionnaire are supported by multiple choices because this type has many merits. It allows the informants to respond confidently and easily.

In the analytical process, the items are categorized according to certain descriptive statistical techniques, where the data are summarized and described numerically within a certain group of individuals. The types of the items determine the kind of analytical device. which can be applied to obtain the required results. (Bell,1987).

The data is presented in tables and, figures to make them clearer. The teachers" questionnaire is the major tool used in collecting the data for the present work.

The subjects to whom the questionnaire was administered are the members of the teaching staff in public and private universities. The analysis of the teacher informants' questionnaire was conducted under the following heads as shown in the table below.

Distribution of the statements grouped under each of the three Sections (parameters) of the questionnaire.

Table (4.6) : Distribution of grades

Weight	Degrees
1	Strongly disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly agree

Source: Preparation of the researcher, based on the questionnaire data, 2022.

Table (4.7): Weight and weighted mean of the research scale:

Level of answers	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Weight	1	2	3	4	5
Arithmetic mean	1-1.79	1.8-2.59	2.6-3.39	3.4-4.19	4.20-5

Table (4.8): Descriptive statistic of the attitude factor

Statement	Measures of frequency	Scale					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
1. I share with my colleagues new information about courses	Frequency	-	-	6	29	67	102
	Per cent	-	-	5.9	28.4	65.7	100
2. I assist new colleagues in gaining experience in effective teaching skills	Frequency	-	1	5	29	67	102
	Per cent	-	1	4.9	28.4	65.7	100
3. I share with my colleagues spreading knowledge among society members through lectures and symposiums	Frequency	1	3	14	48	36	102
	Per cent	1	2.9	13.7	47.1	35.3	10
4. I share with my colleagues knowledge about developing teaching methods	Frequency	-	3	4	42	53	102
	Per cent	-	2.9	3.9	41.2	52	100
5. I exchange my colleague's research materials and new ideas about scientific research	Frequency	-	4	9	38	51	102
	Per cent	-	3.9	8.8	37.3	50	100

Table (4.8) above showed that:

1. The highest percentage of the sample members agreed that "they share with their colleagues' new information about courses"(94.1), and the sample members who did not provide specific answers reached (5.9)

2. The highest percentage of the sample members agreed that "they assist new colleagues in gaining experience about effective teaching skills" (94.1), while the percentage of those who disagreed is (1)% and the sample members who did not provide specific answers reached (4.9)

3. The highest percentage of the sample members agreed that "they share with their colleagues spreading knowledge between society members through lectures and symposium" (82.4), while the percentage of those who disagreed is (3.9)% and the sample members who did not provide specific answers reached (13.7)

4. The highest percentage of the sample members agreed that" they share with their colleagues knowledge about developing teaching methods" (93.2), while the percentage of those who disagreed is (2.9)% and the sample members who did not provide specific answers reached (3.9)

5. The highest percentage of the sample members agreed that " they exchange with their colleagues' research materials and new ideas about scientific research" (87.3), 6.while the percentage of those who disagreed is (3.9)% and the sample members who did not provide specific answers reached (8.8) .

Table (4.9): Descriptive statistics of the expected Contribution factor

Statement	Measures of frequency	Scale					Total
		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	
1. The knowledge sharing will help the faculty members in problems solving	Frequency	-	1	1	22	78	102
	Per cent	-	1	1	21.6	76.5	100
2. Knowledge sharing will create new research opportunities with my colleagues	Frequency	-	-	3	26	73	102
	Per cent	-	-	2.9	25.5	71.6	100
3. Knowledge sharing will improve work procedures in the department in particular	Frequency	-	1	4	26	71	102
	Per cent	-	1	3.9	25.5	69.6	100
4. Knowledge sharing will help the university achieve its goals	Frequency	-	3	2	31	66	102
	Per cent	-	2.9	2	30.4	64.7	100

Table (4.9) showed that:

1. The highest percentage of the sample members agreed that "The Sharing of knowledge will help the faculty members solve problems " (98.1), while the percentage of those who disagreed is (1)% and the sample members who did not provide specific answers reached (1)

2. The highest percentage of the sample members agreed that" The Sharing of knowledge will create new research opportunities with their colleagues" (97.1), and the sample members who did not provide specific answers reached (2.9)

3. The highest percentage of the sample members agreed that" knowledge sharing will improve work procedures in the department in particular" (95.1), while the percentage of those who

disagreed is (1)% and the sample members who did not provide specific answers reached (3.9)

4. The highest percentage of the sample members agreed that" Knowledge sharing will help the university achieve its goals" (95.1), while the percentage of those who disagreed is (2.9)% and the sample members who did not provide specific answers reached (2)

Table (4.10) : Descriptive statistics of the Expected Reward factor

Statement	Measures of frequency	Scale					Total
		Strongly disagreed	Disagree	Neutral	Agree	Strongly agree	
1. University offers monetary rewards in return for knowledge sharing	Frequency	29	24	25	16	8	102
	Per cent	28.4	23.5	24.5	15.7	7.8	100
2. University awarded opportunities for promotions and job stability in return for knowledge sharing between faculty members	Frequency	19	27	28	16	12	102
	Per cent	18.6	26.5	27.5	15.7	11.8	100
3. Academic leaders at the University support knowledge sharing between faculty members through scientific conferences and events.	Frequency	21	34	31	15	1	102
	Per cent	20.6	33.3	30.4	14.7	1	100

Table (4.10): shows that:
1. The percentage of the sample members who agreed that "University offers monetary rewards in return for knowledge sharing" is (23.5), while the percentage of those who disagreed is (51.9)% and the sample members who did not provide specific answers reached (24.5)

2. The percentage of the sample members who agreed that "University should award opportunities for promotions and job stability in return of knowledge sharing between

faculty members" is (27.5), while the percentage of those who disagreed is (45.1)% and the sample members who did not provide specific answers reached (27.5)

3. The percentage of the sample members who agreed that "Academic leaders at University support knowledge sharing between faculty members by scientific conferences and events" is (15.7), while the percentage of those who disagreed is (53.9)% and the sample members who did not provide specific answers reached (30.4).

Table (4.11): Descriptive statistic of the leadership support factor

Statement	Measures of frequency	Scale					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
1. Academic leaders are keen on justice and equity in the treatment of Faculty members	Frequency	19	15	30	26	12	102
	Per cent	18.6	14.7	29.4	25.5	11.8	100
2. Faculty members have a clear view of the role and job requirements in the university	Frequency	21	49	19	10	3	102
	Per cent	20.6	48	18.6	9.8	2.9	100
3. Academic leader are keen to evaluate and appreciate the opinions of Faculty members	Frequency	17	34	36	14	1	102
	Per cent	16.7	33.3	35.3	13.7	1	100
4. Academic leader encourage faculty members for innovation	Frequency	16	36	33	13	4	102
	Per cent	15.7	35.3	32.4	12.7	3.9	100

Table (4.11) shows that :
1. The percentage of the sample members who agreed that "Academic leaders are keen on justice and equity in the treatment of Faculty members" is (37.3), while the percentage of those who disagreed is (33.3)% and the sample members who did not provide specific answers reached (29.4)

2. The percentage of the sample members who agreed that" Faculty members have a clear view of the role and job requirement   in university"is (12.7), while the percentage of those who disagreed is 68.6)% and the sample members who did not provide specific answers reached (18.6)

3. The percentage of the sample members who agreed that "Academic leaders are keen to evaluate and appreciate the opinions of Faculty members" is (14.6), while the percentage of those who disagreed is (50)% and the sample members who did not provide specific answers reached (35.3)

4. The percentage of the sample members who agreed that "Academic leaders encourage faculty members for innovation" is (16.6), while the percentage of those who disagreed is (51)% and the sample members who did not provide specific answers reached (32.4).

Table (4.12) : Descriptive statistics of the organizational structure factor

Statement	Measures of frequency	Scale					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
1. University provides a collaborative atmosphere in the job environment to consolidate confidence between faculty members	Frequency	21	22	28	18	13	102
	Per cent	20.6	21.6	27.5	17.6	12.7	100
2. University structure supports the exchange of knowledge and experience between faculty members	Frequency	2	4	17	39	40	102
	Per cent	2	3.9	16.7	38.2	39.2	100
3. University structure supports collective work among faculty members	Frequency	7	14	24	41	16	102
	Per cent	6.9	13.7	23.5	40.2	15.7	100

Table (4.12) showed that :
1. The percentage of the sample members who agreed that "University provides a collaborative atmosphere in job environment consolidates confidence between faculty members" equals

(30.3), while the percentage of those who disagreed is (42.2)% and the sample members who did not provide specific answers reached (27.5) .

2. The highest percentage of the sample members who agreed that "university structure support exchange of knowledge and experience between faculty members" is (5.9), while the percentage of those who disagreed is (77.4)% and the sample members who did not provide specific answers reached (16.7)

3. The highest percentage of the sample members who agreed that "university structure supports collective work between faculty members" is (55.9), while the percentage of those who disagreed is (20.5)% and the sample members who did not provide specific answers reached (23.5)

Table (4.13) : Descriptive statistics of the Information Technology factor

Statement	Measures of frequency	Scale					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
1. University has an infrastructure for ICT that enables faculty members to share knowledge electronically	Frequency	28	31	15	20	8	102
	Per cent	27.5	30.4	14.7	19.6	7.8	100
2. University has tools and technology which is necessary for sharing knowledge easily	Frequency	27	34	24	12	5	102
	Per cent	26.5	33.3	23.5	11.8	4.9	100
3. More training to be able to use the tool and technology for sharing knowledge effectively	Frequency	4	31	31	14	22	102
	Per cent	3.9	30.4	30.4	13.7	21.6	100
4. University has flexible ICT for sharing knowledge adapted to external and internal environment change	Frequency	28	38	20	14	2	102
	Per cent	27.5	37.3	19.6	13.7	2	100

Table (4.13) shows that :

1. The percentage of the sample members who agree that "University that has infrastructure for ICT enables faculty member sharing knowledge electronically" is (27.4), while the percentage of those who disagreed is (57.9)% and the sample members who did not provide specific answers reached (14.7)

2. The percentage of the sample members who agreed that "University has   tools and technology which is   necessary for sharing knowledge easily" equals (16.7), while the percentage of those who disagreed is (59.8)% and the sample members who did not provide specific answers reached (23.5)

3. The percentage of the sample members who agree that "more training to be able to use the tool and technology for sharing knowledge effectively" is (35.3), while the percentage of those who disagreed is (34.3)% and   the sample members who did not provide specific answers reached equals (30.4)

4. A high percentage of the sample members agreed that "University has flexible ICT for sharing knowledge adapted to external and internal environment change" is (15.7), while the percentage of those who disagreed is (64.8)% and the sample members who did not provide specific answers reached equals (19.6) .

[34]Table (4.14) Correlation Coefficient between Knowledge sharing and other factors

		Correlation	**Statistical significant**	**Results**
Knowledge sharing	Expected Contribution	0.15	0.859	significant
	Expected Reward	*0.12	0.235	Insignificant
	Leadership	0.15	0.147	Insignificant
	Systematic structure	0.09	0.833	significant
	Tools & Technology	0.03	0.660	Insignificant

Table (4.14) shows that there is positive and negative correlation coefficient between (Knowledge sharing) & (Expected gain, Expected return, Leadership, Systematic structure, Tools & Technology), with statistical significance greater than 0.05.

Questions of the study

What attitudes do academics in Sudanese universities have toward knowledge sharing?

To answer this question, the researcher followed the arithmetic mean, standard deviation, rank and chi-square test for statements of the first attitudes

Table (4.15) :The arithmetic mean, standard deviation, rank and chi-square test of the factor of Knowledge sharing .

Statement	Mean	Standard deviation	Rank	Chi-Square	Df	Statistical significance	Interpretation	Result
I share with my colleagues new information about courses	4.60	0.60	1	55.824	2	0.000	Significant	Strongly agree
I assist new colleagues in gaining experience in effective teaching skills	4.59	0.63	2	108.039	3	0.000	Significant	Strongly agree
I share with my colleagues spreading knowledge among society members through lectures and symposiums	4.13	0.83	5	84.569	4	0.000	Significant	Agree
I share with my colleagues knowledge about developing teaching methods	4.42	0.71	3	78.314	3	0.000	Significant	Strongly agree
I exchange with my colleagues' research materials and new ideas about scientific research	4.33	0.80	4	60.431	3	0.000	Significant	Strongly agree
Mean	4.41	0.71						Strongly agree

Table (4.15) :shows that :

1. All items of this core are significant because the statistical level of it less than 0.05

2. The most important item of this core was the item which says "I share with my colleagues' new information about courses" with arithmetic mean (4.60), standard deviation (0.60), and the less important item was "I share with my colleagues r spreading knowledge between society members through lectures and symposium" with arithmetic mean (4.13), and standard deviation(0.83).

3. The general mean (4.41), denotes that the academicstaff in Sudanese universities have a positive attitude toward knowledge sharing

Question Two: **What is the contribution of sharing your knowledge with others to your university?**

Table (4.16): The Arithmetic mean, standard deviation, rank and chi-square test of statements for the Expected Contribution

Statement	Mean	Standard deviation	Rank	Chi-square	Df	Statistical significance	Interpretation	Result
The sharing of knowledge will help the faculty members solve problems	4.74	0.53	1	155.647	3	0.000	Significant	Strongly Agree
The sharing of knowledge will create new research opportunities with my colleagues	4.69	0.53	2	74.882	2	0.000	Significant	Strongly Agree
Knowledge sharing will improve work procedures in the department in particular	4.64	0.61	3	122.863	3	0.000	Significant	Strongly Agree
Knowledge sharing will help the university achieve its goals	4.57	0.68	4	107.020	3	0.000	Significant	Strongly Agree
Mean	4.66	0.59						Strongly Agree

Table (4.16) shows that :

1. All items of the contribution are significant because the statistical level of it less than 0.05

2. The most important item of this core was the item which says "The Sharing of knowledge will help the faculty members solve problems" with arithmetic mean (4.74), standard deviation (0.53), and the less important item was "Knowledge sharing will help the university achieve its goals" with arithmetic mean (4.57) , and standard deviation(0.68).

3. The general mean (4.66), denotes that there is a contribution to sharing your knowledge with others in your university

Question Three: What do you expect to gain from sharing your knowledge?

Table (4.17): The Arithmetic mean, standard deviation, rank and chi-square test of the factor Expected Reward

Statement	Mean	Standard deviation	Rank	Chi-Square	Df	Statistical significance	Interpretation	Result
University offers monetary rewards in return of knowledge sharing	2.51	1.27	2	13.784	4	.008	Significant	Disagree
University awards opportunities for promotions and job stability in return of knowledge sharing between faculty members	2.75	1.6	1	9.471	4	0.05	Significant	Neutral
Academic leaders at the University support knowledge sharing between faculty members through scientific conferences and events.	2.42	1.01	3	34.471	4	0.00	Significant	Disagree
Mean	2.56	1.09						Disagree

Table (4.17): shows that :

1. All items of the expected rewards are significant because the statistical level of it is less than 0.05

2. The most important item of the expected rewards was an item which says University awards opportunities for promotions and job stability in return of knowledge sharing between faculty members" with arithmetic mean (2.75), standard deviation (1.06), and the less important item was "Academic leader at University support knowledge sharing between faculty members by scientific conferences and events." with Arithmetic mean (2.42) , and standard deviation(1.01).

3. The general mean (2.56), denotes what you expect to gain by sharing your knowledge?

Question four: What is the influence of leadership on knowledge sharing among academics?

Table (4.18):The Arithmetic mean, standard deviation, rank and chi-square test of the factor learship support

Statement	Mean	Standard deviation	Rank	Chi-square	Df	Statistical significance	Interpretation	Result
1. Academic leaders are keen on justice and equity in the treatment of faculty members	2.97	1.28	1	11.039	4	.026	Significant	Neutral
2. Faculty members have a clear view of the role and job requirements in the university	2.26	0.99	4	60.353	4	.000	Significant	Disagree
3. Academic leaders are keen to			3	42.020	4	.000	Significant	Disagree

evaluate and appreciate the opinions of faculty members	2.49	0.96						
4. Academic leaders encourage faculty members for innovation	2.54	1.03	2	36.529	4	.000	Significant	Disagree
Mean	2.56	1.07						Disagree

Table (4.18) shows that :

1. All items of   the leadership support are   significant because the statistical level of it is less than 0.05

2. The most important item of this leadership support was the item which says "Academic leaders are keen on justice and equity in the treatment of faculty members" with arithmetic mean (2.97), standard deviation (1.28), and the less important item was "Faculty members are a clear view of the role and job requirement in university" with arithmetic mean (2.26), and standard deviation(0.99).

3. The general mean (2.56), denotes that the leadership have a negative influence on knowledge sharing between academic staff members.

Question five: What is your perspective of the university's structure of exchanging knowledge ?

Table (4.19):The Arithmetic mean, standard deviation, rank and chi-square test of the factor os

Statement	Mean	Standard deviation	Rank	Chi-square	Df	Statistical significance	Interpretation	Result
1. University provides a collaborative atmosphere in the job environment to consolidate confidence between faculty members	2.80	1.31	3	5.941	4	.204	Insignificant	Neutral
2. University structure supports the exchange of knowledge and experience between faculty members	4.09	1.31	1	66.137	4	0.000	Significant	Agree
3. University structure supports collective work between faculty members	3.44	1.12	2	33.196	4	.000	Significant	Agree
4. Mean	3.44	1.25						Agree

Table (4.19) shows that :
1. Almost all items of this core are significant because the statistical level of it is less than 0.05
2. The most important item of this core was the item which says university structure support exchange of knowledge and experience between faculty members" with arithmetic mean (4.09) , standard deviation (1.31), and the less important item was ". University provides a collaborative atmosphere in the job environment to consolidate confidence between faculty members" with arithmetic mean (2.80) , and standard deviation(1.31).

3. The general mean (3.44), denotes that the respondents have views about the university's structure for exchanging knowledge.

Question Sixth: What types of technologies need to be implemented to encourage academics to share their knowledge in your university

Table (4.20) :The Arithmetic mean, standard deviation, rank and chi-square test the factor of Information technology

Statement	Mean	Standard deviation	Rank	Chi-square	Df	Statistical significance	Interpretation	Result
1. University has an infrastructure for ICT that enables faculty members to share knowledge electronically	2.50	1.30	2	17.31 4	4	0.002	Significant	Disagree
2. University has tools and technology which necessary for sharing knowledge easily	2.35	1.14	3	26.92 2	4	0.000	Significant	Disagree
3. More training to be able to use the tool and technology for sharing knowledge effectively	3.19	1.20	1	26.33 3	4	0.000	Significant	Neutral
4. University has			4	36.62	4	0.000		Disagree

flexible ICT for sharing knowledge adapt to external and internal environment change	2.25	1.07		7				Significant	
5. Mean	2.57	1.18							Disagree

Table (4.20): shows that:

1. All items of the Information technology are   significant because the statistical level of it less than 0.05

2. The most important item of the Information technology was the item which says "more training to be able to use the tool and technology for sharing knowledge effectively" with arithmetic mean (3.19) , standard deviation (1.2), and the less important item was "University has flexible ICT for sharing knowledge adapt to external and internal environment change" with arithmetic mean (2.25) , and standard deviation(1.07).

3. The general mean (2.57) , it denotes that the types of technologies are not implemented to encourage academics to share their knowledge in your university

4.2 Discussion

The main objective of this research was to identify the factors that might affect to knowledge sharing among academic staff in Sudanese public and private universities.

The first research question investigated the academics' attitudes toward knowledge sharing. The influence of attitude toward KS was positive and significant. This result was consistent with other research in the area of knowledge sharing [35]. The findings indicate that someone with a positive attitude to share knowledge would have an intention to share it.

The second research question adedresses the contribution of sharing knowledge with others academics. The responses of participants indicated different benefit s to

share their knowledge with others academics such as improving the university performance as well as achieving personal goals.

To address the third research question , three items were used to measure the construct of expected reward and association. The influence of expected reward and association on attitude toward KS was not significant. This finding is not consistent with the findings of this study they found that reward has an impact on KS[36]

Organizational structure is an important aspect of KS within HEIs in Sudanese universities. It is important to know the academics' perspective towards their university's structure for sharing knowledge. The responses of participants have a positive perspective on how knowledge is facilitated within their universities. They said that their universities were supporting or encouraging knowledge sharing across the university colleges and departments.

Data from the closed question four (RQ4) measured leadership using four items. The influence of leadership on attitude toward KS was negative and insignificant. . This finding is consistent with the findings of Fullwood et al. (2013) who found that leadership was not identified to be central.

Data from the closed question six (RQ6) were collected to determine what types of technologies needed to be implemented to encourage academics to share their knowledge. Participants did not find an effective system that will help them to share their knowledge with each other. Others suggested that it would be more effective if their universities implemented a general electronic academic forum, electronic email systems, and electronic meeting systems.

4.3 The Proposed Model of KS Implementation in Sudanese Universities

based on the results discussed earlier the following is the proposed amodel for the requirements of KS implementation in Sudanese universities. Although based on the results of the factors affect of KS such leadership , rewards system, Information Technology, negatively impacted knowledge sharing at individual levels, its strongly belived that these factors are very important to the implementation of KS at organizational level , for this reason these factor were included in the model of sudanses universities'

Leadership Support

The universities' top leadership is encouraged to provide continuouse support for knowledge sharing in the form of infrastructure development, skills development and transfer, policy and adequate funding.

Rewards System

The universities should consider enhancing the current reward system for knowledge sharing by making provision for adequate budget for incentives and rewards to the academics who are participating in knowledge creation and sharing

Organization Structure

The universities' should provide a structure that allows and supports individuals to interact without barriers in order to cultivate knowledge sharing.

Information Technology Platform

Universities should   implement a general electronic academic forum that includes all faculty members where everyone can share their knowledge. Other suggestions include electronic communication systems, research blogs, electronic knowledge management systems, electronic email systems, and electronic meeting system
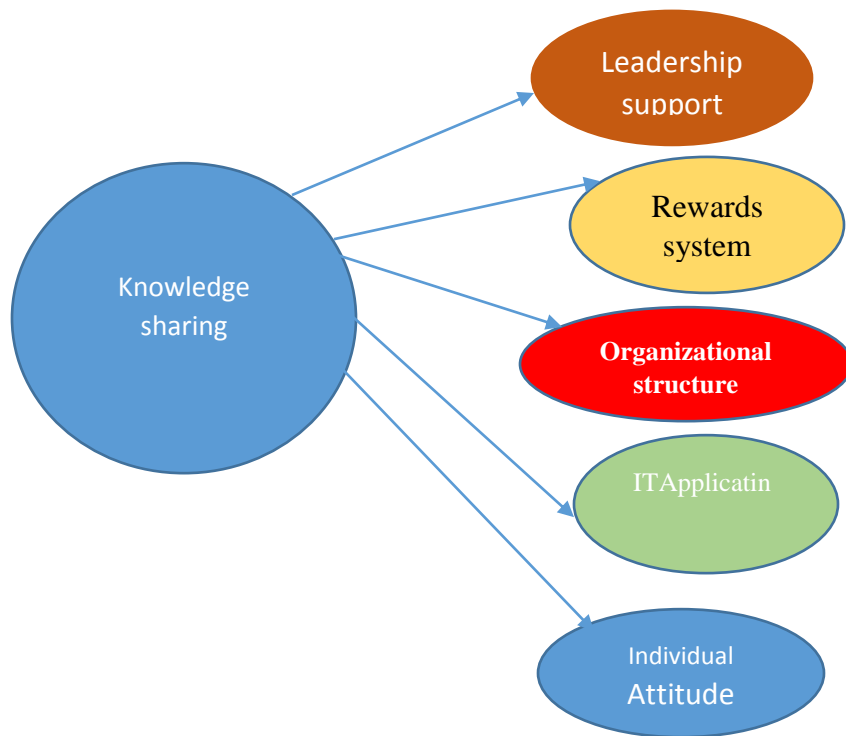
Figure (4.5) Proposed model of KS Implementation in Sudanese Universities

Chapter 5: Conclusions and Recommendations

5.1 Conclusions

The work presented in this research invisagated factors that affect ks in sudanses universities . Data were collected from academics working in public and private Sudanese universities. A survey questionnaire was used to gain a deeper understanding of KS factors. The sample of the study consisted of 102 academics from Sudanese universities. Results from this study may be generalized to a broader Sudanese universities population.

A survey was used to determine the contribution of expected rewards and associations, and expected contribution, leadership, organizational structure, information technology platform, to the attitude toward knowledge sharing . All items were measured by using five-point Likert scales in which a one means "strongly disagree" and a five means "strongly agree."

The study found that the majority of participants have positive attitude toward KS knowledge,as it is more effective. It also found that knowedge sharing has a positive contribution to both the individuals and the universities .It was also found that the organizational structure facilitated the process of knowledge sharing among academics.

The research also concluded that information technology platform not find an effective system that will help them to share their knowledge with each other,and concluded that reward and leadership , information technology have insignificant influence on the individuals' attitude towards KS. prospsed model for factor affect knowledgesharing in sudanse universities based on results

5.2 Recommendations

- Future studies could applied this study on a bigger sample size from another public and private organizations.
- Future research can focus more in-depth on other factors affecting knowledge sharing
- Applying this research in universities. in other countries, in order to understand the impact of certain knowledge sharing factors on different cultures.
- Refine this research using other tools and different samples .
- Applying and test of model for factors affecting knowledge sharing in Sudanese in universities

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Sudan University of Science & Technology

College of Graduate Studies

Dear candidates:

Peace upon you , I, am gratefully inviting you to share academic study for   master degree in Software Engineering under the title Framework for   knowledge sharing in Sudanese universities

Section 1: Demographics Information

I will be grateful for your answering the following questions. Select one of the choices by putting ✓

1- Gender?

1.   Male   2.   Female

2 - Age

1. less than 20   2. From 20 to 30   3.   from 30 to 40   4. above 40

3- Qualification

1.Professor   2.   Associate teacher   3. Assistant professor   4.Lecturer   5. teaching assistant

4- years of work experience as an academic in HEIs?

1.From 2 to 5   2. from 5to 10   3. from 10 to15 4.   above   15

Knowledge sharing

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
kn1	I share with my colleagues new information about courses					
KN 2	I assist new colleagues in gaining experience about effective teaching skills					
Kn3	I share with my colleagues for spreading knowledge between society members through lectures and symposium					
KN4	I share with my colleagues knowledge's about developing teaching methods					
KN5	I exchange with my colleagues research materials and new ideas about scientific research					

Expected Contribution

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
EC1	The Sharing knowledge will help the faculty members to solve problems					
EC2	The Sharing knowledge will create new research opportunities with my colleagues					

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
EC3	knowledge sharing will improve work procedures in the department in particular					
EC4	Knowledge sharing will help the university achieve its goals					

Expected Reward and Associations

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
ER1	University offers monetary rewards in return of knowledge sharing					
ER2	University awarded opportunities for promotions and job stability in return of knowledge sharing between faculty members					
ER3	Academic leader at University support knowledge sharing between faculty members by scientific conferences and events.					

Leader

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
L1	Academic leader are keen on justice and equity in the treatment of Faculty members					
L2	Faculty members are clear view of the role and job requirement in university					
L3	Academic leader are keen to evaluate and appreciate the opinions of Faculty members					

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
L4	Academic leader are encourage faculty members for innovation					

Organizational Structure

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
OS1	University provides collaborative atmosphere in job environment consolidate confidence between faculty members					
OS2	university structure support exchange knowledge and experience between faculty members					
OS3	university structure support collective work between faculty members					

Information technology

		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
IT1	University has infrastructure for ICT enables faculty member sharing knowledge electronically					
IT2	University has tools and technology necessary for sharing knowledge easily					
IT3	more training to be able to use the tool and technology for sharing knowledge effectively					

IT4	University has flexible ICT for sharing knowledge adapt to external and internal environment change					

جامعة السودان للعلوم والتكنولوجيا

كلية الدراسات العليا

ماجستير علوم الحاسوب

الاستبيان

الاخ الكريم / الأخت الكريمـــــــــــة

السلام عليكم و رحمة الله و بركاته أدعوكم للمشاركة في دراسة أكاديمية لنيل درجة الماجستير في هندسة البرمجيات بعنوان عمل اطار عمل لمشاركة المعرفة في الجامعات السودانية أرجو شاكراً الإجابة علي الأسئلة أدناه: -

القسم الأول البيانات الشخصية

الرجاء اختيار خيار واحد بوضع علامة ✓

1. الجنس ؟

ذكر   انثي

2. العمر ؟

اقل من 20   20-30   30-40   40فاكثر

3. الدرجة العلمية ؟

أستاذ   أستاذ مشارك   أستاذ مساعد   محاضر   مساعد تدريس

4. سنين الخبرة في المجال الاكاديمي ؟

2-5   5 – 10   10 – 15   15فاكثر

مجال التشارك المعرفي

لا اوافق بشدة	لا اوافق	محايد	أوافق	أوافق بشدة		رقم السؤال
					اتشارك مع زملائي المعلومات الجديدة حول المقررات الدراسية	1

						رقم السؤال
					أساعد الزملاء الجدد في اكتساب الخبرة حول مهارات التدريس الفعال	2
					أتشارك مع زملائي في نشر العلم والمعرفة بين أفراد المجتمع من خلال الندوات والمحاضرات.	3
					أتشارك مع زملائي المعارف حول تطوير طرائق التدريس	4
					أتبادل مع زملائي المواد البحثية والأفكار الجديدة حول البحث العلمي	5

الاسهام المتوقع

لااوافق بشدة	لااوافق	محايد	أوافق	أوافق بشدة		رقم السؤال
					مشاركة المعرفة ستساعد أعضاء الهيئة التدريسية في حل المشكلات	1
					مشاركة المعرفة تتيح فرص بحث جديدة مع الزملاء	2
					مشاركة المعرفة ستحسن إجراءات العمل في القسم علي وجه الخصوص	3
					مشاركة المعرفة ستساعد الجامعة في تحقيق أهدافها	4

الحوافز المتوقعة والارتباط

لا اوافق بشدة	لا اوافق	محايد	أوافق	أوافق بشدة		رقم السؤال
					تقدم الجامعة مكافات نقدية مقابل مشاركة المعرفة	1
					تمنح الجامعة فرص للترقي والاستقرار الوظيفي مقابل مشاركة المعرفة بين أعضاء هيئة التدريس	2
					تدعم القيادات الأكاديمية في الجامعة مشاركة أعضاء هيئة التدريس بالمؤتمرات العلمية والفعاليات	3

القيادة

لااوافق بشدة	لاوافق	محايد	اوافق	أوافق بشدة		رقم السؤال
					تحرص القيادات الأكاديمية على العدالة والمساواة في معاملة أعضاء هيئة التدريس	1
					أعضاء هيئة التدريس لديهم المام بأدوارهم ومتطلبات عملهم في رسالة الجامعة	2
					تحرص القيادات الاكاديمية علي تقييم وتقدير اراء هيئة التدريس	3

لااوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة		4
					تشجع القيادات الاكاديمية أعضاء هيئة التدريس علي التجديد والابتكار	

الهيكل التنظيمي

لااوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة		رقم السؤال
					توفر الجامعة مناخ تعاوني في بيئة العمل يعزز الثقة بين أعضاء هيئة التدريس	1
					يدعم الهيكل الجامعي ثقافة العمل الجماعي بين أعضاء هيئة التدريس	2
					يدعم الهيكل الجامعي تبادل المعارف والخبرات بين أعضاء هيئة التدريس	3

الأدوات والتكنولوجيا

لاوافق بشدة	لا اوافق	محايد	اوافق	أوافق بشدة		رقم السؤال
					يتوفر بالجامعة بنية تحتية لتكنولوجيا المعلومات تتيح إمكانية التواصل بين أعضاء هيئة التدريس الكترونيا لتشارك المعارف والخبرات	1
					يتوفر بالجامعة الأدوات والتكنولوجيا اللازمة لمشاركة المعرفة بشكل سهل ومرن	2

						استخدام الأدوات والتكنولوجيا بفعالية يحتاج مزيد من التدريب	3
						لدى الجامعة نظم تكنولوجية تتكيف مع المتغيرات البيئية الداخلية والخارجية.	4