CRANFIELD UNIVERSITY

MOHAMED NASSER R ALSHALAAN

A FRAMEWORK FOR ENHANCING KNOWLEDGE SHARING THROUGH SOCIAL MEDIA IN HIGHER EDUCATION INSTITUTIONS IN THE KSA

SCHOOL OF AEROSPACE, TRANSPORT AND MANUFACTURING (SATM)

Doctor of Philosophy
Academic Year: 2016 - 2021

Supervisor: Prof Konstantinos Salonitis
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ABSTRACT

Social media tools have changed the way individuals and academics impart, share content, inter-face, and team up. These days, social media is turning into an important stage for encouraging knowledge sharing and correspondence. The current research focuses on a framework for enhancing of the use of social media for knowledge sharing in higher education institutes (HEIs) in the Kingdom of Saudi Arabia (KSA) by using knowledge-sharing models and theories. The proposed framework was validated in the KSA academic sector. This research used semi-structured interviews with 31 participants from various departments in HEIs. The quantitative data were analysed using descriptive and inferential statistics. The qualitative data were analysed using a thematic analysis approach. The research identifies the factors influencing knowledge sharing through social media based on three aspects: individual, organisational, and technological dimensions. The contribution of this research includes a new framework derived from previous models and theories to investigate the potential factors that influence the use of social media for knowledge sharing. The interpretive structural models were applied based on the factors from the literature review and the findings from interviews. The findings lead to the development of a framework for the development of the knowledge-sharing process through social media in KSA HEIs. The proposed framework was validated using experts' feedback. An interpretive structural model (ISM) as presented for a better understanding of the relationships among the critical factors. The ISM model contributed to the development framework of knowledge-sharing factors through social media. The proposed framework has the ability to identify potential factors and improve the knowledge-sharing process through social media. This research will help educational institutions to know how to support the use of social media tools for knowledge-sharing purposes by focusing on critical factors.

Keywords:

Knowledge Sharing (KS); Social Media (SM); Interpretive structural modelling (ISM), Critical influential factor (CIF), Higher education institutions (HEIs), Kingdom of Saudi Arabia (KSA).

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LIST OF ABBREVIATIONS

KS	Knowledge Sharing
HEIs	Higher Education Institutes
KSA	Kingdom of Saudi Arabia
SM	Social Media
ISM	Interpretive Structural Modeling
SNS	Social Networking Sites
ICT	Information Communication Technology
SEM	Sequence Equation Modelling
PU	Perceived Usefulness
IFs	Influential Factors
SET	Social Exchange Theory
TPB	Theory of Planned Behaviour
UGT	Uses and Gratification Theory
TRA	Theory of Reasoned Action

1 INTRODUCTION

1.1 Background of the Research

Throughout the years, the development and advancement of social media tools have resulted in massive positive implications for many aspects of society. This includes easing the execution of activities that appear difficult. Social media continues to revolutionise how academics and researchers engage in knowledge sharing in an unbelievable way (Kinsey, 2010). It has resulted in major accomplishments that could not be easily actualised when traced decades back. Social media tools are considered to have paved the way for many people across the globe to connect, locate, make friends, solicit support, share ideas, and most importantly, mobilise people who have similar interests (Majchrzak, Faraj, Kane & Azad, 2013). It is imperative to note that social media tools have redefined the manner in which people share knowledge and information across the globe. People are moving away from traditional approaches of conducting research and embracing social media (Van Dijck, 2013).

According to research in the fields of higher education, social media have significantly impacted how institutions conduct research. Social media tools have made it possible for academics and researchers to access more information than ever before, bringing them increased convenience, and ease in doing research. Mosha, Holmner and Penzhorn (2015) present the view that academics and researchers today can conduct research and share information and knowledge using different means. The entire process is active because irrespective of the channels involved, their needs can be met. Social media tools are techniques considered pivotal to the process of sharing knowledge in research in the 21st century (Beetham & Sharpe, 2013) and could have significant pedagogical potential.

It is important to note that researchers in any given field tend to be quite versatile in the use of social media tools for the purposes of knowledge sharing in their studies. In this regard, the adoption and use of social media tools is an ongoing process among academics and researchers in the modern era (Beetham & Sharpe, 2013). Therefore

there is an increasing interest, consideration and awareness of social media tools by the academic community with regards to enhanced knowledge sharing elicitation and facilitation.

1.2 Problem Statement

Development in social media has been linked to the fourth industrial revolution (Penprase, 2018). Social media is revolutionizing the way people interact with each other that results in knowledge sharing and finding solution to problem in timely manner that was not possible traditionally (Filo et al., 2015). Modern platforms of social media tools have move beyond traditional social networking sites such as Facebook, Twitter, Snapchat to include platforms such as WhatsApp, video and picture sharing applications such as Snapchat, Instagram, WhatsApp, video and picture sharing applications such as YouTube, Myspace, Snapchat, blogs, Wikis and podcasts (Ahmed et al., 2019: Natarajan, 2017). There exists consensus among scholars about significance of social media as an important and productive mean of knowledge sharing (Mbasera, 2019). Open forum nature of social media supports rich information sharing platform for experts. However, studies surrounding the use of social media for the purpose of knowledge sharing is in its infancy stages (Ahmed et al., 2019: P2). Moreover, it is also argued that there exists ambiguity among scholars about the implications and purpose of social media as a knowledge sharing tool (Mbasera, 2019: P8). Similarly, there exists gap in literature surrounding the ways social media can be used by individuals and groups to share knowledge (Mbasera, 2019: P8). Additionally, issues related to ICT infrastructure, lack of willingness to use social media for sharing knowledge and lack of trust are key hurdles creating towards use of social media for knowledge sharing platform among both private and public sector organizations (Dahri and Yunus, 2018). On the other hand, extant literature on role of social media for knowledge sharing largely focuses on enterprises in the western countries (Alshahrani and Pennington, 2019: Kim et al., 2015: Razmerita et al., 2016), and little is known in the context of the developing countries such as Saudi Arabia. Therefore, this study aims to fill the void in the extant literature through identifying barriers in the use of social media for knowledge sharing in the HEIs in the Saudi Arabia.

1.3 Significance of the Study

The field of academia, especially higher education, is of special interest in this study as social media tools for knowledge sharing present an opportunity in the process of conducting research and teaching. Owing to the fact that use of social media tools in the academic area has been on the increase, it is vital to explore and develop an understanding of their utility and efficacy as a tools for knowledge sharing among academics in higher education intuitions (Panahi, Watson & Partridge, 2012). Social media tools act as straightforward instruments that academics can use to vary their approach to gathering and sharing knowledge, data and information when conducting studies and teaching. As an example, Facebook and Twitter are social media tools that have simplified communication and stand to facilitate knowledge sharing (Pi, Chou & Liao, 2013). There seems to be a common belief that individuals are apprehensive to share information and knowledge. There are many responsibilities that might be a hindrance to people basically taking the time to share and engage in some kind of knowledge sharing activity (Allee, 2003). In spite of this assumption, numerous investigations have indicated that social media tools have extraordinarily helped and supported the process of knowledge sharing in many fields. The growing use of social media by academics and researchers, especially in higher education institutions, emphasises the need to study and know the nature and pattern of knowledge sharing factors for gaining information and knowledge. Addressing the lack of Saudi studies on the role of social media and its effectiveness in knowledge sharing between individuals and groups will enhance the research in this field.

1.4 Research Motivation

There is a need to understand the factors that hinder knowledge sharing through social media and to develop a framework to investigate the relationship between these factors. To address this issue, some steps need to be followed:

i. Understand and define social media tools for knowledge sharing in higher education.
ii. Categorise social media tools for knowledge sharing in higher education.
iii. Identify the critical success factors and the key barriers in using social media for knowledge sharing and integrate them with the existing theories and models.
iv. Develop a framework to manage the influential factors of knowledge sharing through social media.

1.5 Research Aim, Objectives, Questions and Deliverables

1.5.1 Aim and Objectives

The aim of this research is twofold. Firstly, it aims to investigate the critical factors that influence the use of social media as knowledge sharing platforms. Second aim is to develop a framework to enhance their usage amongst academics in higher education institutions in Saudi Arabia.

The main objectives of this research are to:

i. Identify the current theories and models for social media and knowledge sharing.
ii. Identify the critical success factors and the key barriers in using social media for knowledge sharing.
iii. Develop a framework to develop current social media platforms in order to enhance the knowledge-sharing potential by using interpretive structural modelling (ISM).
iv. Validate the proposed framework to scope its utility using expert feedback.

1.5.2 Research Questions

The research problem can be summarised in the following compound question: “What are the factors that influence knowledge sharing through social media and what is their impact among academics in higher education institutions in KSA?”

More specifically, this research seeks to answer the following research questions:

Q1. What are the influential factors of knowledge sharing through social media in higher education institutions in Saudi Arabia?

Q2. What is the relationship between the influential factors among academic staff in higher education institutions in Saudi Arabia?

Q3. What social media tools are popular among academics in higher education institutions in Saudi Arabia?

1.5.3 Deliverables

i. A clear definition of social media and knowledge sharing in higher education institutions.
ii. A detailed review of social medial tools’ characteristics and categorisation.
iii. A list of the current theories and models for social media and knowledge sharing.
iv. The main factors that affect knowledge sharing through social media tools in higher education institutions in Saudi Arabia.
v. Framework development for the influential factors among academic staff in higher education institutions in Saudi Arabia.
vi. Key findings and conclusions with recommendations for future research.

1.6 Scope Definition

This research will focus on exploring in depth, influential factors among academic staff behaviour in higher education institutions in Saudi Arabia. Greater emphasis will also be placed on social media and how it relates to knowledge sharing. The research will take into consideration academics and researchers in universities in Saudi Arabia. Notably, a new framework will seek to aid the adoption of social media tools for knowledge sharing among academics and researchers. This research provides some suggestions for increasing the use of social media knowledge sharing for academics and educational institution in KSA.

1.7 Overview of Contribution to Knowledge

The research contribution is to offer a deeper understanding of the social media tools used for knowledge sharing among academics in higher education. Social media is considered an area of great interest with respect to its value in academia and industry. The research result could be useful for both researchers and universities.

The main contribution points include:

First: Theoretical contribution:

i. Identification of good practice in social media for knowledge sharing among academics.
ii. Identification of the current theories and models for social media and knowledge sharing.
iii. Social media taxonomy for knowledge sharing among academics.
iv. Identification of all the possible factors affecting social media and knowledge-sharing attitude and intention.
v. A framework to increase the value of social media tools among academics in higher education.

vi. A list of the main factors that affect knowledge sharing in higher education through social media tools.

vii. Examination of the relationship between the key influential factors of knowledge sharing through social media tools by the application of ISM methodology.

viii. This research is considered an important reference for those interested and involved in the areas of research since it studies social media tools, which play an important role in various fields of life among all classes of society.

ix. This research is considered as an important reference to fill the gap in Saudi studies on the role of social media and its effectiveness in knowledge sharing among academics.

x. This research is a contribution to the development of new knowledge for academics who are also interested in understanding the nature of social media uses, tools and various forms.

Second: Practical contribution:

i. The research will help educational institutions to know how to support the use of social media tools for educational purposes by focusing on the organisational factors.

ii. This research contributes by providing some suggestions for increasing the use of social media knowledge sharing for academics and higher education institutions.

1.8 Structure of the Thesis

Chapter 1 – Introduction

This chapter provides a discussion of the background to the research problem; problem statement of the research; the significance of the study; research motivation; aims and objectives; research questions; research deliverables; scope definition; overview of contribution to knowledge and structure of the thesis. The purpose is to provide an overview of the research topic.

Chapter 2 – Literature Review

This is the literature review section, which begins with the background of social media and knowledge sharing, to understand its basic concepts and essential characteristics. The chapter presents the definition of the main terminology of the research 'social media, knowledge sharing' by various authors. The purpose is to establish an understanding of the concept. The chapter reviews the existing work, models and theories in order to identify factors that affect social media for knowledge sharing. The theories and models of social media and knowledge sharing are discussed in this chapter, aiming to provide the theoretical underpinning of the study. Finally, this chapter identifies the research gaps.

Chapter 3 – Research Methodology

This chapter presents the methods of research, including the research design, research philosophy, data collection methods, research models, sampling techniques, method of data analysis. It provides a direction on how to address the research questions.

Chapter 4 – Initial Framework

This chapter focuses on the development of a theoretical framework. It presents the proposed framework for social media and knowledge sharing and identifies the factors that may influence academics in terms of knowledge sharing through social media.

Chapter 5 – Discussion and Analysis

The results of the interview are presented in this chapter, as well as the analysis of the data. The purpose is to directly answer the research objectives identified in Chapter 1.

Chapter 6 - Framework Development

This chapter provides a discussion of the aims and objectives of the social media and knowledge-sharing framework, its desired outcomes, and aspects of implementation and validation of the framework.

Chapter 7 – Conclusion

This chapter provides the conclusion based on the analysis, as well as the theoretical and practical contribution to research knowledge and recommendations for future research.

2 LITERATURE REVIEW

2.1 Introduction

This chapter critically examines the available literature regarding the relationship between social media and knowledge sharing (KS) in general and specifically in Saudi Arabia's High Education Institutions (HEIs). The chapter explores concepts of knowledge sharing, social media, and social media categorisation, focusing on KS's intertwinement and social media use. The chapter examines the theoretical frameworks and models used to explain social media and knowledge sharing. The chapter's focus is on critically evaluating the existing theoretical frameworks and models as well as establishing emerging gaps within the literature relevant to the study topic.

2.2 Literature Review Design

The primary objective of this study is to investigate the potential factors that influence the use of social media platforms as knowledge sharing tools and to develop a framework to enhance their utilisation among stakeholders in the academic field in higher education institutions in Saudi Arabia. This analysis retrieved secondary data sources comprising previously conducted studies from databases. The databases used include ABI/INFORM Complete (ProQuest), ScienceDirect, JSTOR, Scopus, and the Directory of Open Access Journals (DOAJ). Keywords and phrases were used in searching and retrieving relevant sources in this review. A Boolean approach was adopted with operators and limiters to refine the searches to enhance the quality and relevance of the sources employed. The keywords used in this study include academics, social media, knowledge-sharing factors, higher education, and Saudi Arabia. The initial search on these databases resulted in 2,113 sources. Given the scale of this study, this sample was too big for this review, which meant there was a need to refine the search and retrieval process. In this case, limiters were used; which included the time of publication, peer review, abstract, and free text availability.

The time of publication of the sources employed in this review was restricted to between 2010 and 2020. Time of publication is essential because it is used to establish a source's relevance to the current trends and patterns in HEIs as well as the business sector in Saudi Arabia and across the world. This limiter is especially important in this review because social media are continually shifting and advancing, which means that outdated sources might fail to provide the high-quality and relevant information needed. The application of this limiter reduced the number of sources from 2,113 to 1,211. The peer-reviewed limiter was employed to ensure that the sources adopted in this review were of high quality and met the validity and reliability standards. In this regard, this limiter application reduced the number of sources from 1,211 to 512. The presence of an abstract is essential because it allows the targets of the research (objectives), the theoretical frameworks, methodology, and findings to be checked for; this way, the research can establish whether a specific source is relevant to this review. The application of this limiter (abstract) reduced the sources from 512 to 191.

Additionally, the study applied the free text limiter, which allowed sources to be chosen which were available without copyright restrictions or behind a paywall. This limiter reduced the sources from 191 to 112. The study subsequently used purposive sampling to choose the 81 of the most relevant to this review's subject topic.

2.3 Knowledge Sharing

2.3.1 Definition of Knowledge Sharing

The concept of KS refers to how knowledge, information, expertise, or skills are transferred or exchanged among peers, people, families, communities, or within and/or between companies (Al-Kurdi et al., 2018). Some of the core channels through which people share knowledge include meetings, learning sessions, conversations, videos, workshops, and other media platforms (Farrukh et al., 2019). In recent years, the role and centrality of KS have been underpinned by the realisation among organisations that knowledge comprises an invaluable intangible asset in developing and sustaining a

competitive presence in the market. Typically, KS activities are anchored by the knowledge management systems within enterprises (Corcoran and Duane, 2018).

The digital world, including websites and other platforms and applications, plays an essential role in shaping and enabling talent as well as knowledge sharing between teams, organisations, and individuals (Al-Kurdi et al., 2020). The ease of reach, clarity of communication, and the convenience of information flow have been central to KS's growth within organisations, in B2B interactions, and among employees, peers, and competitors.

Over the years various knowledge sharing models have emerged (Islamil and Yousof, 2008). Small and Sage (2005) describes a model as representative of reality. Existing models of knowledge management are theoretical as they merely represent imagined process describing the knowledge management process. Socialization, externalization, combination and internalization (SECI) model is the most traditional models of knowledge sharing proposed by Nonaka and Takeuchi (Nonaka and Takeuchi, 1996). The SECI model proposes four ways by which explicit and tacit knowledge can be created, combined, converted and shared among members in an organization as shown in the figure 2.1 below. Socialization process of SECI model requires face-to-face interaction (Faith and Seeam, 2019: P54), thus cannot be implemented for sharing knowledge in virtual environment. On the other hand, externalisation process of SECI model requires conversion of tacit knowledge into implicit knowledge. Tacit knowledge is what people learns and carry with them such as experience which is difficult to find. Explicit knowledge is the one that is documented thus can be easily transferred. More details explanation of explicit and implicit knowledge is described later in this chapter. Combination element of the SECI model insists on transfer of tacit knowledge into explicit knowledge through socialization process. The process of transfer of tacit into explicit and vice versa, is called internalization.

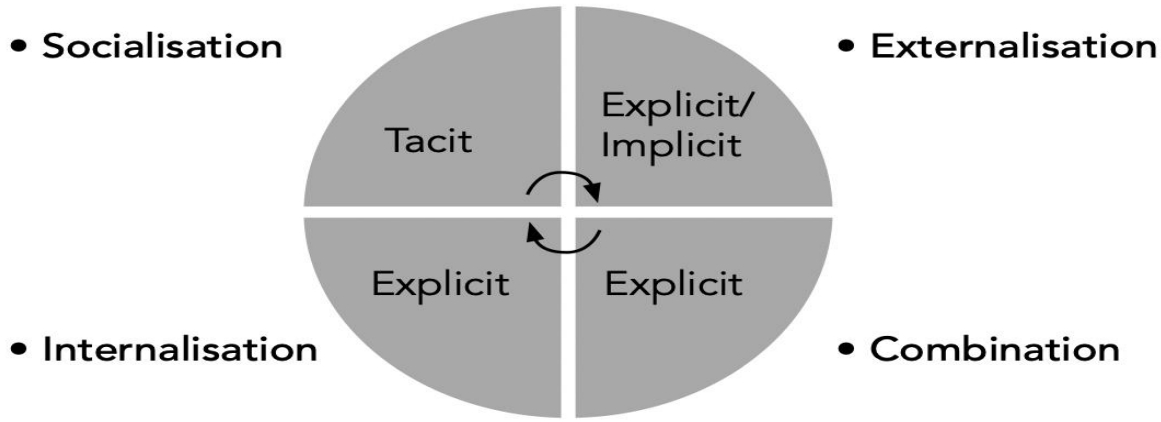


Figure 2.1: The SECI model of knowledge sharing (Faith and Seeam, 2018)

The SECI model is also criticized for failing to identify the impact of culture on the knowledge sharing process (Andreeva and Ikhilchik, 2011). Easa (2012) agrees with Andreeva and Ikhilchik (2011) through highlighting the weakness of the SECI model for knowledge sharing practice in Middle East such as Egyptian banks. To this end, Easa (2012) employed mixed method methodology thorough collecting 210 responses in self-administered survey and 26 semi-structured interviews were conducted with banking officials in the Egypt. Analysis of findings reveals that cultural characteristics of the Middle East such as high-power distance and collectivism negatively impacts socialisation process of the SECI model. Power distance and collectivism are elements of the cultural dimension model proposed by Hofstede (1993). Power distance means the extent to which people in an organization accept inequality in distribution of power. Collectivism impacts knowledge sharing because it promotes socialization only among specific group of people that is close to management.

At the backdrop of criticism of the SECI model, Lodhi (2005) porposed four factor model. According to the Lodhi (2005)'s four factor model flow of knowledge in an organization influenced by four factors such as communication channel, attitude of individuals and groip and organizational culture. Lodhi (2005) insists that effective transfer of knowledge relies upon mutual respect, equality and indiscrimination among group of people. While

Lodhi (2005)'s model does identify the role of culture for influencing knowledge sharing, however it may not suit to evaluate the knowledge sharing in virtual environment.

Farooq (2017) proposes conceptual model for knowledge sharing and its impact on business performance. To this end, author reviewed studies between 1987 to 2017. Review of studies resulted in identification of seven factors that contributes towards knowledge sharing such as organizational culture, organizational structure, reward system, motivation, interpersonal trust, management support and information communication technologies as shown in figure 2.2 below. Farooq (2017: P15) is of the view that organizational culture plays an important role for effective knowledge sharing at both individual and group level. In the nutshell, organizational culture shapes the ground for development, disseminated and legitimization of new knowledge in an organization (Durmusoglu et al., 2014). Similarly, organizational structure defines the degree to which operational activities such as coordination and supervision assists in achieving organizational goals (Farooq, 2017: P15). To this end, author propose that organizations should adopt informal organizational structure to ensure successful knowledge sharing because formal and centralized organizational structure dampens knowledge sharing. Reward system of an organization is considered as an important motivator towards achieving organizational goals (Lee and Ahn, 2005). Rewards should be placed to encourage knowledge sharing.

Similarly, employee needs to be motivated to share their knowledge with others. It is argued that unless employees are motivated to share their knowledge, any investment in infrastructure and technologies would be useless (Noshinfard and Nemati-Anaraki, 2014). Additionally, mutual trust plays an important role towards knowledge sharing as it creates willingness among people to support knowledge sharing in an organization (Rutten et al., 2016). Lack of interpersonal trust could cause hurdles in knowledge sharing because people would feel threatened that they may lose potentially advantage over others. On the other hand, support by top management works as a glue for promoting knowledge sharing (Swift and Hwang, 2013). Management plays major role in shaping the knowledge sharing environment because they are the ones who set organizational structure, organizational culture, reward system, motivation and interpersonal trust among

employees. Finally, information communication technology (ICT) plays an important role in knowledge sharing through supporting documenting knowledge and making it accessible to members of organization through central database (Farooq, 2017: P18). Farooq (2017: P19) adds moderating effect of industry type for impacting relationship between knowledge sharing and business performance. Author is of the view that service industry tends to be more knowledge intensive, therefore knowledge sharing may have more positive impact on business performance comparative to manufacturing industry.

Although, Farooq (2017)'s model provides extensive factors that impacts knowledge sharing vis-à-vis business performance, however author insists that model is of elementary nature and require further refinement and development. To this end, author argues that operationalization of the model needs to be substantiated through further empirical studies. On the other hand, Farooq (2017)'s model does identify role of ICT in knowledge sharing; however ICT role is more organizational centered rather than external one such as social media.

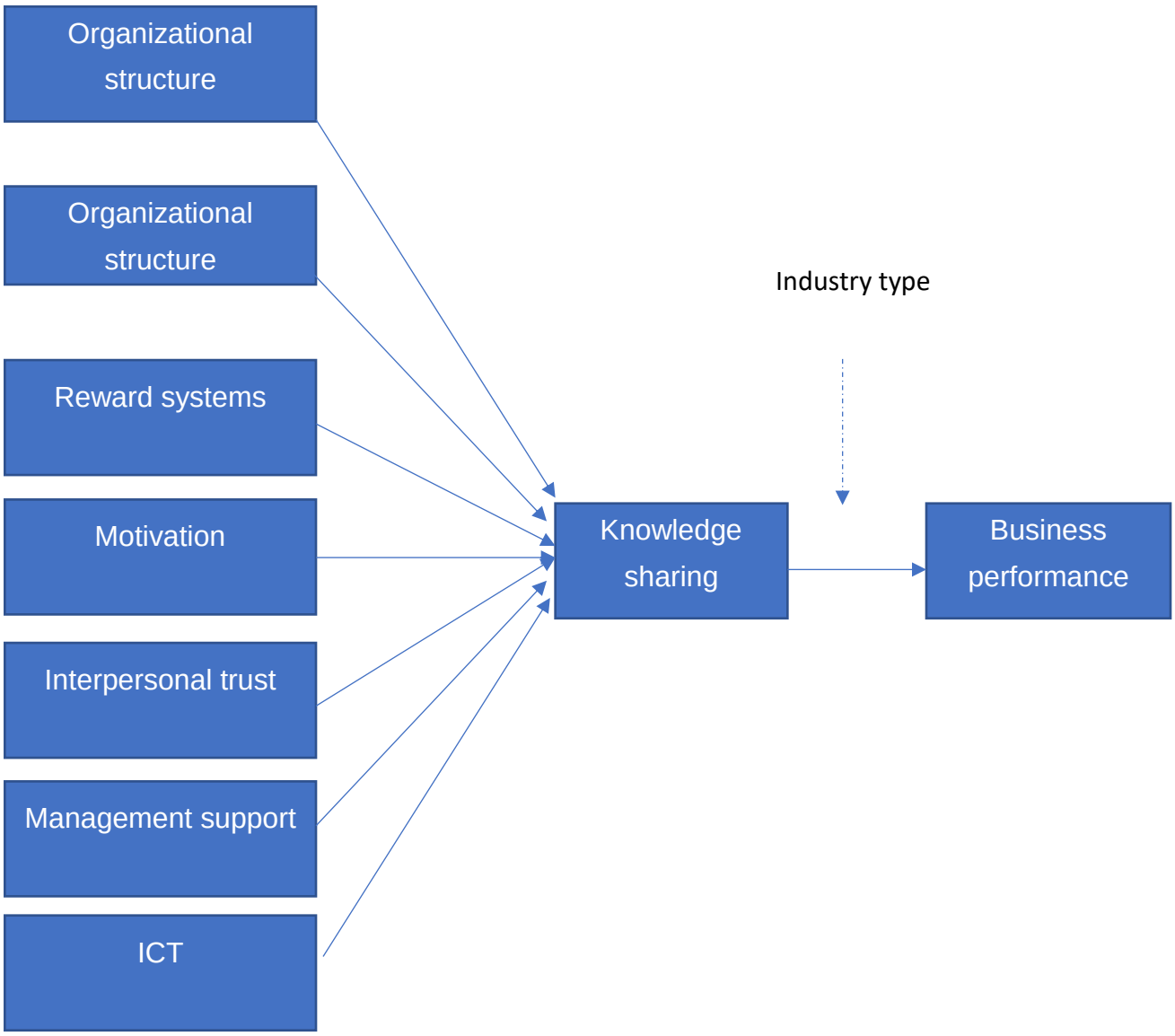


Figure 2.2: Conceptual model for knowledge sharing (Farooq, 2017)

Moderate effect ----------->

Direct effect ——————>

Panahi et al (2012) proposed their conceptual model for knowledge sharing over social media. The model proposed by the Panahi et al (2012) is based on the assumption that social media is suited for sharing tacit knowledge because of their commonalities. For

instance, social media provides space for social interaction for sharing experience, observations, developing informal networking and mutual trust, all of which are needed to convert tacit knowledge into implicit knowledge as shown in figure 2.3 below. Panahi et al (2012: P7) are of the view that combination of factors identified in figure 2 below develops opportunities for effective flow of tacit knowledge in social media spaces.

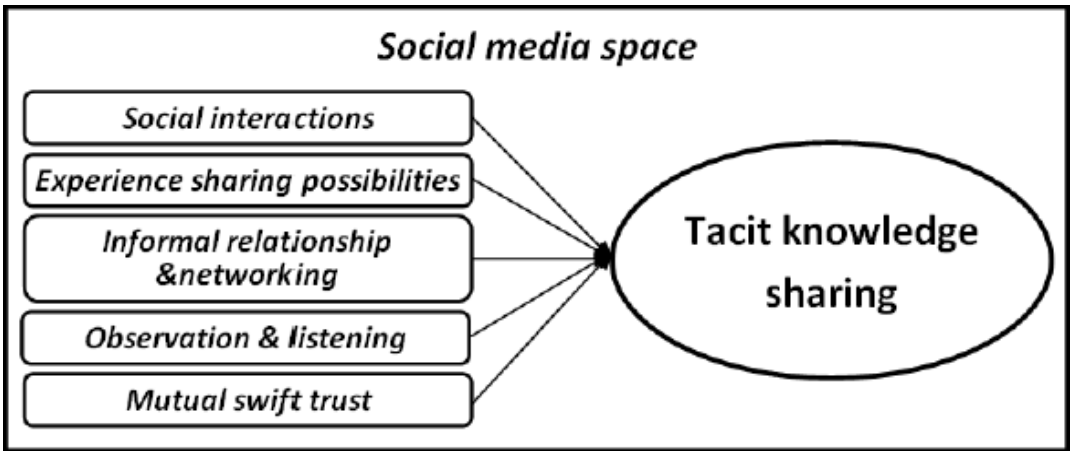


Figure 2.3: Conceptual framework for tacit knowledge sharing on social media (Panahi et al., 2012: P7)

However, Panahi et al (2012)'s model possesses several limitations. Firstly, model lacks empirical investigation to substantiate its claims. Moreover, Panahi et al (2012: P7) hinted on the inconclusiveness of the model to highlight the role of surrounding conditions such as culture for supporting knowledge sharing over social media.

In summary, discussion on various models of knowledge sharing reveals that there is dearth of conceptual models to explain the process of knowledge sharing over social media. Moreover, existing model that does explain the way social media can assists in sharing of tacit knowledge (figure 2), lacks in empirical evidence to generalize. Therefore, there is a need to fill this void in literature through developing and verifying factors that impacts knowledge sharing.

Farooq, R. (2017). Innovation and entrepreneurship in the HEI sector: A conceptual model of knowledge sharing. International journal of innovation science, Emerald publishing limited, PP 1757-2223.

2.3.2 Hierarchy of Knowledge

The hierarchy of knowledge refers to the functional and structural relationship between information, data, wisdom, and knowledge. The interaction among these aspects provides the platforms upon which organisations process information or data for policy formulation and decision-making (Lee, 2018). In this regard, most companies have established targeted processes, procedures, and structures to collect business intelligence, analysis, interpretation, and subsequent actions designed to enhance performance and bolster competitive advantages in the market (Dee and Leisyte, 2017). As illustrated in Figure 2.4, the hierarchy of information shows a pyramid highlighting the transformation of data (business intelligence) into knowledge and wisdom (upon which organisational actions are based).

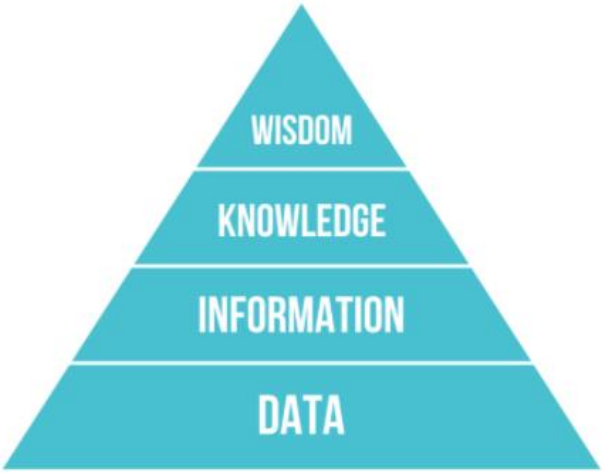


Figure 2.4: The Pyramid (Hierarchy) of Knowledge (Lee, 2018)

Under this hierarchy of knowledge, data are a linguistic representation that can be either true or false. In this regard, the collected or obtained data must be evaluated, analysed, and vetted to allow the institution to establish their veracity, reliability, and validity for core

objectives in the short and long term (Al-Husseini et al., 2019; Annansingh et al., 2018). Data can be regarded as evidence, facts, or suggestions that offer insight into specific issues; however, raw data cannot be used to take action at this stage. Therefore, further processing is needed to refine and evaluate the data to establish trends, patterns, and consistencies that inform decision-making. Under the DIKW model, information refers to "knowledge by description" and is differentiated from data because it is useful and inferred from collected raw data. Therefore, information is created by answering questions such as "how many," "who," "where," "when," and “what". In this regard, these interrogative questions allow the firm to make the collected data useful, thus transforming them into "information".

The effectiveness of the DIKW model within contemporary organisations depends on the internal environment, existing infrastructure, personnel, and the support for the information flow channels. Firms need to be more deliberate in data collection, analytics, and incorporation into their business models to reap the rewards of the hierarchy of knowledge (Corcoran and Duane, 2017a; Androutsos, 2020; Corcoran and Duane 2017b). The contours of knowledge infrastructure and the information flow channels inside and outside organisations need to be developed and continuously maintained to sustain individual companies' edge in the market. In the information age characterised by social media platforms as well as internet-based communication and information flow applications, leveraging KS is essential in gaining a competitive advantage in the market. Figure 2.5 illustrates the DIKW model.

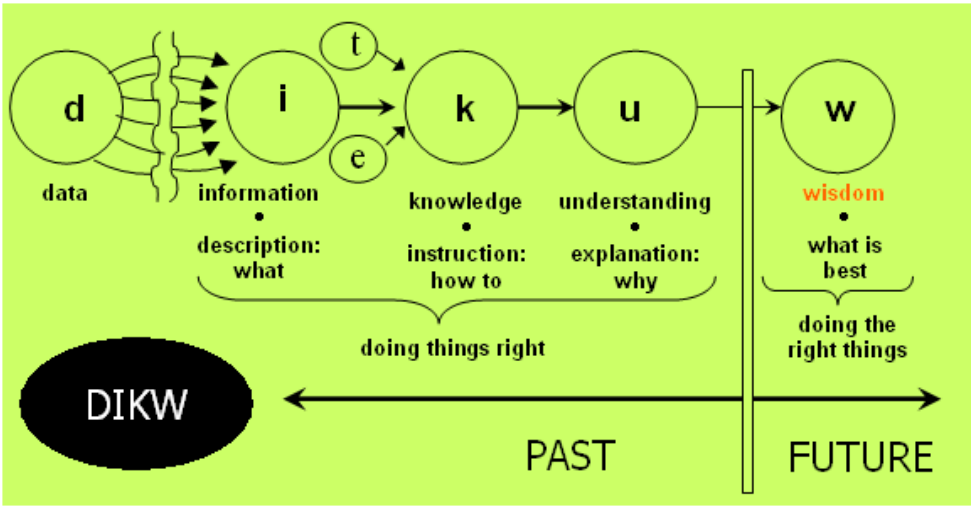


Figure 2.5: Graphical Portrayal of the Knowledge Hierarchy in Action (Elrehail et al., 2018)

2.3.3 Types of Knowledge

Knowledge Management (KM) and Knowledge Sharing (KS) aspects within and outside the organisational structural and functional spheres require an understanding of the types of knowledge (Al-Kurdi et al., 2018). For example, the knowledge collected in a document is managed (storage, retrieval, sharing, and change) differently from the knowledge collected in the form of employee experiences. Understanding the type of knowledge existing in an organisation offers the starting point of utility in advancing a firm's competitive presence and its capacity to adjust to the external environment shifts (Farrukh et al., 2019). Typical KM approaches highlight two types of knowledge – tacit and explicit. Figure 2.6 illustrates the two main types of knowledge that companies, communities, and sectors deal with.

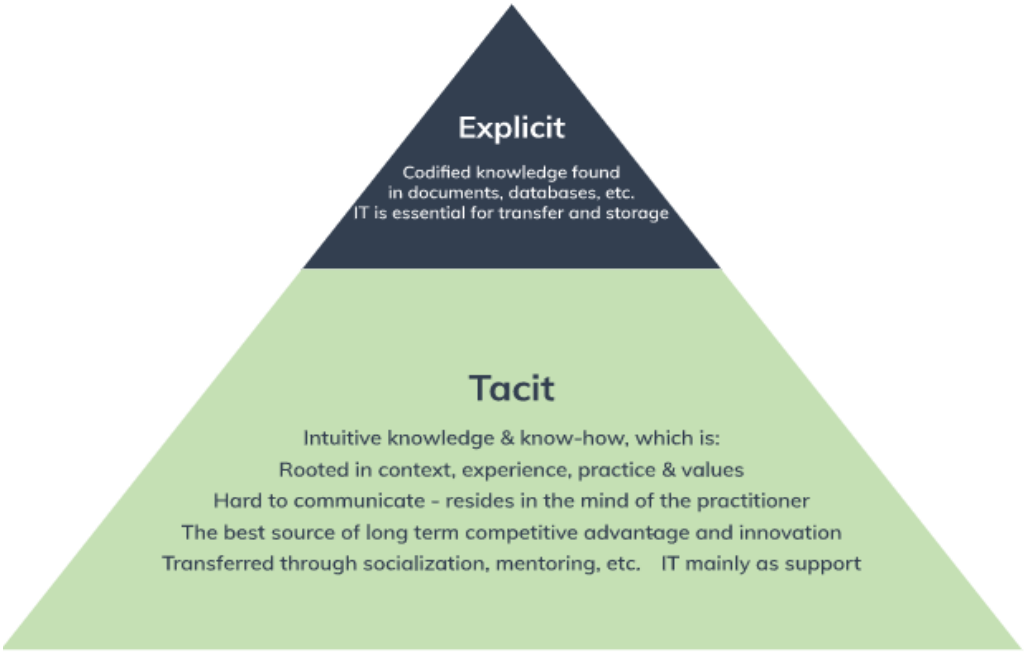


Figure 2.6: Tacit and Explicit Knowledge (Farrukh et al., 2019)

Explicit knowledge is typically formalised as well as codified, and sometimes it can be referred to as “know-what”. In this regard, explicit knowledge can be easily identified, stored, and retrieved for utilisation (Corcoran & Duane, 2017a; Androutsos, 2020; Corcoran & Duane 2017b). As a result, this type of knowledge can be easily shared within an organisation, incorporated into the business model, and monitored to visualise its effectiveness. One of the core managerial responsibilities within an institution is ensuring that such explicit knowledge is effectively collected, stored, and available for employees, managers, and other partners (Corcoran & Duane, 2018).

2.4 Social Media

2.4.1 Definition of Social Media

According to Burnett and Merchant (2011), social media is a term with no universally agreed-upon definition. It is also not a uniform terminology that may be considered consistent with the fast developments in technology and evolving uses and conventions.

Often researchers tend to use terms such as social networking (Livingstone and Brake, 2010), Web 2.0 (McLoughlin & Lee, 2007), social software (Minocha, 2009; Owen et al., 2006), and the internet among others. Researchers in all fields have, over time, embraced social media as interactive applications whereby video sharing (e.g. YouTube), social networking services (e.g. Facebook), forums (e.g. Minecraft forum), image sharing (e.g. Flickr), blogs or microblogs (e.g. BlogSpot and Twitter respectively) and Wikis (e.g. Wiktionary.org) have been widely used in facilitating easy connections, collaborations and most importantly sharing of information (Al-Rahmi, et al., 2015). Sobaci (2015) argues that social media occupies a vital part of the lives of many people across the globe. In this regard, it has broadly influenced the way people communicate with one another as they go on with their day-to-day activities. The recently invented social media technologies and tools allow individuals to scan, extract, and produce global text, video, image and audio content (Akar and Topçu, 2011). Figure 2.7 shows that the content of social media.

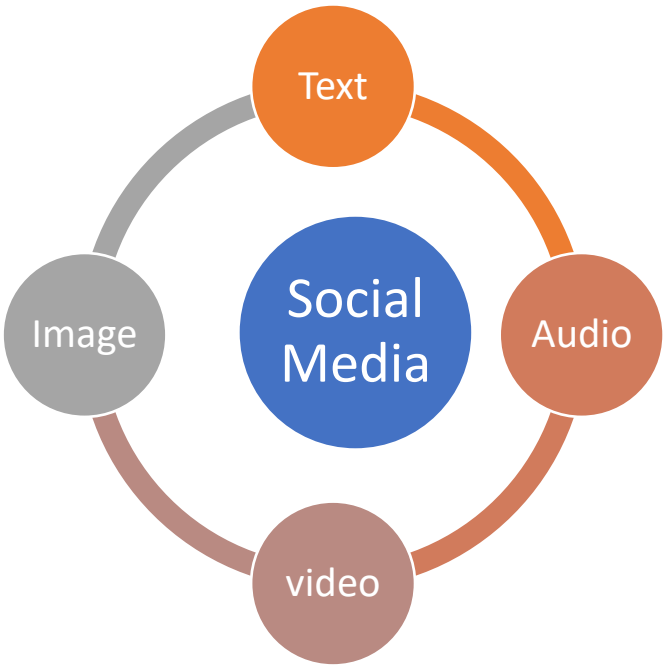


Figure 2.7: Social Media Content (Akar and Topçu, 2011)

A study by Hall (2018) explored the occasions when social media is used for social interaction? Author finds that social media is rarely used for social interaction. Hall (2018: P2) described social interaction as the awareness of the presence of others and consequential behavioral adjustments that people make respond to that awareness. The counter argument of definition of social interaction asserts that people may not communicate interpersonally even if they recognize the extensive knowledge of existence of another person. Based on the two continuums of social interaction, Hall (2018) evaluated results of three studies that asserts that use of social media rarely promotes social interaction. The results of the first study stated that occasional interaction among people over social media does predicts the element of social interaction. In contrast, results of second study reveals that 96.5% of the social interactions among friends does not take place over social media, instead face-to-face medium is preferred. Finally, results of third study records experience of participants of social media and reveals that use of social media and interaction occurs occasionally as merely 2% of the social interaction takes place over social media. Based on the evaluation of findings of three studies, Hall (2018) concludes that social interaction via social media appears to be focused, one-on-one exchanges with closed acquaintances rather than with strangers.

Wright and Hinson (2009) identify social media as tools purposed to facilitate social interaction while making use of highly scalable and accessible techniques of publishing on the internet such as discussion boards, Wikis, status updates, blogs, among other types of Web 2.0 technologies. According to Grosseck (2009), Web 2.0 technologies such as Twitter, Wikis and blogs have, at a fast rate, become ubiquitous providing many powerful and unique information, collaboration, and sharing features that are easily accessible via the net on tablets, computers, and smartphones or through other electronic devices and applications. Despite social media being considered as a potent tool for purposes of knowledge sharing by some academics and researchers, a major gap still exists because of a lack of understanding and knowledge on how social media may enable knowledge sharing. Furthermore, academics and researchers do not know how they can maximise benefits from social media and most importantly how they can tailor various social media tools to meet their specific needs as academics and researchers.

There are several definitions for social media from different studies; a selection is provided in Table 2.1:

Table 2.1: Summary of SM Definitions from the Literature

Authors	Definition
Mangold & Faulds (2009)	"Social media is a hybrid in that it springs from mixed technology and media origins that enable instantaneous, real-time communications, and utilizes multi-media formats and numerous delivery platforms with global reach capabilities".
Henderson & Bowley (2010)	"Social media is collaborative online applications and technologies that enable participation, connectivity user-generated content, sharing of information, and collaboration amongst a community of users".
Kaplan & Haenlein (2010)	"A group of internet-based applications that build on the ideological and technological foundation of Web 2.0, and that allow the creation and exchange of User Generated Content".
Malita (2010)	"Social media are the tools that facilitate the socialization of content".
Malita (2010)	"Social media services encourage collaboration, interaction, and communication through discussion, feedback, voting, comments, and sharing of information from all interested parties".

2.4.2 History and Development

The original concept of social media development focused on establishing a way for people to interact with their family and friends (Matthews, 2016). However, they were later adopted by businesses that sought to leverage the new communication options they offered and, thus, reach out to customers. Social media's core attraction is its power to give businesses and individuals the ability to contact, interact, connect, and engage with people across the world. For businesses, this meant having the capacity to share information with everyone on earth, including their targeted customers, simultaneously (Milne & Ni, 2017). Therefore, recent years' growth of social media has been powered and has partly contributed to the shift in behavioural and attitudinal aspects regarding communication and interaction. These changes have coincided with the emergence of portable technology devices such as laptops, smartphones, and computers as well as the expansion of access to internet connections across the world (Hood, 2018). Social media use is pronounced among younger voters, especially the technology natives such as Millennials and Gen Z.

Across the world, over 3 billion people have signed up as social media users. However, with different interactions, tastes in communication, and mediums of engagement, social media platforms are evolving considerably to meet these different user needs and expectations in the market (Hood & Reid, 2018; Robertson, 2018; Lessard et al., 2017). Pew Research indicates that typical social media users tend to skew younger, with more than 90 per cent of them being between 18 and 29 years (Bowman & Clark-Gordon, 2018). Moreover, the social media platforms users tend to be relatively wealthy and better educated, with an average social media user earning more than $75,000 annually.

2.4.3 Social Media Characteristics

As used globally in general, and specifically in Saudi Arabia, the concept of social media is characterised by specific aspects. Firstly, a social media platform offers web space to its users; this means that it allows users to access free web space to upload content such as photographs, text, or videos. In this case, the leading platforms used in Saudi Arabia

– Facebook, Twitter, and Instagram – provide free access to unlimited web space to upload and store different media types (Hood & Reid, 2018). Over the years more social networks have emerged that includes Snapchat, Instagram, WhatsApp, video and picture sharing applications such as YouTube, Myspace, blogs, Wikis and podcasts. According to research by PEW Research institute Snapchat emerged as a social media platform in 2013 (Utz et al., 2015). Snapchat is mainly used for sending pictures, selfies and snaps from other people. Similarly, Instagram is also a photo-sharing mobile application that allows users to share take pictures and apply filters to them prior to sharing them onto the platform (Lee and Tao, 2021). Alhabash and Ma (2017) found that Snapchat and Instagram are more popular among young generation such as undergraduate students. Alhabash and Ma (2017: P9) compared the motivation behind use of four social media networks among users as shown in the figure 2.8 below. It can be seen in figure 1 that unlike Facebook and Twitter that has information sharing as fifth and sixth motivator respectively, information sharing is the least motivator for Snapchat and Instagram.

	FACEBOOK	TWITTER	INSTAGRAM	SNAPCHAT
1	Convenience	Entertainment	Entertainment	Entertainment
2	Entertainment	Convenience	Convenience	Convenience
3	Passing Time	Medium Appeal	Medium Appeal	Medium Appeal
4	Medium Appeal	Passing Time	Passing Time	Passing Time
5	Information Sharing	Self-Expression	Self-Expression	Self-Expression
6	Self-Expression	Information Sharing	Self-Documentation	Self-Documentation
7	Social Interaction	Social Interaction	Social Interaction	Social Interaction
8	Self-Documentation	Self-Documentation	Information Sharing	Information Sharing

Figure 2.4: Motivation behind use of social media networks for information sharing (*Alhabash and Ma, 2017: P9*)

On the other hand, YouTube and Myspace are content sharing communities used for sharing knowledge through providing live or uploading a prepared video (Natarajan, 2017). In contrast, LinkedIn largely use for creating professional networks (Natarajan, 2017: P727). However, Li et al (2018) LinkedIn possess unique capability for iterative and

progressive knowledge construction platform thus, apart from developing professional network, platform is also used for constructing and sharing knowledge. Similarly, recent emerging technological platforms such as podcasts, blogs and wikis are also dubbed as Web 2.0 technologies that possess distinct technical feature for unleashing passion for knowledge sharing (Natarajan, 2017: P727). Finally, WhatsApp is also an instant mobile messaging platform that enables share information with specific network or networks on the platform (Udem et al., 2020). WhatsApp is largely used by students and academics for knowledge sharing in the form of visuals and text (Adomi and Solomon-Uwakwe, 2019). More detailed discussion on the variety of social media platforms is given later in this chapter.

Secondly, these platforms offer web addresses to their users, who have unique web addresses that help formulate their identities online. In this case, they can use these unique addresses to post, upload, and share all their content employing these web platforms. The unique addresses also enable users to interact as unique entities with identifiers; they also enable users to build their social media brands, cultivate a following, and build up influence that can subsequently be monetised for marketing and promotional activities (Hood & Reid, 2018; Robertson, 2018; Lessard et al., 2017).

Thirdly, in academia generally, and specifically in higher education, social media has assumed increased importance. For example, knowledge sharing is important in the world of research, academia, and lectures. The advent of social media – with its core characteristic of sharing ideas, concepts, and content – has revolutionised the sharing of knowledge in higher education platforms across the world. In this regard, the proliferation of social media use in higher education institutions (HEIs) has bolstered the ability to facilitate communication, group establishments, and idea generation (Chen & Hung, 2010). Therefore, social media platforms for the foundation for upgrading and the knowledge sharing processes, which have been central to assisting academia and scholarly work.

The overarching characteristics crucial to the use of social media by academics in HEIs to share knowledge include the ability of users to build unique profiles, the capacity to

send and receive content, and the platforms' ubiquity across society. For example, academics in Saudi Arabia can share ideas, content, innovations, and out-of-the-box thinking using Wikis, blogs, micro-blogging, and social networking (Wang & Noe, 2010). In this regard, social media has expanded the learning community to include a broad range of people from varying backgrounds. Traditionally, the learning process was confined to the classrooms or the institutions' environments. For example, a student learning in a University in Riyadh, Saudi Arabia, could only access students and experts within the college or the city. However, social media has disrupted this conventional structure (Panahi et al., 2016). Instead, the emerging learning environment has been expanded to include more students, experts, and stakeholders in the country (Saudi Arabia) and beyond across the world.

For example, Wikis allow academics to create content and share it with others interested in particular topics or themes. Moreover, Wikis allow other academics to add knowledge and content based on their understanding, perspectives, and experiences. The net result is a collaborative platform for creating and sharing knowledge among higher education stakeholders. Blogs and micro-blogging allow for extensive knowledge sharing with a broad range of academics (audience) within Saudi Arabia and beyond (Kaplan & Haenlein, 2010; Pee & Lee, 2015). Similarly, media sharing in content communities allows individual learners, academics, researchers, or specialists to share their knowledge with many students within the institutions and/or beyond.

Therefore, the emerging characteristic of social media in HEIs is the surge in content creation, development of knowledge, increase in collaborative working, and the bolstering of knowledge-sharing among academics and other stakeholders. Social media tools and platforms, such as Wikis, micro-blogging, blogs, media sharing, and social networking, have broken down the geographical, social, cultural, and structural barriers that have hindered communication, interaction, engagement, and sharing within the higher education community. In its place, social media has created a flat and horizontally integrated world with in-built knowledge-sharing facilitation (Bilgihan et al., 2016; Shang et al., 2011). This is especially pronounced among HEIs given the emphasis on

knowledge creation through research and innovation, and the need to share such progress with stakeholders, other students, and communities to enhance progress.

2.4.4 Social Media Categorisation

There exist conflicting views of researchers about the definition of social media. Van-Looy (2016) there exists both limited and broader perspectives of definition of social media. The limited interpretation of social media describes it as multiple internet-based applications built on Web 2.0 that supports creation and sharing of user generated contents (UGCs) (Afify et al., 2019). Therefore, limited view definition of social media restricts itself to Web 2.0 and UGC. In contrast, broader definition of social media defines it as a communication tool that uses web and mobile based technologies to turn communication into an interactive dialogue (Van-Looy, 2016: P27). Aichner et al (2021) offers a comprehensive definition of social media through defining it as an umbrella term that uses variety of platforms such as blogs, collaborative projects, enterprise social networks (SN), forums, microblogging, photo and video sharing and others. In summary various definitions of social media conforms that it is an online interactive tool that connect people. Conflicting definitions of social media makes it difficult to classify its tools (Van-Looy, 2016: P27). Van-Looy (2016: P27) classifies social media tools based on theory and common characteristics.

Theoretical classification of social media is based on theories from the field of media research and social processes (Van-Looy, 2016: P27). The social presence theory is one of the key frameworks in the media research field. The roots of social presence theory stems from social psychology theory of interpersonal communication and symbolic interactionism (Cui et al., 2012). Immediacy and intimacy are two underlying concepts of the social presence theory. The immediacy concept concerns with communication behaviors that improves closeness to non-verbal communication. Here non-verbal communication can be linked to digital contents posted on social media. In contrast, intimacy concept of social presence theory concerns with the intimacy of the topic under

discussion. Using intimacy and immediacy concepts of social presence theory, Van-Looy (2016: P27) argues that personalized and synchronous communication on the social media possess the ability to influence behavior of someone. Moreover, it is the involvement of intimacy and immediacy factors in the social media that platform tends to be more personalized than traditional mass communication media such as television, radio and newspapers, thus supports quicker interaction. Moreover, social media allows transmission of large amount of information in relatively quicker manner than traditional communication means with more clarity and knowledgeable facts, hence possess more power to cause behavioral influence. In contrast, social process theories such as self-presentation theory is used to classify social media tools. The self-presentation theory describes an intention to influence the once's perception of other (Bern, 1967). For example, when an individual wants other to see themselves as an outgoing person, then they may post pictures of themselves visiting places. Therefore, social media is used by individuals as an image building tool (Van-Looy, 2016: P28).

Extant literature uses media and social process theories to classify social media tools on the basis of the extent of instant contact and image building technique (Van-Looy, 2016: P28). Table 2.2 summarises the different categorisation found in the literature.

Table 2.2: Classification of social media tools, types and commonalities (Van-Looy, 2016: P30)

Social media types	**Social media tools**
Social communities	Facebook, LinkedIn, Google+ and etc.
Social text publishing tools	Blogs, Wiki, Slide share, Academia and etc.
Microblogging tools	Twitter

Social visual tools	Pinterest, Instagram, Snapchat, YouTube, Podcast
Social gaming tools	Pabbje and etc.
Productivity tools	Survey monkey, Google forms, Qualtrics

2.4.5 Social Networking

Social networks focus on the connection and exchange of ideas, thoughts, and content with others. Increasingly, most users with similar tastes and interests develop networks to share ideas, content, and information with others in styles, themes, and topics of interest (Voorveld et al., 2018). Therefore, users can tailor their social media accounts to develop a network that meets their interests, expectations, and needs (Vannucci et al., 2019). Some standard social networks include Facebook and LinkedIn. ResearchGate is a social network with a more professional focus than the other two. Overall, social networking sites encourage users to carry out three main aspects. Firstly, it enables them to share, post, and respond to each other's content.

The interactive aspect of these social networking tools has crucial in sharing learning experiences, perspectives, and approaches to address emerging issues. For example, Facebook is also used to create learning communities or groups that can engage comprehensively in learning and KS. Trends and patterns indicate that academics within universities can form these groups and platforms to engage and share. Additionally, in Saudi Arabia, the use of social networking to engage in KS occurs within and beyond individual universities. For example, academics engaged in cross-border studies and analyses can use social media platforms to engage, discuss, and exchange ideas and content (Harden, 2012). Some of the other social networking tools used in learning and KS in HEIs include Google+, Edmodo, TedEd, the Connected Educator, Facebook, and Vimeo. These tools are designed specifically to enhance learning and KS aspects, such

as collaborative working, sharing ideas and content, continuous engagement, and peer-review.

Most HEIs in Saudi Arabia and globally have embraced social networking tools as part of their core learning approaches and KS traditions because they offer learners and academics the ability to access more useful information, connect, interact, and engage with learning groups and other educational systems that make the transfer of information (knowledge) convenient and robust. The following table summarises the tools in the first main category that emerged from the analysis and are described in the table.

Table 2.3: Social Networking Tools

Name of tools	Description	URL
Academia.edu	For academics, and researchers, share papers, follow the researchers in a specific field, researchers able to create a profile, upload their research.	www.academia.edu
ResearchGate	For scientists and researchers, follow the researchers in a specific field, researchers able to create a profile, upload their research.	www.researchgate.net
LinkedIn	For professionals, create a profile, share skills and experience, connect with others.	https://linkedin.com/
Facebook	It is one of the largest social network services, create an online topic, share photos and videos, add friends.	www.facebook.com

2.4.6 Blogs

Blogs have increasingly become one of the emerging ways that students in higher education learn, engage, and disseminate knowledge to others in their specific fields of study (Churchill, 2009). Over the last 10 years, blogging has become one of the social media tools that has become available and proliferated in learning institutions, especially among academics in HEIs. Although reports indicate the adoption of social media tools in higher education, especially blogs, few empirical studies have focused on the use of blogs in KS and as part of the learning process among academics and students in these institutions. However, analysis reveals that there has been an acceleration in the shift of mindsets regarding the use of technology in the learning process. As a result, tools such as blogs have been fast-tracked into the mainstream of HEIs' models of operation (Powell et.al, 2012).

In this regard, blogs can be used as statements of fact, records of learning experiences, innovations, for creative thinking, critical perspectives, or research findings. Moreover, blogs can be developed individually or collaboratively. For example, academics and researchers can collaborate to develop blogs focused on specific disciplines, themes, topics, or research areas. In this regard, the content, engagement, and critical analysis provided in blogs offers a crucial platform for academics to discuss and share their perspectives, critical analysis, and knowledge. Studies show the blogs can be used pedagogically – with the use of blog posts as assessment platforms and for examining the progression of students (Majchrzak et al., 2013). On the other hand, academics or a group of learners can maintain blogs focused on disseminating specific types of information and knowledge to other academics and researchers in the university and beyond. Overall, blogs provide a budding and fast-expanding social media tool used in HEIs for KS purposes. The following table summarises the tools in the second main category that emerged from the analysis and are described in the table.

Table 2.4: Blogging Tools

Name of Tool	Description	URL
Blogger	Create content easily, free, variety of topics.	www.blogger.com

2.4.7 Wikis

The integration of technology into the learning process in higher education has seen continuous evolution of knowledge-sharing processes. For example, the traditional classroom setting has been flipped with the use of technology enabling increased involvement of learners in the creation, dissemination, and sharing of knowledge and content (Al Saifi et al., 2016). Wikis form part of the massive transformation of the learning process in HEIs in Saudi Arabia and across the world. In this regard, a Wiki refers to a system that facilitates one or more individuals to develop a corpus of knowledge contained in a set of connected web pages, and subsequently share them with other academics, researchers, or stakeholders in a particular field or discipline. Therefore, Wikis allow users to collaborate add content, delete, modify, or change content directly from the web browsers.

As a KS platform, a Wiki encourages collaboration, allowing users to create, edit, and delete content, ideas, and perspectives. Subsequently, the users can then publish such content on web pages that can be accessed by others on the web. Wikis allow academics to become creators as well as consumers of knowledge (Ma and Chan, 2014). In this case, Wikis have become an excellent resource for informing, shaping, and influencing academics to nurture and develop critical thinking techniques, share knowledge with others, learn from others, and become advanced contributors to group settings and at peer-reviewing information and knowledge advanced by others.

Wikis are used for hybrid or online courses in HEIs in Saudi Arabia. Therefore, these tools are utilised in collecting information, assessment, and fostering collaboration and

engagement among learners and including academics staff in knowledge creation as well. Academic-centred content production, engagement, and sharing are essential for encouraging critical thinking, creativity, and innovation (Hung and Cheng, 2013). Moreover, the created content and ideas can be shared among a broader population of academics and stakeholders, which advances peer-review and broad-based learning within Saudi Arabia and beyond in the global space of higher education. The following table summarises the tools in the third main category that emerged from the analysis and are described in the table.

Table 2.5: Wiki Tools

Name of Tool	Description	URL
Wikipedia	Wikipedia is the largest encyclopaedia available on the Web in the world, user-generated, create, add, and edit topics, different subjects.	https://wikipedia.org/wiki/

2.4.8 Content Communities (Media Sharing)

The discussion networks provide ideal platforms for posts that seek to encourage and spark in-depth discussion and engagement among users (Wang et al., 2016). In this regard, users can provide detailed responses in the comment section, which encourages further debate regarding the subject topic. An example of a discussion network is Reddit, which allows conversations to develop and grow organically (Vraga & Bode, 2018). Other discussion networks also allow for social blogging, enabling individuals and brands to utilise Search Engine Optimisation (SEO) and, thus, reach the targeted audience. Using platforms such as Tumblr and Medium offers people and brands fresh approaches to engage with their audiences through written content.

Some of the other content communities broadly used in HEIs include YouTube, SlideShare, and Flickr. The overarching trait of content communities is that they allow users to share multimedia materials on online platforms. For example, videos are an effective medium to transfer and share knowledge and content with others in higher education institutions. For example, YouTube videos are widely used to disseminate lectures, Ted Talks, documentaries, and videos created to cover specific topics, issues, or themes. Once posted, YouTube videos can be accessed by other users in Saudi Arabia and across the world, which allows for the wide sharing of knowledge.

Additionally, content communities also provide specific resources addressing particular aspects or themes for academics to access. For example, individuals interested in marine geology can subscribe to the Scripps podcast; or for those interested in science news, they will need a subscription to the National Science Foundation's YouTube channel allows them to access news and the latest video posts regarding these themes. Content communities allow for the creation and sharing of knowledge and content by researchers and academics, which are subsequently shared – in the form of mages, videos, slides, podcasts – to other users (either targeted or to others globally) (Corcoran and Duane, 2017a; Androutsos, 2020; Corcoran and Duane 2017b). These communities also allow for debate and discussions using the comments section, ensuring that others can contribute to the specific discourse. The following table summarises the tools in the fourth main category that emerged from the analysis and are described in the table.

Table 2.6: Content Communities Tools

Name of Tool	Description	URL
YouTube	Discover and watch videos, upload and share videos, public and private account, live broadcasting, add comments on the content.	www.youtube.com
Instagram	Create a profile, upload and share photos and videos, private or public account, add	www.instagram.com/

	comments, interact with followers, and follow other users.	
Slideshare	For education and learning, useful content, upload files, store and show files to the users.	www.slideshare.net

2.4.9 Micro-blogging

With the surge of Web 2.0 and the proliferation of technological integration into the learning approaches in Saudi Arabia and globally, micro-blogging has become a broadly accepted and encouraged phenomenon for the creation and sharing of information and knowledge among students and from academics, experts, and individuals with distinct experiences (Annansingh et al., 2018). In this regard, micro-blogging refers to the web services that allow users to create, develop, and share (broadcast) short messages to other users (subscribers) of the services. Micro-posts can be shared publicly with other users, or they can be distributed to private group members.

Micro-blogging – for example through Twitter – allows higher education academics and researchers to share crucial ideas, perceptions, and worldviews with others in these HEIs. This way, they can share crucial knowledge or directions regarding crucial themes or issues in the learning discourse. Micro-blogging can also be used to share links to content communities, Wikis, blogs, or social networks (Al-Husseini et al., 2019). For example, Twitter is widely used by academics and students to introduce, inform, or create awareness about content or themes covered in other social media tools. For example, academics share links to their podcasts, YouTube videos, or blogs (Feiz et al., 2019). As a result, micro-blogging provides a platform to share short precise ideas as well as introducing people to further content, ideas, and perspectives covered, presented, and displayed on other platforms. The following table summarises the tools in the fifth main category that emerged from the analysis and are described in the table.

Table 2.7: Micro-blogging Tools

Name of Tool	Description	URL
Twitter	Create a profile, follow users, and send tweets, limited to 280 characters.	www.twitter.com

2.5 Theories of Knowledge Sharing

Extant literature in the field of knowledge sharing uses variety of social theories to explain the behavioural motivation. These theories include but not limited to personality traits, theory of reasoned action (TRA), theory of planned behaviour (TPB), social capital theory, social cognitive theory, social identity theory, uses and gratification theory and social exchange theory (Zhao and Deltor, 2021: Jadin et al., 2013: Kircaburun et al., 2020: Kwahk & Park, 2016: Diriye, 2019: Almuqrin and Mutambik, 2021: Kim et al., 2020). Most of these theories explains link of social interaction for extrinsically and intrinsically motivating individuals to involve in knowledge sharing practice (Mbasera, 2019). According to Orhun and Hoople (2008) behavioral theories are useful starting point to identify the circumstances that organizations use to promote knowledge sharing. Discussion below provides brief discussion in relevant theories in the domain of knowledge sharing.

2.5.1 A Review of Theories for Knowledge Sharing

2.5.1.1 Personality Traits

Individuals are both main source and principal agents of knowledge sharing (Lofti et al., 2016). The activity of knowledge sharing cannot take place without collective act, thus emphasis the significance of personality traits dimensions for knowledge sharing. Deng et al (2017) are of the view that accessibility of information shared on social media is largely restricted by users. For instance, individuals may restrict access to information

among key contracts, friends and specific group (Nisar et al., 2019). In simple words, users of social media possess control over what information they share and accessibility of the information to people. Extant literature relates personality as an important tool for sharing information on social media (Deng et al., 2017). Rubin (1993) also agrees with Deng et al (2017) through suggesting that personality related differences impact the motivation of individuals to use media. Personality is described as a dynamic system that generates patterns of behaviour, thoughts and feelings (Costa et al., 2019). Funder (2012) links personality to emotional state that impacts individual's attitude and interpersonal processes. Personality traits differs from person to person because every individual possesses different background and social experiences. Therefore, individuals with different personality tends to have different attitude towards sharing knowledge and information on social media (Lofti et al., 2016: P4). To this end, extant literature uses big five personality traits framework to evaluate the information sharing behaviour generally (Lofti et al., 2017) and on social media specifically (Kircaburun et al., 2020).

The big five personality traits dimensions consists of factors such as agreeableness, conscientiousness, extraversion, neuroticism and openness to experience (Gupta, 2008). Agreeableness is exemplified by being helpful, cooperative and compassionate towards others. People with extraversion personality traits show greater degree of sociability, assertiveness and talkativeness. Neuroticism exemplified by being emotionally stable with ability to control impulse and anxiety. Openness concerns with strong intellectual curiosity and preference for novelty. Finally, conscientiousness is about being disciplined, organized and goal oriented (Komarraju et al., 2011).

Nishanthi and Munasinghe (2020) argues that there exists lack of studies that investigates the impact of personality traits on online knowledge sharing behaviour in the non-western context. To this end, authors conducted study to investigate the role of personality traits for knowledge sharing on social media among undergraduate students in the Sri Lanka. Author also used interpersonal trust as a moderating factor for impacting knowledge sharing among people with different traits. Using stratified random sampling technique, authors collected 322 responses from undergraduate students. Results of statistical analysis revealed that traits such as extraversion, openness, neuroticism and

conscientiousness are associated with online knowledge sharing without having any effect of interpersonal trust. Similarly, Lofti et al (2017) in their study also investigates the role of personality traits and trust for impacting knowledge sharing behaviour on social media of Chinese youth through conducting an online survey. Findings concludes that both personality traits and traits significantly impact information sharing behavior on social media. Like Nishanthi and Munasinghe (2020), Lofti et al (2017) also founds that trust moderates the relationship between personality traits and knowledge sharing. To the best of the knowledge of the author of this thesis, there exists no study that investigates the relationship between personality traits and social media knowledge sharing in the context of the Saudi Arabia. Dukhaykh (2021) investigates the degree to which personality traits such as innovativeness, competence in interpersonal relations and extraversion impacts propensity of opinion leadership on social media in the Saudi Arabia. To this end, author collects 321 responses from social media users. Analysis of findings concludes that people with high degree of innovativeness and interpersonal relationship competency becomes opinion leaders in social media. However, extroverts found to have no effect on the propensity to become opinion leader on social media.

Big five personality traits have gained recognition for identifying the attitude and perception of individuals in variety of field such as marketing (Caliskan, 2019), knowledge management (Lofti et al., 2016: Rahman et al., 2018), sociology (Buecker et al., 2020) and other fields. However, theory also comes with various limitations. For instance, inability to address the constructs of personality beyond the functioning of specific traits (McAdams, 1992). Inability to describe the influence of personal lives of individual that results in shaping certain personality. Finally, big personality trait theory disregards contextual nature of individual experience for shaping their experience (Horwood and Anglim, 2017).

2.5.1.2 Theory of Reasoned Action (TRA)

The analytical focus of the Theory of Reasoned Action (TRA) is to examine and explain the interaction between attitudinal and behavioural constructs of human actions. Therefore, as illustrated in Figure 2.9, the TRA is employed in forecasting individual

conduct based on pre-existing behavioural intentions and attitudes (Zhang et al., 2020). Expected outcomes typically drive a person's decision to engage in a specific mannerism or adopt a particular attitude in light of their display of behaviours (Ahmed et al., 2019). In this case, the TRA focuses on voluntary human behaviour by examining the underlying motivation to carry out a specific action. According to this model, an individual's intention to perform a specific behaviour is a robust predictor of whether or not they will proceed to perform such conduct.

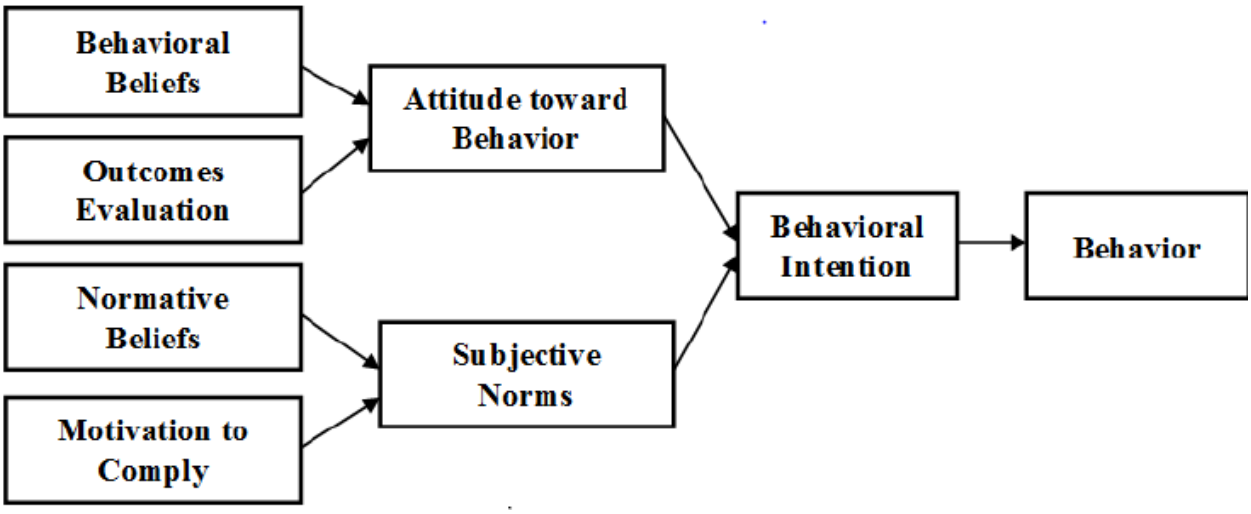


Figure 2.9: Theory of Reasoned Action (Ahmed et al., 2019)

Moreover, the model also indicates that normative aspects, such as social norms informing the specific act, play a crucial role in shaping the decision about whether the individual performs the behaviour or not (Fauzi et al., 2018). Therefore, the emphasis of the TRA is the individual's intention which precedes the actual behaviour. In this regard, the TRA can be applied to predict a person's intention to interact with others using social media and their willingness to share knowledge with others within an organisation or a sector (Razmerita et al., 2016). Therefore, the TRA can provide an insight into the intersection between social media and knowledge sharing. This underscores the most critical area for businesses that have made investments in facilitating KS and social media's embrace as a crucial communication, interaction, and engagement platform for its employees and other stakeholders (Kwahk & Park, 2016).

In Saudi Arabia, social media are considerably shaped by the normative aspects underpinned by Islam and the Muslim culture in the country (Al-Qaysi et al., 2020). Moreover, normative political aspects surrounding challenging authorities and freedom of expression are crucial players shaping the country's discourse (Chen & Luo, 2017). Therefore, in the corporate sector, organisations need to nurture and develop a knowledge-sharing culture, using social media platforms, that is consistent with the local normative concepts and attitudes towards behaviour (Anwar et al., 2019). In this regard, social media platforms are reflections of the local culture. Therefore, there is no universal approach to social media and KS; instead, Saudi businesses should tailor their use of these media platforms to the local sociocultural constructs and respond to the needs and expectations of their stakeholders within the country (Nguyen et al., Anwar et al., 2019; Chen & Kuo, 2017).

Like any other theory, TRA also comes with some limitations. TRA claims that an individual's intention to engage in certain behavior provides good predictor of their behavior (Mbasera, 2019). To this end, it is assumed that behavior that an individual commits violates the individual. It means that an individual tends to always have control on whether or not to perform an act. Mbasera (2019: P23) argues predictive power of the TRA suffers for identification of behavior that are not under the total violation control of behavior. Additionally, TRA has been criticized for lacking to identify the role of external factors that causes violation of individual's behavior (Madden et al., 1992).

2.5.1.3 Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) is closely related to the TRA because they both seek to predict human behaviour, establishing the likelihood of a person engaging in a specific behaviour. However, the TPB model focuses on predicting and understanding conduct; it argues that behaviours are mainly influenced by intentions which are, in turn, determined by three main factors: subjective norms, attitude toward behaviour, and perceived behavioural control, as illustrated in Figure 2.10. In this model, crucial variables shape its application; these include normative beliefs versus subjective norms as well as control beliefs versus perceived consumers' behavioural intention versus conduct (Anwar

et al., 2019; Chen & Kuo, 2017 and Nguyen et al., 2019). Normative belief refers to people's perceptions of normative social pressures. In contrast, subjective norms refer to an individual's perception of the specific behaviour affected by other people's judgment close to them, such as parents, friends, teachers, and spouses.

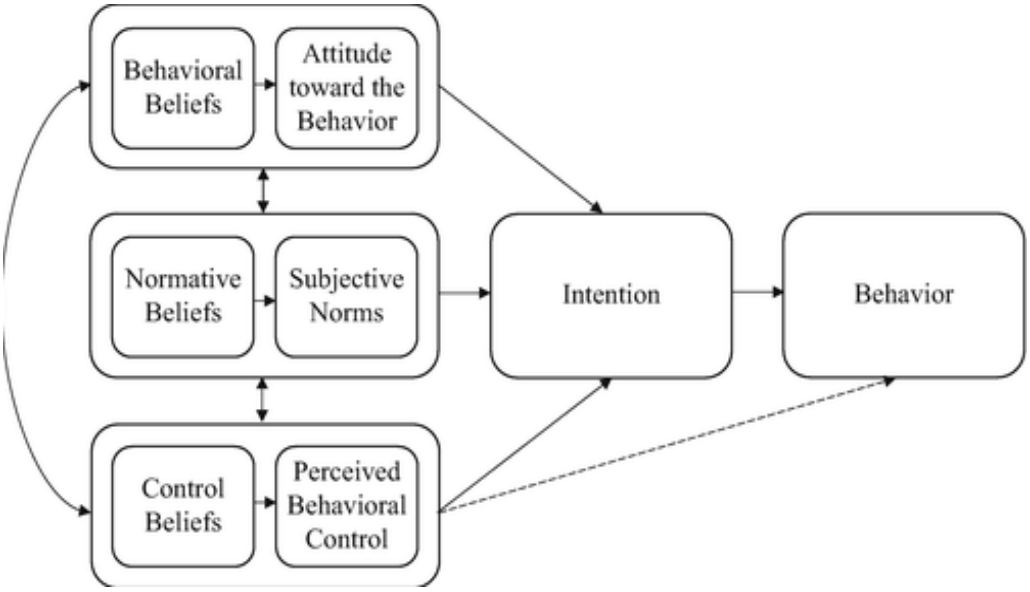


Figure 2.10: Theory of Planned Behaviour (Nguyen et al., 2019)

Control beliefs refer to a person's beliefs regarding the presence of aspects that might influence or hinder the performance of a particular conduct. In contrast, perceived control of conduct refers to an individual's perception of the ease or difficulty of performing a specific behaviour (Fauzi et al., 2018). On the other hand, behavioural intention refers to the indication of a person's willingness and readiness to execute a specific behaviour. In contrast, behaviour refers to an individual's observable response in a given situation concerning a particular target (Zhang et al., 2020). The TPB's overall assertion is that organisations and individuals need to establish social media use and knowledge-sharing platforms aligned with favourable attitudes toward behaviour, moral norms, and an individual's moral correctness (Kwahk & Park, 2016). In turn, the alignment will enhance the strength of the intention to perform (using social media and knowledge sharing), allowing the subject firm to meet its core targets.

However, TPB also appears to have some limitations, particularly regarding its exploratory power for identifying determinants of knowledge sharing behavior (Mbasera, 2019: P24). Additionally, extant literature advocates inclusion of other theoretical frameworks such as social capital theory to enhance the explanatory power of the TPB (Mbasera, 2019: P24). Similarly, Samad (2018) is of the view that relationship between TPB and knowledge sharing is moderated by distributive justice. Ajzen (2002) also agrees with Samad (2018) through suggesting that relationship between components of TPB and knowledge sharing is contingent to moderating factors. Here moderating factors involves individual motives that motivates individuals to share knowledge. The motivational factors include justice, fairness and satisfaction. Therefore, it is important for an organization to ensure organizational fairness to create culture of knowledge sharing.

2.5.1.4 Social Capital Theory

The concept of social capital is used to explain the relationship between adoption of social media and informal structures needed for knowledge sharing (Jarrahi, 2017). The social capital theory describes social capital as consequential resources that come to fore as a result of social relationship (Putnam, 2001). Nahapiet and Ghosal (1988) identifies three dimensions of social capital such as structural, relational and cognitive. The Structural dimension of social capital concerns with the patterns of the social network such as group of people communicating with certain individuals, ease of joining the network, and configuration of network. In contrast, relational dimension of social capital involves the type of relations that individuals develop via their interactions. Example of relational dimension involves friendship that individual develops in society, workplace or on virtual communities. Finally, cognitive dimension involves the similar thinking that members of particular group develop which is used for the purpose of interpretation of social happening. Each of these dimensions are interdependent for creating knowledge. For instance, structural dimension of social capital paves way for social interaction that results in sharing tacit knowledge. However, frequent interactions are required to strengthen the bond through creation of mutual trust and understanding. Emergence of relational dimensions also results in creating willingness among members to share and seek knowledge from each other in the group. According to Chang et al (2012) prolonged

interactions among group members further strengthened the trust among members whereby every behave trustworthily thus constructing social norms and cognitive understanding.

Diriye (2019) investigates the way higher education institutes in the Saudi Arabia can improve knowledge sharing practices through cultivating social capital among their employees. To this end, author targets higher education institutes in the Saudi Arabia and conducted semi-structured interviews and survey to assess the applicability of social capital theory for knowledge sharing. Findings indicates that trust, social interaction, involvement and rewards plays vital role for promoting knowledge sharing. Similarly, Akhavan et al (2015) examines the casual relationship between enablers of knowledge sharing outcomes among research and development teams in Iran. To this end, authors collected 230 responses from employees. Analysis of findings reveals that elements of social capital theory such as social interaction, trust, reciprocity and relational identification significantly impacts knowledge sharing practice among members of research and development teams in Iran. Author further adds that development of social capital is pretext for knowledge sharing intention among individuals. Santos et al (2021) investigates the benefits of integrating knowledge sharing, social media and social capital theory. To this end, author employs qualitative study and reviews twenty-two literature to conduct content analysis. Findings reveals that social media tools supports knowledge sharing through developing virtual social capital. Author states that social media channels promote knowledge sharing through leveraging social capital resources such as network ties, trust and shared aims. Santos et al (2021) further states that social media is a powerful tool for knowledge sharing because it fuels innovation and generate competitive advantage through effective knowledge management.

However, there exists empirical evidences that denies the role of elements of social capital theory for supporting knowledge sharing. Bakker et al (2006) investigates the role of trust for developing knowledge sharing relationships to support new product development projects. To this end, authors conducted survey targeted 91 members of twenty-three teams charged with responsibility of new product development projects in the field of space science. Analysis of findings reveals that trust is a poor explanatory

factor for knowledge sharing. Authors concludes that social capital does not reside in trust instead, it is the membership of team that is necessary for knowledge sharing particularly in longer-lived teams. Similarly, Cai et al (2020) in their study examines the mediating role of social capital for tacit-knowledge sharing among Chinese firms. To this end, authors collected 209 responses from employees working in multiple industries in China. Analysis of data reveals that social capital does positively impacts intentions to share tacit knowledge. However, structural and cognitive elements of social capital were found to have no role in mediating the path through which social capital influences the tacit knowledge sharing. Analysis of empirical studies presents conflicting views on the role of social capital for knowledge sharing, thus require further investigations.

2.5.1.5 Social Cognitive Theory (SCT)

The social cognitive theory (SCT) defines human behaviour as a result of interaction and interconnection of personal, environmental and behavioural factors (Bandura, 1986). Therefore, SCT argues that individual's learn behaviours by interacting with others but adds that behaviour is also influenced by social and environmental factors that includes psychological outcome expectancy determinants, environmental determinants, observational learning and self-efficacy (Jacobs et al., 2012). Therefore, SCT moves beyond personal and cognitive factors of TRA and TBP respectively to recognize not only the significance of environmental outcomes for influencing behaviour but also embraces the role of cognitive process of self-efficacy for impacting behaviour. The self-efficacy judgement describes individual's ability to execute given type of performance. In contract, outcome expectancy determinant describes individual's ability to anticipate likely consequences such as performance that a behaviour will produce. Various past studies have used SCT to evaluate the behaviour of individuals on social networking sites (Hsu and Chiu, 2004: Yoon and Tourassi, 2014).

Chiu et al (2006) explains the way SCT influences individual's online behaviour. According to the author developing social relations tends to be key cause of people becoming part of online community. Chiu et al (2006: P4) applies SCT to argue that behaviour of people on online communities is shaped and controlled by the social network

and expectation beliefs. The self-efficacy element is necessary to provide individuals with confidence to share knowledge online. Similarly, social influence plays an important role in motivating people towards knowledge sharing.

Almuqrin and Mutambik (2021) tests the link between SCT and knowledge sharing behaviour through focusing on faculty staff in the Saudi higher education. Authors collected 411 responses from Saudi faculty teaching at higher learning institutions. Statistical analysis of data under structural equation model reveals that social system such as community characteristics including altruism and reputation have significant positive impact on knowledge sharing. Authors also found that personal outcomes expectation has moderate positive impact on knowledge sharing. Additionally, self-efficacy element of SCT is also found to be an important predictor of knowledge sharing behaviour of Saudi academics. Based on the findings, Almuqrin and Mutambik (2021) implicates the need for developing professional training tutorials about using social media as a knowledge sharing platform at both departmental and college level. However, Almuqrin and Mutambik (2021)'s study suffers methodological weakness that creates problem for generalizing findings. Furthermore, study also suffers from social desirability and agreement acquiescence biases. On the other hand, Chiu et al (2006: P3) criticized SCT for failing to address the components within social network and their influence on the behaviour of individuals needed for exploring the impact of social networks on knowledge sharing on social media. As a consequence social capital theory emerged to supplement the weakness of the SCT (Chiu et al., 2006: P3).

2.5.1.6 Social Identity Theory

The concept of social identity refers to the self-concept about belongingness to certain community and the emotional value that they attached to their membership of that group (Tajfel, 1981). Zhou (2011) adds that social identity is a state of mind for collectivism. The theory assists individuals to clarify their relationship among self-concept and group. In simple words, people attempt to define their own uniqueness in terms of personal attributes through relating them to those of the group (Homburg et al., 2009). There are three dimensions of social identity theory such as cognitive, affective and appraisal.

Cognitive dimension assists individuals in differentiating perception of identity of their own group with that of other groups. Affective dimension relates to the affective involvement that is the sense of belongingness to certain community. Lin (2008) argues that strength of affective identity demonstrates individual's loyalty to a group. Finally, appraisal dimension of the social identity theory echoes the perceived value and significance that an individual bestows to his/her membership to certain society.

According to Kim et al (2020) personal online identity reflects unique social persona of individuals in online space. Online social network of individuals demonstrates their unique social aspect through which they recognize themselves as a member of online community (Lee and Jeong, 2012). Degree to which individual collaborates and immerse in social web shapes their digital identity (Kim et al., 2020: P380). According to Yen (2016) digital identity of individuals serves significant role for collaborative interaction and knowledge sharing in online platform. A perceived digital identity fosters motivation for knowledge sharing through helping individuals to improve their reputations and self-esteem. Ernst (2015) is of the view that an individual with large personal online network is likely to active in knowledge sharing on social networking sites.

Kim et al (2020) uses theories of planned behaviour and social identity to investigate the characteristics of individuals that impact knowledge sharing among learning communities over social networking sites. To this end, authors collected eighty responses from the active users of Facebook. Analysis of findings reveals that online personal identity along with online specific and knowledge creation self-efficacies significantly predicts knowledge sharing among users of social media. Similarly, Yen (2016) uses social identity theory in conjunction with social capital and gratification theories to investigate the knowledge sharing intention and collective stickiness intentions of social media users to social networking sites. To this end, author collected 20 responses from the participants of two educational virtual communities on Facebook, targeting teachers and educators. Analysis of results revealed that social capital and social identity significantly impacts educators and teachers' propensity of knowledge sharing intentions that in return promotes collective intentions to stick to the social networking sites. Analysis of empirical

studies above clearly indicates the significance of social identity for sharing knowledge on online platforms.

One of the key drawbacks of social identity theory is its failure to predict cross group knowledge sharing (Vinney, 2019). Key premises of the theory is that individuals would show high level of intentions of knowledge sharing in their own group, thus theory posits that individuals may discriminate outgroup knowledge sharing. However, current literature reveals that cross group knowledge sharing is important for gaining competitive advantage, therefore hoarding knowledge to gain authority, influence and favouritism negatively impact knowledge sharing (Muqadas et al., 2017).

2.5.1.7 Uses and Gratification Theory (UGT)

The TRA's adoption, especially regarding the use of social media and the utilisation of KS, is closely related to the conceptual framework advanced by the Uses and Gratification Theory (UGT), as illustrated in Figure 2.11. This framework seeks to understand the aspects of "why" and "how" regarding people's active choices of the use of social media platforms (Yan et al., 2016). In seeking to understand mass communication, the UGT adopts a positivistic approach anchored in socio-psychological communication traditions and emphasises communication at the mass media scale. In this regard, the UGT argues that users are not passive consumers of media; instead, they have power to exercise over the ways they consume media (Yasir & Majid, 2017). The UGT further argues that media users assume an active role in interpreting and integrating media into their lives.

In the UGT model, social media users, including organisational workforces, actively and deliberately seek out specific social media platforms to meet particular needs. In this regard, organisations can leverage utility-based decision-making to encourage knowledge-sharing, which bolsters value creation (Nguyen et al., Anwar et al., 2019; Chen & Kuo, 2017). For example, in Saudi Arabia, organisations use their employees as the face and spokespeople for their brands (Etemadi et al., 2019). As the use of social media has been bolstered in recent years, its power as a marketing platform has increased tremendously. As a result, using its employees as the face of the brand allows

individual organisations to build their brands around their workers' engagement with the community members.

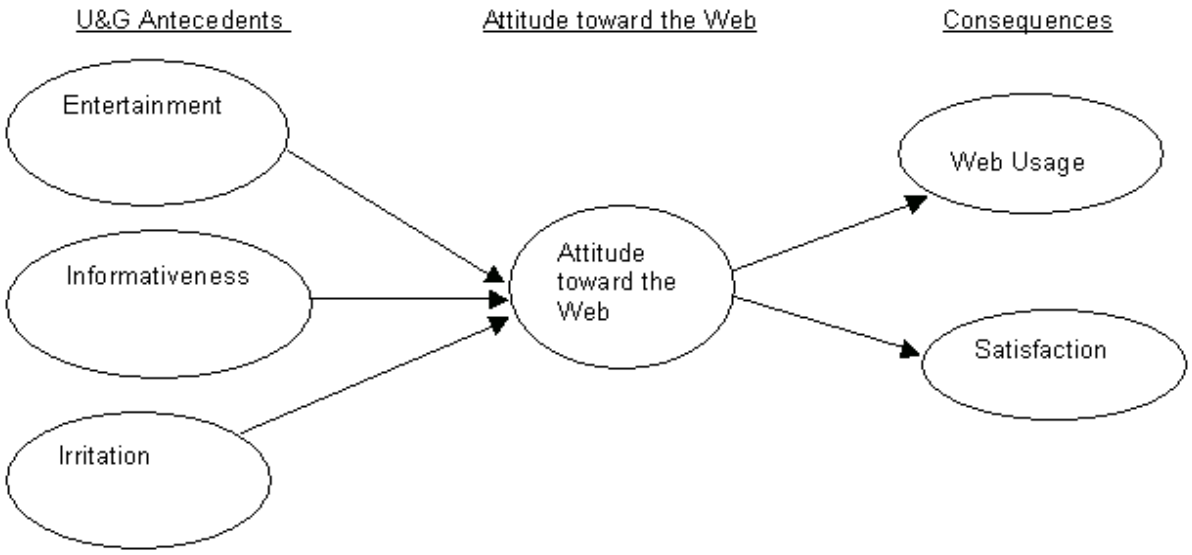


Figure 2.11: Uses and Gratification Theory (Yasir and Majid, 2017)

Moreover, the use of the UGT model in Saudi Arabia is underscored by the move of most of the country's organisations to align their core business models with their consumers' overarching expectations (Gunawan and Gunawan, 2019). Some of these changes include the adoption of sustainability and eco-friendly measures, the focus on Corporate Social Responsibility (CSR), and an increased focus on the engagement of consumers on social media (Nguyen et al., 2019). Aligning a business's core objectives with its consumers and employees facilitates a robust engagement on social media while encouraging knowledge sharing within and outside the enterprise.

Various past studies have used UGT model to evaluate the reasons behind use of social media by people. Whiting and Williams (2013) use UGT model to explore and evaluate the uses and gratification that consumer get through using social media. To this end, authors conducted twenty-five in-depth interviews with people using social media. Findings indicates that variety of reasons for the use of social media such as social interaction, information seeking, information sharing, entertainment, knowledge about

others, expression of opinion and etc. Similarly, Chaung (2015) used UGT model to investigate the role of multiplayer online role-playing games (MMORPGs) for knowledge sharing. Through reviewing literature Chaung (2015) developed conceptual model based on the underlying assumption that factors of UGT effects knowledge sharing because they lead to development of sense of virtual communities. However, Chaung (2015) feel short of empirically testing the model.

However, UGT also comes with some drawbacks. Cruickshank (2011) criticizes UGT for its assumption that there is no control of public over the media and what it produces. Additionally, Bajracharya (2018) criticizes UGT for ignoring the strength of media for influencing human needs and gratifications. Bajracharya (2018) even went as far as to argue that UGT does not meet the standard to be called a theory instead, it is merely an approach for the recollection of memory.

2.5.1.8 Social Exchange Theory (SET)

The Social Exchange Theory (SET) posits that social behaviour results from an exchange process. In this regard, the exchange process is designed to optimise benefits while minimising costs. The SET model indicates that people typically weigh the risks and benefits of social relationships, interactions, and knowledge sharing (Yan et al., 2016). Therefore, if the risks outweigh the rewards, people tend to terminate relationships or interactions. Therefore, this theory views relationships, including those on social media, through a give-and-take lens. This theory is crucial in determining the influence of social media across cultural constructs globally.

Studies indicate that social media have exposed most people, especially young ones, to Western culture. This has enabled a surge in preference for freedom of expression and the press as well as the adoption of some of the West's cultural trends, including consumer preferences in fashion and food (Etemadi et al., 2019). However, this impact is not uniform across the world. In Saudi Arabia, social media have been adopted mainly as one of the core platforms for communication and interaction (Yasir & Majid, 2017).

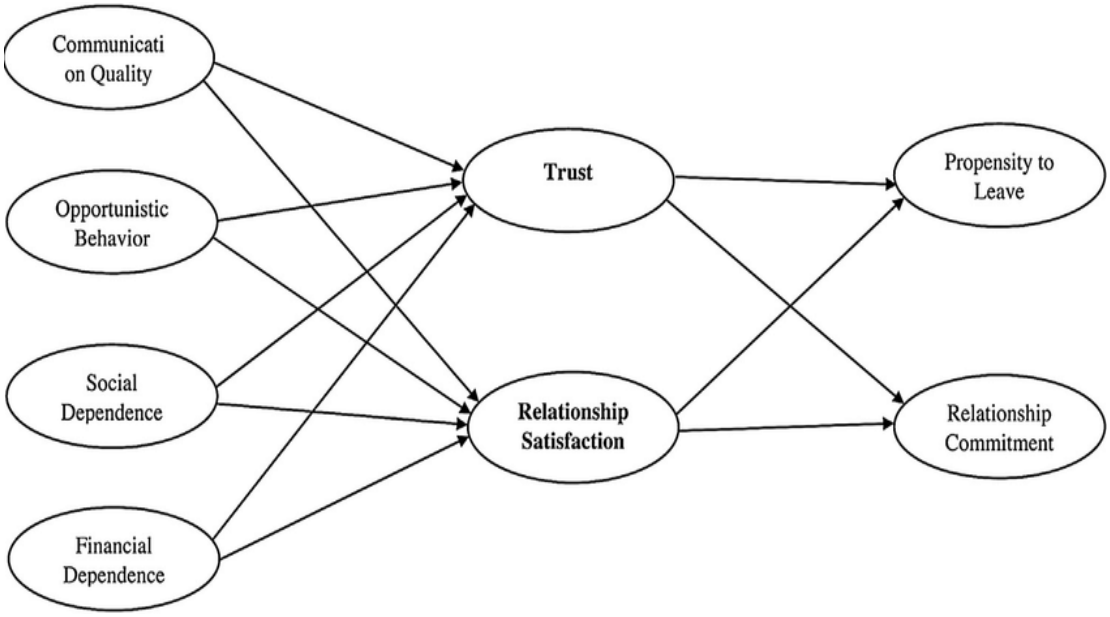


Figure 2.12: Social Exchange Theory (Yasir and Majid, 2017)

Therefore, Saudi Arabia's culture, including social dependence, financial dependence, opportunistic behaviour, and communication approaches, has been shaped by social media. This includes the inclination to use social media and share knowledge (Ahmed et al., 2019). This theoretical model highlights the need for adaptation among businesses to meet consumer behaviour shifts, including in communication preferences and the sharing of knowledge (Zhang et al., 2020). In this regard, especially among academics in higher education, social media have liberalised information flow, which enhances knowledge sharing in their learning processes, exposure to new cultures, and behavioural influence on consumption, innovation, and intellectual growth.

However, there exists empirical studies that not all elements of SET impacts knowledge sharing. Li (2015) investigates the online knowledge sharing behavior of people through using willingness, trust, reciprocity and altruism factors of the SET. To this end, author collected 240 responses from undergraduate and postgraduate students and some teachers in the China. Analysis of the findings indicates that altruism cannot predict the knowledge sharing behavior. However, willingness is most important predictor of knowledge sharing on virtual platforms comparative to trust, reciprocity and altruism.

Liang et al (2008) also agrees with the findings of Li (2015) through arguing that SET lacks empirical support for influencing knowledge sharing behavior. Specifically, Liang (2008) argues that extant literature provides inconsistent results on the organizational rewards and trust constructs of SET for supporting knowledge sharing. Therefore, there is exists need for further interpretation of practical role of SET for promoting knowledge sharing.

2.5.2 Critical factors impacting knowledge sharing in Higher Education

The use of technology – especially social media platforms – in KS among HEIs raises several issues, such as the interaction between technology and the core norms and conventions within the institutions, impact on academics, and the resulting quality of knowledge creation and sharing. As a result, there is a need to evaluate frameworks and models that explain the interaction among these factors and establishing the impact they have on KS (Shina, 2020). For example, the Structurational Model of Technology, advanced by (Orlikoswski, 1992) seeks to establish an in-depth understanding of the relationship between technology, institutions, and interaction. In this regard, the Structurational Model of Technology argues that technology affects and is affected by institutions, social norms, or "rules of the game". The model further argues that technology is influenced by and influences social and economic actors and practices in an institution (Harden, 2012). The underlying argument by the Orlikowski (1992) model is that the intersection between technology and the overarching structural/social/behavioural/attitudinal constructs within a specific institution affect value co-creation (Lee et al., 2010). Consequently, the value created in one university can differ from another, even though the technology they use is similar. Therefore, from the perspective of structurational model of technology it is not wrong to argue that factors that impact knowledge sharing through social media may variate from university to university.

In this regard, there is a need for individual HEIs, academics, and researchers to work collaboratively to leverage knowledge, and thus optimise the value of technology. For example, the use of social networking tools, Wikis, blogs, micro-blogging, or content communities can only be effective in KS when accompanied by effective peer-review

(Chai et al., 2011). The proliferation of blogs and content creation (and sharing) means that the validity and reliability of the knowledge on the web might not be guaranteed. As a result, developing robust frameworks of review and peer-review in HEIs allows the posting and sharing of authoritative and empirical information/data/knowledge, and thus bolstering the liberalisation of crucial information while maintaining the standards of empiricism, validity, and reliability.

Corcoran et al (2018) proposed an alternative model for KS in higher education institutions through social media. Model proposed by the Corcoran et al (2018) is driven by the motivation to evaluate the way enterprise social networks (ESNs) enables KS among academic staff through development of virtual communities of practice (vCOPs). Based on the review of literature authors developed a conceptual model for KS as shown in the figure 2.13 below. The conceptual model developed presented in figure 2.13 below showcases various antecedents, motivators, organizational and individual problems and benefits that support KS. However, author recognizes the need for further testing the model because ESNs in higher education is a recent phenomenon and there is need for assessing how it can support KS in higher education institutes (Ortbach and Recker, 2014). To this end, author conducted an action research project over the period of twelve months period from September 2015 to August 2016. Author targeted multi campus higher education institutes in the Ireland with 6,500 students and 600 staff. However, study only focuses only on staff. The project involved implementation of ESN tools known as Microsoft's social networking tool called Yammer and promotion of the tool to facilitate establishment of vCOP.

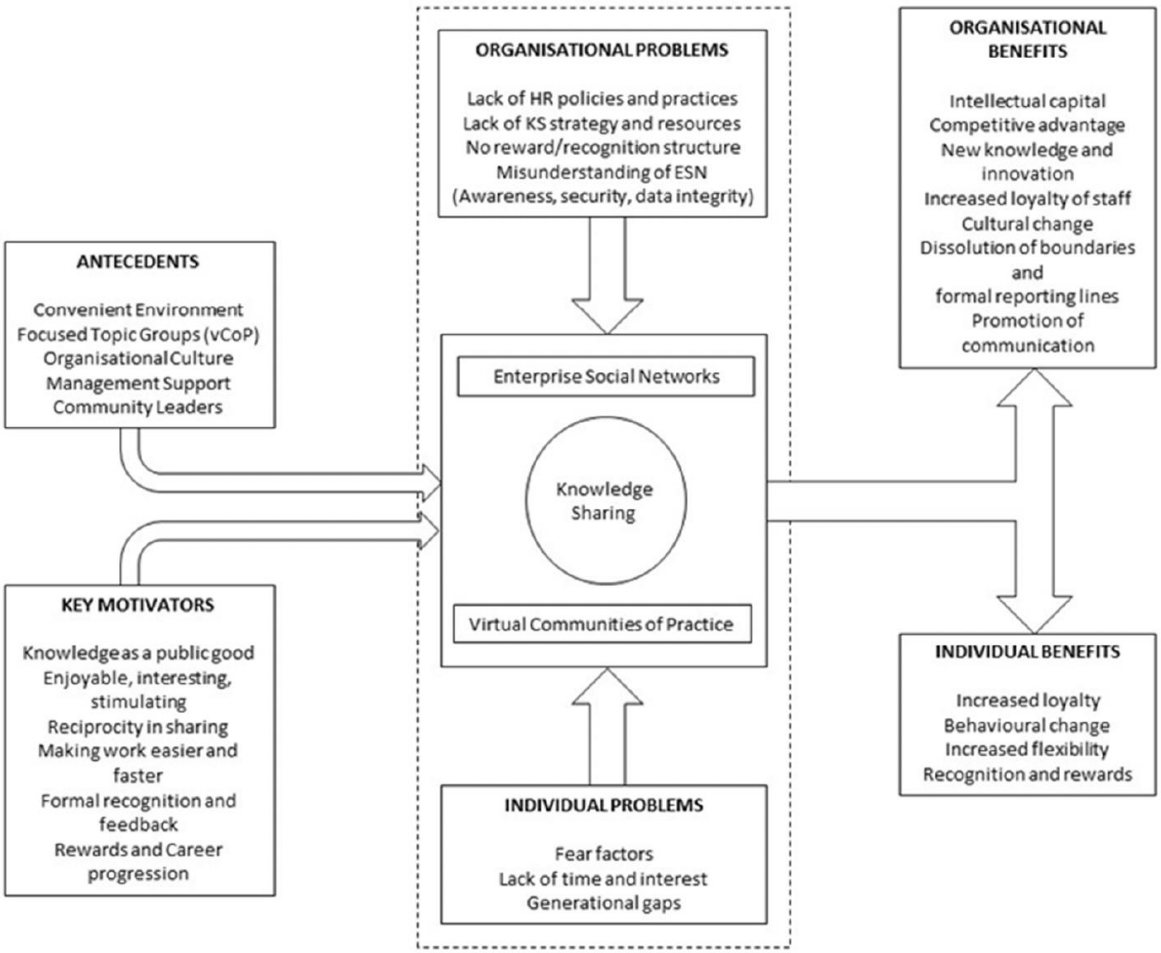


Figure 2.13: Conceptual model for KS through ESNs and vCOPs (Corcoran et al; 2018)

Analysis of the results led to identification of various interdependencies between various factors that creates problems and benefits of KS among academic staff in higher education. Based on the analysis, Corcoran et al (2018) developed a framework as shown in the figure 2.14 below. The conceptual model in figure 2.14 below considers organizational culture as an antecedent of successful KS environment. To this end, authors argues that adoption of culture that recognizes the significance of KS in vCOP via social media tools is necessary for effective KS. Author identifies two types of organizational culture such as transactional and transformational culture. It is proposed that transactional culture negatively impacts KS behavior because of its closed linked to hierarchical organizational structure that promotes explicit and implicit contractual

relationship, encourage short-termism and little alignment of individual values with the mission and vision of the organization. In contrast, transformational cultural characteristics such as openness, sharing and trust are identified as important cultural values that support KS.

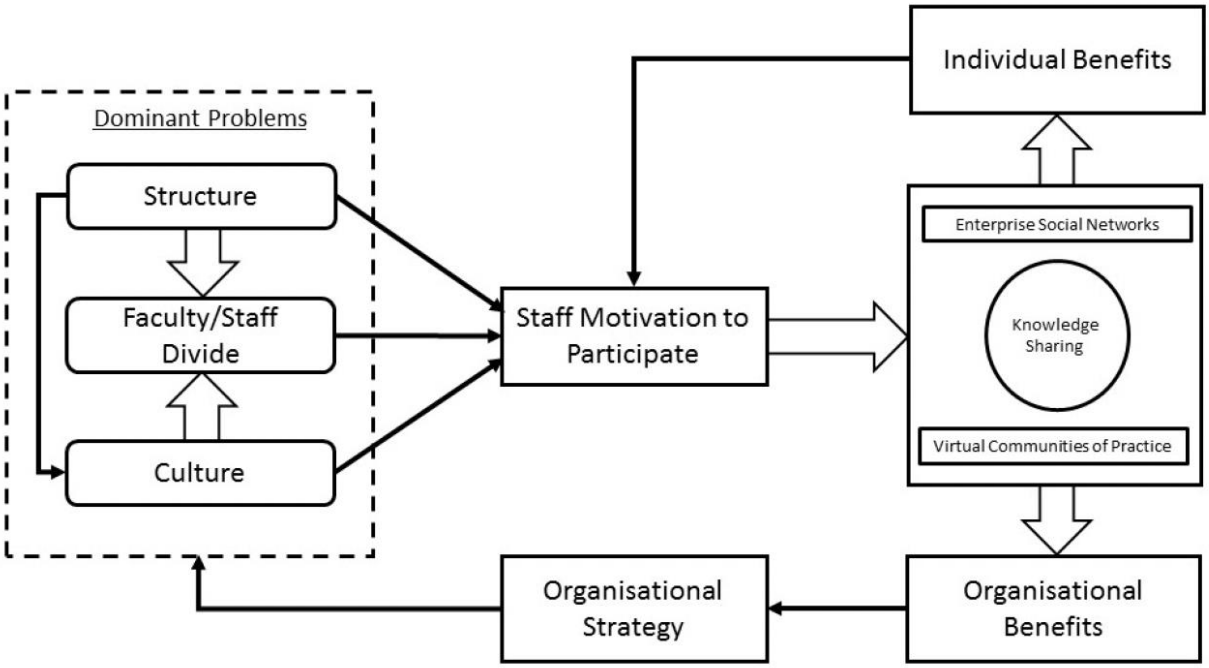


Figure 2.14: Interdependencies between organizational factors and KS on social media (Corcoran et al, 2018)

Faculty staff divide is identified as another hurdle in promotion of KS over social media in the model presented in figure 2.14 above. To this end, Corcoran et al (2018: P12) argues that fragmentation of staff exacerbates cultural opportunities for interaction and collaboration among staff needed for KS. Author insist on the need for transformational culture for eliminating the staff divide and motivating staff to participate in the KS practice. To this end, author states that management has crucial role to influence attitude, actions and behavior of employees to promote KS. Without involvement of hierarchy, staff would not recognize the benefits of KS for themselves at both individual and organizational level. Therefore, model in figure 2.14 states that organizational culture, structure and degree of

staff involvement are key to motivate staff to participate in the KS practice over social media.

Consequently, emergence of vCOP cannot be possible without the involvement of management. Findings indicate that vCOP can only emerge when individuals show their readiness and interest in specific subjects and seek colleagues to share their knowledge. Finally, model agrees with general perception that participation in KS environment benefits both individuals and organizations. However, author fell short of measuring the benefit of KS through social media for individuals.

Although, framework proposed by Corcoran et al (2018) does provide comprehensive list of factors that influence KS through social media in higher education institutes. However, study focuses on higher education institutes in the Ireland that may differ from the cultural practices in the Saudi organizations. For instance, Corcoran et al (2018) proposes that transformational cultural practices are needed to promote KS through social media, however, Saudi organizations tends to adopt transactional culture because of the traditional tribalism that promotes hierarchical organizational culture (Al-Sheri et al., 2017). However, Welzel et al (2003) are of the view that current theories of management are produced via keeping in the view of the western cultural environment, therefore they may not be applicable in the context of non-western culture. Likewise, Corcoran et al (2018)'s study is conducted in the context of the Ireland, therefore its application in the context of Saudi higher education institutes is questionable. Another key limitation of the model in figure 2.14 is ignorance for IT infrastructure for promoting KS (Islam et al., 2015).

Extant literature insists that establishing an effective IT infrastructure is essential to implementing KS processes (Wang et al., 2016). For example, for HEIs, there is a need to facilitate access to the gadgets, Internet connection, databases, software, and skills required for the creation and sharing of content, ideas, and innovations (Wang et al., 2016). Therefore, the IT infrastructure needs to be available, accessible, and retrievable to facilitate KS. Technology systems required for KS also need to be robustly built, accessible, and easy-to-use, and retrievable to encourage academics and researchers to employ them in KS. Codification is essential because it allows the conversion of tacit

information into codified information, which can be shared with others (Myrick et al., 2016; McCay-Peet and Quan-Haase, 2017; Kiracuburun et al., 2020). Encouraging and enabling codification encourages the overarching KS process and culture within an institution.

The researchers of knowledge sharing have proposed several models. The models of knowledge sharing are conducted in higher education institutions and the factors that influence people's decisions to share the knowledge are discussed. According to Jain et al., (2007), there are 15 factors that influence the process of knowledge sharing among academic staff. The research stated these factors are as follow: rewards, time, formal and informal activities to cultivate knowledge sharing, university/college culture, lack of interaction, no system to identify the knowledge seeker, retention of highly skilled and experienced staff, physical work environment, staff status fear, trust, fear misused of knowledge, value of the knowledge, knowledge as a source of power, poor verbal/written communication, IT systems and processes.

In contrast, Razmerita et al (2016) develops research framework that identifies significant factors which motivates individual’s motivation to sharing knowledge with social media through identifying drivers and barriers towards adoption of social media. The model presented in the figure 2.15 below shows frequency of KS as an independent factor because person who share knowledge more often tends to be more motivated to share knowledge. On the other hand, framework includes individual, organizational and technological factors that are both drivers and barriers towards promotion of KS. To test the factors identified in the research framework, Razmerita et al (2016) used mixed method methodology such as online survey and semi-structured interviews. Target population included seven Danish companies using social media for internal communication, however authors ended up in collecting data only from five companies. Analysis of findings reveals that at individual level intrinsic motivation to help others drivers KS, however lack of trust on colleagues and lack of time creates barriers for KS. Similarly, at organizational level role of management in encouraging and recognizing KS behavior are identified as motivators and change of behavior is recognized as barriers for KS. Finally, lack of training towards using social media platforms, lack of ease of use and

information overload are identified as hurdles in promotion of KS over social media. Findings implicates that adoption of social media for KS require cultural change in the organization because it require behavioral change. However, findings of the study cannot be generalized in the context of higher education because of small sample. Author went as far as to argue that conceptual model may be only applicable to Scandinavian organization, thus questioning its applicability into the context of the Saudi organizations.

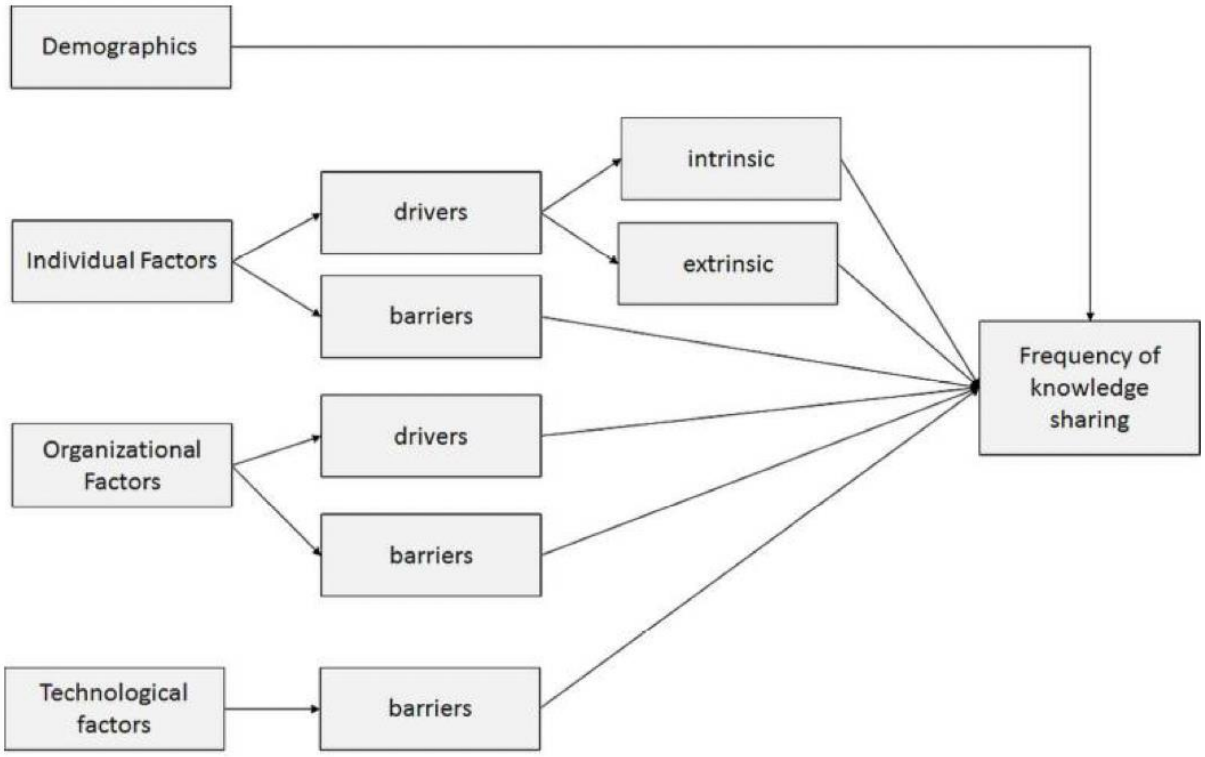


Figure 2.15: KS model over social media (Razmerita et al, 2016)

Moreover, Cheng et al. (2009) grouped the factors that influence the knowledge-sharing activities into three factors, namely organisational factors, individual factors and technological factors. The factors are divided into six subfactors. This model is illustrated in Figure 2.16. However, model proposed by Cheng et al (2009) is not supported by the information system theories, thus does not support KS through social media.

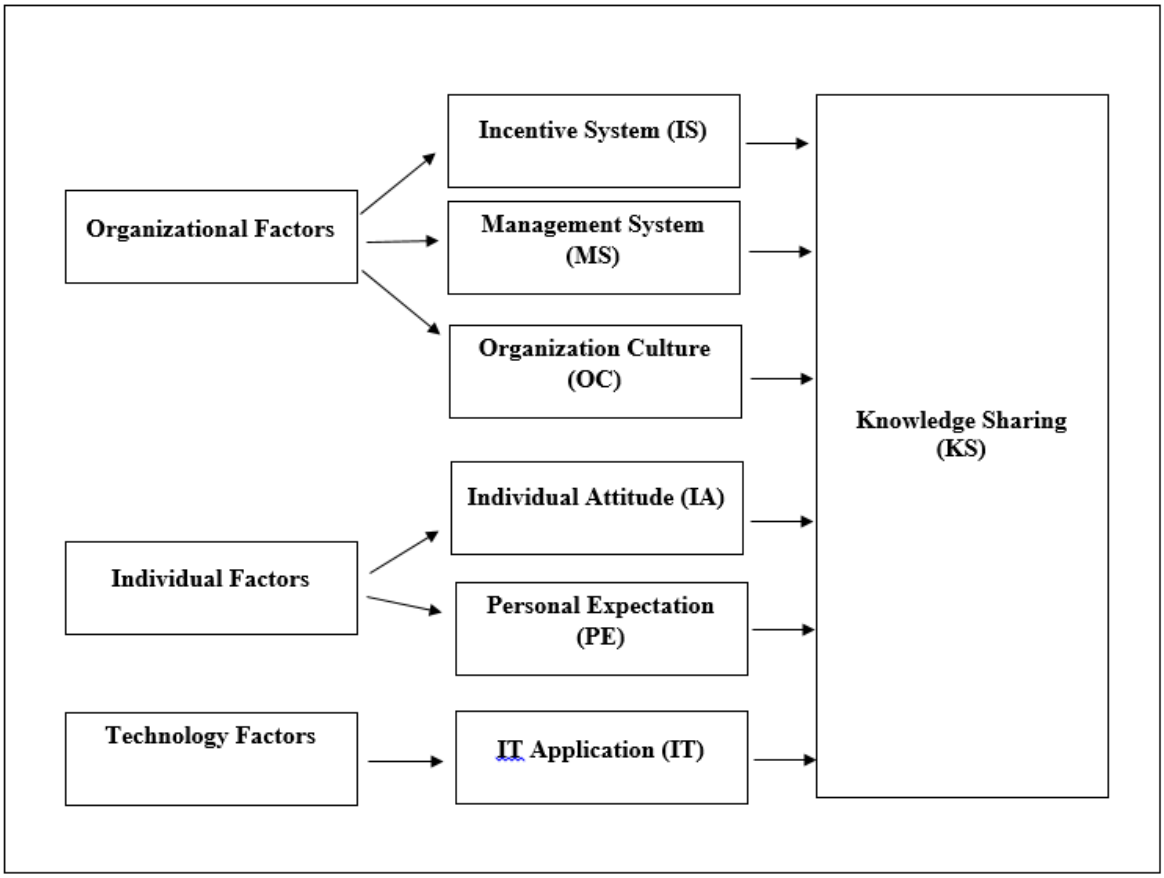


Figure 2.16: KS Research Model for HEIs (Cheng et al., 2009)

In this regard, Lee et al. (2010) stated that three factors influence knowledge-sharing activities, namely personal factors, organisational factors, and technical factors. These factors are divided into five sub-factors. The below figure illustrates this model. Similar to Chend et al (2009)'s model, Lee et al (2010) model is also not supported by the information system theories (Haque et al., 2015), therefore cannot be applied to investigate the KS behavior over social media.

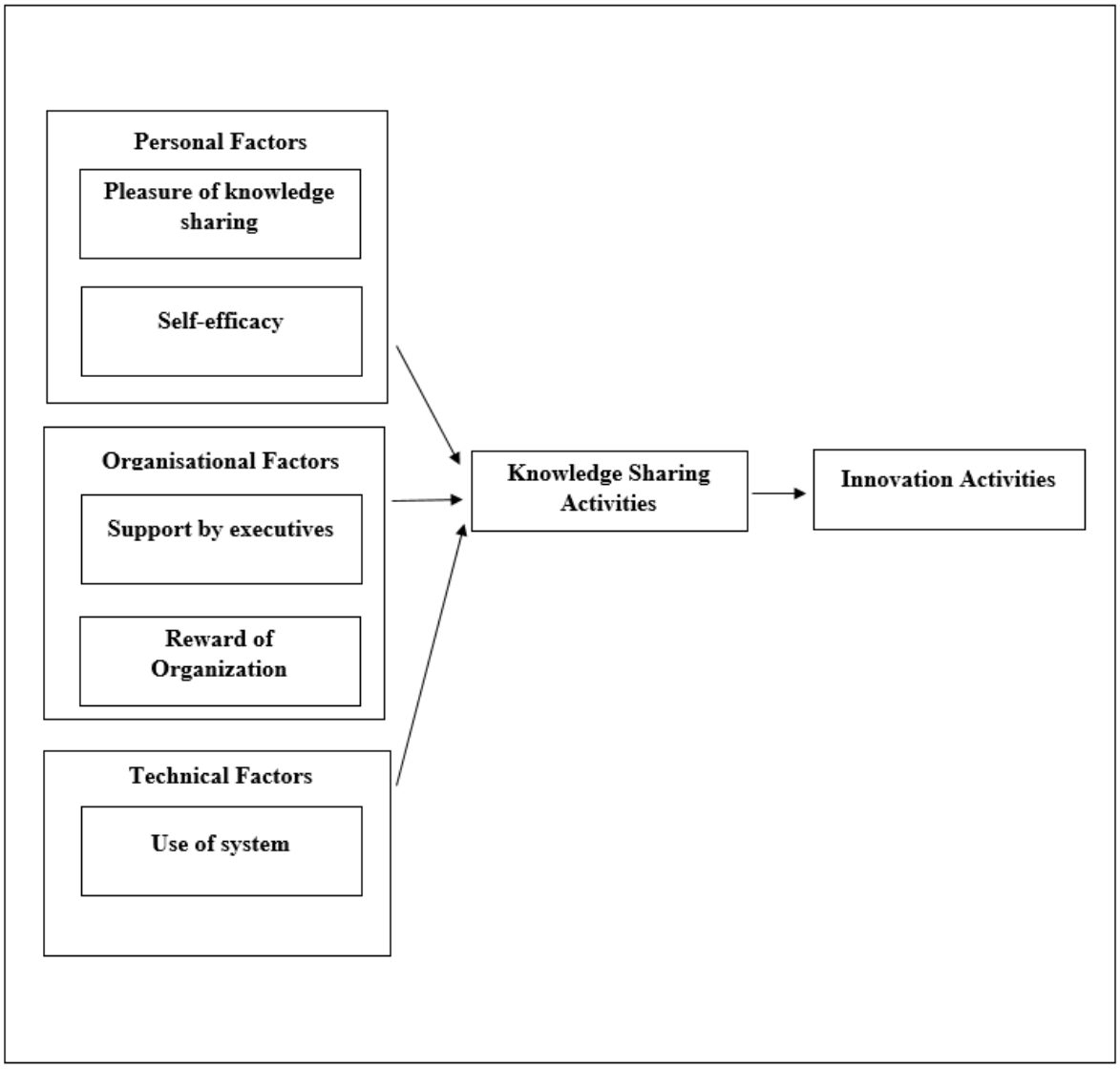


Figure 2.17: KS Research Model for HEIs (Lee et al., 2010)

The research conducted by Supar et al. (2005) noted that there are four factors that contribute to the sharing of knowledge among academic staff and these factors influence the performance in the organization. The factors are categorised as cultural factors, technological factors, communication and organisational support factors. The

categorisation of these factors considers sixteen factors under the main categories. The figure below explains this model.

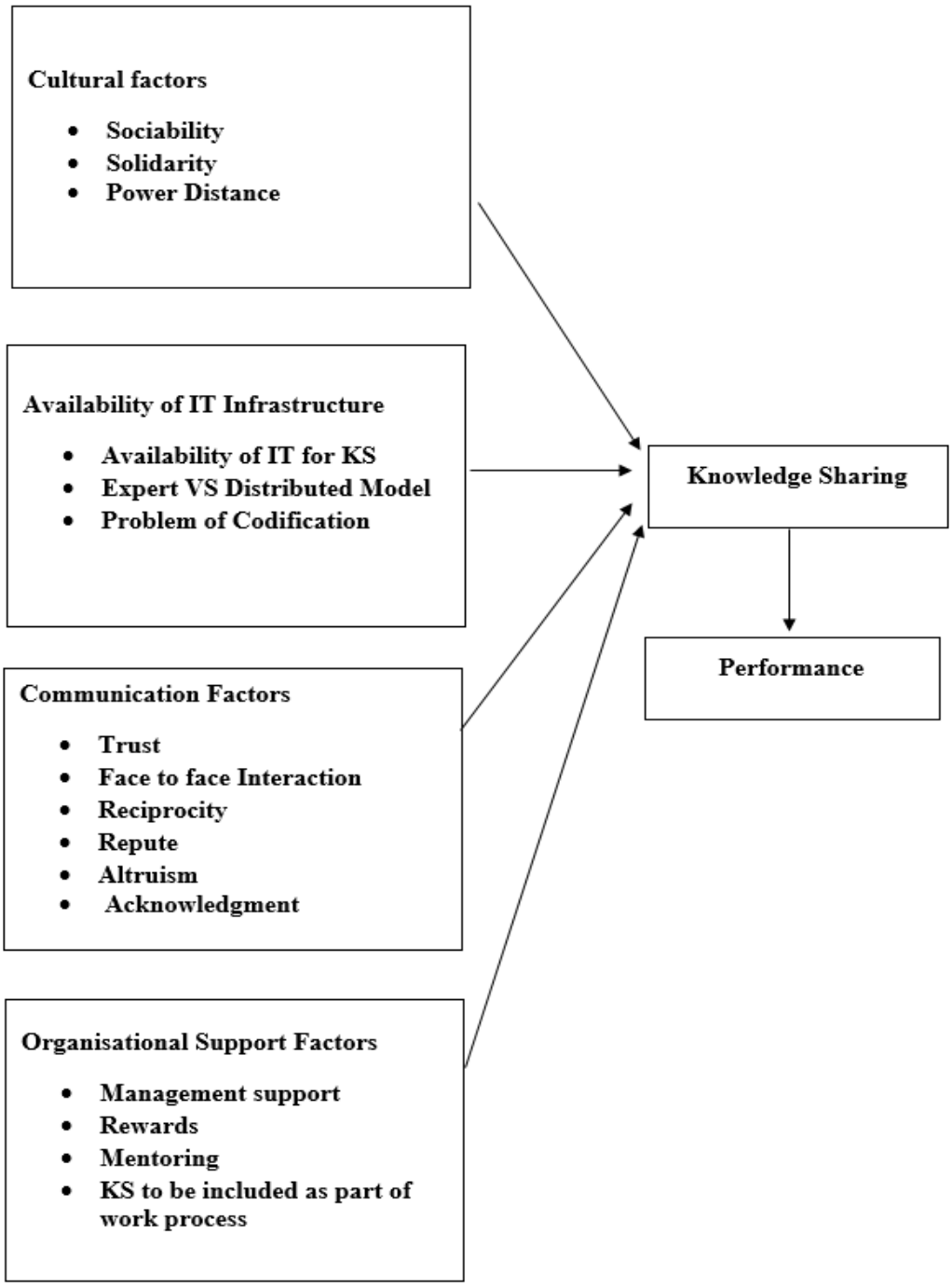


Figure 2.18: KS Research Model for HEIs (Supar et al., 2005)

The model illustrated in Figure 2.19 below indicates the factors among academic staff in universities by providing the knowledge-sharing model. As stated in Bulan & Sensuse (2012), the factors that influence knowledge sharing are divided into three groups which are individual factors, organisational factors, and technological factors. These groups consist of 19 factors related to the main factors. Models proposed by Supar et al (2015) and Bulamn and Sensuse (2012) while identified organizational, individual and technological antecedents needed for KS in higher educational institutes, however they are not supported by the information system theories (Haque et al., 2015: P7), therefore they cannot be applied to investigate the potential factors impacting KS over social media.

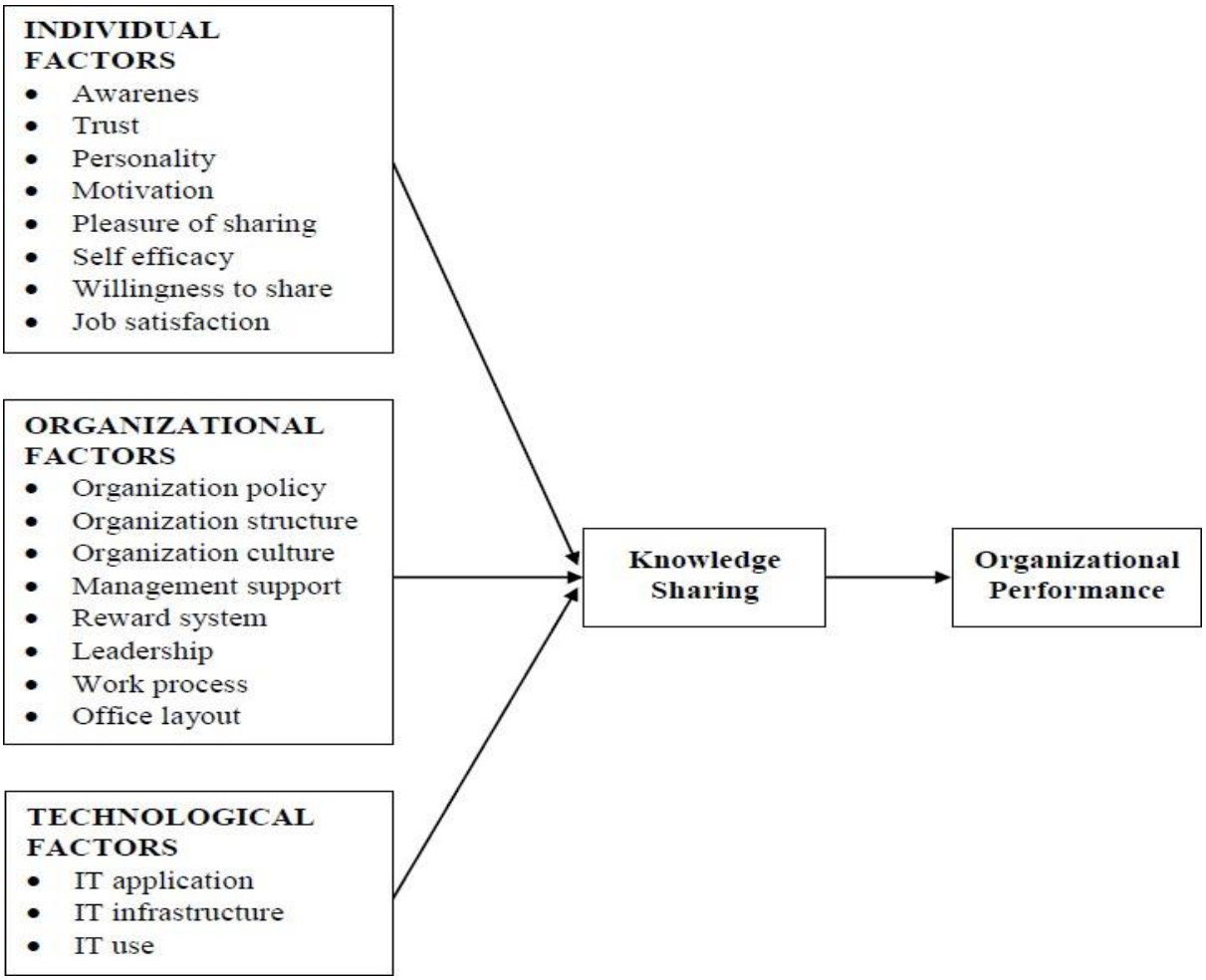


Figure 2.5: KS Research Model for HEIs (Bulan & Sensuse, 2012)

In the below KS model (Figure 2.20), the research by Skaik and Othman (2014) have made a KS model and adopted IS theory namely Theory of Planned Behaviour (TPB). This model did not adopt individual, organisational and technological dimensions together, but the model classified the factors into 11 elements. They have focused on the individual and organisational factors in their study of academics' knowledge-sharing behaviour. The framework provided by the Skaik and Othman (2014) provides basis for creating KS culture among higher education institutes in the Arab world, however it does not identify technological antecedents thus cannot be used as a tool to evaluate the factors that impacts KS through social media platform.

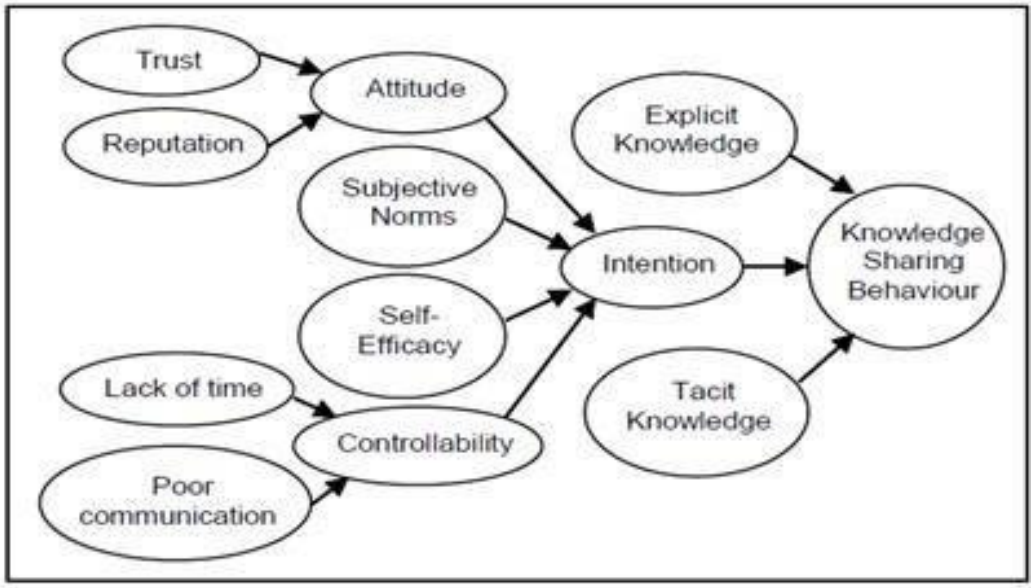


Figure 2.6: KS Research Model for HEIs (Skaik and Othman, 2014)

According to Ramayah et al. (2013), there are eight factors that influence the academics' KS behaviour. The model adopts individual and organisational antecedents and the Theory of Planned Behaviour (TPB). The technological factors are overlooked in the framework of Ramyah et al (2013) as shown in the figure 2.21 describes this model.

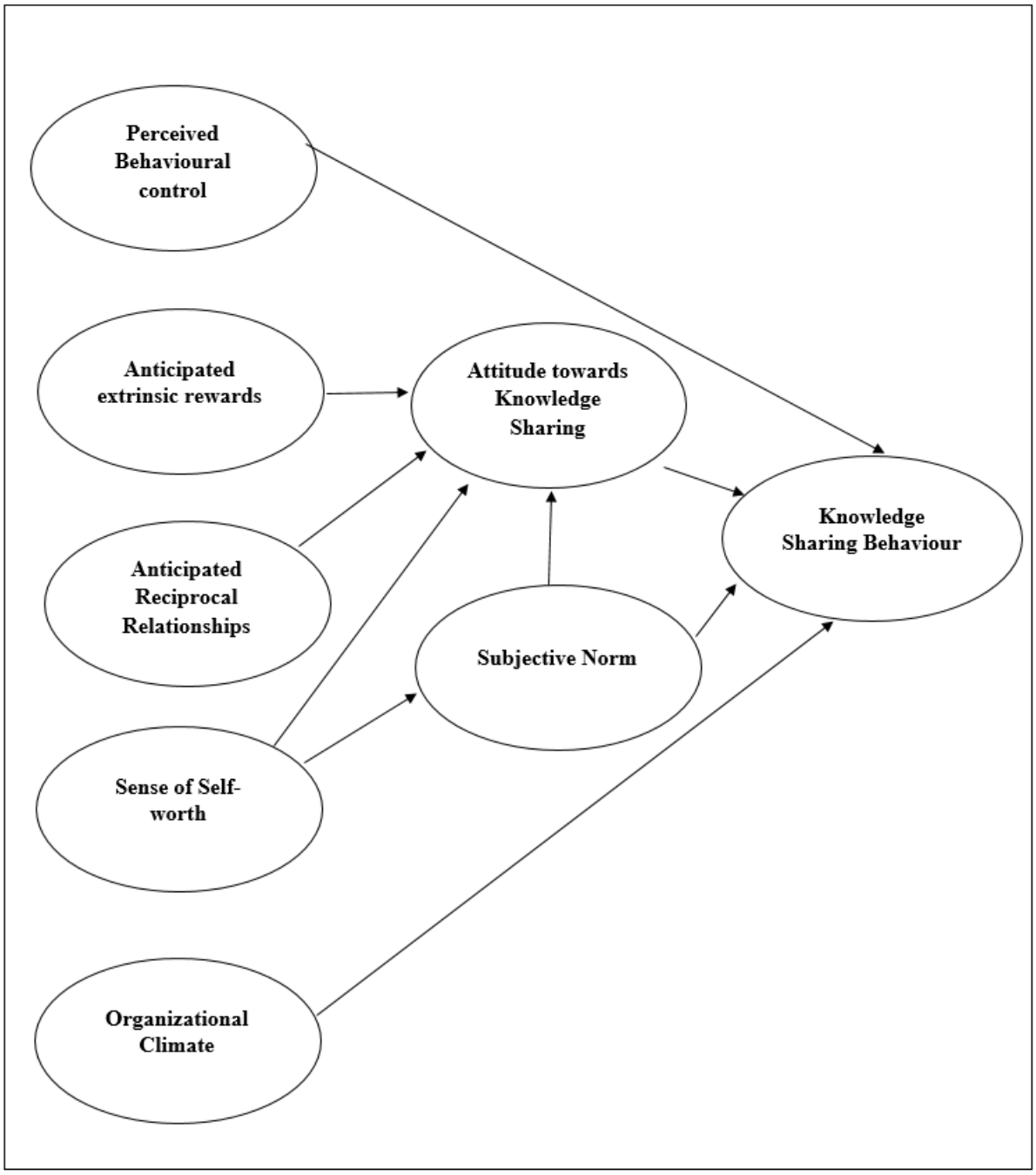


Figure 2.7: KS Research Model for HEIs (Ramayah et al., 2013)

At the end of the discussion of the research models, Haque et al. (2015) proposed a KS research model and conducted research with the theory of IS. They have adopted TRA

and TBP, with selected individuals, organisational and technological factors and integrated them with Social Capital Theory. The figure below shows this model. Although model proposed by Haque et al (2015) identifies both organizational and individual factors for impacting KS among higher education institutes, however it lacks empirical support.

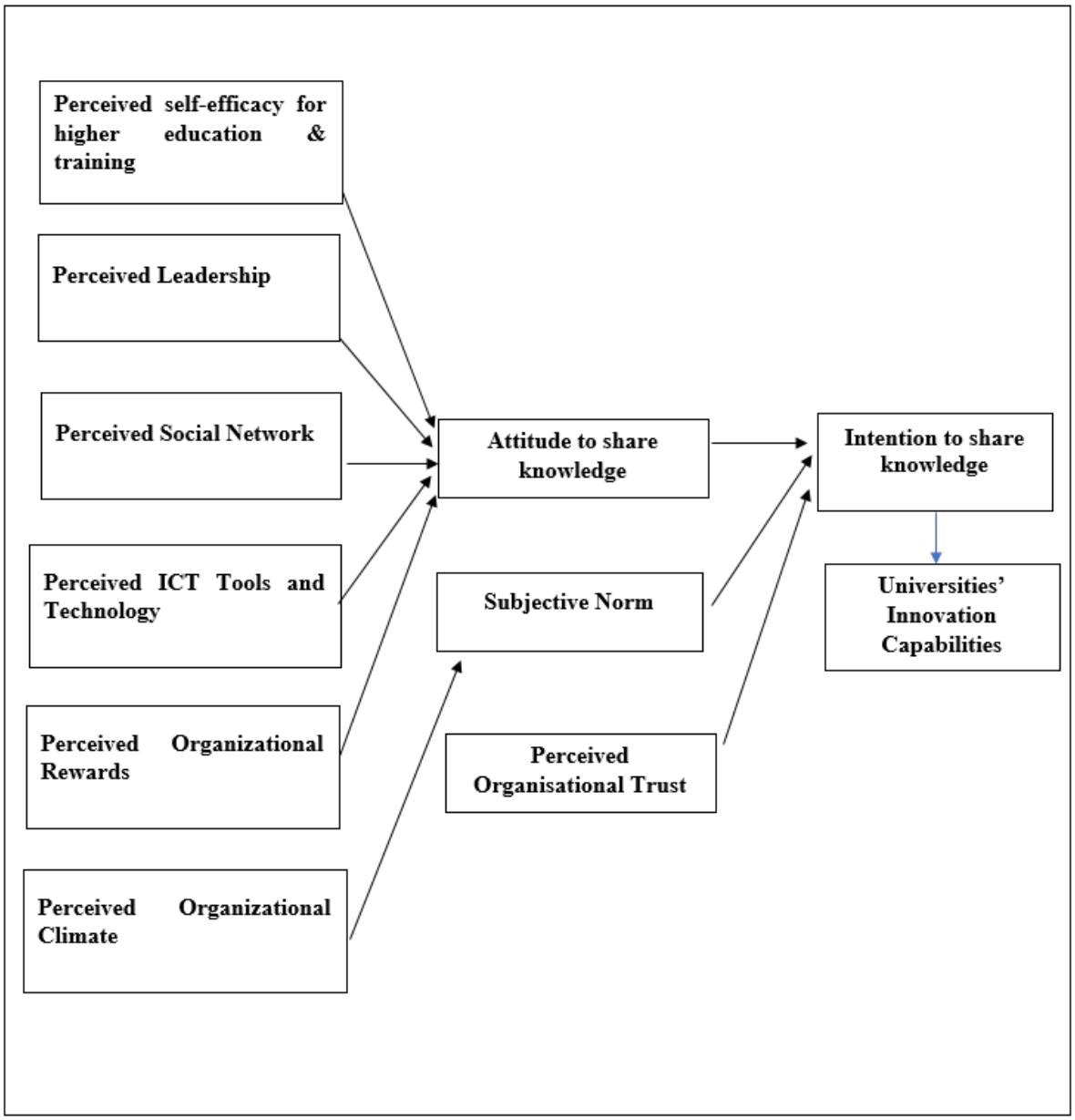


Figure 2.22: KS Research Model for HEIs (Haque et al., 2015)

Although the current models stated by several researchers, there is a need for a comprehensive knowledge-sharing model (Kettinger et al., 2015). However, a knowledge-sharing model with individual, organisational, cultural and technological factors and supported by IS theories is a comprehensive framework for knowledge-sharing research in higher education contexts, especially so in developing countries. The review of these models and the factors above have been shown in Table 2.8. There is a limitation of these models in the existing studies. Discussion on various KS models above shows that extant literature does propose various models that identified factors needed for promotion of KS among higher education institutes. For instance, existing models lacks in heir applicability into the context of the Saudi organizations (Corcoran et al., 2018: Razmerita et al., 2016) or missing technological factors (Cheng et al., 2009: Lee et al., 2010: Supar et al., 2015) and Bulamn and Sensuse, 2012: Skaik and Othman, 2014: Ramyah et al., 2013) and lacks empirical support (Haque et al., 2015).

***Table 2.8: Researchers Adopt IS Theories and Models in the Context of KS Studies in HEIs* (Haque et al., 2015) (modified)**

KS research model	**Individual, organisational and technological factors as antecedents**	**Supported by IS theories**
Jain et al. (2007)	√	X
Azmi et al. (2010)	√	X
Cheng et al. (2009)	√	X
Lee et al. (2010)	√	X
Supar et al. (2005)	√	X
Bulan & Sensuse (2012)	√	X
Skaik & Othman (2014)	√ (Not including Technological factors)	√ (Use TPB)
Ramayah et al. (2013)	√ (Not including Technological factors)	√ (Use TRA)
Haque et al. (2015)	√	√ (Use TRA, TPB & SCT)

2.6 Knowledge-sharing Barriers

2.6.1 Individual Factors

KS is based on the ability and willingness of individuals to create and share information with others for different purposes. In this regard, there is a need to ensure that individuals operating the social media platforms can enjoy the process of creating and sharing content ad knowledge. Enjoying a specific KS medium encourages people to continue developing and sharing information (Vannucci et al., 2019). Social media platforms that allow face-to-face interaction – such as live chats and engagements – promote the effectiveness and impact of the sharing process.

Promoting the awareness of social media platforms used for KS within the higher education community helps increase the potential impact of the themes, issues, and concepts covered (Ghazali et al, 2016). Lack of awareness reduces access to the KS platforms, which reduces the rate and effectiveness of shared knowledge (Kim and Sin, 2016). Additionally, it is essential to promote the understanding of social media, advance the required technical skills, and promote the ability of individuals to utilise these platforms in sharing knowledge.

At the individual level, factors such as altruism, language, trust, and reciprocity play a central role in shaping the effectiveness of knowledge sharing. For example, altruistic individuals are more likely to share knowledge on social media platforms. Moreover, people with knowledge and skills in a specific language are more likely to access and utilise knowledge shared than those unfamiliar with such languages (Skoric et al., 2016). Therefore, the language of presentation, creation or sharing affects the core ability of the content to be consumed by the audience. Additionally, reciprocity is crucial in promoting the motivation of content creation and sharing.

Overall, individual factors influence KS from the creator and the consumer perspectives. For example, motivation, altruism, social media skills, language, and self-efficacy play a central role in promoting and enhancing the creation and sharing of knowledge. At the

same time, these factors also shape the consumption of shared knowledge (DeVito et al., 2017). As a result, the interaction of these individual factors plays a central role in shaping the overarching process of KS.

2.6.2 Organisational Factors

Some of the main organisational factors that shape the use of social media in KS include the institution's structure, culture, process, and physical environment as discussed below.

2.6.2.1 Organisational Structure

KS execution depends on two concepts. Firstly, there is a need for a dedicated framework for Knowledge Management (KM) focusing on technological integration and knowledge processes to align with operational units within the subject organisation (Naeem, 2019). Secondly, there is a need for integrators who own the knowledge content with the firm, which plays a crucial role in ensuring that KS is carried out in a manner that optimises value for all the stakeholders (Alshahrani and Pennington, 2018). Therefore, there is a need for a business or institution for higher education to adopt a balance between KM and KS in order to attain success. In this regard, KM provides the basis upon which KS can be successfully adopted (Ghazali et al., 2016). This school of thought can be observed in most Saudi Arabia companies that have succeeded in adopting a robust KS – most of them have a functioning and dynamic KM structure in place.

2.6.2.2 Organisational Culture

The role of culture is two-fold when it comes to the adoption of KS. On the one hand, organisational culture is essential in shaping the enterprise's overarching direction regarding KM and KS. On the other hand, there is a need to recognise and incorporate the cultural difference between individual workers into the overall thinking (Alshahrani & Pennington, 2019). For example, in an organisational structure where workers compete against each other for a decreasing number of positions and opportunities, KS is unlikely to thrive. In flat organisations that emphasise the functional and project teams, flow of

information, and collective success, KS is likely to be encouraged. In this regard, the leaders of such an organisation, especially their trust and integrity, play a prominent role in unlocking the workers' resistance to KS. In Saudi Arabia, in recent years, the focus has been on cultivating the "right" culture to encourage KS (Imran et al., 2019). Some of the steps taken include setting KS priorities within the organisation, modelling by senior leaders (such as actively advocating for KS behaviour), offering strong KS leadership, and actively supporting KS through resource allocation and investment.

2.6.2.3 Organisational Processes

Integrating KS into an organisation or business's everyday processes is essential to creating an atmosphere that encourages its success in the short and long term. Therefore, KS needs to be incorporated into daily work processes. The underlying argument here is that if KS is introduced into a company's daily operations, it is likely to succeed and help create value within the core modes of execution (Imran et al., 2019; Okazaki et al., 2017). This approach also allows everyone in the organisation to understand how and where to contribute to knowledge and what happens in the aftermath of their contributions. Therefore, most of the HEIs in Saudi Arabia are designed to encourage exploration, research, innovation, and sharing. The publication platforms allow academics to share knowledge (Sarka and Ipsen, 2017). However, most Saudi companies have not successfully integrated KS into their processes at the organisational level, highlighting a massive gap in the business models within the Saudi Arabia corporate sector.

2.6.2.4 Physical Environment

The physical environment within an organisation is central to cultivating and nurturing KS. As a result, firms that do not actively develop and sustain an environment that enhances and facilitates KS are likely to fail at these attempts and miss out on potential value creation. Trends and patterns in Saudi Arabia demonstrate that organisations are beginning to realise the importance of developing environments for KS, such as informal

surroundings, quiet spaces, relaxed physical spaces, and online or technology-driven platforms that encourage the flow of knowledge (Sun et al., 2019).

2.6.3 Technological Factors

The utilisation of technology within organisations and/or HEIs is dependent on the operational structures, infrastructure, and skill-sets. However, the adoption of technology-based KS needs a cultural construct that facilitates the interaction between the personnel, technology, and culture to optimise the flow of information (knowledge) (DeVito et al., 2017). As a result, several technological factors underpin KS within the internal environment of educational institutions. For example, there is a need for accessible technical training and support for academics and stakeholders in higher education. Technologies, especially social media-based tools, are continuously changing with the incorporation of Artificial Intelligence (AI) and the Internet of Things (IoT) (Myrick et al., 2016; McCay-Peet and Quan-Haase, 2017; Kiracuburun et al., 2020). Consequently, there is a need to consistently train, support, and enhance the skills and capacity of the stakeholders in HEIs. This way, the academics and researchers will be both empowered and encouraged to create and share ideas and content. Therefore, the culture of KS is anchored in the ability of the stakeholders to use and disseminate information and knowledge about the targeted social media tools and platforms.

Additionally, there is a need to ensure that the technologies (software and hardware) essential in KS are accessible, easy-to-use, and retrievable by the main stakeholders. Researchers and academics should easily access and use the social media tools and platforms employed in KS. In instances that the technologies are difficult to use, then most people might be put off from employing them (Myrick et al., 2016). Therefore, organisations should deliberately seek to advance the accessibility and retrievability of these tools to promote their utilisation and advance the trend and culture of KS.

The functionality of social media is essential in promoting KS. For example, Wikis, social networking sites, content communities, and blogs provide effective platforms for posting and sharing a broad range of information, content, and media to others. Therefore,

functional platforms encourage KS, whereas platforms and tools that are ineffective in posting and sharing information might discourage KS (Skoric et al., 2016). In this regard, the collaborative capacity of Wikis means that they are preferred for collaborative work among academics, allowing for the creation and sharing of knowledge.

Information overload is also a crucial factor shaping the use of technology in KS. The flow of information is designed to be effective, with high validity and reliability. Information overload means that too much information is being disseminated (beyond the capacity of the technology or the targeted consumers' willingness or ability to the consumer it) (Myrick et al., 2016; McCay-Peet and Quan-Haase, 2017; Kiracuburun et al., 2020). Therefore, there is a need for organisations to set a standard that enhances the flow of knowledge from one point to the other without disruption.

Table 2.10: Barriers impacting KS through social media in higher education institutes

Factors	**Barriers**
Individual barriers	• Lack of awareness • Lack of technical skills • Altruism • Language • Trust • Reciprocity Sources: Skoric et al., 2016; Ghazali et al, 2016; Kim and Sin, 2016; Vannucci et al., 2019)
Organizational factors	Organizational structure • Organizational culture

	• Organizational processes such as daily operations • Physical environment such as informal surroundings, spaces, physical spaces and technology driven platforms Sources: Sun et al., 2019; Sarka and Ipsen, 2017; Imran et al., 2019; Okazaki et al., 2017; Alshahrani & Pennington, 2019; Alshahrani and Pennington, 2018)
Technological factors	• Accessibility of technical training • Social media-based tools • Technological infrastructure such as hardware and software • Awareness about functionality of social media as a collaborative tool • Information overload Sources: Myrick et al., 2016; McCay-Peet and Quan-Haase, 2017; Kiracuburun et al., 2020; Skoric et al., 2016; DeVito et al., 2017)

2.7 Overview of Knowledge-sharing in Higher Education Institutions

KS is essential in HEIs; therefore, most of them have invested in establishing platforms and approaches to enhance the sharing and flow of tacit and explicit knowledge within

and outside the institutional environments to the public (Chaves et al., 2018). Increasingly, HEIs have embraced technology to enhance KS processes; thus, information communication technologies and social media platforms have been integrated into the learning environment's core operations to facilitate the flow of knowledge between the teaching staff and among the students. Some of these models for KS are discussed below.

2.7.1 Information Communication Technologies (ICT)

ICT offers intricate platforms for storage, dissemination, sharing, and access to crucial knowledge. Most of the HEIs are designed to bolster the growth of new knowledge, analysis of current frameworks, and progress in understanding crucial concepts. ICT is used as a facilitator of the learning process as well as for enhancing access and sharing of crucial knowledge – both curriculum and innovations (Wu et al., 2016). In this regard, ICT allows for interaction among academics across the world. For example, the embrace of ICT allows academics in Riyadh, Saudi Arabia to interact continually with academics in the UK and the US. These platforms have liberalised information, allowing academics to access some of the highest-quality and cutting-edge studies, discoveries, models, and frameworks in their respective fields of study (Leonardi, 2017). In this regard, ICT has provided a platform for continuous and efficacious KS as well as KM within HEIs and across the world to benefit the stakeholders.

2.7.2 Social Media

The transformative impact of social media has predominantly been felt among learning institutions. The majority of the academics at HEIs in Saudi Arabia and across the world tend to be relatively young. Therefore, they can be savvy in using social media in their private lives for connections, interactions, engagement, and discussion. In the KS models, social media have opened up the world of high education to the globalisation effect, allowing widespread sharing, transfer, and interaction among academics and their peers from across the world (Jrani et al., 2017). This has led to cross-influence, as illustrated in the social exchange model in Figure 8. The influence on cultural inclinations and

behavioural aspects are essential in being the gateway to shaping society and the future constructs of culture. Moreover, KS models adopted in HEIs in Saudi Arabia have been transferred to the workplace as more and more graduates from these institutions are hired (Panahi et al., 2016). Therefore, the impact of social media on KS has been ubiquitous in Saudi society, especially among HEIs and the business sector.

2.7.3 In-Person Communication

HEIs are designed to optimise the learning of both tacit and explicit knowledge. Although online learning platforms have cropped up across Saudi Arabia, many academics still prefer the in-person and on-campus sharing experience. In-person knowledge sharing is especially important because of its capacity to encourage the flow of tacit information, which is typically experiential and not found in documents, notes, memos, or papers that can be accessed remotely. In-person teaching and knowledge sharing are traditionally considered the primary approach to learning (Pérez-González et al., 2017). However, the advent of technological platforms for learning has led to a surge in flipped learning, online sharing, and blended approaches. However, in Saudi Arabia, there is the recognition that platforms such as social media for knowledge sharing should be complemented with in-person learning to enhance the experience and quality of academic performance among academic staff.

2.7.4 Publications and Peer-Reviewed Journals

Journals and databases are used as the ultimate expression platforms for academic content and knowledge. Although access to these databases varies from one platform to the other, they represent the central repositories for the storage, dissemination, access, and review of knowledge generated from universities in the form of research and systematic analyses. Accessing research studies, results, summations, and other researchers' inferences from different HEIs worldwide provides an integrated approach to knowledge sharing (Alshahrani and Pennington, 2020b). It promotes peer analysis, expansion, and growth of knowledge, and encourages creativity and innovation among academics (Di Virgilio, 2018; Sweet et al., 2020; Rasheed et al., 2020). In Saudi Arabia,

peer-reviewed journals and databases are widely used to allow academics in HEIs to showcase their work and innovation. It also encourages academics to access new knowledge, which facilitates their academic life.

2.8 Overview of Interpretive Structural Model (ISM) Methodology

2.8.1 Definition of ISM

Interpretive Structural Modelling (ISM) refers to a process that seeks to change unclear mental models that are poorly articulated into well-defined, visible models that can be leveraged for specific purposes of research, exploration, and analysis (Jena et al., 2017). Within the ISM model, the interpretation of links is comparatively weak; moreover, there is a lack of the interpretation of a specific link regarding its operation. In this regard, ISM can be utilised to evaluate various variables' driving and dependence power in a specific study (Tan et al., 2019). ISM emphasises that the evaluation of variables or entities has to be rooted in collecting realistic data or materials, the analysis, and processing of the information to establish the contours of the targeted questions or hypotheses (Azevedo et al., 2019). ISM can employ theoretical deduction to extract interaction mechanisms among aspects within a complex system, which can be subsequently utilised in formulating a theoretical concept.

2.8.2 Importance of ISM

This study adopts the ISM method to evaluate social media use for knowledge sharing in higher education in Saudi Arabia. It seeks to draw conclusions through a hierarchical topology approach that seeks to establish an intuitive understanding of the inherent factors' structures. Current analyses provide an evaluation of social media use in society and an analysis of its impact on society, including academics and researchers in HEIs (Gardas et al., 2017). However, there is a need for the study to evaluate the intersection of social media and KS. KS is emerging as one of the crucial functions of organisational

performance and higher education operations. In this regard, the focus on enhancing innovation and creativity is directly linked to KS.

Additionally, social media have liberalised information access and sharing across the world. Therefore, this sets the stage for this study to evaluate the role of social media in KS in Saudi Arabia's higher education sector (Agrawal, 2019). ISM provides the best basis for analysing the unclear aspects of social media and KS to help develop a theoretical framework that explains the inherent and emerging trends and patterns in this sector.

The overall advantage of ISM in this study is several variables under social media and KS that need to be evaluated to establish a coherent framework. The resulting model needs to answer the study's core question – how does the use of social media affect KS in Saudi Arabia's higher education institutions (Thirupathi & Vinodh, 2016)? Some of these variables include the types of social media, the extent to which they are used, the core uses of these platforms, the influence of culture, type of knowledge, and knowledge-sharing factors. In this regard, the ISM provides the best approach to aggregating these variables to establish a coherent pattern/trend that explains the interaction and intersection between social media and KS factors in organisational environments and higher education institutions in Saudi Arabia. The steps adopted in ISM seek to combine relevant information on social system engineering to transform complex information into structure modelling of an identified organisational structure (Thirupathi & Vinodh, 2016). In this case, this ISM process changes the complex structures into organisational associations that can be understood and evaluated. ISM's ability to identify elements within complex problems and establish their relations is crucial in its adoption. In this regard, it is essential to help individuals or groups establish modelling or maps that provide insights into targeted concepts of study (Jena et al., 2017). Additionally, ISM can be applied in the analysis process to establish the relationship of identified variables in a study. ISM is also employed along with the graphic theory of association structure to present a horizontal, vertical, and general association structure, reflecting the complexity of the issues at hand. In this regard, ISM computer programming carries out matrix computation to evaluate the complex thinking procedures that the human brain is

associated with (Tan et al., 2019). However, the ISM approach is crucial in simplifying the complicated concepts to make it easy to understand and conceptualise the underlying issues, as illustrated in Figure 2.23.

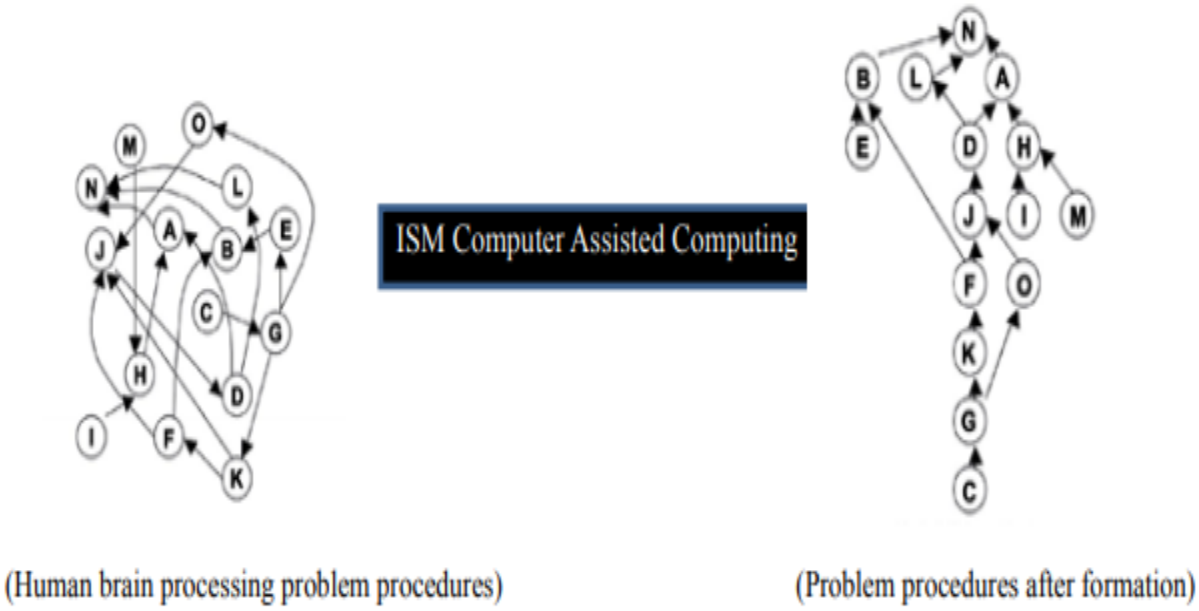


Figure 2.23: ISM Converts Complex Thinking into a Systematic Procedural Map (Azevedo et al., 2019)

The analysis also reveals that ISM can be operated through the intersection of the human mind and computational capacity. In this regard, the human is responsible for the decision-making, whereas the computer plays the role of computation and displays the targeted operations' results.

In this study, the emphasis is on employing ISM to establish the impact of the use of social media on KS. The focus here is to establish the relationship between the variables within social media, such as culture, external environmental factors, technological changes, type of social media platforms, personality, as well as structures in place, and KS. These variables interact intricately within the external environment of HEIs in Saudi Arabia (Agrawal, 2019). Therefore, ISM is well-positioned to disentangle these interactions'

complications and establish the direct lines that inform the influence of social media on knowledge sharing in higher education institutions in the country.

2.9 Research Gap

The literature establishes that knowledge sharing is a crucial concept for organisations, businesses, and higher learning institutions. The flow of knowledge is central to maintaining a competitive advantage in the market. For HEIs, knowledge sharing is essential in bolstering intellectual growth and progress within and outside these institutions and enhancing the positive impact on local communities and society. Moreover, this analysis of the literature reveals that social media are increasingly becoming incorporated into several spheres of contemporary life, focusing on creating and sharing ideas, content, and concepts. The implication of the proliferation of social media, especially in HEIs, has been a surge in the liberalisation, availability, and accessibility of information in the form of studies, findings, inferences, opinions, and critical perspectives. The literature has also demonstrated an intersection of social media in knowledge sharing, especially in the corporate sector. Some of the demonstrable examples of social media use in knowledge sharing include the emphasis on engagement, communication, and interaction between organisations in Saudi Arabia and their targeted staff. Therefore, social media has enabled the development and sustenance of a conduit of information flow (bidirectional channels of engagement and interaction) between businesses and their customers. However, there exists gaps in literature surrounding the use of social media for promoting KS among HEIs such as:

- The literature demonstrates a lack of understanding of the concept of social media regarding KS among academic researchers in higher education.

- Majority of the researchers in this review focus on social media as a tool without offering a critical evaluation of its KS functions.

- Extant literature provides different categorisations of the use of social media in different areas of life; however, it does not provide higher-education-specific categorisation. As a result, there is a need to categorise the social media platforms and tools employed in KS in the area of higher education.

- Extant literature provides a limited platform for understanding the use of social media in KS among researchers and academics in higher education in Saudi Arabia. Therefore, there is a need to evaluate and understand the trend and patterns regarding the intersection of social media, KS, and higher education in Saudi Arabia.

- Existing studies do not provide robust frameworks that can be used in developing effective approaches to social media use in KS among academics operating in HEIs. Therefore, there is a need to establish a robust understanding of the interaction between social media and KS in higher education to develop frameworks that will allow stakeholders to leverage the opportunities provided by KS to advance learning, creativity, innovation, and globalisation of knowledge in the higher education field.

- There exists lack of comprehensive analysis of the core barriers to the utilisation of social media in KS among researchers and academics in HEIs. Without an understanding of the core barriers, the implementation of social media in higher education and its integration with KS lacks the comprehensive visualisation to promote its effectiveness and troubleshooting. Therefore, there is a need to establish the key factors negatively affecting the use of social media in KS.

3 RESEARCH METHODOLOGY

3.1 Introduction

The methodology chapter will focus on discussing the research methodology to be used, the data collection plan and data analysis methods. In order to select the most suitable research strategy, it is necessary to examine the formulation components of the research methodology. The key elements for the formulation of the research methodology are the research approach and data collection methods (Robson, 2011). More specifically, it is essential to select an appropriate research methodology that aligns with the research aim and objectives to address the research gap on hand. This chapter presents an overview of the research methodology applied to address the research objectives. In presenting this research methodology, the chapter outlines the research paradigm and philosophy, research approach, research strategy, research methods and discusses the multi-phased methodological approach adopted in this research.

3.2 Research Paradigm and Philosophy

Philosophical research is fundamental for any academic research, with the presumptions, philosophical aspects and impacts of how the model would answer the research questions (Wilson, 2001). According to Kuhn (1962), a research paradigm is defined as “a conceptual framework that is accepted by a community of researchers or scientists and that provides them with an in-depth guideline to conduct the research”. A research paradigm is an approach or framework that guides the researcher to conduct the research in an appropriate way. All research uses and follows one of the research paradigms for doing or developing their research methodology (Cohen et al., 2000). In this way, when the researcher has recognised the research paradigm, the next step is identifying and designing a research methodology that fits the research’s philosophical assumptions and a research paradigm (Collis & Hussey, 2013).

There are many reasons why the research paradigm and philosophy are crucial for use in research. Firstly, the research paradigm and philosophy can aid and assist the

researchers in defining the choice of research methods. Secondly, the understanding of the research paradigm and philosophy can help to decide between various research methods and the selection of a suitable method for the research. Finally, research paradigm and philosophy facilitate the researcher in the decision about choosing the approach for the research which may be considered as a new approach (Burrell & Morgan, 1982). There are two main categorisations of research philosophy as discussed below.

3.2.1 Ontology

As a research philosophy, the ontology describes reality and existence. It is also mentioned as a concept of being (Moon and Blackman, 2014). It focuses on many related questions of the structure of reality. An ontology question considers the question about the nature of existence (Al-Saadi, 2014). Ontological arguments inquire about the subjects and matters that are determined in society. In different words, ontology displays assumptions associated with nature and the kind of the present truth (Idoudi et al., 2019).

3.2.2 Epistemology

Research philosophy is related to the studies of the nature of knowledge and includes assumptions about what is knowledge and how to reach it (Guba and Lincoln, 1994). Moreover, epistemology refers to how individuals understand knowledge through their thinking processes or how others thinking about knowledge (Al-Saadi, 2014). An epistemological question would be: “How can I know reality?”. It consists of knowledge and belief that can be examined using designs and tools to solve the problem in order to reach a sound conclusion.

The term research philosophy refers to a set of assumptions and beliefs about knowledge to develop scientific research (Mackenzie and Knipe, 2006). Creswell (2014) noted that there are many types of research philosophy. In this regard, there are three common types used by most scientific research and followed by researchers. As there are many of the research paradigms, many of the studies indicate that they can all be grouped

together into three or four paradigms (Candy, 1989; Teddlie, 2003). These types are as follow:

3.2.3 Positivism

It refers to the research used hypotheses to test or prove the research statements or questions (Saunders & Tosey, 2012). This kind of philosophy is typically used in quantitative studies (Saunders et al., 2009). In this regard, research utilises statistical analysis and the results are quantifiable. It emphasises objective and single reality.

3.2.4 Interpretivism

This philosophy focuses on interpretation based on multiple realities and these can be from any society during the research process (Saunders et al., 2009). In general, the interpretive research is considered a qualitative method rather than a quantitative method and allows the researcher to interpret reality by understanding multiple views (Cohen et al., 2002). This type of study is based on a naturalistic approach to data collection such as observations, interviews and analysis of existing texts from a comparatively smaller sample size.

3.2.5 Realism

This philosophy focuses on the truth which is discovered by the researcher and emphasises that there is only one truth. It suggests explaining what we see in terms of reality based on observation. In general, the realism philosophy is considered a quantitative method through the use of experimentation (Saunders et al., 2016). Realism suggests that the researcher and study are independent of each other, so research is not influenced. According to Saunders et al. (2009) with regard to a realistic perspective, “objects have an existence independent of the human mind.”

3.2.6 Pragmatism

Saunders and Tosey (2012) stated that from a pragmatic perspective, “no single viewpoint can ever give the entire picture and that there may be multiple realities”. Pragmatism suggests that there are many truths based on a variety of approaches. Pragmatism refers to the truth and believes the concept of "what works" based on free-thinking about believing in anything (Morgan, 2014). This philosophy is very flexible and practical. However, pragmatism emphasises that if the reality works then it does not simply mean it is true (Boisvert, 1998).

Many researchers have associated the pragmatism philosophy with the mixed research approach based on the underlying assumptions for mixing research methods and emphasis on the fact that pragmatism is considered to be "the philosophical partner" of the mixed research approach (Denscombe, 2008; Mitchell, 2018; Maarouf, 2019).

The pragmatic philosophy permits the research to combine two approaches and methods based on the logic for this advanced philosophy (Johnson et al., 2007). In other words, pragmatism philosophy allows for mixing in the methodology part through many phases of the research. It allows for mixing in paradigms, assumptions, approaches and data collection and analysis methods of the study (Creswell, 2014). Based on pragmatism philosophy’s advantages, it is indicated that it is appropriate for a mixed-method approach, practical and flexible, offers logic for mixing and integration between paradigms, assumptions, methods and approaches for gathering and analysing the data. This research has selected pragmatism as a research philosophy based on these rationale reasons (Maarouf, 2019).

3.3 Research Approach

The research approach can be divided into three types: induction, deduction, and abduction approaches (Saunders et al., 2012). A brief overview of the research approaches follow.

3.3.1 Induction

This approach focuses on collecting the data and facts based on investigation and builds patterns from the data to develop a theory. In other words, the researcher starts with data towards the end result of building a theory. Moreover, this kind of approach uses investigation to create or build a theory rather than the testing of an existing theory (Bryman, 2012). In general, the application of the inductive approach is related to applying qualitative methods of data collection and analysis (Schutt, 2006).

3.3.2 Deduction

In this approach, deductive reasoning can be used to prove hypotheses based on an existing theory (Saunders et al., 2009). It is associated with a quantitative method. The researcher can formulate a set of hypotheses for the research that needs to be proved or rejected during the research stages (Bryman and Bell, 2014). The deductive approach means that started from the reasoning particular to end with the general reasoning.

3.3.3 Abduction

The abductive approach is also known as abductive reasoning. This kind of approach is very flexible and adaptable because the researcher can move back and forwards between approaches and combine both the inductive and deductive approaches to conclude the research. It is an alternative approach to the main approaches (Bryman & Bell, 2015). Moreover, the abductive approach is similar to the inductive and deductive approaches from the logical aspect. This approach allows for use of mixed methodology along with a pragmatist perspective. In general, an abduction is an appropriate approach when the researcher is not clear about what is important during the research process (Reichertz, 2009).

3.4 Research Purpose

The research purpose emphasises the research goal and might have one of these purposes: descriptive, exploratory or explanatory (Yin, 2014). Many types of research

may involve more than one purpose to describe, explore and explain the study goal. According to Robson (2011), the research purpose may change during the research time. Table 3.1 shows the characteristics of research purposes. There are three main research purposes as follow.

3.4.1 Descriptive

The goal of this research purpose is to describe the research problem by expanding knowledge and focusing on the 'what' and 'how' of the phenomenon related to the problem of research. In general, it is describing the phenomenon according to its characteristics and population (Robson, 2011).

3.4.2 Explanatory

Explanatory research is concentrated on the causal relationships between different variables. It is useful to identify and understand the cause and effect relationships of variables. It is focusing on the 'why' of the research problem but not on the 'how' and 'what' (Robson, 2011). This kind of research purpose is based on experiments and related to quantitative data (Saunders et al., 2007).

Table 3.1: Characteristics of Research Purpose *(Robson, 2011)*

Research Purpose	**Characteristics**
Descriptive	Ability to provide an accurate description Describing an accurate profile of situations, events or persons. Previous knowledge of situations is extensively required. The flexibility of the research design may be qualitative. Can be a basis for decision making.
Explanatory	Looking for an explanation of phenomena or problem. Explaining patterns relating to the phenomenon being researched. Casual relationships between factors of the phenomenon.

	Mainly focused on the quantitative approach.
Exploratory	Asking research questions. Clarifying problems. Used in case of little-understood situations. Ability to generate insights. Evaluating phenomena in a different view. Building hypotheses and generating ideas. Mainly focused on a qualitative approach. Early stages of decision making.

3.4.3 Exploratory

Exploratory research focuses on exploring and discovering phenomena in a new direction and gaining a better understanding of them in-depth. It is useful to use this purpose of research to conduct research about phenomena that have not yet been clearly defined in order to provide a comprehensive exploration (Robson, 2011). Moreover, it focuses on the ‘why’, ‘how’ and ‘what’ of the research problem. This kind of research purpose has a lot of flexibility and can adapt to changes during the research process. However, the answers and results may not provide a sound conclusion to the perceived issue which can help further studies in future research. In many cases, exploratory research is carried out by the use of the literature review, interviewing experts, and carrying out focus group discussions (Saunders et al., 2009).

3.5 Research Methods

There are three main research methods: qualitative and quantitative and mixed-methods which is a combination of qualitative and quantitative. Table 3.2 illustrates the difference between quantitative and qualitative approaches.

3.5.1 Quantitative Method

The quantitative method focuses on gathering numerical data and providing a numerical or statistical result based on statistical procedures. The quantitative method is to determine the relationship between variables within the study (Muijs, 2010). The main purpose of the quantitative approach is to make causal relationships between variables, test hypotheses, and generalise results to wider populations. This method follows the positivism paradigm. A quantitative research method is a deductive approach where the researchers rely on statistical numerical data (Weaver & Olson, 2006).

Table 3.2: Quantitative and Qualitative Approaches (Zikmund et al., 2012; Bryman & Bell 2007; Johnson & Christensen 2008)

Aspect	Qualitative	Quantitative
Purpose	To understand & interpret social interactions.	To test hypotheses, look at cause & effect, interactions & make predictions.
Approach	Observation and interpretation.	Measurement and testing.
Type of Data Collected	Words, images, or objects.	Numbers and statistics.
Form of Data Collected	Qualitative data such as open-ended responses, interviews, participant observations, field notes, & reflections.	Quantitative data based on precise measurements using structured & validated data-collection instruments.
Sample	Small size	Large size
Objectivity and Subjectivity	Subjectivity is expected.	Objectivity is critical.
Generalisation	Particular or specialised findings that are less generalisable.	Generalisable findings that can be applied to other populations.

3.5.2 Qualitative Method

Qualitative research methods focus on interpreting narrative for data analysis based on the research problem. Qualitative research is frequently used in many subjects such as the humanities and social sciences, anthropology, sociology, history, education, health sciences, etc. The type of data in this method are non-numerical data, such as text, audio and video data. The qualitative research method allows an interaction between the researcher and the people (Hussey & Hussey, 2003). Moreover, this method makes the participants answer based their own perspectives based on questions. Additionally, this method can provide more information and data about the subject of study which comes from in-depth insights of the participants (Anderson, 2010). Table 3.3 illustrates the strengths and weaknesses of quantitative and qualitative methods.

Table 3.3: Strengths and Weaknesses of Quantitative and Qualitative Methods (Source: Robson, 2011)

Method	Strengths	Weaknesses
Qualitative	Provides rich data. Investigates complex issues. Explains phenomena. Identifies and evaluates factors that help solve problems. Generates new ideas for theories. Directs contact with participants. Low cost.	Time-consuming. No clear strategy for analysis. Interpretation of data may be subjective. Bias is possible. Difficulties with validity and reliability.
Quantitative	Findings can be generalised across participants. Easier to analyse. Enables the researcher to do statistical comparison. Precise and accurate measurements.	High cost. Lack of flexibility. Lack of depth. Only applicable for measurable (quantifiable) phenomena.

	Findings are verifiable. Shows the causal relationship. Less time-consuming. Findings are replicable.	

3.5.3 Mixed-method Approach

The mixed-method allows using of both quantitative and qualitative methods in the same research to address the study questions (Creswell and Clark, 2011). This method focuses on triangulation in order to improve the research validity. Triangulation is used to test for the consistency of the methods rather than the use of more than one method to collect the data in reaching the same results. According to Flick (2009) and Runeson and Host (2009), there are four types of triangulation techniques, which are investigator triangulation, data triangulation, theoretical triangulation and methodological triangulation. By combining the quantitative and qualitative methods, the researcher can gain a better understanding of the problem and more accurate results. However, combining two methods may add complexity to the research because of the need for a long time for data collection and analysis and considering alternative research paradigms that align with the research.

3.6 Research Strategy

The research strategy is the general guidelines and plans that the researcher follows in order to generate answers regarding the research questions to address the research problem. The strategy of research can be helpful and assist the research result by providing validity and reliability (Saunders et al., 2009). However, the overlaps among the research strategies exist in many cases despite the existence of several strategies (Yin, 2003; Saunders et al., 2009). It is important to select the research strategy that would help the researcher in meeting the research objectives based on the research question. There are common types of research strategy listed below.

3.6.1 Experiment

This strategy is called the experimental method. The experiment uses a scientific way to test the cause and effect relationship among variables. It is focused on quantitative data and involves statistical analysis during the performing of the experiment (Saunders et al., 2007).

3.6.2 Survey

This kind of strategy focuses on measurement based on the views and opinions of the research participants. Data are collected through a survey strategy then analysed statistically to reach meaningful conclusions in the research. The survey strategy is a quantitative method for collecting data and information from individuals by asking multiple questions. The survey strategy is adopted to gather data from a sizeable sample in order to generalise the result of the research (Saunders et al., 2009).

3.6.3 Case Study

The case study strategy focuses on the investigation and deeply understands the phenomenon. This strategy has been used in social science broadly and is often associated with qualitative methods (Creswell, 2013; Denzin & Lincoln 2011). According to Yin (2014) a case study is “An empirical enquiry that investigates a contemporary phenomenon with its life context, especially when the boundaries between the phenomenon and context are not clearly evident”. It is a general plan for answering the research questions (Saunders et al., 2012). This kind of strategy considers empirical or theoretical studies or both in some cases (Tellis, 2005). Moreover, the case study strategy may be considered exploratory, explanatory, or descriptive for research purposes. Case studies often use single or multiple-cases as an approach depending on the research problem. It allows for data collection via various tools. Also, the case study is useful in a situation where there is more explanation that can be provided to conclude the research topic. However, it is a very flexible and simple research design and provides a real picture of real-life events (Peter 2010).

3.6.4 Action Research

This research strategy focuses on the purpose of the research in order to understand the underlying causes. The main aim of the strategy is to enable future predictions about organisational and personal change. It allows the researcher to be involved in the action for change and application of the knowledge (Wiles et al., 2011).

3.6.5 Grounded Theory

The grounded theory research strategy puts an emphasis on the systematic building of a theory based on data gathered from the field. In general, it is the strategy associated with qualitative research. It is applicable to a wide range of issues and uses an interview for data collection (Robson, 2011).

3.6.6 Ethnography

This strategy focuses on analysis and explanation of how an organisation or community live and experience the subject. It uses the inductive approach (Robson, 2011).

3.6.7 Archival Research

This strategy uses administrative records and files of the document or other sources of data. The data sources can be both historical and recent. The strategy focuses on seeking and extracting data from the records to create understandable meaning (Saunders et al., 2009).

3.7 Data Collection Technique

Data collection is the methodical process of gathering specific data related to the research questions and objectives of the research focusing on the optimal technique for collecting it. The data can be categorised into primary and secondary data. Primary data are referred to as the raw data and are gathered by the researcher for a specific research purpose. Moreover, primary data could use a qualitative or quantitative data collection

method or both of them. The primary data can be gathered by many methods such as by interviews, observations and surveys. On the other hand, secondary data collection uses second-hand data gathered by other researchers who may not be the original researchers for a different research aim. These data can be found in published journals, websites or books. In general, it is usually less time consuming, less expensive and easier to find (Saunders et al., 2009).

In research, selecting a data collection technique depends on the type of information needed based on the research conditions. However, there is no single data collection technique that has more advantages than other techniques (Robson, 2011). There are many data collection techniques that can be utilised during the data-gathering phase. The most common data collection techniques in qualitative research are interview, focus group and observation (Yin, 2014).

3.7.1 Interview

The interview technique focuses on the effective capturing of more knowledge in the research subject and more exploration of the views of the interviewees (Robson, 2011). It is very flexible because the interaction between the interviewer and participants in interviews can assist in avoiding misunderstandings in any questions. However, a difficulty of finding participants in the research may be faced by the researcher (Oppenheim, 1992). The researcher is involved in asking questions and writing or recording the answers of the participants. The interview technique can be performed face-to-face, or by using a normal phone call and video conferencing tools to interview respondents for the research. There are three main types of interview techniques: structured, semi-structured and unstructured (Robson, 2011). Structured interviews are based on questions that have planned and predetermined option outcomes by using fixed wording questionnaires. These types of questionnaires consist of closed-ended questions for collecting data from each participant. On the other hand, semi-structured interviews are more flexible because they combine closed- and open-ended questions. They allow the participant and investigator, during the interview, to ask more questions and explain more information (DiCicco, 2006). The third type is unstructured which focuses on open

questions and it allows the researcher to explore more information in-depth about the research problem (Britten, 1995).

This study will use the semi-structured interview approach because the researcher will guide the participants by following an interview protocol during the interview process. The main aim of using semi-structured interview questions was to review the current factors that influence knowledge sharing through social media based on the literature review. Another aim was to identify other factors that were not mentioned in previous studies. Moreover, the research objective of identification and analysis of the critical barriers that influence knowledge sharing through social media use will be obtained by conducting semi-structured interviews. The interview questions included closed- and open-ended questions and were prepared prior to the interviews. Semi-structured interviews were conducted involving 31 participants. The researcher applied online for ethics approval for all involved university institutions to conduct semi-structured interviews with a sample of academics (instructors, lecturers, assistance professors), heads of departments and deans within the universities. For the cases that need decisions, a five-point Likert scale can be the good and optimal choice (Foddy, 1993). Also, the scale can increase the validity and reliability of results (Lietz, 2008). According to Neuman & Robson (2004) using a rating scale provides an accurate answer rather than yes/no or true/false. In this study, the first type of questions in the interview included closed-ended questions using a five-point Likert scale: (very important = 5; slightly important = 4; neither important nor unimportant = 3; slightly unimportant = 2 and definitely unimportant = 1). The other questions were designed using open questions. This kind of question enables one to understand an organisation’s requirements and attitude toward knowledge sharing through social media as well as to explore other important factors. The interview questions were developed in the English language and also translated into Arabic. A pilot study was conducted to identify any problems in the questions and make any required amendments to ensure the accuracy of the questions and test the clarity of the questions. The English versions of the semi-structured interview questions are provided in Appendix A.

3.7.2 Focus Group

This technique is similar to interviews but in the form of a group discussion. This technique allows the participants to share their opinions through a brainstorming session and is used widely in conservation research and social science research. The focus group can be used to obtain validation of the results and for discussing the research problem in more detail. It can play a vital role in research validation and reducing the bias level by having experts involved in the group discussion (Robson, 2011). This study used the focus group technique to apply the interpretive structural modelling (ISM) technique during a workshop session with experts. The process for the interpretive structural modelling (ISM) technique will be described in Chapter 5.

3.7.3 Observation

The observation technique is focused on capturing data about what participants do rather than what they say about what they do in terms of the research problem. It can be used in qualitative research for data gathering from the observation process. The observation allows the researcher to do direct observation in order to capture real scenarios and practices. In other cases, the researcher could be doing indirect observation through observation from a distance or in a laboratory environment (Robson, 2011).

3.8 Data Analysis

In terms of this research, for qualitative data analysis, thematic analysis will be used, and it primarily involves the extraction of common themes (Creswell, 2014). Thematic analysis is the process of identifying themes or patterns from qualitative data (Braun & Clarke, 2006). In interviews, there is no optimal sample size that can be set for collecting the data from interviews; there is no specific number for participants in interviews for data collection. According to Creswell (1998), the acceptable number of participants in interviews is from 5 to 25 interviewees. However, Morse (1994) suggests that the minimum number of participants in interviews is six participants. In the current study, saturation level was reached after 28 interviews from different deanships and colleges. It

is important to mention the saturation level which is related to data gathered via interview. The saturation level focuses on when there is no more additional data that can be captured from the participants. Thomson (2011) stated that saturation level occurs between 10 and 30 interviews and repeated data and information indicate saturation. Also, saturation depends on the researcher's decision regarding the gathered data (Strauss & Corbin, 1998). In this regard, the researcher has considered these recommendations and suggestions until there was no new data and information to be added to the investigation. Data coding was employed in this study for the thematic analysis. Thematic analysis is usually applied for interview transcripts to a set of texts. The researcher prepared the data and closely examined the transcripts and then identified common themes for the topics, patterns and ideas of meaning. Systematic coding of the data was carried out manually due to the limited number of interviewees. During thematic analysis, the researcher needs to combine several codes into one theme. More details will be presented in Chapter 5 about the analysis of qualitative data in this study. On the other hand, SPSS will be utilised for quantitative data analysis. Descriptive statistics including means, medians, modes, the weight of the responses, standard deviations (SD), coefficients of variation (CV) and standard errors will be reported. In addition to this, the one-sample t-test and Bonferroni correction will be utilised to indicate the extent to which variables are statistically significant.

3.9 Research Methodology Phases

The methodology of this research is composed of five stages to guarantee the achievement of goals and objectives in a reasonable way. The emphasis is on applying proper methods, tools and strategies to the research that empower the exploration of research objectives and questions to make sure they are adequately answered (Creswell and Poth, 2016). Figure 3.1 demonstrates every one of the stages which will help in continuing with an underlying estimation of the general planning and turning points. The information for each phase is illustrated below in order to make a contribution to the research.

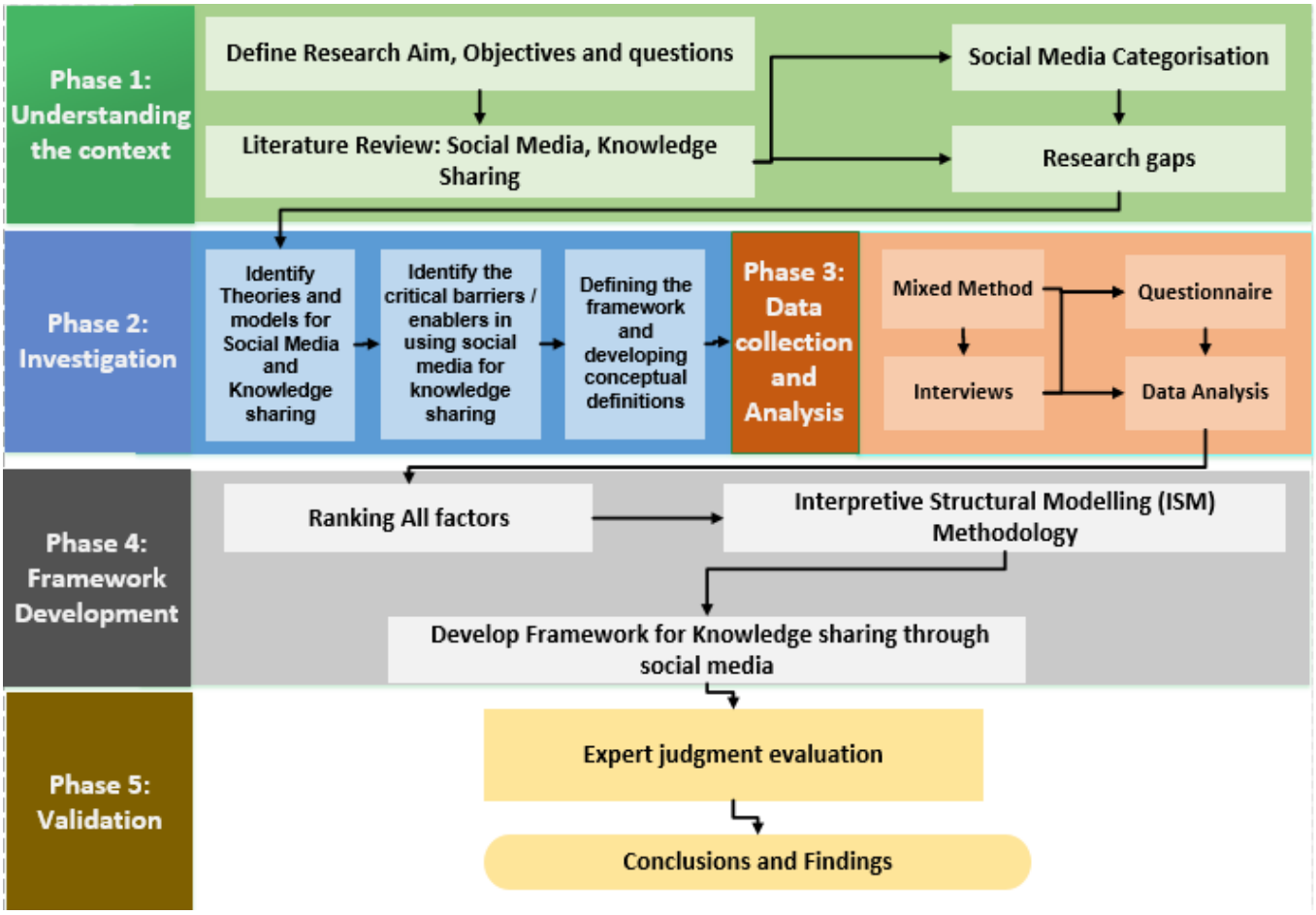


Figure 3.1: Multi-phases Methodological Framework

3.9.1 Phase 1: Understanding the Context

The initial phase of this research focused on gaining a contextual understanding of ongoing practices in social media categorisation as well as comprehending different knowledge-sharing process. An extensive literature review has been accomplished which covers the domain of social media and knowledge-sharing processes and factors presented in Chapter 2. During this phase, numerous material sources were used, such as books, reports, blogs, and other electronic sources such as Google Scholar, Science-Direct, Elsevier, Scopus, and ProQuest etc. This phase is essential for the following research steps. The output of this phase will provide a better understanding of social

media tools among academics by delivering a working definition of social media. The first phase can be summarised as follows in these points:

- Understanding all social media tools for knowledge sharing used to support the academics in higher education institutions.
- Identifying social media types that share knowledge and are used by academics in higher education and the next phase of defining how they work and determine the strategies in different types of social media tools.
- Classifying the social media tools for knowledge sharing in higher education from the findings and the outcomes will show the tools used among academics.
- Identifying research gaps from the literature regarding knowledge sharing through social media in higher education in KSA.

3.9.2 Phase 2: Investigation

This investigation phase includes social media theories, models and the key factors of barriers in using social media for knowledge sharing. Through research gap analysis, the key knowledge-sharing variables and social media and knowledge-sharing theories and models have been determined. An effort is also made to develop the design of a conceptual framework for identified theories and models in order to proceed with the data phase. This phase was fundamental as it supported the plan of fitting interview questions into the field of study. The second phase can be summarised as follows:

- Identifying the current theories and models proposed in the social media and knowledge sharing that discussed in previously studied for social media on knowledge sharing.
- Identifying the critical success factors and the key barriers in using social media for knowledge sharing discussed in previous studies for social media on knowledge sharing.

- Developing the initial framework based on the key barriers in using social media for knowledge sharing and integrating the factors with the suitable theories and models of social media and knowledge sharing.

3.9.3 Phase 3: Data collection

Phase three was a field study. The data collection and analysis chapter will explain how the data will be collected and managed and who will have access to them. This research focused on an exploratory process and assesses the phenomena in another light. This kind of research is appropriate to discover what is happening, to look for new knowledge and to develop inquiries in order to gain a deeper understanding of the phenomena (Robson, 2011). This study aims to help decision-makers in higher education explore and determine factors that influence the knowledge-sharing process, especially when this is related to social media as a phenomenon. Detailed data analysis will be performed to understand and analyse the effects of the knowledge-sharing variables which will lead to the influence on the attitude and intention to knowledge share through social media. Additionally, the method of the data analysis should also be specified and will be included in Chapter 5. The third phase summary is as follows:

- Data collection tool place in Saudi Arabia. A questionnaire was designed then distributed to 31 academics in higher education institutions.
- Semi-structured interviews were conducted with instructors, lecturers, assistant professors, heads of departments and deans within the universities.
- Data analysis was performed to identify the current factors that influence knowledge sharing through social media.

3.9.4 Phase 4: Framework Development

The fourth phase will involve the framework development; the development will be done to develop social media for a knowledge-sharing model. These improvements will be performed in two stages. In the first stage, ranking the factors will be employed to assess

the factors of the developed model. These factors will include individual, organisational and technological knowledge-sharing factors. In the second stage, an interpretive structural modelling methodology will be used to validate the knowledge-sharing factors. In the end, a framework will be delivered along with social media for knowledge sharing. This phase can be summarised as follows:

- The workshop session was held via a face-to-face meeting to apply the ISM technique.
- The ISM technique follows eight steps that are briefly described below and illustrated in Figure 2.
- Core elements for developing the model were identified through data analysis from the field study.
- An ISM-based model of influential factors of social media for knowledge sharing was developed based on research findings.

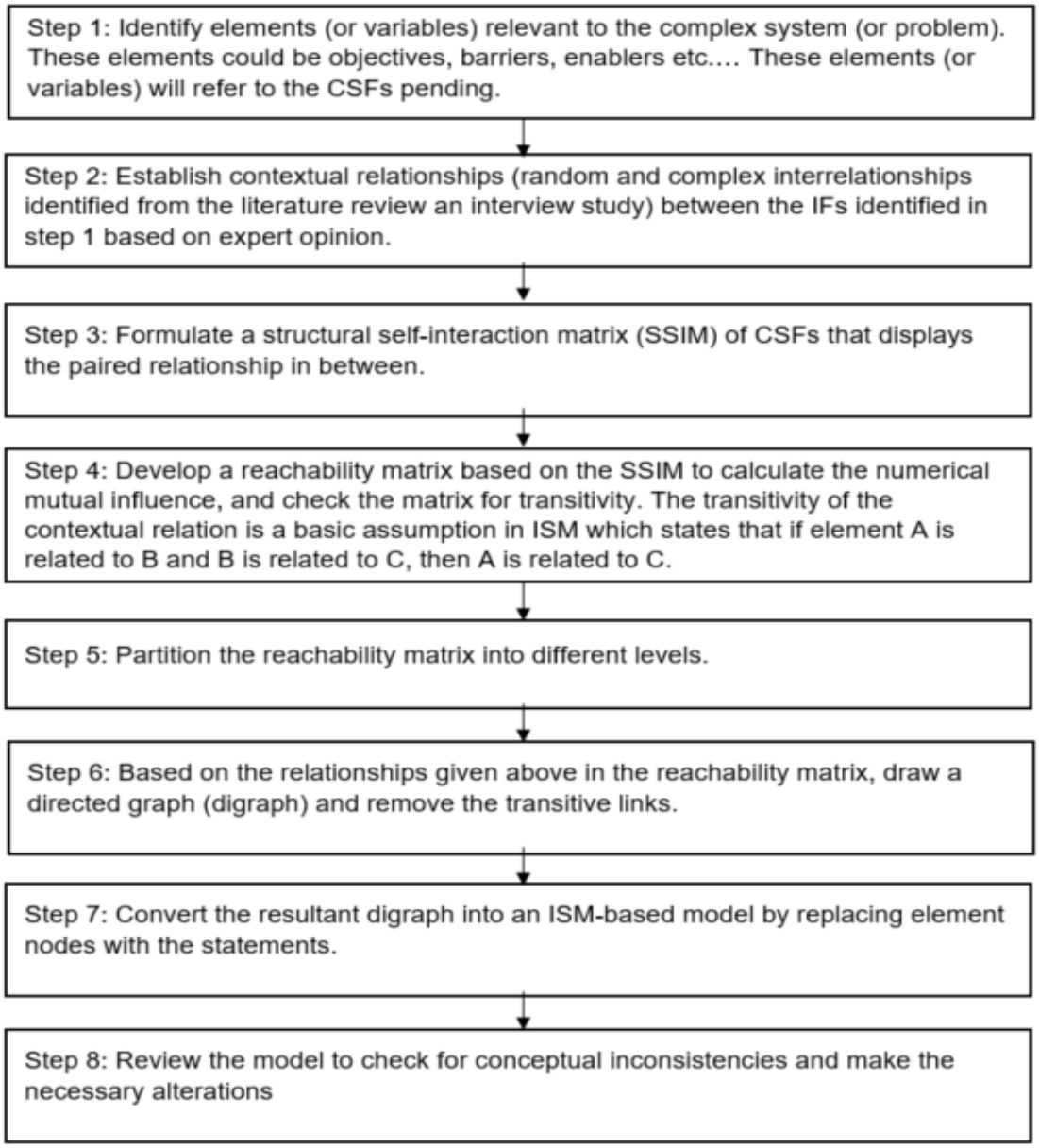


Figure 3.2: Framework Summarising the Steps that Will be Taken in the ISM (Yang, 2012)

3.9.5 Phase 5: Validation

In the final phase of the research, validation will be done for model outputs to validate the social media for the knowledge-sharing model. One of the most basic research principles

and criteria is the trustworthiness of the research result and this is considered crucial and necessary to evaluate the research validity (Yin, 2014). The validation of this research was performed by experts' judgement to validate the developed model. This is an important aspect considering the nature of the knowledge-sharing factors as a new field still in the early developmental stage. Data for the validation study were obtained with an interview of experts who have deepened knowledge of the research topic and the academics of the KSA universities. In the end, conclusions and findings will be delivered along with the contribution to knowledge.

3.10 Summary

In this chapter, the research philosophy, strategy, methodology and data collection techniques were presented in a comprehensive way. Next, the justification reasons for the selected research methods and strategy were discussed. This research associated mixed-method research with a pragmatist philosophy to apply the current study.

4 CONCEPTUAL FRAMEWORK

4.1 Introduction

This chapter focuses on the development of a theoretical framework. It presents the proposed framework for social media and knowledge sharing and identifies the factors that may influence academics for knowledge sharing through social media. The purpose of this section is to justify the factors in the framework and incorporate new other factors that have not been inspected in the past studies especially at the higher education level.

4.2 Initial Framework

Past studies have concurred on the fact that knowledge sharing is a multifaceted issue that can only be fully explained through a multiplicity of variables. Chen and Hung (2010) combine the constructs under the technology acceptance model (TAM), compatibility between the sender and receiver, and the technology readiness index (TRI). In spite of the concurrence in views, there are disparities in the categories of variables which are found to explain the propensity and willingness to share knowledge. These differences can be explained through methodological rationales, variations in time and space aspects of the study. For instance, Chen and Hung (2010) treat knowledge sharing as either an activity, a behaviour or a process, while other studies like Anwar et al. (2019) approach the subject without specifying its intrinsic characteristics.

Past studies have often focused on a limited scope of the variables that determine knowledge-sharing conduct. Justifiably so, these studies focus on knowledge sharing within the institutional framework, hence the need to adhere to the characteristics of knowledge-management systems. Furthermore, these studies are characteristically focused on the creation of frameworks to benefit a particular organisation, hence the focus on the functional dimensions. On the other hand, two studies have used the three variables identified in this literature review. Lin (2007), who studies the three categories of variables, albeit using a different set of sub-variables, relies on data from 172 employees drawn from 50 organisations. The three variables are treated as enablers, with the outcome being the capability of the firms to innovate. Serenko, Bontis and Hardie

(2007) also studied the subject under the three variables, and concluded that the size of the organisation influences knowledge-sharing conduct. However, these studies have focused on other dimensions of knowledge sharing, not on social media. Similarly, the studies are limited to a narrow scope of knowledge-sharing conduct. In this study, a broader range of constructs is studied, in order to accommodate all dimensions of the variables and sub-variables that affect knowledge-sharing conduct.

Based on the literature review which is shows there is a few empirical studies have investigated the factors influence the knowledge-sharing process at an academic level. In addition, some studies were focused on a limit number of factors and ignored other factors which may affect the knowledge-sharing process through social media. The initial framework in this study combines these factors to examine their effect amongst academics in higher education institutions in Saudi Arabia. Due to these differences, the variables and constructs have varied over time. In this conceptual framework development chapter, effects of the three main variables and 34 sub-variables are reviewed in order to determine how they interact with one another. The factors in this study were categorised based on the three main aspects: individual, organisational and technological factors as mentioned in the figure 4-1.

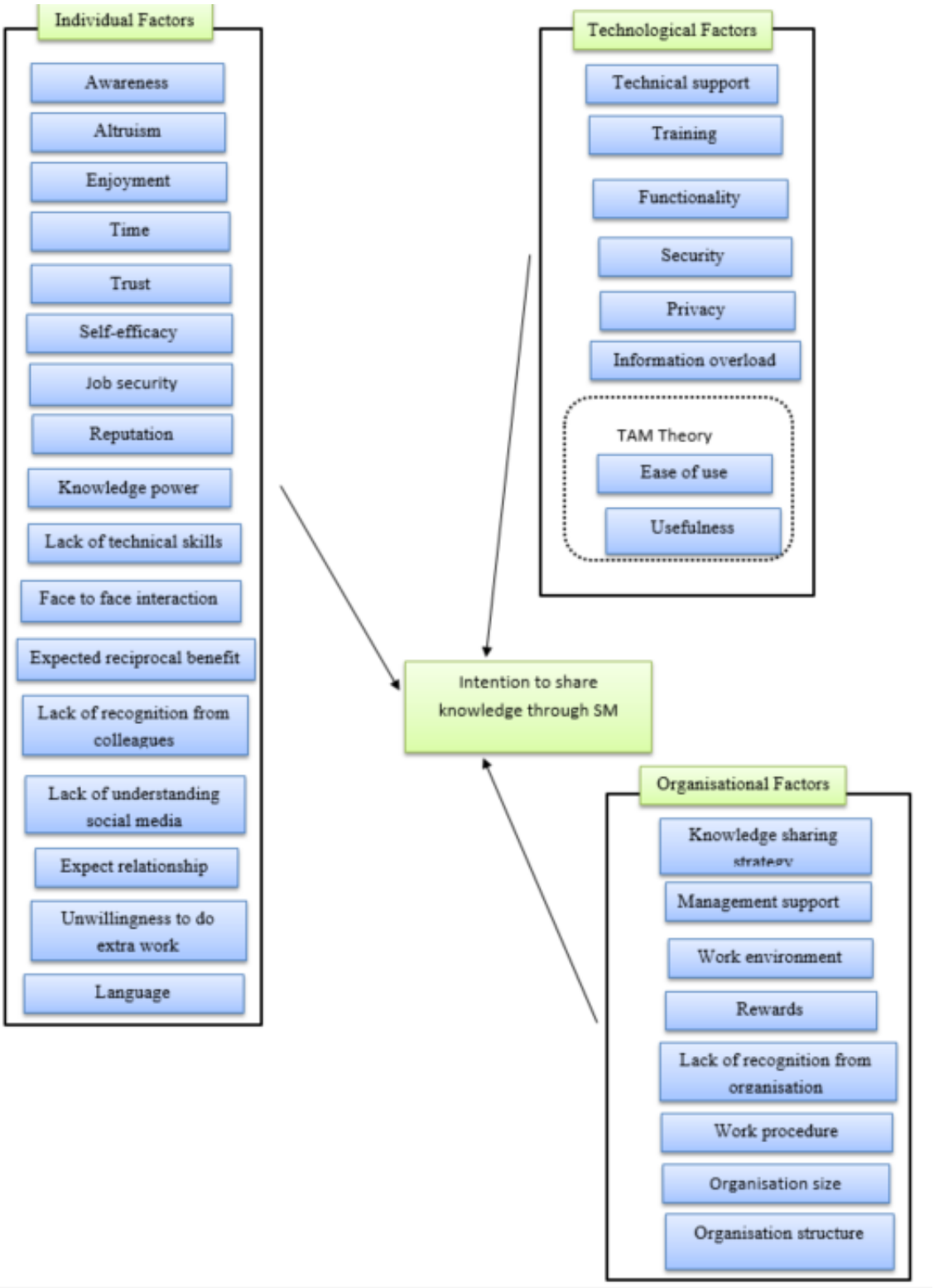

Individual Factors
Awareness
Altruism
Enjoyment
Time
Trust
Self-efficacy
Job security
Reputation
Knowledge power
Lack of technical skills
Face to face interaction
Expected reciprocal benefit
Lack of recognition from colleagues
Lack of understanding social media
Expect relationship
Unwillingness to do extra work
Language
Technological Factors
Technical support
Training
Functionality
Security
Privacy
Information overload
TAM Theory
Ease of use
Usefulness
Intention to share knowledge through SM
Organisational Factors
Knowledge sharing strategy
Management support
Work environment
Rewards
Lack of recognition from organisation
Work procedure
Organisation size
Organisation structure

Figure 4.1: The Proposed Conceptual Framework for Knowledge-sharing Factors through Social Media

4.2.1 Individual Factors

The motivation for an individual to share knowledge within a community is determined by personal choices, interests, experiences and expectations from the knowledge-sharing activities (Shina, 2020). These factors are explained by a number of theoretical models. The social exchange theory (SET) posits that individuals are inclined to reciprocate actions, since they feel obliged to do so as a way of appreciating the benefits or efforts (Yan, et al., 2016). However, the impact of SET in knowledge sharing is complicated by the fact that the value or benefits from knowledge are subjective and dynamic. Due to the challenges in quantifying the value or benefits from knowledge, reciprocation is not possible. In spite of this situation, it is apparent that the combination of intrinsic and extrinsic reciprocal benefits is perceived as sufficient within certain communities (Yasir & Majid, 2017). As a result, even when the recipient is not the ultimate beneficiary, or in cases where the expected benefits are not achieved, knowledge sharing still occurs. To a large extent, past research recognises the fact that efforts and intention to share knowledge are often viewed as sufficient reciprocity, especially due to the voluntariness of the sharing activities, as well as the potential for future and continued cooperation through sharing knowledge. The factors related to the decisions by an individual to share knowledge on social media are defined below.

4.2.1.1 Altruism

The role of altruism is reflected in the study by Kwahk and Park (2016), who highlight that whereas knowledge is shared between two parties, it often ends up benefitting third parties. Social media platforms tend to lay down the foundation for the entry of third parties to the knowledge-sharing processes. Altruism facilitates the voluntary and continuous sharing of knowledge within a community, including facilitation of knowledge

sharing at one's own cost (money, time and effort) (Fang and Chiu, 2010). The primary concern for the welfare of others helps eliminate the potential barriers of knowledge sharing. Mansor and Jaharuddin (2020) and Wasko and Faraj (2005) concur on the fact that altruistic tendencies lead to secondary and tertiary effects of knowledge sharing, thereby creating a culture that is favourable for knowledge sharing within the community. The peer-to-peer outcomes have the propensity to increase the willingness for other members of the community to contribute to the knowledge base, thereby leading to mutuality in benefits.

4.2.1.2 Enjoyment of Helping Others

Enjoyment of helping others is often viewed as a mediator for knowledge sharing and diffusion (Lin, 2007). An individual who enjoys sharing knowledge for the benefit of others is much more willing to share the knowledge and contribute to its creation, due to the robustness of the intrinsic motivations (Jin, et al., 2015). Such an individual is thus willing to solve the emergent barriers to knowledge sharing as well as actively seek and participate in forums where knowledge is created, aggregated and shared. The enjoyment of helping occurs with conscientiousness, whereby an individual is willing to take measures to ensure the success of knowledge sharing within the community. This factor also plays a key role in eliminating barriers that reduce the perceived ease of use, as well as other factors. However, Kwahk and Park (2016) found that enjoyment of helping others was not a key to sharing knowledge. This is because there are no formalised mechanisms for assessing this intrinsic motivation, and determining how it drives an individual to share knowledge. Chen and Hung (2010) posit that the objective of sharing knowledge is to improve the capability of an individual or an organisation. These objectives highlight the presence of genuine readiness to assist others, rather than the presence of a transactional value, whereby commensurate actions are expected. The enjoyment of helping others plays a key role in nullifying the effects of bottlenecks in the sharing of knowledge.

4.2.1.3 Face-to-face Interaction

Face-to-face interactions are defined as the reciprocal influence of an individual(s) through physical contact and presence (Al Saifi, et al., 2016). As a basic component of social systems, face-to-face interactions lead to the formation of knowledge sharing facilitated by face-to-face interactions, since these interactions lead to the use of different communication styles, consultation, learning while teaching, training and coaching, brain storming and problem-solving (Ansarimoghaddam, Hoon & Yong, 2017). Face-to-face interactions lead to better connections between and among individuals, thereby facilitating the transfer of different forms of knowledge, including tacit and explicit knowledge. Aljuwaiber (2019) and McConnell et al. (2013) indicate that face-to-face interactions are integral for the sharing of tacit knowledge, which tends to be unstructured. Despite the multiplicity of advantages provided by information technology tools, face-to-face interactions remain key in the development and reinforcement of social networks. It is common for people to develop authentic and more robust relationships during face-to-face interactions.

4.2.1.4 Lack of Time

The process of sharing knowledge takes time, depending on the quality and quantity of knowledge being shared. Al-Busaidi and Olfman (2017) point out that since knowledge sharing is considered an auxiliary activity for most individuals and not necessarily a primary responsibility, it is common for people to engage in knowledge sharing only when free. In the absence of sufficient motivations, most individuals are unable or unwilling to commit sufficient time for knowledge sharing, especially if they are involved in other activities such as knowledge creation (Seba, Rowley & Lambert, 2012). The role of time also arises from the fact that in technology-mediated knowledge sharing, it is challenging for the sender and receiver of the knowledge to be available on the platforms at the same time (Nadason, Saad & Almi, 2017). Consequently, this introduces a number of challenges in bringing the sender and receiver together for complete transfer of the knowledge. The lack of time leads to incomplete sharing of knowledge, while the sender may decide against starting the process if they feel that the process will not be completed.

4.2.1.5 Trust in People through Social Media

Trust is often viewed as a facilitator of knowledge sharing within communities, starting with the formation of the communities to the reinforcement of relationships that bind the members together and attract other individuals (Harden, 2012). According to Panteli and Sockalingam (2005), trust is integral in virtual networks as much as it is offline, where the actors tend to base their interactions on emotions, moods, values and attitudes. The level of trust within a social network reduces the need for verification of the components of knowledge that are shared. The conceptualisation of trust as the combination of beliefs related to integrity, benevolence and competence plays a key in its positive influence on knowledge sharing (Fang & Chiu, 2010). In the absence of trust, members tend to hoard the knowledge they possess, while also limiting the transmission of that knowledge to third parties (Nichani & Hung, 2002). The role of trust is framed in a multiplicity of ways. First, trust facilitates knowledge sharing by establishing links between formal and informal mechanisms of key elements such as reciprocity and verification. Fang and Chiu (2010) point out that if the community has a trusted contributor or aggregator, the speed of knowledge sharing is increased. Similarly, trust reduces the possibility of opportunistic behaviour within communities, whereby one individual seeks to benefit from the shared knowledge without contributing (Kimmerle, Cress & Hesse, 2007). Finally, the presence of trust drives dialogue and discussions about the content of the knowledge. Chen and Hung (2010) study the variable as interpersonal trust, as defined as the outcome of historical experiences and interactions with favourable outcomes. The development of trust, which is associated with expectations of similarly favourable outcomes, can also arise from the absence of adverse interactions. Trust is established and reinforced through the belief that the other party has good intentions, has integrity, is competent, and benevolent. Based on past studies, trust in social media leads to an increased propensity to seek, collect and exchange knowledge (Cress & Martin, 2006). In the study by Oliveira and Pinheiro (2020), trust is discussed as a facilitator viewed as a facilitator since it removes barriers associated with knowledge-sharing activities. The role of interpersonal trust is fundamentally integrated into social media platforms since interactions there are facilitated by the perceptions of the members of the community on one another. Chen et al. (2012, p. 2) argue that “trust strengthens the process of

cooperation… since a high level of interpersonal trust encourages open discussions, understanding of work-related problems, and effective communication." In contrast, a high level of trust can impede the willingness and potential for the recipient to validate the quality of knowledge that is shared.

4.2.1.6 Awareness of the Importance of Knowledge Sharing through Social Media

Knowledge sharing through social media platforms is dependent on the extent to which the senders, recipients and users view the process as necessary. Chow and Chan (2008) indicate that social media platforms are but one of the many channels through which knowledge is shared. The unique characteristics of the platforms influence the willingness and ability to share knowledge. Shina (2020) found that social media platforms promote knowledge sharing because socialisation processes are more robust and organic. The organic nature of the socialisation processes and networks imply that communities grow by attracting individuals with similar characteristics and interests. Whereas this can lead to convergence in the characteristics of knowledge shared in those groups (Marouf, & Khalil, 2015), it also leads to the possibility of sharing knowledge that is relevant (Noor, & Salim, 2011). As a result, the knowledge shared to communities within a social media platform is bound to be synthesised by the members of the group, since they have similar interests and characteristics. On the same note, such members have a fundamental appreciation of the value, characteristics and purpose of the knowledge being shared. Ultimately, these social media platforms mediate the socialisation process by bringing people together into communities. Through automated mechanisms, social media platforms are capable of directing individuals with similar interests to communities where knowledge is shared. These similarities mediate in the knowledge-sharing behaviour, by influencing the type of knowledge shared, the approach and processes of sharing knowledge, as well as the tendencies of the members to engage in mutually beneficial activities under knowledge sharing. For instance, in the Blogosphere, knowledge sharing is directed or guided by the blogger, with the possibility of contribution by the members (Papadopoulos, Stamati and Nopparuch, 2013). On the other hand, on forums, the knowledge can arise from any member of the community.

4.2.1.7 Job Security

The process of sharing knowledge involves the transfer of an element that determines the job security of an individual within an organisation. Mehrizi (2016) indicated that job security arises from the ability of an individual to prove and justify their worth to an organisation, by possessing skills and competencies that are unique. Job security is acquired through the possession of certain knowledge that makes the employee valuable to the organisation. By sharing that knowledge, an individual can compromise their position within the organisation, thereby losing their job (Huie, Cassaberry & Rivera, 2020). The situation places employees who hold knowledge in a precarious position where they have to make a decision. On the one hand, by sharing the knowledge, they may lose the unique value to the organisation to the end-users, who might recalibrate the knowledge and package it better. On the other hand, by sharing the knowledge, these employees may acquire new value within the organisation as individuals who are integral to the development of knowledge in that particular trajectory (Riege, 2005). The divergence in these two scenarios is solved through the provision of job security. Such security of tenure reassures employees that whereas possession of knowledge is integral to their position in the company, the company has made commitments not to replace them in the foreseeable future (Jaberi, Salimi & Khazaei 2013). Through these assurances, it is possible to eliminate barriers leading to hoarding of knowledge, based on the fear that such knowledge can be used by the end-users to compromise the power or position of the individual who created or shared it.

4.2.1.8 Expected Reciprocal Benefit

Reciprocal benefits represent the benefits that accrue to individuals who share knowledge, primarily due to their willingness and ability to share knowledge within a community, or with an individual recipient (Chai, Das and Rao, 2011). In most situations, possession of knowledge is akin to possession of wealth. This highlights the imperativeness of measures to protect that wealth, due to its scarcity and value. Kankanhalli et al. (2005, p. 125) define reciprocal benefits as “the belief that current contribution to electronic knowledge repository (EKR) would lead future request for knowledge being met”. Reciprocal benefits exist in situations where knowledge is treated

as a public good, and the existing knowledge base is the product of the collective contribution by all members of the community, who also have access to the knowledge base (Fang and Chiu, 2010). As a result, there are mutual benefits from reciprocity, which implies that for knowledge sharing to occur, the recipient doesn't need to provide an equal or immediate benefit to the person sharing the knowledge. Similarly, since the benefits accrue to a community, rather than a single individual, it is not possible to determine equality in benefits. After all, both parties perceive the sharing as fair. The expected reciprocal benefits are also associated with the anticipated reciprocal relationships, which influence the continuity and future cohesiveness in the community. According to Hsu and Lin (2008), favourable reciprocal relationships only exist within a community of practice, whereby individuals have shared goals, interests and processes. In the study by Kankanhalli et al. (2005), the expected reciprocal benefits are positively related to knowledge sharing where strong pro-sharing norms exist. Based on data from 323 respondents in two communities, Chen and Hung (2010) found that the norm of reciprocity has a positive and statistically significant impact on knowledge-sharing behaviours. However, this occurred within a structured system of professional virtual communities. Wang and Noe (2010) also reference the role of norm reciprocity, based on social capital theory.

4.2.1.9 Loss of Knowledge Power

Knowledge power arises from the fact that possession of certain forms of knowledge elevates the value of an individual within the institution, or environment (Supar et al., 2005). Chen et al. (2012) point out that experts show less willingness to share or codify the knowledge they possess if such knowledge represents a personal advantage over others. In some cases, the potential for loss of power is dependent on the quality and quantity of rewards and recognition attached to sharing knowledge. The loss of knowledge power arises from the fact that even in the presence of formal and commensurate rewards, individuals who possess knowledge often tend to feel that they are not fully rewarded (Lam and Lambertmont-Ford, 2010). Essentially, in the face of homogenous rewards, the individuals sharing knowledge may feel the loss of knowledge power, since they view those rewards as being relatively lower than expected or

deserved. On the other hand, heterogeneous rewards are challenging to manage, especially due to the dynamic characteristics of the knowledge shared by different individuals.

4.1.2.10 Reputation

Wasko and Faraj (2005) indicate that the possibility of gaining reputation drives individuals to share knowledge within a community. Reputation is itself a non-financial benefit to the sharer, but it can also lead to direct financial benefits from the accumulation of expert power within the community. The possibility of gaining a reputation is directly linked to knowledge-sharing conduct and vice versa (Obermayer & Tóth, 2017). Chai, Das and Rao (2011) use the example of the blogosphere, where individuals gain reputations and credit based on the quality and quantity of their contribution to a particular area of knowledge. The potential for gaining a reputation, which is fundamentally a reward in itself, motivates individuals to share knowledge. As predicted under social capital theory, the reputation is often monetised, with the type of financial and non-financial benefits dependent on the individual (Allam et al., 2012). Consequently, the preference for reputation as the form of reciprocation can influence the willingness and ability of an individual to share knowledge, especially if they are not assured of getting the reputation from the community.

4.2.1.11 Lack of Recognition from Colleagues

Social cognition theory (SCT), which was advanced by A. Bandura in 2001 from social learning theory, explains the role of recognition by colleagues in influencing knowledge-sharing behaviour. SCT posits that individuals are more inclined to share knowledge when there are expectations of favourable outcomes from within the community in which they expect recognition (Chen & Hung, 2010). The potential for favourable outcomes is influenced by the personalisation of the knowledge sharing, and the characteristics of the knowledge. Essentially, if an individual gets recognition from peers, they are more inclined to share knowledge within such groups (Al-Kurdi et al., 2018). Similarly, the propensity to share knowledge within a community is dependent on the extent to which the receivers and users of the knowledge as well as the members of the community, view the individual

who shares the knowledge as a prominent figure with the authority to share knowledge of value. The SCT is comprised of several variables, including self-efficacy, observational learning, behavioural capacity, expectancies, expectations, reinforcements and self-control.

4.2.1.12 Lack of Technical Skills

The ability to share knowledge, which is determined by possession of technical skills, expertise and experiences, determines the willingness of employees to engage in the processes. Choi, Kang and Lee (2008) point out that sharing knowledge requires the possession of technical abilities which are acquired through specialised training. In the absence of such skills, knowledge sharing is sub-optimal or non-existent. Whereas face-to-face interactions lead to sharing of knowledge without the need for training, Choi, Kang and Lee (2008) found that there are specialised skills required when a Knowledge Management System (KMS) is involved. KMSs are designed purposes for customised use within an organisation, implying that individuals who are not aware of the functions of the various modules face challenges sharing knowledge. As a result, to share knowledge on social media, one has to possess the necessary skills under the KMS, as well as the use of the social media platforms where the recipients and users are.

4.2.1.13 Lack of Understanding Social Media

Social media is a fairly novel creation since it only gained global prominence in the 2000s. Ahmed et al., (2019) and Al-Qaysi et al., (2020) posit that although social media has penetrated most communities (those which existed offline as well as emergent ones due to increased socialisation), it is still perceived as a novel technology, which is still evolving. Its evolution is marked by the emergence of novel platforms, the introduction of new modes of use as well as changes in the policies and guidelines on use (Chang, & Chuang, 2011). These factors mark the reality that some members of knowledge-sharing communities may lack a clear understanding of social media. The disparity in understanding of what social media represents, its philosophical foundations and how it

is used affect their ability and willingness to share knowledge therein. Literature on digitisation under the third industrial revolution posits that the achievement of previously unexpected outcomes, such as zero marginal costs of production are important considerations (Rifkin, 2011).

4.2.1.14 Language

The role of language, which is a cultural artefact, is discussed by Moller and Svahn (2004). Differences in languages used by the sender, and/or recipients and users of knowledge influence the utility of the knowledge, as well as the success in sharing the knowledge (Ahmad & Widen, 2015). The language used by the parties to the knowledge-sharing activities and processes has direct and indirect effects on the attitudes of the individuals involved therein. On the one hand, disparities in the languages have a bearing on the socialisation processes as well as the potential for the development of social capital within the community (Skoric et al., 2016). By design, differences in language within a community imply heterogeneity, which is fundamentally a potential barrier for knowledge sharing. Similarly, the language used influences the meaning and implications of the knowledge, especially in instances where translation leads to distortion of the intended meaning (DeVito et al., 2017). The differences or similarities in languages also influence the costs of sharing knowledge, based on the time and other logistical aspects. Differences or similarities in languages have implications for culture, which influences the values, habits and styles of individuals, and ultimately, their actions in certain situations (Reinhardt, 2019). The differences and their effects tend to affect the perceived and actual value of the knowledge while influencing other outcomes such as reciprocity and potential future relations among others.

4.2.1.15 Expected Relationship

The expectations of relationships play a key role in limiting the unilateral exploitation within knowledge-sharing relationships. The structural role perspective posits that in a network of individuals or groups, the person who acts as a link between or among the various entities. Teo et al., (2008) posit that the possibility of a sense of community among individuals who share knowledge is a driving factor. The sense of community lays down

the foundation for the enjoyment of the benefits of belonging to the group, especially in informal communities where membership is dependent on what each individual contributes. Yu and Chu (2007) argue that in some communities, where relationships are dependent on self-organisation, the absence of formal rewards scheme implies that participation is dependent on a decision by members. Within such communities, the voluntariness of knowledge sharing is determined by the type of relationships expected by both the sender and recipient of the knowledge. As indicated by Ma and Chan (2014), users of knowledge can decide which sender to focus on the knowledge shared by a particular sender, depending on the type of benefits they expect from receiving and using the knowledge. As predicted by the theory of reasoned actions (TRA), the presence of social networks that drives social trust leads to shared goals (Chow & Chan, 2008). Even in the absence of a formalised organisation, communities where knowledge is shared display tendencies towards acting in particular ways that are associated with the propensity to share knowledge. A different perspective on the expected relations is predicted by social role theory. Based on the theory, men are agentic, with their knowledge-sharing behaviour dependent on the expected outcomes, while women are more communal, thus they base their decision on interpersonal relationships (Chai, Das & Rao, 2011). As a result, in sharing knowledge, men tend to be dominant and competitive, while women focus on creating harmony, intimacy, cooperation and friendships.

4.2.1.16 Unwillingness to Do Extra Work

Knowledge sharing involves efforts, which require time and money to implement and achieve. Due to the differences in each instance of knowledge sharing, Halimah et al. (2020) and Lee et al. (2010) recognise the fact that the activities and processes may require additional work. The need for additional work during knowledge sharing is documented in past studies and is often viewed as an impediment to the success of knowledge sharing and the willingness of some individuals to share knowledge within communities. According to Wu and Sukoco (2010), the need for extra work arises in instances where the individual sharing the knowledge has to learn new skills on how to share the knowledge. Yilmaz (2016) posits that it is also necessary to explain the

knowledge in a manner that makes it easy for all members of the community to understand. Within communities where people have different abilities, the process of sharing knowledge is non-linear, with synthesis and aggregation having to be taken into account. If the person holding the knowledge is unwilling to do the extra work, they may choose not to share the knowledge, to avoid committing to an activity that is taxing. The unwillingness to do extra work arises from the view that the benefits from sharing are not commensurate to the costs incurred, especially if the knowledge is complex.

4.2.1.17 Self-efficacy

Self-efficacy denotes a scenario where an individual believes that they have control over, and can execute a particular behaviour, in this case, sharing knowledge (Kwahk & Park, 2016). Fang and Chiu (2010) further define self-efficacy as a self-evaluation that affects the decision of the person to participate in a particular activity. Self-efficacy also influences the degree of commitment to succeeding in the behaviour, especially when they experience obstacles along the way. Finally, self-efficacy denotes the overall lessons learnt and growth through mastering the behaviour (Lin, 2007). Self-efficacy thus influences the behaviour of an individual, their motivation to behave in that particular way, as well as the willingness to retain such behaviour across time and space. High levels of self-efficacy in knowledge sharing imply that an individual is capable of sharing more quantities, and/or higher qualities of information with lesser efforts or at a lower cost.

4.2.1.18 Poor Verbal/Written Communication and Interpersonal Skills

The process of sharing knowledge involves the packaging and framing of knowledge in a manner that makes it suitable for the recipient and end-user. Chow and Chan (2008) and Moller and Svahn (2004) highlight the role of communication skills and abilities in the sharing of knowledge within any formal or informal community. In addition to influencing the nature of the relationships and interactions between the sender and receiver of the knowledge, communication and interpersonal skills influence the degree to which members of a community are willing to accept and use the knowledge shared by a member. Socialisation processes are influenced by the nature of the relationship, implying that the presence of unfavourable ties between members can limit the emergence of

opportunities (Oyemoni et al., 2016), as well as the willingness of the members to share knowledge (Halimah et al., 2020). The role of interpersonal skills in the process arises from the fact that knowledge sharing does not occur within a vacuum, but is affected by the ability of the sender or receiver to create a conducive environment for the sharing of knowledge. The discourse revolves around the fundamental motives and abilities of individuals, such as power relations, the sense of achievement, and affiliations as markers of knowledge-sharing behaviour.

4.2.2 Organisational Factors

The differences in the size, scope and other characteristics of organisations are often viewed as having a direct influence on knowledge sharing. Researchers such as Yang and Chen (2005) posit that knowledge sharing within organisations is influenced by economic theories, with inclinations towards the capabilities of the organisation. This makes the resource-based view relevant in understanding the intention and propensity to share knowledge among employees and functional units within the institution. Furthermore, the potential for specific benefits to the organisation has led to the formalisation of knowledge management (Choi, Kang and Lee, 2008). On the other hand, Lam and Lambertmont-Ford (2010) discuss the knowledge-based view, which is built on the foundation of collective and social aspects of learning. Under this perspective, an organisation is an entity comprised of communities that are committed to learning and identity. The overriding presumption is the utopic view that the members of these communities are co-operators driven by benevolence, who are willing to share knowledge on a voluntary basis, without requiring any form of reward. According to Foss (2003), the view overlooks the possibility of conflicts of interest, as well as the validity of incentives in knowledge sharing. Chen et al. (2012) opine that knowledge management, a function of knowledge sharing, is not influenced by the scale of operations, since the factors associated with the cycle of knowledge creation and sharing (such as externalisation, socialisation, internationalisation and combination) do not change linearly based on the size of the organisation. The relevance of the organisational factors arises from the fact that knowledge sharing presents several benefits to the institution (Wang & Noe, 2010).

Based on the perceived benefits, which differ from one institution to another, an organisation lays out resources to collect, store and distribute knowledge.

4.2.2.1 Lack of Knowledge-sharing Strategy (Vision and Goal)

Organisations have developed specific strategies for sharing knowledge which is designed to make the activities and processes more objective (Nadason, Saad & Almi, 2017). These visions and goals promote the exchange of ideas and mutual understanding, thereby creating a force that binds the members of the organisation together. Within such a tightly bound entity, members display increased propensity and ability to share knowledge as long as the processes are tied to a particular strategy. In the absence of such a strategy, employees who are part of a knowledge-sharing community tend to share knowledge in a subjective manner, which is often laced with conflicting objectives and outcomes (Alhalhouli, Hasan & Der, 2014). These members of the knowledge-sharing community have limited ability to utilise any particular approach when sharing knowledge, thereby limiting the utility of the knowledge for the particular purposes it is intended. Since most organisations invest in knowledge management systems on account of the potential benefits (Chan et al., 2013), these benefits are compromised by the lack of a specific strategy for knowledge sharing (Chung, Nam, & Koo, 2016). The absence of an overall strategy for knowledge sharing also limits the existence of collective goals, which limits the ability of employees to act in a particularly predictable manner, since there are no assurances that the self-interest of other employees regarding knowledge sharing has limited potential for leading to adverse effects (Chow & Chan, 2008).

4.2.2.2 Lack of Rewards

The role of rewards in influencing knowledge-sharing tendencies is often discussed from an individual perspective since rewards are linked to motivation and capacity (Lin, 2007). Rewards are often viewed as interventions aimed at encouraging knowledge sharing, as well as the development of a knowledge-sharing culture (Nelson, Sabatier & Nelson, 2006; Yao, Kam & Chan, 2007). These rewards include bonuses, career advancement and job security. Lam and Lambertmont-Ford (2010) termed rewards as inducements that

are necessary for motivating employees to deviate from self-interest and opportunistic conduct, such as hoarding knowledge. There are different types of reward schemes, each with a unique effect on knowledge-sharing tendencies. Ferrin and Dirks (2003) found that competitive reward schemes (whereby the rewards are based on the amount of knowledge which is shared) had a negative effect on knowledge-sharing tendencies. In the same study, cooperative reward schemes had a positive effect on knowledge sharing, since such schemes are cognisant of the fact that knowledge sharing is not ultimately predictable or linear. Despite the differences, it is apparent that within the institutional frameworks, rewards play an integral role in motivation, and ultimately the knowledge-sharing propensities, due to direct and indirect benefits. At the basic level, group-based incentives play a role in influencing group members to share knowledge (Lin, 2007). Studies on reward mechanisms, specifically the incentive programmes for groups are often based on collective performance. However, within the organisation, empirical studies have shown that the utilisation of rewards has adverse outcomes, especially if team members perceive the rewards as insufficient or unsuitable. This is why in most studies, researchers focus on the absence of rewards, rather than the presence of rewards. Lam and Lambertmont-Ford (2010) found that financial incentives are not relevant to individuals, but their influence on knowledge-sharing behaviour is reinforced by a diversified set of rewards, featuring non-financial elements.

4.2.2.3 Lack of Recognition from the Organisation

The discourse on rewards and knowledge sharing highlights the presence of transactional value in the sharing of knowledge. Wang and Noe (2010) recognise the scenario and attribute it to the fact that the creation, storage and sharing of knowledge have direct and indirect costs which represent value. Essentially, the rewards are viewed as commensurate reciprocity by the recipients or ultimate beneficiaries of the shared knowledge. However, Choi, Kang and Lee (2008) and Cress and Martin (2006) concur on the fact that these tangible benefits are sometimes insufficient, or unavailable, hence the need for recognition from the organisation. Literature on human resources management points towards the supplementary and complementary relationship between financial and non-financial rewards. Drawing from these theories, it is common

for employees to expect recognition for creating and sharing knowledge, as the sole form of reciprocation, or as a complement to other rewards. Recognition is key for subsequent benefits, especially among individuals who perceive generic rewards as insufficient forms of reciprocity for the knowledge that they share. The recognition of employees can be discussed from a professional or administrative perspective. Lam and Lambertmont-Ford (2010) point out that within professional bureaucratic scenarios, an individual is more inclined to adhere to professional standards as opposed to institutional policies. These professional standards affect the inter-group boundaries since, in addition to fitting into the teams, the individual's decision on knowledge sharing is influenced by industry standards. Such standards tend to drive autonomy since the decision to share knowledge is influenced by professional alliances as much as it is influenced by administrative boundaries.

4.2.2.4 Management Support

Management support denotes the set of activities that the top-level management within an organisation offers to subordinate employees for the achievement of specific goals and outcomes (Lin, 2007). Fang and Chiu (2010) attribute management support for knowledge sharing to the value accruing to an organisation in the form of competitive advantages, as well as orienting the company towards a culture of learning and sharing. In addition to eliminating barriers, the support of management teams improves the propensity and ability to share knowledge through the formalisation of the activities and processes for sharing knowledge. The support by management teams within an organisation is found to have a positive effect on knowledge-sharing culture. Management support is integral to the entire lifecycle of knowledge management, from the creation of knowledge to the development of a knowledge management system (Chai, Das & Rao, 2011). However, rather than being a monolith, management support can occur at different levels of management, including top-, mid- and low-level management. King and Marks (2008) studied management support as supervisory control, thereby highlighting the extent to which management teams direct and control knowledge management activities and ultimately, knowledge sharing. Sohail and Daud (2009) also argued that the attitudes of immediate supervisors play an integral role as proxies to management support. Under

such circumstances, there is bound to be increased knowledge sharing, since the processes are formalised and structured (Harden, 2012). Organisations with the right type of support are thus found to generate more knowledge, as well as showing increased initiative and willingness to share such knowledge. Liao (2008) indicated that since top management teams control reward power, social power and expert power in most organisations, their support for knowledge sharing is a facilitator for the process. However, some studies recognise the fact that generic management support can have an adverse effect on knowledge sharing by employees.

4.2.2.5 Physical Work Environment

The physical work environment is often discussed concerning the size, types and location of offices (Weijs-Perrée et al., 2019), the number, nature and type of meeting rooms (Kasuganti, 2017), and the design of the structures and how they are separated (Chen & Huang, 2007). The physical environment influences knowledge sharing by determining the chances for employees to meet and share ideas (Becerra-Fernandez & Sabherwal, 2010; Kasuganti, 2017). The type of facilities in the physical environment, specifically those elements which relate to knowledge sharing, is also a factor of concern. The presence of facilities that promote increased socialisation leads to increased knowledge sharing since they promote the development of social capital (Zagenczyk, Murrell & Gibney, 2008). These include the presence of facilities for face-to-face interactions as well as online interactions, which can accommodate the number of employees involved in the knowledge-sharing activities. Chen and Huang (2007) found that the facilities within an institution influence knowledge sharing based on how conducive they are. In the study, physical environments that are not comfortable are found to have adverse effects on knowledge sharing.

4.2.2.6 Organisation Structure

The organisational structure denotes how tasks are allocated, coordinated and supervised to achieve the goals of the institution (Supar et al., 2005). Organisations differ based on their structure, which can either be formal/informal, centralised/decentralised or vertical/ horizontal. The structure of an organisation, which is based on the relationships

between the various functional units, affects knowledge sharing (Kim and Lee, 2006). Functional segmentation within an organisation is found to impede knowledge sharing since employees operate and view the institution from those functional divisions (Lin, 2007). Past research concurs on the fact that organisations with more decentralised structures experience higher levels of knowledge sharing since the structure does not interfere with knowledge sharing. Huang (2009) and Gottschalg and Zollo (2006) posit that decentralisation, which denotes the even distribution of power and authority across the different levels of management, empowers individuals to access the resources and capabilities for knowledge sharing. Such a structure, which is characterised by dynamic job description, open workspaces, job rotation and informal settings, promotes knowledge sharing by eliminating the barriers arising from bureaucratic bottlenecks. It also de-emphasises positions, hierarchies and ranks, thus enabling employees to interact more freely. However, it is also imperative to recognise the fact that the utility of the knowledge to be shared is influenced by its functional characteristic, which is dependent on the formality of structures. Furthermore, these past studies do not focus on the role of organisational structure in the creation and storage of knowledge. Chen and Hung (2010) identify professional virtual communities, which are a form of institutionalised system for sharing information among persons who operate in geographically dispersed locations.

4.2.2.7 Organisation Size

The scale of an organisation affects knowledge sharing since sharing knowledge with a large group of individuals is marred by a multiplicity of challenges that are not relevant when the community is small. Yasir and Majid (2017) point out that the size of an organisation, based on the number of employees, has direct effects on knowledge sharing. On the one hand, the size of the firm can have positive effects on knowledge sharing. According to Moffett and McAdam (2007), large organisations possess unique resources and capabilities for knowledge sharing. These resources and capabilities culminate from formalised knowledge management systems and processes, as well as well-established communities for sharing information. On the other hand, large-scale firms face several inefficiencies in sharing knowledge, due to the effects of scale and scope. On the other hand, Serenko, Bontis and Hardie (2007, p. 2) indicated that "…as

the size of an organizational unit increases, the effectiveness of internal knowledge flows dramatically diminishes and the degree of intra-organizational knowledge sharing decreases". The diminished knowledge-sharing tendencies emerge from the weakening of interpersonal relationships, reduced trust, decrease in the efficacy of connections and inefficiencies in communication.

4.2.2.8 Work Procedure

The procedures that are laid down within an institution influence knowledge sharing (Bock et al., 2005; Hooff & Weenen, 2004). These procedures have an indirect effect on a multiplicity of knowledge-sharing conduct, including the creation, storage and sharing of knowledge. Yeh et al. (2006) indicate that the work procedures determine the kind of interactions that employees have, as well we the type of relationships that develop within the organisation. In organisations where team work is promoted, knowledge sharing thrives more, since members of the team have to keep one another appraised about the projects they are involved in. Huang (2009) found that in institutions where remote work is common, the lack of spontaneous face-to-face interactions may limit the sharing of tacit knowledge, even if other forms of knowledge are shared across online platforms. Certain work procedures result in increased knowledge sharing. Huang (2009) states that institutions involved in research and development tended to engage in knowledge sharing since this was integral in the work procedures. To fully conceptualise the role of organisational factors in knowledge sharing, it is imperative to understand the motivation-based perspective through which the social dilemmas of sharing knowledge are resolved.

4.2.3 Technological Factors

Studies on technological factors revolve around models such as the technology acceptance model (Chen & Hung, 2010). Under TAM, the perceived ease of use and perceived usefulness are key determinants of the extent to which novel or existing ICT tools are viewed as improving the antecedents and outcomes of knowledge sharing, such as improvement in job performance, and future plans. Based on a study by Hung and Cheng (2013), the presence of positive attitudes towards technology (among individuals) has a positive effect on knowledge sharing tendencies. A sense of insecurity, whether

actual or perceived, has a negative effect on the willingness and ability to share knowledge through such technologies. Ultimately, the role of technological factors, which are relevant at the individual and the organisational levels, is dependent on the ability of the entity to adapt to the technology. Most of these technological factors influence knowledge sharing by supplementing or complementing face-to-face interactions. Similarly, the influence as enablers or barriers reflects the generic challenges associated with technology. The factors are as discussed below.

4.2.3.1 Ease of Use for Social Media

The differences in the abilities of users of social media platforms to utilise the various functions and modules influences how and whether knowledge is shared. Bilgihan et al. (2016) posit that knowledge sharing is sometimes a technical process, especially when complex systems and processes are involved. The perceived ease of use (PEOU) is linked to the evaluation (by the user of the technology) of the efforts required for the utilisation of the technology. Thus, a technology that is perceived as easy to use for knowledge sharing involves limited efforts and is easy to operate. As a result, the user faces limited barriers when sharing knowledge. PEOU motivates individuals to share knowledge since the processes do not necessitate unmanageable efforts and costs. Kim and Lee (2006) and Lin (2007) concur that knowledge sharing is barred by the presence of complex and costly processes, which reduce the relative value of the knowledge to the receiver, compared to the commensurate benefit accruing to the sender. The ease of use can be estimated based on the time it takes to complete the process, as well as the costs associated with sharing the knowledge. In instances where specialised technologies are required for sending the knowledge, the sender may lack the motivation to engage in acquiring those technologies, thus reducing the PEOU.

4.2.3.2 Functionality for Social Media

The growing sophistication of information communication and technology tools and applications, such as Web 2.0 tools, facilitate knowledge sharing in several ways. The tools include groupware software, shared databases and intranets that are purposefully developed for supporting communication within organisations and between/among

employees and individuals (Quigley et al., 2007). According to Yeh et al. (2006), these IT tools correct the flow procedures for sharing knowledge, lead to the identification of the carriers and requesters of knowledge, and establish the channels for communicating knowledge from one individual to another. The proliferation of IT tools, most of which are customised to share knowledge also play a key role in the process (Fang & Chiu, 2010). For instance, social media platforms that allow for the transfer of knowledge in different forms, including audio, audio-visual, visual and text provide diversified opportunities for senders and receivers to interact more effectively. Chai, Das and Rao (2011) indicate that blogs enable communities to gather, codify, store, share and synthesise knowledge. The introduction of real-time communications, whereby multiple parties can interact concurrently further enable members of a community to aggregate and share knowledge. The high level of customisation of these tools has played a key role in the elimination of several organisational and individual barriers. For instance, Zhang et al. (2010) identify the establishment of virtual spaces that enable the creation, development, storage and sharing of knowledge with similar ease as physical networks. Concerning virtual communities, Chen and Hung (2010) concur with Hung and Cheng (2013) that improvements in the functionalities of the ICT have made it possible for novel forms of interactive sharing of knowledge.

4.2.3.3 Lack of Training (How to Use, How to Share)

The ability to use social media platforms for safe and secure knowledge sharing, among other activities comes from training. In explaining the mediating role of the differences in the types of social media platforms, Voorveld et al. (2018) indicated that some aspects of social media use require technical knowledge that can only be acquired through training. Lam and Lambertmont-Ford (2010) refer to training as part of the hedonic motivations through which employees are provided with rationales and the ability to share knowledge. Training is often deployed with development programmes, whereby the skills and competencies necessary for sharing are nurtured, improved and diversified in response to changes in the environment. When the skills required for sharing knowledge are taken into account as well, the effects of training or lack thereof become apparent. Past studies concur on the fact that whereas social media platforms are often viewed as easy to use,

it is necessary for training on the technical aspects to enable the users to optimise the benefits, especially for activities and processes of integral importance such as knowledge sharing (Kulakli, & Mahony, 2014; Wang & Wang, 2018; Wu et al., 2016). The lack of training on social media use implies the possibility of disparity in the ability to use social media, thereby leading to the disproportionate use of social media platforms during knowledge sharing. These outcomes include total inability to use the social media platforms for knowledge sharing, as well as the lack of confidence by a member of the community when sharing or using the knowledge shared on the social media platforms. Other potential outcomes include compromises to the security and safety of social media, as discussed later.

4.2.3.4 Lack of Technical Support

Technical support plays a key role in reinforcing the intensive socialisation among communities as well as solving the emergent challenges that limit the utility of social media for knowledge sharing. By definition, technical support is availed of by users of IT systems to enable them to utilise the products and services optimally (Pee & Lee, 2015). Lack thereof implies that the community faces challenges when using social media platforms to share knowledge. The lack of technical support implies that when challenges emerge, the community is left with limited options in terms of sharing knowledge (Qammach, 2016). Technical support is commonly required since social media platforms are faced with some generic and custom challenges associated with IT systems, such as bugs or service outages. The process of solving these technical challenges is often above the capacity of the members of the community, thus necessitating the involvement of the entities that created the platform (Sarka & Ipsen, 2017). The norms of IT systems imply that technical support is integral to facilitating the effective functioning of the platform, and ultimately, the ability of the members of the community to share knowledge. The availability of technical support is integral in the integration of the propositions for improving knowledge sharing within particular communities, especially where there are customer needs. For instance, Sweet et al. (2020) indicated that the integration of software elements to accommodate the needs of disabled individuals increased knowledge-sharing behaviour. Since some of these technical challenges are unique, their

solution can only be implemented where technical support is available to implement the propositions by the community that is involved in knowledge sharing.

4.2.3.5 Information Overload

The ability to share knowledge, and inadvertently, the propensity to participate and benefit from knowledge-sharing activities are influenced by the quantity and quality of knowledge available. Bock et al. (2010) indicate that in the presence of excess knowledge, the effectiveness of sharing knowledge tends to diminish. This is caused by the inability of the sender and receiver to focus on any particular dimension of the knowledge since they are overwhelmed by the quantity. Jones, Ravid and Rafaeli (2004) indicate that an increase in the quantity of knowledge leads to a reduction in the relative quality since the end-users find it challenging to synthesise and use all aspects of the knowledge. Ultimately, information overload is viewed as a weakness in the knowledge management systems by the organisation, since it is indicative of weak synthesis and calibration of the information (Li, 2016). Under such circumstances, rather than the community experiencing challenges in sharing knowledge, there are unexpected outcomes such as suboptimal use of the knowledge and recognition of its value. Information overload can be caused by the unstructured or unplanned sharing of knowledge, which is common in informal communities (Hanka & Fuka, 2000). The lack of a structure for the substance of the knowledge shared often leads to differences in the quantity and quality of information shared at any point in time. Ultimately, these circumstances lead to adverse outcomes in knowledge sharing, with the effects trickling down based on several individual factors, such as the lack of reciprocal benefits.

4.2.3.6 Security of Social Media

Vayrynen, Hekkala and Liias (2013) indicated that the security of knowledge-sharing channels is a key determinant of knowledge sharing since it plays a role in ensuring that the knowledge shared reaches the targeted individuals only. In the absence of security on social media platforms, several risk exposures emerge, some of which go beyond knowledge sharing. The concerns about security influence the willingness of individuals to share certain types of knowledge, as well as the extent to which they participate in the

knowledge-sharing activities. The security concerns also influence the willingness of members of a community to join the social media platforms. The concerns about security arise from the fact that social media platforms can be used as attack points, leading to adverse outcomes such as cyber-attacks on the company (Wang et al., 2016). The most common security threats include unauthorised access to key elements of the knowledge, loss of reputation leading to damaged brands, hacking of accounts and key IT infrastructure through phishing attacks and social engineering and the use of fraudulent and fake accounts to join the community (Majchrzak et al., 2013). Hung and Cheng (2013) disprove the assertion that discomfort with the knowledge-sharing technology harms the intentions to share knowledge. This can be explained by the fact that there are numerous alternatives for sharing knowledge, and that in the absence of better alternatives, the motivations for sharing knowledge are often more potent than the unfounded discomfort.

4.2.3.7 Privacy of Social Media

Privacy is defined as the ability of a community or members there to determine, on their own volition, how, when and the extent to which the knowledge and information about them are communicated to other entities (Chai, Das and Rao, 2011). The proliferation of social media platforms has led to the emergence of novel concerns about the privacy of individuals, especially considering the implications of the lack thereof. These concerns arise from the fact that online communities are highly fluid, and there is limited control over who has access to the knowledge shared therein. A more potent concern on privacy is shared by Myrick et al. (2016) who indicate that there is limited control over how the knowledge shared on social media platforms is used. Whereas privacy concerns relate to online activities, Papadopoulos, Stamati and Nopparuch (2013) and Taylor (2004) concur on the fact that there are real-life and offline implications when privacy guidelines are breached. Assurances on privacy are often associated with increased willingness to share knowledge since the risks of exposure are reduced significantly (Al-Busaidi & Olfman, 2017). Evidence also shows that when communities have privacy concerns, they are more deliberate about sharing knowledge, and their actions result in a reduction in the quality and quantity of knowledge shared (Sohail & Daud, 2009). The concerns around privacy also lead to emergent costs and the need for additional efforts associated

with verification of the knowledge shared therein, as well as the lack of willingness to share sensitive knowledge across social media.

4.2.3.8 Perceived Usefulness of Social Media

The perceived usefulness of social media in knowledge sharing has a direct effect on knowledge-sharing conduct. The effect of perceived usefulness for knowledge sharing emerges from the realisation that social media platforms provide a more effective and efficient approach to sharing knowledge within the community (Stewart & Osei-Bryson, 2013). The effectiveness and efficiency can be influenced by the nature of knowledge being shared or the characteristics of the community in which the knowledge-sharing activities and processes occur. Past studies such as Gunawan and Gunawan (2019) and Imran et al. (2019), recognise the fact that some forms of knowledge have to be shared in a particular format, manner or approach, this leading to the preference for particular channels for each type of knowledge. Imran et al. (2019) argue that some forms of knowledge are best shared through social media, especially if such knowledge is not part of official workplace business. Although the absence of social media (or other channels) does not imply a lack of knowledge transfer, its presence as an option increases the propensity of the members of the community to share knowledge more effectively and efficiently.

4.3 Summary

This chapter has presented the initial framework for knowledge sharing through social media, identifying the key factors that may influence knowledge-sharing processes from three main aspects. In addition, the initial framework considers the critical factors from the literature review, Moreover, it incorporates other influential factors that have not been examined in previous studies in order to investigate the effect of these factors in this study. Finally, this chapter presented the justification for combining the factors.

5 ANALYSIS AND DISCUSSION

5.1 Introduction

In this chapter, the findings from the qualitative and quantitative study are analysed and presented. The findings are discussed in relation to the literature review.

5.2 Quantitative Data

5.2.1 Demographic Information

The demographic data below provide insights into the characteristics of the individuals who participated in the survey study.

5.2.1.1 Position

The sample for this study included two deans, two vice deans, two heads of department, two vice department heads, 17 academic staff, five lecturers, two instructors, one supervisor of the research support unit. Although unevenly distributed, most of the departments in the institutions are well represented among the respondents.

5.2.1.2 Age Group

The age statistics in Figure 5.1 show that 9% of the sample are 25-30 years, 16% are 31-35 years and 36-40 years, 19% are 41-45 years and 31% of the sample are 46-50 years; 6% of the sample are 51-55 years and 3% are 56-60 years. This indicates that the respondents are from different age categories, but most of the respondents are under fifty.

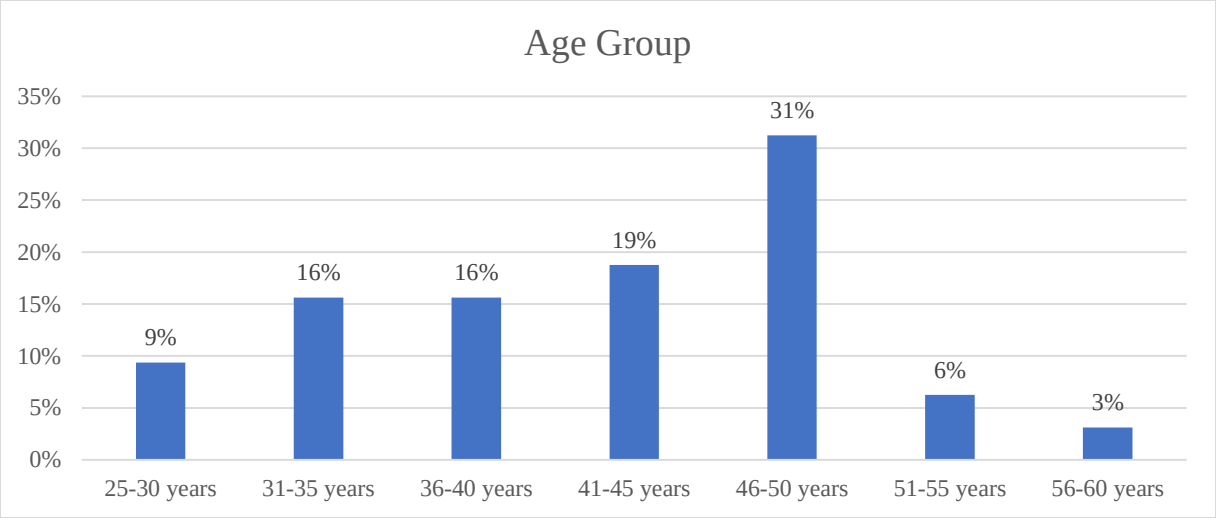


Figure 5.1: Age Group

5.2.1.3 Work Experience

The work experience statistics in Figure 5.2 show that 6% of the sample have 3-4 years' work experience, 16% have 5-6 years' experience, 25% have 7-8 years' experience, 19% have 8-9 years' experience and 9-10 years and 16% of the sample have above 10 years' work experience. In general, 94% of respondents have five years or more experience in the field of academic work, which represents their credibility in providing insights about the research topic.

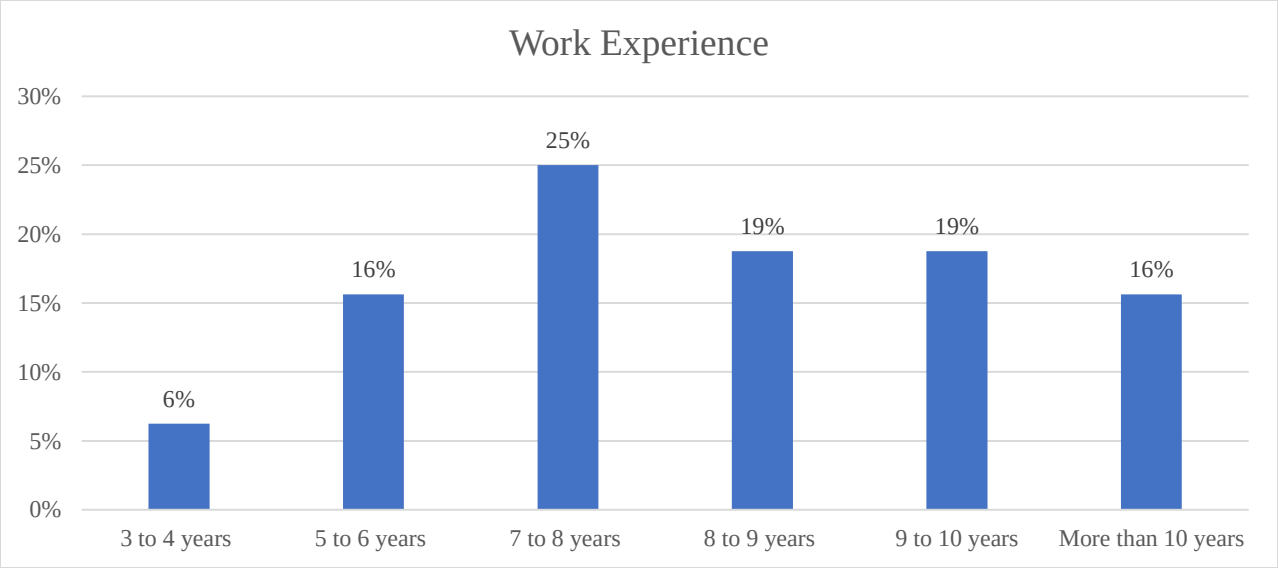


Figure 5.2: Work Experience

5.2.1.4 Job Role

The job role for the participants indicates that most of the sample are teaching and doing administrative work. The administrative duties varied in their job between the departmental duties and college responsibilities. It is interesting to note that a small number of the sample was doing the research work. Scientific research is not compulsory but they need it in relation to promotion. Here are some quotes of respondents regarding the role of the job:

" The system requires the administrative staff to have a minimum quorum of 3 hours per semester.''

“Teaching, research, and community service, but mostly teaching due to a large number of students.”

5.2.1.5 Social Media Use

Figure 5.3 shows that WhatsApp ranked first among participants with 97% of the respondents indicating that they use the platform. YouTube is used by 68% of the

respondents, with 48% of the respondents indicating that they use Twitter and Wikipedia. The least popular social media platforms, with a reported 3% use rate include Stack Overflow, Personal Websites, Microsoft 365, Google Drive, Google+, DropBox and Acadox. The researcher attributes the differences in the popularity of the social media platforms such as WhatsApp, YouTube, Wikipedia and Twitter to the functionality in these platforms, and that this network provides groups that enable members to get the information they need easily without the need for guidance or instructions. Another reason for this high percentage of the use of the platforms is the popularity of this tool between users in Saudi, which originates from the diversity of uses that they are put to. For instance, WhatsApp messenger is key to communication, with the ability to share audio, text and audio-visual messages in real time. The platforms with limited use levels are specialised in nature and require technical skills.

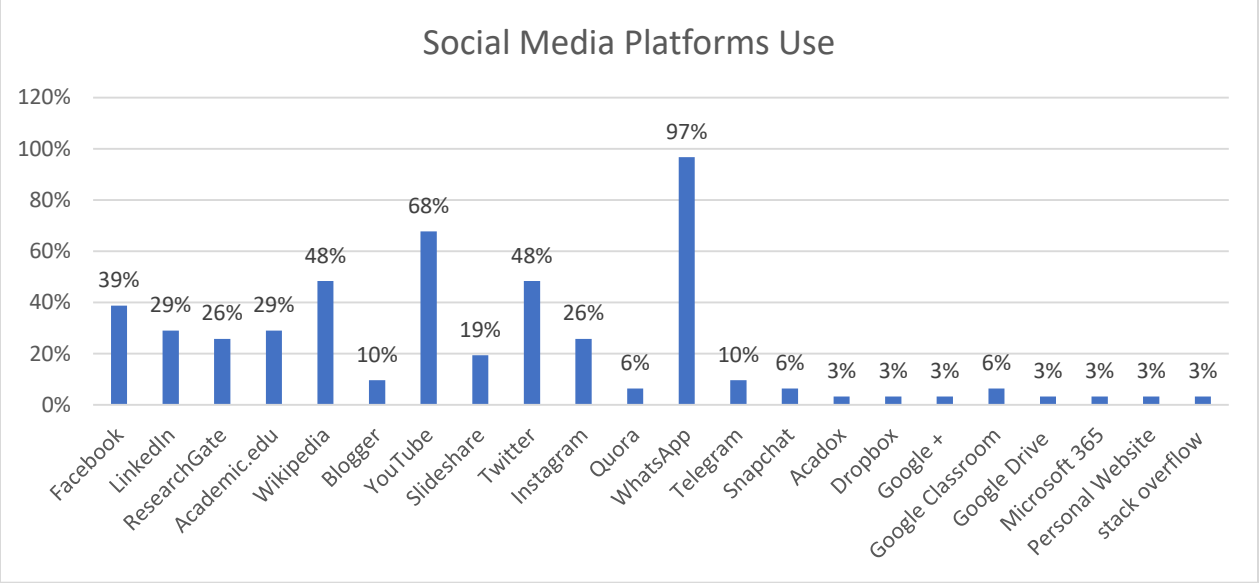


Figure 5.3: Social Media Platforms Used

5.2.2 Descriptive Data

By the combination of the five-point Likert scales with three-point Likert scales, the "very important" and "slightly important" scales changed to "important" scale, "slightly unimportant" and "definitely unimportant" scales changed to "unimportant" scale. There is no charge for this scale "Neither important nor unimportant". This combination applied to the result of the respondent be combine with the result of the scores to the changed scales. As a result, a mean score from ‘0.01’ to ‘1.00’ is labelled as ‘unimportant’ while a mean score from ‘1.00’ to ‘2.00’ is labelled as ‘Neither important nor unimportant’ and finally, a score from ‘2.01’ to ‘3.00’ is classified as ‘important’. In the descriptive analysis, the objective is to determine whether the mean from the responses.

5.2.2.1 Individual Factors

A total of 18 individual factors were included in this analysis. Out of the 18 variables, the enjoyment of helping others (x=2.93) is found to be the most influential, thus accounting for the rationales for use of social media platforms for knowledge sharing. Lack of recognition from colleagues (x=1.80) had the lowest mean among the variables. Based on the opinion of experts the results in the table 5.1 indicates that the means of all the factors are greater than the defined value which is 2 (Al-Khater, 2017). The findings also reveal that the means of only four variables are less than the defined value of 2. These variables include loss of knowledge power (x=1.87), lack of recognition from colleagues (x=1.80), expected relationships (x=1.90) and unwillingness to do extra work (x=1.87). The remainder of the variables have means higher than 2. The results are shown in Table 5.1 below.

Table 5.1: The Analysis of the Individual Factors Using the Mean and Defined Value

How important are the following factors to the attitude and intention of knowledge sharing through social media tools? (N=31)			
Factors	**Mean**	**Defined Value**	**Result**
Altruism	2.67	>2	Statistically significant
Enjoyment of helping others	2.93	>2	Statistically significant
Face-to-face interaction	2.38	>2	Statistically significant
Lack of time	2.51	>2	Statistically significant
Trust in people through social media	2.35	>2	Statistically significant
Awareness of the importance of knowledge sharing through social media	2.87	>2	Statistically significant
Job security	2.09	>2	Statistically significant
Expected reciprocal benefit	2.48	>2	Statistically significant
Loss of knowledge power	1.87	<2	Not statistically significant
Reputation	2.38	>2	Statistically significant
Lack of recognition from colleagues	1.80	<2	Not statistically significant
Lack of technical skills	2.45	>2	Statistically significant
Lack of understanding social media	2.38	>2	Statistically significant
Language	2.41	>2	Statistically significant
Expected relationship	1.90	<2	Not statistically significant
Unwillingness to do extra work	1.87	<2	Not statistically significant
Self-efficacy	2.67	>2	Statistically significant
Poor verbal/written communication and interpersonal skills	2.19	>2	Statistically significant

The results in the table below (Table 5.2) indicate the means, medians, modes, the weight of the responses, standard deviations (SD), coefficients of variation (CV) and standard errors (SE) for all the variables classified under individual factors.

Table 5.2: The Analysis of the Individual Factors Using Mean, Median, Mode, the Weight of the Responses, SD, CV and SE

How important are the following factors to the attitude and intention of knowledge sharing through social media tools? (N=31)

Factors	Mean	Median	Mode	Weight	SD	CV	SE
Altruism	2.67	3	3	2.70	0.65	0.24	0.11
Enjoyment of helping others	2.93	3	3	2.90	0.35	0.12	0.06
Face-to-face interaction	2.38	3	3	2.38	0.91	0.38	0.16
Lack of time	2.51	3	3	2.51	0.81	0.32	0.14
Trust in people through social media	2.35	3	3	2.35	0.87	0.37	0.15
Awareness of the importance of knowledge sharing through social media	2.87	3	3	2.87	0.42	0.14	0.07
Job security	2.09	2	3	2.09	0.90	0.43	0.16
Expected reciprocal benefit	2.48	3	3	2.48	0.76	0.30	0.13
Loss of knowledge power	1.87	2	1	1.87	0.88	0.47	0.15
Reputation	2.38	3	3	2.35	0.84	0.35	0.15
Lack of recognition from colleagues	1.80	1	1	1.80	0.94	0.52	0.16
Lack of technical skills	2.45	3	3	2.45	0.85	0.34	0.15
Lack of understanding social media	2.38	3	3	2.38	0.88	0.36	0.15

Language	2.41	3	3	2.41	0.88	0.36	0.15
Expect relationship	1.90	2	1	1.96	0.83	0.43	0.14
Unwillingness to do extra work	1.87	2	1	1.87	0.92	0.49	0.16
Self-efficacy	2.67	3	3	2.67	0.70	0.26	0.12
Poor verbal/written communication and interpersonal skills	2.19	3	3	2.19	0.94	0.43	0.16

Based on the classifications of the responses in percentages, ''Enjoyment of helping others'" is viewed as an important factor by the largest proportion of respondents (94%). ''Awareness of the importance of sharing knowledge" is viewed as an important factor by 90% of the respondents, while "self-efficacy" and "altruism" are selected by 81% of the respondents as an important factor. On the other of the spectrum, loss of knowledge power and expected relationships are identified as important factors by 32% of the respondents.

Among variables viewed as being unimportant, "lack of recognition from colleagues" is selected by 55% of the respondents, while loss of knowledge power is identified by 45% of the respondents. Finally, among the variables which are viewed as neither important nor unimportant, "expected relationships" is selected by 32% of the respondents, while "loss of knowledge power" is chosen by 23% of the respondents. The differences in these responses reveal variables that have the highest influence among the respondents, based on whether they are considered important, unimportant, or neither of the two. However, it is apparent that the respondents are inclined towards viewing the individual factors as being "important" influences in the decision to share knowledge through social media. The results are shown in the figure below.

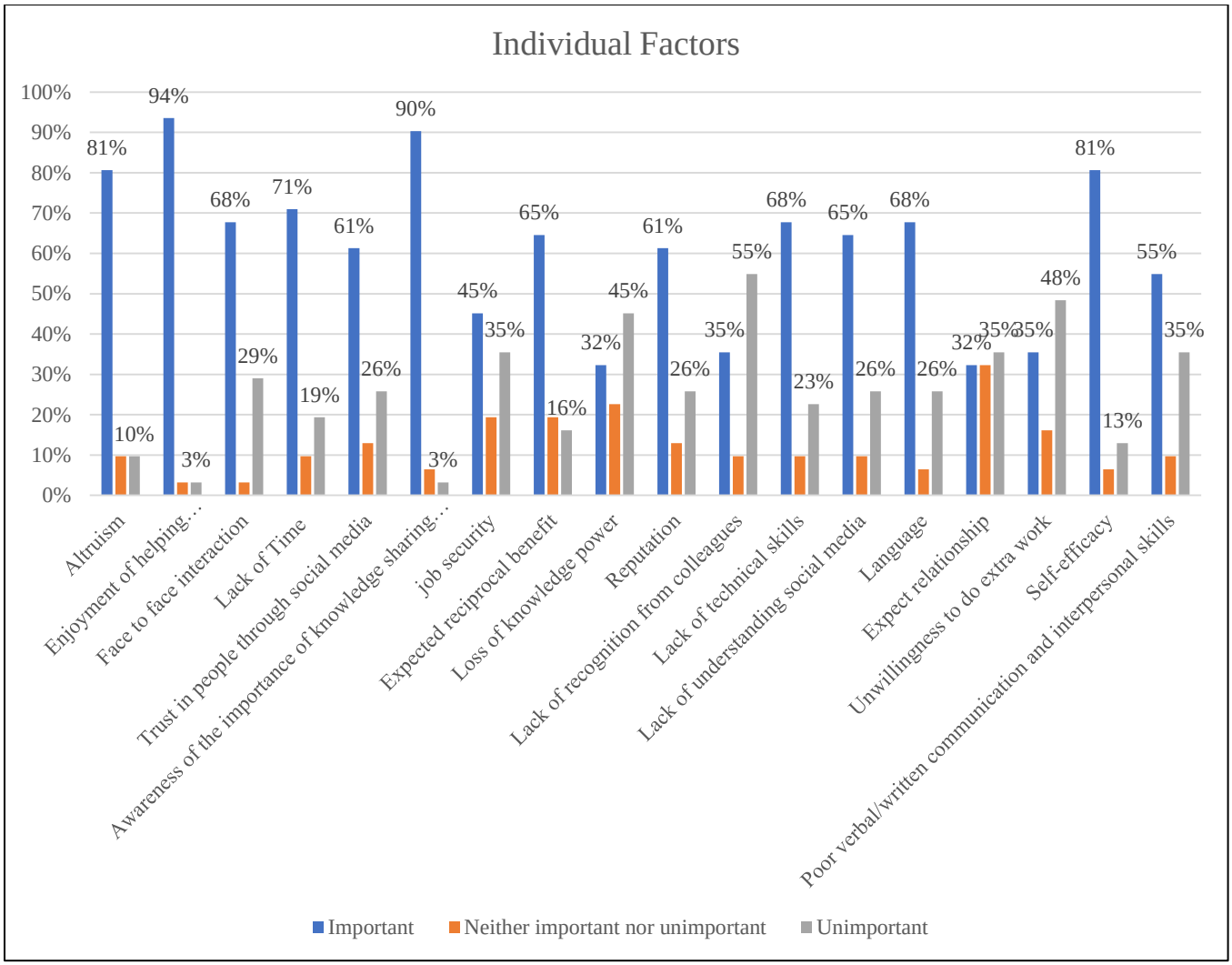


Figure 5.4: Individual Factors Analysis

5.2.2.2 Organisational Factors

A total of eight variables classified as organisational factors are included in this analysis. Based on the interview participants, the results in the table below indicate that the means of all of the proposed organisational factors are greater than a defined value, which is 2. Based on the results, the “physical work environment” (x=2.67) is the most potent variable in influencing the decision to share knowledge through social media, while “lack of

rewards" (x=2) is the lead influence based on the mean. The results are included in the table below.

Table 5.3: The Analysis of the Organisational Factors Using the Mean and Defined Value

How important are the following factors to the attitude and intention of knowledge sharing through social media tools? (N=31)			
Factors	**Mean**	**Defined Value**	**Result**
Lack of knowledge-sharing strategy (vision and goal)	2.58	>2	Statistically significant
Lack of rewards	2	>2	Statistically significant
Lack of recognition from the organisation	2.12	>2	Statistically significant
Management support	2.35	>2	Statistically significant
Environment (physical work environment)	2.67	>2	Statistically significant
Organisation structure	2.29	>2	Statistically significant
Organisation size	2.09	>2	Statistically significant
Work procedure	2.5	>2	Statistically significant

The results in the table below (Table 5.4) indicate that the means, medians, modes, the weight of the responses, standard deviations (SD), coefficients of variation (CV) and standard errors (SE) for all the proposed individual factors. The weighting of the variables provides a unique view of the influence of each variable under the organisational factors.

Table 5.4: The Analysis of the Organisation Factors Using Mean, Median, Mode, the Weight of the Responses, SD, CV and SE.

How important are the following factors to the attitude and intention of knowledge sharing through social media tools? (N=31)

Factors	Mean	Median	Mode	Weighting	SD	CV	SE
Lack of knowledge-sharing strategy (vision and goal)	2.58	3	3	2.54	0.76	0.29	0.13
Lack of rewards	2	2	1	1.93	0.96	0.48	0.17
Lack of recognition from organisation	2.12	3	3	2.06	0.95	0.44	0.17
Management support	2.35	3	3	2.29	0.91	0.38	0.16
Environment (physical work environment)	2.67	3	3	2.61	0.74	0.27	0.13
Organisation structure	2.29	3	3	2.22	0.82	0.35	0.14
Organisation size	2.09	2	3	2.09	0.87	0.41	0.15
Work procedure	2.51	3	3	2.45	0.81	0.32	0.14

Based on the categorisation of the variables based on the importance of their influence on knowledge sharing on social media, the largest number of respondents indicate the “organisational environment (physical work environment)”; it is selected by 81% of the respondents as an important factor. A further 74% of the respondents selected “lack of knowledge sharing strategy” as an important factor. “Lack of rewards” is selected as an important factor by 42% of the respondents while 45% of the respondents chose the “size of the organisation”. Among the variables viewed as unimportant, “lack of rewards” was selected by 48% of the respondents, followed by “lack of recognition from the organisation”, by 42%. Only 19% selected a lack of a knowledge-sharing vision/strategy and the “organisational environment (physical work environment)” as a factor they consider unimportant. Finally, “the organisational structure” is viewed as neither important

nor unimportant, revealing that its influences on the decision to share knowledge through social media are neutral. The results are shown in Figure 5.5 below.

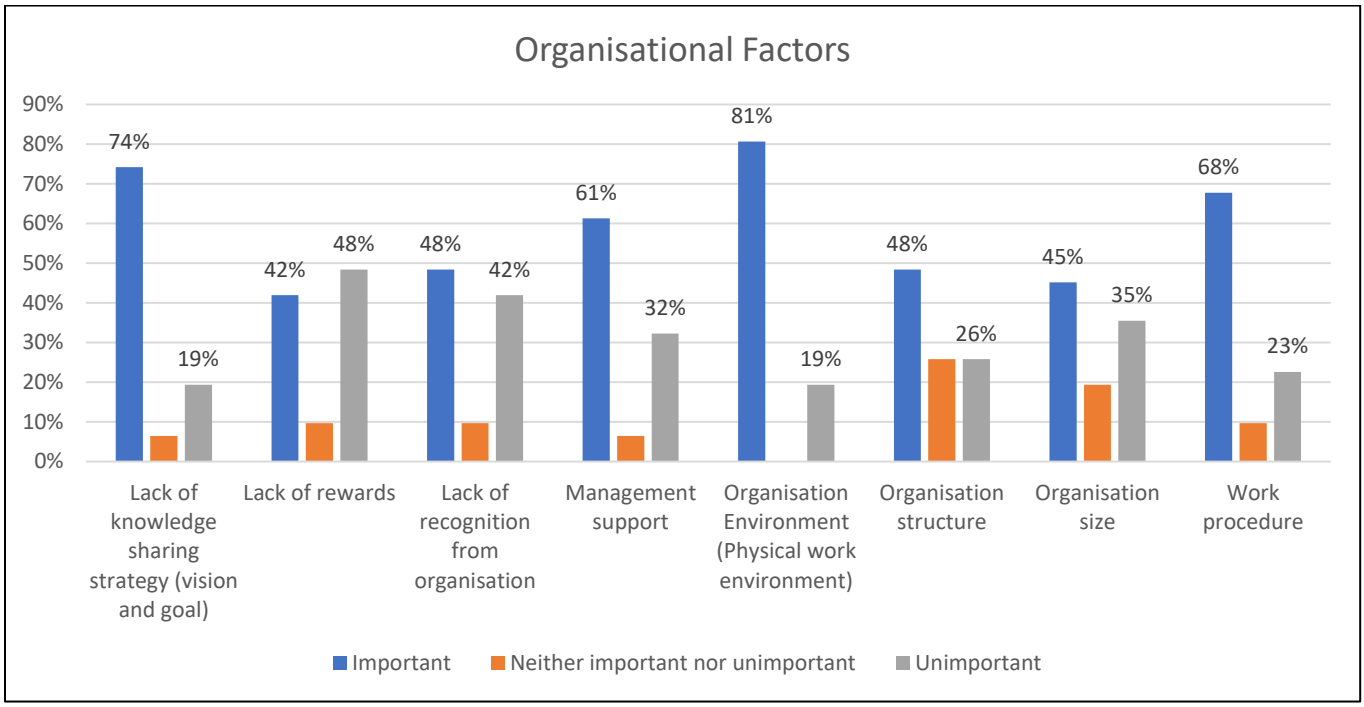


Figure 5.5: Organisational Factors Analysis

5.2.2.3 Technological Factors

A total of eight variables are identified as part of the technological factors that influence the sharing of knowledge on social media platforms. Based on the survey participants, the results in the table below indicate that the means of all of the identified technological factors are greater than a defined value, which is 2. The ease of "use of social media" (x=3) has the highest influence on the decision to share knowledge on social media, while the effects of "information overload" (x=2.38) are the least potent. The results are shown below in Table 5.5.

Table 5.5: The Analysis of the Technological Factors Using the Mean and Defined Value

How important are the following factors to the attitude and intention of knowledge sharing through social media tools? (N=31)

Factors	Mean	Defined Value	Result
Ease of use for social media	3	>2	Statistically significant
Functionality for social media	2.96	>2	Statistically significant
Lack of training (how to use, how to share)	2.45	>2	Statistically significant
Lack of technical support	2.61	>2	Statistically significant
Information overload	2.38	>2	Statistically significant
Security of social media	2.80	>2	Statistically significant
Privacy of social media	2.80	>2	Statistically significant
Perceived usefulness of social media	2.70	>2	Statistically significant

The results in the table below (Table 5.6) indicate the means, medians, modes, the weight of the responses, standard deviations (SD), coefficients of variation (CV) and standard errors (SE) for all the proposed individual factors. The means and weighting range from X=2.38, SD=0.88 for the effects of information overload to X=3, SD=0 for ease of use of social media.

Table 5.6: The Analysis of the Technological Factors Using Mean, Median, Mode, the Weight of the Responses, SD, CV and SE.

How important are the following factors to the attitude and intention of knowledge sharing through social media tools? (N=31)

Factors	Mean	Median	Mode	Weighting	SD	CV	SE
Ease of use for social media	3	3	3	3	0	0	0
Functionality for social media	2.96	3	3	2.96	0.17	0.06	0.03
Lack of training (how to use, how to share)	2.45	3	3	2.45	0.80	0.33	0.14
Lack of technical support	2.61	3	3	2.61	0.76	0.29	0.13
Information overload	2.38	3	3	2.38	0.88	0.36	0.15
Security of social media	2.80	3	3	2.80	0.60	0.21	0.10
Privacy of social media	2.80	3	3	2.80	0.54	0.19	0.09
Perceived usefulness of social media	2.70	3	3	2.70	0.64	0.23	0.11

The frequency distributions under each category of responses are shown below in Figure 5.6. All respondents reveal the consensus that "Ease of use" is the only important factor that influences their attitudes and intentions to use social media. Overall, 97% of the respondents select "Functionality" as the 'important' variable that influences their attitudes and intentions to use social media, while 3% indicate that it is neither important nor unimportant. With reference to the security of the social media platforms, 90% indicate that this factor is an important consideration, while 10% view the variable as definitely an unimportant determinant. Among the variables with the least impact, lack of training on how to use the platforms and how to share knowledge is identified by 65% of the respondents as an important determinant, while 19% view the variable as definitely unimportant as a determinant. The remaining 16% hold neutral views regarding its importance. Similarly, the role of information overload is gauged as important by 65% of

the respondents, definitely unimportant by 25%, with the remaining 10% holding neutral views. The results are presented hereunder.

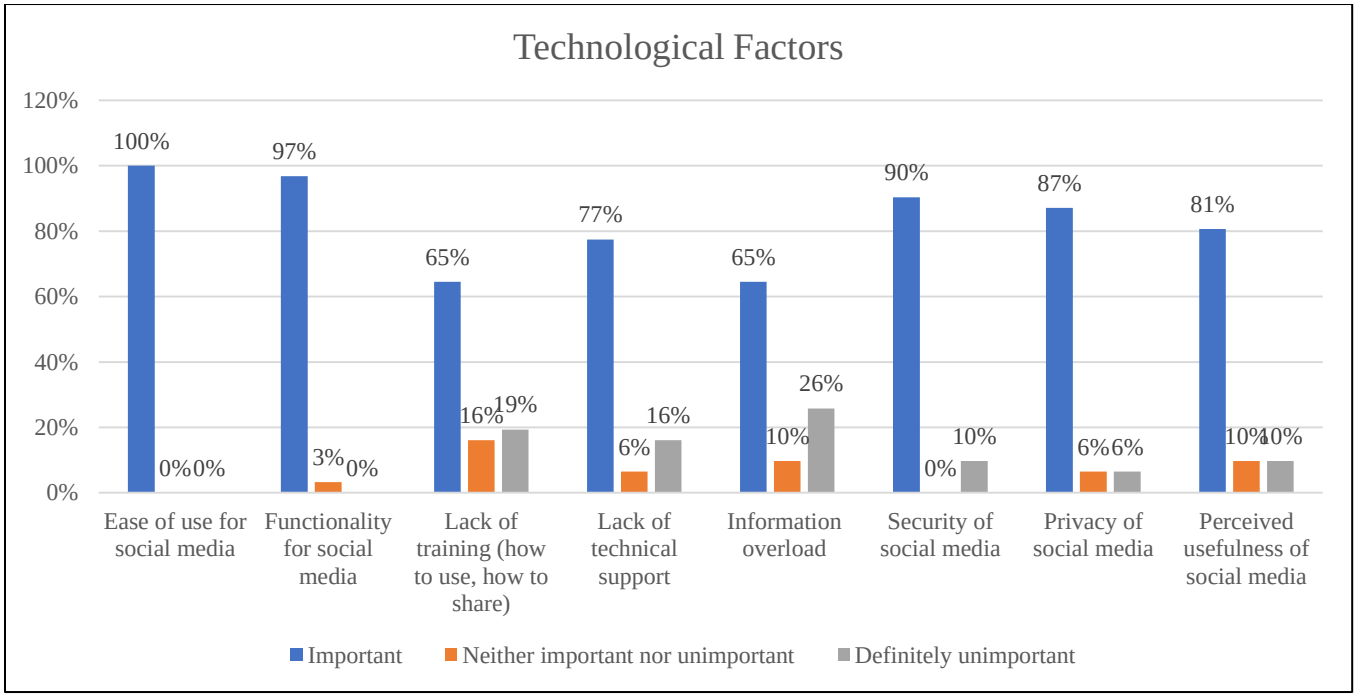


Figure 5.6: Technological Factors Analysis

5.2.3 Inferential Statistics

This section provides the results for the quantitative data in this study based on the responses of the respondents. The interviewees were asked for their views and opinions about all the proposed factors using closed-ended questions. The aim of the questions was to assess the importance of these factors for an individual's intention to use social media for knowledge sharing, from the participants' point of view. By using the one-sample t-test, the test value was defined as 2 on the three-point Likert scale, which ranged from 3 (important) to 1 (unimportant). The results are presented in Table 5.7. In this study, Bonferroni correction was used for controlling false-positive results, by dividing alpha (α) by the number of factors included in the questionnaire = (α/n) 0.05/32 =0.0015. Consequently, the factor is only statistically significant if the p-value < 0.0015.

Table 5.7: The Analysis of Factors Using a One-sample T-test

How important are the following factors to the attitude and intention of knowledge sharing through social media tools?

Factors	N	Mean	P Value	Result
Altruism	31	2.677419355	<2.059e-05*	**Statistically significant**
Enjoyment of helping others	31	2.935483871	< 8.9e-09	**Statistically significant**
Face-to face-interaction	31	2.387096774	0.00359205	Not statistically significant
Lack of time	31	2.516129032	0.002042566	Not statistically significant
Trust in people through social media	31	2.35483871	0.053535015	Not statistically significant
Awareness of the importance of knowledge sharing through social media	31	2.870967742	< 6e-08	**Statistically significant**
Job security	31	2.096774194	0.830702234	Not statistically significant
Expected reciprocal benefit	31	2.483870968	0.010669964	Not statistically significant
Loss of knowledge power	31	1.870967742	0.67902538	Not statistically significant

Reputation	31	2.387096774	0.053535015	Not statistically significant
Lack of recognition from colleagues	31	1.806451613	0.172378176	Not statistically significant
Lack of technical skills	31	2.451612903	0.006847505	Not statistically significant
Lack of understanding social media	31	2.387096774	0.019536244	Not statistically significant
Language	31	2.419354839	0.005597228	Not statistically significant
Expect relationship	31	1.903225806	0.228594302	Not statistically significant
Unwillingness to do extra work	31	1.870967742	0.626415158	Not statistically significant
Self-efficacy	31	2.677419355	<2.32e-05	**Statistically significant**
Poor verbal/written communication and interpersonal skills	31	2.193548387	0.172378176	Not statistically significant
Lack of knowledge-sharing strategy (vision and goal)	31	2.580645161	<0.000498036	**Statistically significant**
Lack of rewards	31	2	0.328603565	Not statistically significant

Lack of recognition from organisation	31	2.129032258	0.328603565	Not statistically significant
Management support	31	2.35483871	0.032998594	Not statistically significant
Physical work environment	31	2.677419355	< 1.432e-05	**Statistically significant**
Organisation structure	31	2.290322581	0.268604262	Not statistically significant
Organisation size	31	2.096774194	0.830702234	Not statistically significant
Work procedure	31	2.516129032	0.006847505	Not statistically significant
Ease of use for social media	31	3	< 7.9e-11	**Statistically significant**
Functionality for social media	31	2.967741935	< 8.6e-10	Statistically significant
Lack of training (how to use, how to share)	31	2.451612903	0.016626222	Not statistically significant
Lack of technical support	31	2.612903226	<0.000116636	**Statistically significant**
Information overload	31	2.387096774	0.019536244	Not statistically significant

Security of social media	31	2.806451613	< 6.9e-08	**Statistically significant**
Privacy of social media	31	2.806451613	< 5.6e-07	**Statistically significant**
Perceived usefulness of social media	31	2.709677419	<2.05e-05	**Statistically significant**

* 2.059e-05 is the "scientific notation" of the value 2.059 * 10^ (-5) = 0.00002059.

Based on the academics' opinions, the results in the above table indicate that the means of most of the proposed factors are greater than a defined value, which is 2. Furthermore, the inferential analysis of responses to these questions shows that 12 factors are statistically significantly important. These include enjoyment of helping others (x=2.93, p<0.00015), altruism (x=2., p<0.00015), awareness (x=2.87, p<0.00015), self-efficacy (x=2.68, p<0.00015), lack of knowledge-sharing strategy (from organisation) (x=2.58, p<0.00015), physical work environment (x=2.68, p<0.00015), ease of use for social media (x=3, p<0.00015), functionality for social media (x=2.97, p<0.00015), lack of technical support (x=2.61, p<0.00015), privacy and security of social media platforms (x=2.81, p<0.00015), and the perceived usefulness of social media (x=2.70, p<0.00015). However, the inferential analysis of responses to these questions shows that the remaining twenty-two factors do not have a statistically significant influence on the sharing of knowledge on social media platforms based on the p-value, which is greater than 0.0015.

5.2.4 Development of the Model

The findings culminate in the development of the following model, which reveals the variables that influence knowledge sharing through social media among academics in higher education institutions in KSA. As the results show, four out of the 18 variables under individual factors are included in the model (enjoyment of helping others, altruism

awareness, self-efficacy). Only two out of the eight organisational factors (lack of knowledge-sharing strategy, physical work environment) are included in the model. Finally, five out of the eight variables under technological factors (ease of use for social media, functionality for social media, lack of technical support, privacy and security of social media platforms and the perceived usefulness of social media) are included in the model. Although the results show that the time, training and reward factors have no significant impact on the individual's intention to share the knowledge through social media, the findings from former studies indicate that this factor has a major influence on the decision to use social media for knowledge sharing.

5.3 Qualitative Findings

5.3.1 Introduction

The aim of this phase of the analysis is to explore the subject to identify other factors relating to the use of social media for knowledge sharing in Saudi Arabia from the participants' view. Through the exploratory design, the findings in this section will also clarify the findings from the quantitative study to reveal and justify the findings and provide additional context. The other influential factors that might affect an individual's intent to use social media for knowledge sharing were coded under the following headings: verification, culture, appropriate content and popularity of the tool.

5.3.2 Findings from the Interview Data

5.3.2.1 Verification Mechanism

The use of social media introduces the need for verification, considering the potential risks arising from the lack of face-to-face contact. The verification mechanism theme is linked to the trust element of the social capital theory (Jarrahi, 2017). The social capital theory argues that degree of trust that groups or individuals in an organization develop

tends to base upon reciprocal systems, norms and networks. Moreover, the need for verification arises from the fact the identities used by the members of a community on the social media platforms are not necessarily the same as those used in offline situations (Tewksbury, 2013). The difference implies that members of a community have to reconcile their online and offline identities, to eliminate the possibility of an individual who is not a member of the community misrepresenting themselves for the purpose of getting involved in the knowledge-sharing activities. One interviewee referred to "*Authenticating accounts with the names of their owners for more credibility*." Verification of identities is integral to the authentication of identities, and ultimately influences the level of trust between the members of the knowledge-sharing community. Verification of identities is viewed by some of the academics to be an essential element of the use of social media for knowledge sharing since it leads to the identification of each member of the group, based on whether they are sources, users or synthesisers during the knowledge-sharing process. The verification introduces an element of transparency among the members of the community, thus leading to increased reliability of the knowledge shared by the members. Furthermore, verification enables the members of the online community to identify the members based on their credentials on the offline platforms, as a way of ensuring that they are who they say they are. Ultimately, this will make it possible to determine which individual has the qualifications to provide reliable knowledge. As referred to by one interviewee, "…*Verifying and reviewing information, with reference to the speciality to which it relates*." The process enables the members of the community to match the offline and online identities, thereby making it possible for individuals with the right credentials to be allowed to share knowledge according to their qualifications. In the absence of a verification mechanism, it becomes challenging to determine whether the holders of the online identities have the qualifications necessary to share the knowledge, thus leading to mistrust on the reliability and authenticity of knowledge shared within the community. Furthermore, in a situation where the process and objectives of verification are not fulfilled, leading to the inability to determine whether or if those involved in sharing knowledge are qualified to do so, the community will experience a degradation in the quality and quantity of knowledge shared. The verification mechanism should consider the reference mechanism in order to reference the knowledge and information with the

right sources. The authentication of accounts will help users to share knowledge with more credibility via the cancellation of anonyms and pseudonyms.

For verification to occur, it is imperative to have a mechanism that is universal and reliable. The presence of a reference mechanism, with a specific start and end-point, is key. One interviewee stated that "*There must be a way to verify names.*" However, verification goes beyond confirmation of identities, since the knowledge-sharing communities change over time. This is why it is necessary for second-order verification, such as interventions by members if one of the verified identities is false. One interviewee stated that social media should ensure this outcome by "*Enabling cancellation of pseudonyms names*".

Verification has to be end-to-end, featuring all members of the community, whether they are sources or users of knowledge. This includes the verification of identities as well as the knowledge and information shared. With the emergence of fake news in the information age, the verification of content is integral. As referred to by one interviewee, "…*Verification of knowledge and information*". Since members can transition from any role within the community, from users to sources to synthesisers of knowledge and vice versa, it is imperative to ensure that even "*The recipient of the information needs to be checked*". Since the recipients of the information also participate in the process of knowledge sharing, their identities have to be verified. As indicated by one interviewee, such verification will result in "*Transparency when dealing with others*". As a result, the process of verification will streamline the sharing of knowledge. Finally, verification has to be done in a transparent manner, with one interviewee stating that it has to be done in "*Full clarity of the other party*". Such an approach to verification mechanisms increases the level of trust and reliability in the verification process and makes it possible for all members of the community to trust the identities of the verified members since they trust the process. In the absence of such clarity, it is possible to doubt whether all members of the community are who or what they say they are.

5.3.2.2 Culture

The role of culture is often discussed with reference to the use of emergent technologies, and actions involving the decisions of individuals and institutions. The interviewees reveal this theme as an integral consideration in the sharing of knowledge on social media platforms. Culture is defined as the “beliefs, values, habits, norms and behavioural patterns of a group of people in a community” (Leung et al., 2005). The analysis reveals that culture has an impact on the use of social media for knowledge-sharing decisions. The exploration sought to determine whether Saudi culture allowed the interviewees to share knowledge and whether the culture influenced their willingness and ability to share knowledge widely. In addition to the cultural dimension, these questions focused on social factors, which precipitate from the cultural factors. Based on past research, the influence of social factors as associated with Saudi culture include the limited motivation for researchers and academics working in the universities to share knowledge.

Furthermore, one participant believed that the generation resistance of the technology is essential to encourage knowledge sharing in the university. This factor is illustrated in the following example, with one interviewee defining the generation as “*The technology resisting generation*”. Based on the analysis and quotations such as these, culture is considered to be an important factor of knowledge sharing through social media in this study.

5.3.2.3 Appropriate Content

The willingness to share knowledge within the community is influenced by the suitability of the content of knowledge. Based on the views of the participants, the most sought-after knowledge is scientific content. To ensure that only such knowledge is shared on social media platforms, filtration of unwanted and unsuitable content is necessary. By filtering out the unsuitable and unwanted content, the social media platform, as well as the community, will be viewed as a source of useful and valuable knowledge, thus attracting the right kind of people. The availability of suitable knowledge leads people to be willing to share, acquire, use or synthesise knowledge in the community, and ultimately to the

social media platform, thus leading to an increase in knowledge-sharing activities. The concerns raised by the interviewees include whether there are filters for decency, whereby inappropriate messages are filtered out before they can be shared. The interviewees were concerned with whether the social media platform has the option to block content that is deemed inappropriate or unwanted. Similarly, they showed interest in the effect that members of the community have on the ability to filter out the content to suit the interests of each member of the community. Such facilities are integral in ensuring that the knowledge which is shared is what the users need.

5.3.2.4 The Popularity of the Tool

The popularity of certain social media platforms is another factor that influences knowledge sharing. The effects of the popularity of a social media platform arise from the fact that it is related to the number of members of a community available for knowledge-sharing activities. The most popular platforms have a high number of subscribers, thus increasing the possibility of the emergence of social groups and communities for the objective of increased socialisation. Consequently, such groups end up sharing information, even if the original objective was not necessarily knowledge sharing. As indicated by one interviewee, "…*popularity of a given media in a certain area and a particular domain will be an effective factor to use it*". The role of popularity in knowledge sharing occurs from a different perspective, whereby an individual who is popular within the social media platform and elsewhere finds it easier to share knowledge. Persons with specific status in society or holders of certain knowledge stand to benefit from popularity, and ultimately, get an opportunity to share knowledge, on account of their status. As indicated by one interviewee, "…*some specialists in a field use a certain media, they will earn it popularity*". Popularity, which is closely linked to reputation, is widely recognised as a determinant of knowledge-sharing activities, whether it is viewed as a form of informal reward or the basis for potential financial gains.

5.3.2.5 Other Factors

A number of the factors identified from the interview data do not fall into the main categories identified above, perhaps due to the fact that they are based on the unique and outlier inputs from the interviewees. However, the academics and researchers suggested that the influence of these factors is worth noting, due to the fact that they have the potential to influence knowledge sharing from a qualitative or quantitative perspective. Furthermore, since they are directly or indirectly related to some of the factors identified in the framework development in Chapter 4, they are included in this analysis. These factors relate to the following variables. First, the interviewees reiterate the importance of the ease of use of certain social media platforms in knowledge-sharing activities. The ease of use is determined by the design of the social media platform interface, as well as the speed with which the social media platform can be accessed. These two factors reduce the challenges associated with accessing and using the platforms, and ultimately, the sharing of knowledge. Second, to allay the concerns surrounding security on social media platforms, the identification and uses of reliable social media tools are imperative. The survey study identified numerous social media platforms for use in knowledge sharing. The diversity in platforms also reduces the reliability of the social media tools available for use in sharing knowledge. Third, the academics raise questions on the privacy of social media tools. Privacy concerns are raised due to the nature of knowledge shared on social media platforms, especially when such knowledge is considered of high value. Fourth, the need for training courses on the use of social media platforms is integral in creating awareness on which platforms are best suited for knowledge sharing. The training courses are part of the measures to ensure parity in the awareness of the academics since they are from different backgrounds. Fifth, self-efficacy is identified as a determinant. According to one interviewee, "*…having a good background about the subject to be discussed and gathering sufficient information so that the topic becomes beneficial*" Is important. Self-efficacy relates to the multiplicity of measures relating to the ability to share knowledge as and when needed. Furthermore, self-efficacy reduces the possibility of sharing the wrong information through measures such as restricting the types of knowledge shared by each individual based on their area of expertise. Sixth is

recognition, appreciation and encouragement. The interviewees concur with findings from the literature review and quantitative study on the role of recognition and appreciation but also highlight the fact that encouragement to participate in knowledge sharing is integral. Encouragement involves active measures aimed at providing the members of the community with what they require in order to share knowledge. Encouragement is normally customised to particular circumstances, which makes it an integral consideration. For instance, encouragement can target a particular individual who holds specific knowledge or involve the users of knowledge targeted in order to achieve particular goals from improvement in knowledge sharing. Seventh, the interviewees report that it is necessary to categorise the social media platforms, based on their characteristics. For more information about the factors suggested by participants, Table 5.8 illustrates these factors.

Table 5.8: The Other Factors Suggested by Participants

Themes	Codes (Factors)
Interface design. The social media should be easy and quick.	Ease of use
A reliable tool should be used. The security issue.	Security
Privacy.	Privacy
Initial training is very important. Ongoing training. Renovation and being up-to-date with technology. One must have had training on how to use it.	Training courses
You need to have knowledge in order to share it. Not to give the wrong information. The area of expertise. Having a good background about the subject to be discussed and gathering sufficient information so that the topic becomes beneficial. The quality of knowledge available.	Self-efficacy

Encouragement and incentives are very important.	Recognition, appreciation, encouragement
The nature of social media. The category of social media. Area-specific.	Social media categorisation
The certainty of the delivery of dissertations and scientific reports.	Altruism
The internal motivation.	Enjoyment of helping others
One's intention should be directed to knowledge sharing and to choose one of the social media tools to master. The selected tool should be suitable. One must have had training on how to use it, and should share with contacts the best methods to use that tool, even if it is a simple one.	Intention to use social media for knowledge sharing

5.3.3 Knowledge-sharing Improvement Factors

Extant literature identifies specific incentives that need to be considered for increasing knowledge sharing. Incentives are integral in motivating the members of a community to share knowledge on social media, primarily by eliminating the barriers to the process. These types of encouragement and specific incentives that might increase the knowledge-sharing process were coded under the following headings.

5.3.3.1 Knowledge Sharing Strategy

A knowledge-sharing strategy streamlines the process of sharing knowledge, by eliminating uncertainties in the process. A strategy involves the identification of the resources and objectives while outlining the possible outcomes. The interviewees argues for an effective strategy, several actions are required at different levels within the society. At a national level, the creation of the necessary laws and regulations for knowledge sharing and the use of social media is integral in ensuring that all users of social media adhere to specific codes of conduct. At the institutional level, it is imperative for policies

to target the different participants in the knowledge-sharing activities, including students, staff and outsiders. Control over the responsibility and duty to share knowledge among the faculty members is integral in ensuring that all faculty members are involved in the activities while eliminating the possibility that some members are locked out of the process. However, this strategy can also compromise the fluidity of knowledge-sharing activities, since not all faculty members are involved in the creation of knowledge. The institution can also create a unique department for handling knowledge sharing, especially for the types of knowledge that require specialised processing during sharing. One interviewee stated that there is a need for “Establishing a special unit for e-publishing on YouTube, that has its own studios, and whose production would be uploaded to YouTube on a special channel.”

5.3.3.2 Rewards, Recognition, Appreciation and Encouragement

The utility of rewards, recognition, appreciation and encouragement is recognised as an incentive for knowledge sharing on social media. Although the literature review discusses some of these variables as determinants of willingness to share knowledge, they are identified herein as incentives that drive the willingness to share knowledge on social media platforms. There are different ways through which rewards, recognition, appreciation and encouragement can be utilised, depending on the characteristics of the members of the community who are targeted. Similarly, As referenced in the literature review, it is imperative to offer a diversified portfolio in order to meet the expectations of the various individuals, including promotions and upgrades, for motivation-oriented rewards. The utility of rewards arises from the fact that they can be used for different purposes, such as targeted outcomes, or generic change in knowledge sharing on social media. One respondent indicated “Like the current support of research and its publication and the research distinction award.” Such support targets particular outcomes, while “Giving rewards incentives to those who share their lectures on YouTube or their researchers on Twitter” focuses on rewarding specific behaviour. The rewards can be customised to ensure continuity in knowledge sharing, as proposed by one interviewee who stated that “Through financial support, those who share knowledge on a weekly or monthly basis should be rewarded.” Finally, rewards can be customised to encourage

efforts as much as they encourage results in knowledge sharing. The responses also reveal the role of negative reinforcement, with one respondent suggesting that “the reward and punishment policy should be implemented”. Negative rewards are designed to encourage positive behaviour while reducing key negative actions.

5.3.3.3 Management Support

Management support plays a key role as an incentive for knowledge sharing on social media, since the institution provides the necessary resources for these activities. The interviewees identify two ways through which top management support facilitates knowledge sharing, including “Administrative and management support” and “The higher management supports social media”. Support from management involves recognition of the utility of social media in sharing, especially since these tools have the power to enhance performance in terms of academic outcomes.

5.3.3.4 Technical Support

Technical support incentivises knowledge sharing on social media platforms since it helps solve the challenges identified in the literature review. A large number of individuals report that they face challenges in understanding how to use social media platforms, specifically for knowledge sharing. As revealed in the quantitative study, the largest number of variables that influence social media sharing are categorised under technological factors. Consequently, among the key technical support, actions include “Providing good internet connection and the suitable tool for knowledge sharing.” Furthermore, one interviewee suggests that “The university should offer the WI-FI connection throughout the campus, and this is quite enough” as part of the technical support. These forms of support solve specific challenges that limit the use of social media and ultimately contribute to the sharing of knowledge.

5.3.3.5 Workload

The reduction of the workload assigned to the staff gives them more time for generation and sharing of knowledge. The proposition facilitates knowledge sharing through social media since the academics have to be available on the platforms in order to share the

knowledge within the community: “Providing more time for faculty members by reducing the teaching load.”

5.3.3.6 Training

Training and workshops courses provide incentives to academics, by enabling them to avoid the common challenges associated with knowledge sharing. According to the interviewees, training courses inform the academics on how to use the functions in the social media platforms, while also opening doors for increased benefits during the knowledge-sharing activities. Seventh, the ease of use and functionalities of social media platforms are identified as an incentive. However, unlike the other incentives which are within the reach and control of the institutions, these two propositions are dependent on the interventions of the creators of the social media platforms. Although the users of social media platforms can influence changes to the architecture of the networks, the ability of academics to influence the speed, accuracy and costs associated with the use of social media platforms is outside the control of the knowledge-sharing community. However, these characteristics are evident from the quantitative results, whereby the free-to-use platforms such as WhatsApp, YouTube and Twitter were found to be popular, while other subscription-based platforms such as Microsoft 365 are rarely utilised for knowledge sharing. Finally, there is a perspective that social media platforms are not needed for knowledge sharing activities. One interviewee stated that “It’s not the duty of universities to share knowledge on social media”. Consequently, the views that sharing knowledge on social media platforms is not a concern of the institution nullifies most of the positive variables associated with organisational factors. The results relating to the propositions for incentives are included in Table 5.9 below.

Table 5.9: Improvement Factors

Themes	Codes (Factors)
• Enacting laws and regulations. • Finding a mechanism to regulate the students' posts on these tools. • Assigning each faculty member, the task of sharing two posts via the social media tools. • Preparing online courses for colleges to be shared on social media tools. • Establishing electronic journals for the university to facilitate knowledge publishing and sharing. • Establishing a special unit for e-publishing on YouTube, that has its own studios, and whose production would be uploaded to YouTube on a special channel. • Urging faculty members to create social media accounts in general or to have accounts on certain media, like Twitter or YouTube. • Developing electronic applications for each deanship that will be linked to the university. • Count the participation on social media. • Media promotion. • Should have his lessons or contributions shared on social media. • Recommending certain communication tools for the students and urging them to access and acquire them. • Creating a platform for student-student communication, rather than student-teacher communication. Why not have mono-directional channels like student-student and	Knowledge-sharing strategy through social media

teacher-teacher, which are lacking. We must focus on the same category. • It needs more work and study.	
• Rewards. • Promotion and upgrading. • Moral incentives. • The rewards motivation. • The reward and punishment policy should be implemented. • Encouragement and rewards and job incentives. • Like the current support of research and its publication and the research distinction award. • Receive rewards, e.g. computer and use of technology allowances. • Giving rewards incentives to those who share their lectures on YouTube or their researchers on Twitter. • Using competitions as incentives to increase the publishing and sharing of knowledge via social media. • Offering financial incentives. • Evaluating the effort made in this area and appreciating and honouring the participants. • Financial motivation is important. • Rewards, appreciation. • Financial and moral incentives can be provided. When your knowledge sharing is increasing and has an impact, you will be supported financially and morally by praise, thanks and appreciation. • Financial and moral motivation and constant update of these tools.	Rewards, recognition, appreciating, encouragement

• It is best to encourage students to use them through incentives. • Through financial support. Those who share knowledge on a weekly or monthly basis should be rewarded. • Through financial support. • Any creative initiative in the field of knowledge sharing is encouraged, financially or otherwise.	
• Administrative and management support. • The higher management supports social media.	Management support
• The university should offer WI-FI connection throughout the campus, and this is quite enough. • 24/7 powerful internet access for everyone. • Providing a good internet connection and a suitable tool for knowledge sharing. • Computers and cell phones should be provided to the faculty members. • At least providing full technical support to them.	Technical support
• Providing more time for faculty members by reducing the teaching load.	Work load
• Offering training courses on how to use social media, legally, orderly and safely. • Instructive incentives in the form of workshops. • As well as training courses on how to benefit from these tools.	Training and workshop courses
• Social media are quick, accurate and free of charge.	Social media (ease of use, functionality)
• Not needed in the university.	Not needed

- It’s not the duty of universities to share knowledge on social media.

5.3.4 Summary of Findings

The views of the interviewees reveal that the level of importance given to the technological factors as an influence on the knowledge-sharing activities on social media, which was implied in the quantitative findings is valid. Technological factors have a huge bearing on the use of social media platforms for sharing knowledge since the activity involves a technical process. There is no doubt about the importance of the ease of use and functionality of social media for knowledge sharing. The technological factors extend to generic concerns such as security and privacy on social media, to novel concerns such as another level of importance to the technological factors. The other factors suggested by participants focus on the discussed factors in the proposed model and some views mention that the verification, culture, appropriate content and popularity of the tool are important factors.

Regarding the academics’ views about increasing of knowledge sharing, they suggest strategy and vision in order to enact laws and regulations in the university. The regulations might help the faculty members to know the rules about the use of social media tools and to regulate it between the staff. The strategy needs more work/study in order to align these strategies to the nature of the university and its academic staff. There is a need to implement a rewards policy and incentives. These could be under financial or moral incentives which are useful for encouragement. Technical support and training are considered as important factor that might help to increase knowledge sharing through social media based on the interviewees' answers. The teaching load is another important factor because the faculty members teach and do administrative work during the workday. These kinds of workload could impact the time of the faculty members so the reduction of the teaching and administrative responsibilities might be giving the academics enough time to share knowledge. Finally, focusing on the ease of use and the functionality of the social media tools would be considered as a support for the users to share their knowledge through the tools in an easy way.

5.4 Discussion of Findings

Past research concurs on the fact that social media platforms facilitate knowledge sharing. In addition to offering an alternative to face-to-face interactions, social media platforms deliver a horde of unique benefits associated with technological innovations. Chen and Hew (2015) indicate that in spite of these benefits, the use of social media for knowledge sharing is still plagued by a number of bottlenecks. These bottlenecks influence the willingness and ability of individuals to share knowledge through social media platforms. These bottlenecks differ from one scenario to another, with particular concerns raised within the education sector, specifically, institutions of higher learning. Panahi, Watson & Partridge (2012) justify the unique nature of the concerns by reference to the fact that the type of knowledge shared by entities and individuals in this sector is of particular value to the members of the community.

The first objective was to categorise the current social media tools that are used for knowledge sharing. The findings reveal that there are different categories of social media tools utilised for knowledge sharing, all of which are used by academics in Saudi Arabian universities. The literature review identifies four categories, including blogs (Majchrzak et al., 2013), Wikis (Al Saifi et al., 2016), media sharing for various content communities such as YouTube (Wang et al., 2016) and micro-blogging tools such as Twitter (Annansingh et al., 2018). A total of 22 social media tools from different categories are identified in this study, with the most popular being the multifaceted communication and microblogging tools, specifically, WhatsApp. As a centralised cross-platform messaging platform, WhatsApp offers its users a multiplicity of functionalities that facilitate knowledge sharing, since the users can send text, audio and text messages, as well as make voice and video calls. Users can also share graphics, documents in different formats, tag locations and share other forms of content, free of charge. As indicated by Hood and Reid (2018), these cross-platform social media tools have gained popularity since different categories of users can share content in a secure, fast and reliable manner. Lessard et al. 2017) and Robertson (2018) further concur on the fact that the cross-platform tools

are dynamic in nature, thus enabling individuals to build and advance their reputation for monetisation and other forms of promotional activities on other platforms. Media sharing tools such as YouTube are popular as well, primarily due to the fact that they specialise in audio-visual knowledge sharing. As indicated by Vraga and Bode (2018), platforms such as YouTube enable persons sharing different forms of knowledge to reach a wider community, since access is not limited to the members of a particular community. YouTube, which is a specialised tool for video-sharing draws its utility from the fact that academics can create knowledge featuring audio, audio-visual and text components about different topics under their specialisation, as indicated by Corcoran and Duane (2017a). The users can access the content, with options of subscribing for notifications, which increases the reliability of interactive knowledge sharing (Androutsos, 2020).

Both WhatsApp and YouTube provide options for real-time interactions, thus making it possible for the academics and members of the knowledge sharing community to synthesise and use the knowledge as it is delivered. Since the roles of the members of the community, as creators, contributors and users of knowledge are clearly identifiable, these platforms are viewed as integral in the sharing of high value and technical knowledge about particular specialisations. This is because the value of such knowledge is dependent on the characteristics of the creator, based on their professional qualifications and abilities. YouTube, unlike WhatsApp, offers the users the ability to bundle large volumes of knowledge in a single session or aggregate the various segments of the knowledge so that the users can choose what aspects of the knowledge to focus on. Due to the technical nature of this activity, there is evidence that the availability of technical help facilitates the use of YouTube among academics. As proposed under the qualitative findings, the technical assistance enables the academics to frame the knowledge in the most effective manner, to increase its utility to the members of the community and the users. It also enables academics, some of whom are not techno-savvy, to avoid the limitations during knowledge creation.

The findings also reveal that Wikipedia (a Wiki) and Twitter (for microblogging) are popular among academics. According to Al Saifi et al. (2016), the prominence of Wikis arises from the fact that they are originally designed for creation and sharing of

knowledge, unlike the other social media tools which have other alternative uses. Wikis are created to facilitate collaboration for knowledge sharing, with options for creating, editing and deleting content, as indicated by Ma and Chan (2014). Consequently, the members of the community play diversified roles in the knowledge-sharing processes under these tools. Unlike WhatsApp and YouTube, the knowledge available on Wikis is dynamic and synthesised through the contribution of the members of the community. However, the fact that any member of the community can edit or create knowledge in a Wiki implies that there is an increased need for authentication and verification of the identities of the members of the community.

Under the second objective, the current theories and models for social media and knowledge sharing are identified. The literature review identified four models which explain the influences of knowledge sharing on social media platforms. The models include the theory of reasoned actions, use and gratification theory (UGT), the theory of planned behaviour (TPB) and social exchange theory. These models have been utilised in a multiplicity of the studies reviewed in the literature, from which a framework is developed. The framework, which is comprised of three categories of factors, including individuals, organisational and technological factors, combines the tenets of the theories. Consequently, from the perspective of this study, the theories which model the roles of these three categories of factors explain how social media influences knowledge sharing among the universities in Saudi Arabia. First, as indicated by Zhang et al. (2020), the TRA forecasts how individual factors influence the use of social media in knowledge sharing. On the same note, the TPB relates to the decisions and choices by individuals regarding the use of social media platforms for knowledge sharing (Chen & Kuo, 2017). However, unlike the TRA, the TBP relates to those variables under the individual factors which denote deliberate actions and behavioural responses. Although only four out of the eighteen variables have a statistically significant influence, the theory posits that the interactions between attitudinal and behavioural constructs play a role in the actions and processes of sharing knowledge on social media platforms among academics in the universities. The TRA focuses on the voluntary nature of human behaviour, which influences the decisions of the academics with professional qualifications and experiences to create, share or synthesise knowledge on social media, while also driving

other individuals to join the communities and use the knowledge. Secondly, the influence of social media is also predicted by the UGT, as discussed by Yan et al. (2016). This theory predicts the actions of individuals and organisations, by indicating the rationales for why and how the choice to use social media to share knowledge occurs. As indicated by Etemadi et al. (2019), and with revelations from the qualitative study, the academics have shown an inclination to use social media as part of their personal decision due to the numerous benefits, while it is also evident that the institutions promote the use of social media platforms for knowledge sharing. Some platforms such as YouTube provide advantages to the furtherance of pedagogical goals since academics can share knowledge with their students and peers. Third, the SET, which models behavioural choices within an exchange situation, indicates the influences associated with the organisational factors. Under the framework developed for the study, eight variables are derived from exchange-related behaviour, whereby the actions of one individual within an institutional framework influence the actions of others within the same entity (Yan et al., 2016). The framework reveals that a number of choices by individuals within the institution influence the sharing of knowledge on social media. To this end, these influences are evident from a multiplicity of individuals, on account of institutional policy. For instance, there is evidence that the prominence of some social media tools such as YouTube and WhatsApp is influenced by the fact that the adoption and use are influenced by the decisions of management. Finally, the TAM predicts a number of the variables associated with the adoption of novel technologies. In their basic form, the attitudes towards emergent technologies are influenced by the perceived usefulness and perceived ease of use (Chen & Hung, 2010). Anwar et al. (2019) further indicated that depending on the characteristics and uses of the technology, there are other variables that influence adoption, including the barriers and challenges that are generic to communities and individuals that use novel technologies.

The third objective was to identify the critical success factors and the key barriers in using social media for knowledge sharing. The development of the framework, which involves identification of the variables under the three factors (individual, organisational and technologies) led to the identification of the barriers and critical success factors for use of social media for knowledge sharing. The studies by Lin (2007) and Serenko, Bontis and

Hardie (2007) focused on the three categories of factors, but a different set of variables under each factor. In this study, a broader range of variables under each factor is identified, due to the unique characteristics of the settings. Furthermore, the relationships between the variables under each factor are predicted by the five theoretical models identified for this study. In this study, the critical success factors are identified based on whether the variables under each of the three factors meet the threshold under the defined factors. Based on the review of the literature, the critical success factors include those variables which are found to have a positive influence on the sharing of knowledge through social media platforms. The individual factors include altruism (Kwahk & Park, 2016), enjoyment of helping others (Jin et al., 2015), trust in the people on social media (Panteli & Sockalingam 2005), awareness of the importance of knowledge sharing *(*Marouf & Khalil, 2015), job security (Riege, 2005), reputation (Obermayer & Tóth, 2017) and self-efficacy (Kwahk & Park, 2016). Among the organisational factors, critical success factors include the following: organisational size (Serenko, Bontis & Hardie, 2007) and work procedures (Hooff & Weenen, 2004). Among the technological factors, the critical success factors include ease of use of social media (Bilgihan et al., (2016), the functionality of social media tools (Fang & Chiu, 2010) and the perceived usefulness of social media (Gunawan & Gunawan, 2019). These critical success factors represent the ways through which social media tools lead to enhanced knowledge sharing by academics in the universities.

The literature review reveals that there are variables under the three factors which have an adverse effect on knowledge sharing through social media. In this study, these variables are identified on account and considered in the initial framework and integrated into the main factors. They include the following. Among the individual factors, the barriers include lack of time (Al-Busaidi and Olfman (2017), lack of technical skills (Choi, Kang & Lee, 2008), lack of understanding of social media (Al-Qaysi et al., 2020), and poor verbal and written communication and interpersonal skills (Oyemoni et al., 2016). Among the organisational factors, barriers include lack of knowledge-sharing strategy (vision and goal) (Nadason, Saad & Almi, 2017), lack of rewards (Ferrin & Dirks, 2003) and lack of recognition from the organisation (Wang & Noe, 2010). Among the technological factors, the barriers include the lack of training on the use of social media for sharing knowledge

(Kulakli & Mahony, 2014), lack of technical support (Sarka & Ipsen, 2017) and information overload (Li, 2016). Based on the findings from these studies, the barriers have an outright negative impact on the influence of social media on knowledge sharing. Consequently, they provide the basis for changes to the knowledge management strategies within the universities and are particularly identified as areas of improvement by the experts, with some experts indicating the views that social media tools were not required for knowledge sharing to occur.

Other factors which are not classified as either successes or barriers have a positive or negative impact on knowledge sharing through social media tools. Based on the review of the literature, the impact of these variables changes depending on the circumstances. Among the individual factors, these variables include face-to-face interactions (Aljuwaiber, 2019; Al Saifi et al., 2016), expected reciprocal benefits (Chai, Das & Rao, 2011; Kankanhalli et al., 2005) and language (DeVito et al., 2017). Other factors among the organisational factors include support from management (Fang & Chiu, 2010), physical work environment (Kasuganti, 2017; Zagenczyk, Murrell & Gibney, 2008) and organisational structure (Gottschalg & Zollo, 2006). Among technological factors are social media security (Majchrzak et al., 2013) and the privacy of social media (Sohail & Daud, 2009). These variables are found to have a dynamic effect on knowledge sharing through social media, based on the circumstances. The primary difference among the variables under these three factors is the plasticity and malleability of human behaviour and attitudes. Unlike organisational factors which are influenced by decisions made within the institutional frameworks (Imran et al., 2019), and the technological factors which are affected by time and place (Myrick et al., 2016), individual factors change in a more dynamic and flexible manner (DeVito et al., 2017).

With regard to technological factors, the functionalities of social media are predicted to have a positive effect on knowledge sharing through social media (Yeh et al., 2006). The findings reflect the implications in the existing body of knowledge since social media tools such as WhatsApp and microblogging tools such as Twitter are the most popular. Academics rely on these tools to share knowledge in different formats, while also performing other functions such as communication. The functionalities under these social

media promote knowledge sharing by enabling the members of the community to keep in touch.

The lack of training is identified as a variable that affects the attitudes and intention to share knowledge through social media. Past literature posits that lack of training on how to use social media platforms for sharing knowledge has adverse effects on knowledge sharing (Voorveld et al., 2018). The lack of training influences the ability of academics to use the more complex platforms such as Stack Overflow and Google Classroom. The interview data reveal that the institutions have taken measures to train some of the academics on how to use social media tools, such as YouTube. This accounts for the high prevalence of the use of the tool for knowledge sharing.

The effects of time, which lead to negative outcomes on knowledge sharing attitudes and intentions on social media, are statistically significant (Bock et al., 2010). The findings reveal that academics are faced with a workload which limits their ability to share knowledge effectively. The effects of time are two-fold: first, due to the high workloads, the academics face challenges sharing the knowledge as required (Ravid & Rafaeli, 2004); second, users and other members of the community do not have sufficient time to fully synthesise the knowledge and use it (Hanka & Fuka, 2000). As indicated in past literature, this situation leads to wasted opportunities under knowledge management strategies and can lead to the emergence of a number of barriers.

Additionally, privacy has a positive effect on the attitudes and intentions to share knowledge through social media tools. The concerns surrounding privacy on social media tools arise from the challenges in the authentication of the identities of the members of the online communities (Chai, Das & Rao, 2011). As indicated by Papadopoulos, Stamati and Nopparuch (2013), with the right kind of privacy, academics are assured that the knowledge shared on the social media platforms is not misused, and it does not end up in the hands of unintended individuals. The privacy concerns are reflected in the qualitative findings, whereby the respondents reiterate the need for verification of the identities of the participants of the knowledge-sharing communities. A number of the

social media tools provide for such verification activities, while others allow for anonymisation of the participants.

Finally, the perceived usefulness, whose effect on the intention and attitude to share knowledge is predicted to be positive (Imran et al., 2019), has a statistically significant effect on the academics in Saudi universities. Past literature alludes to the fact that if the social media tool is perceived as being useful to the process of sharing knowledge, then its effect on the attitudes and intentions is positive and statistically significant. Among the academics in Saudi universities, social media platforms are viewed as being useful to the process. Ahmed et al. (2019) and Yasir & Majid (2017) concur on the fact that most Saudi universities have adopted ICT tools as part of their institutional strategies in improving their performance and operations. Amidi et al. (2015) further indicate that these institutions have improved their knowledge-sharing activities in line with the goal of creating a knowledge economy. The combined effects of these situations imply that social media platforms that are viewed as useful lead to increased knowledge-sharing activities.

The findings from the qualitative data culminate in a number of discussion points. First, the experts identify the role of the verification mechanism as an influential factor in the intention and attitudes towards the use of social media for knowledge sharing. The prominence of the need for verification of identities is implied under variables such as trust (Panteli & Sockalingam, 2005), individual factors, and safety and security under technological factors (Wang et al., 2016). Based on their inputs, verification mediates in the precursor processes of socialisation before knowledge sharing, thus leading to a close-knit community on the social media tools, whereby knowledge sharing can occur more effectively. Verification also plays a key role in reaffirming the reliability of the knowledge shared on the social media tools, since the members of the community can trust the identities of the persons who share the knowledge. Verification also extends to the quality of the knowledge shared on social media platforms. Past studies as well as the current model developed have operated on the premise that the knowledge shared meets the quality standards expected by the recipients and users. However, in the absence of the necessary knowledge management strategies in the organisation, there are no assurances that whatever knowledge is shared has value, as is advertised (Chung,

Nam & Koo, 2016). That is why the experts identify the role of the verification mechanism for the knowledge shared through social media tools.

Second, the experts highlight the role of cultural inclinations, in the intention and attitudes towards sharing knowledge on social media tools. Al-Qaysi et al. (2020) and Anwar et al. (2019) argued that culture is an important consideration in the adoption and use of technologies, including for the specific purposes of sharing knowledge. Culture influences the attitudes and views of individuals, with the overriding view in existing studies being that some of the technological advances are oriented towards Western culture, which is different from the culture of the people in the Middle East (Etemadi et al., 2019). Ahmed et al. (2019), who generalised Saudi Arabia's culture, as revolving around social dependence, financial dependence, opportunistic behaviour, and communication approaches, point out that the use of social media is shaped by the culture. The inclination of academics to use specific social media tools reveals the dependence, which emerges from the inclination of the people to stick together.

Third, appropriate content shared on the social media tools is highlighted as a key influence. The quality of knowledge influences knowledge-sharing activities on social media in a number of ways. On the one hand, Al-Busaidi and Olfman (2017) pointed out that quality knowledge attracts users and recipients since it is highly sought after. Consequently, the members of the community have higher motivations to seek and acquire knowledge. With most of the individuals involved in knowledge sharing being in the academic field, the concerns around the suitability of the knowledge also refer to the format and characteristics of the knowledge. The experts propose that different forms of assistance to academics to make the knowledge suitable for the recipients and users plays a key role in the outcome.

Fifth, in concurrence with implied influences under the technological factors, the popularity of the social media tools is identified as a key influence. Hung and Cheng (2013) point out that the popularity of social media tools makes them an integral component in the ICT strategies and tools in universities. Consequently, the popularity drives academics to integrate them into knowledge-sharing activities and processes.

Popularity, which is determined by the ease of use and perceived usefulness, among other factors, determines the number of individuals who use the social media tool. Kim and Lee (2006) pointed out that popular social media tools facilitate knowledge transfer, due to the availability of members on the networks. For some tools, such as WhatsApp and YouTube, popularity is an indicator of the choices by the members of the knowledge-sharing community. This is why it is necessary for academics to focus on promoting the popularity of specific social media tools, depending on the type of knowledge that is shared on those platforms. For instance, Stack Overflow, which is one of the least popular tools among academics, is suited for technology-related knowledge. The low popularity can be attributed to the fact that the type of knowledge shared on these platforms lacks universal appeal and use.

6 Interpretive structural modelling (ISM) AND FRAMEWORK DEVELOPMENT

6.3 Introduction

The literature review presented in Chapter 4 and the findings discussed in Chapter 5 helped identify the critical factors and the barriers associated with knowledge sharing through social media. However, it is important to highlight that no studies have been discovered to investigate all factors. Thus, this study integrates these factors in the KSA context for the higher education sector. These factors and their relationships have been explored by applying an interpretive structural modelling (ISM) methodology. This methodology helped develop a framework for enhancing the knowledge-sharing factors through social media. However, it is also required to validate the framework after the application of steps. Thus, in this chapter, the framework is applied and validated based on expert feedback.

6.4 Interpretive Structural Modelling

6.4.3 Process of Interpretive Structural Modelling (ISM)

Interpretive structural modelling (ISM) enables a better understanding of the relationships between many factors or variables associated with a system or an organisation and helps develop a structured model (Warfield, 1994). It can be used for analysing the relationships between factors or variables to understand their influence (Mandal & Deshmukh, 1994; Sharma, Gupta, & Sushil, 1995). The methodology provides the following steps to execution as explained by Kumar et al. (2013):

- Identification of variables: Identify the factors related to the problem under investigation. In this study, nine academic workshops from the KSA (Kingdom of Saudi Arabia) higher education were investigated to identify 19 IFs.
- Establishing the contextual relationship: Establish contextual relationships between the factors identified in this study.

- Developing a structural self-interaction matrix (SSIM): Develop a structural self-interaction matrix (SSIM) of the factors to indicate pairwise relationships among the variables.
- Developing the reachability matrix: Develop a reachability matrix based on structural self-interaction matrix (SSIM) to calculate the numerical influence, and check the transitivity for the matrix. The transitivity of the contextual relationship for the matrix is a basic assumption in ISM, which states that if element X is related to Y, and Y is related to Z, then X is also related to Z.
- Partitioning the reachability matrix: Partition the final reachability matrix into different levels.
- Removal of transitive links and drawing directed graph: Remove the transitivity links based on the relationships in the final reachability matrix, and draw a directed graph (digraph).
- ISM Model: Based on the previous step, convert the directed graph into an ISM-based model by replacing factors nodes with statements.

6.4.4 Development of the ISM

Identification of variables: Identify the factors relevant to knowledge sharing through social media. In this study, the literature review on the factors and the findings discussed in Chapter 5 assisted in the identification of the factors presented in this step. In this research, 19 Influential Factors (IFs) were identified as follow:

F1: Altruism

F2: Enjoyment of helping others

F3: Awareness of the importance of knowledge sharing through social media

F4: Self-efficacy

F5: Knowledge-sharing strategy

F6: Organisation environment

F7: Ease of social media use

F8: Functionality of social media

F9: Technical support

F10: Security of social media

F11: Privacy of social media

F12: Perceived usefulness of social media

F13: Time

F14: Training

F15: Rewards system

F16: Culture

F17: Popularity of the tool

F18: Appropriate content

F19: Verification mechanism

The team of nine participants was selected based on their job profiles, knowledge and experience with higher education. Also, the impact of the research on them was investigated. All selected stakeholders had the experience of teaching students and understood knowledge sharing over social media. The stakeholders were invited to the workshop three weeks before the event by sending letters asking them to present their views and opinions on the subject for this research. However, anonymity was maintained. After accepting the invite, the participants were briefed on study objectives and the list of factors two weeks before the first meeting. Upon their arrival, the researcher greeted the participants and then, in the 6-hour workshop, the participants were given two 20-minutes breaks. The participants first introduced themselves, revealing their background and

academic interest. Further, the researcher explained the study objectives and ISM process with steps shown, along with the clarification of the inputs required from them.

Establishing the contextual relationship: Establish contextual relationships between the factors identified in the previous step based on the participant opinion.

From the 19 IFs obtained in the identification of variables step, the contextual relationships between the IFs were identified. Out of the nine participants, those with eight or more years of working experience were selected to examine the contextual relationships between the 19 IFs. They provided their opinion regarding the factors that are more related to each other. Consequently, they were asked to make a pairwise comparison of the 19 IFs listed in rows and columns during the discussion. Specifically, the experts were informed to compare each cell on the table of the matrix and select the appropriate symbol. Based on the perception of direct relationships between two IFs, the experts were instructed compare the statement of the column to the statement of the row. The description of each symbol as plotted on the matrix is below.

V is used for the relation from IF i to IF j; but not in the opposite direction (i.e. if IF i influences or achieves IF j)

A is used for the relation from IF j to IF i, but the reverse is impossible (i.e., IF j influences or achieves IF i).

X is used for both direction relations (i.e., IF i and j will facilitate achieving or influencing, IF i and j will facilitate achieving or influencing, IF i and j will facilitate achieving or influencing each other).

O is used for no relation between the two IF principles (i.e., IF i and j have no relationship).

*(Note: ‘i’ and ‘j’ values are from IF 1, 2,….19).

Developing a structural self-interaction matrix (SSIM): A structural self-interaction matrix (SSIM) is a technique that is used for finding the nature of contextual relationships among identified factors using expert opinions. Using pairwise comparison by the experts

using the V, A, X, O symbol-set, the SSIM was established to disclose the pairwise relationships of the IFs in Table 6.1. Note that the entries in the matrix were based on the majority vote acquired for the pair of IFs.

Table 6.1: Structural Self-Interaction Matrix (SSIM)

IFj / IFi	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	O	A	O	X	A	A	O	X	O	O	O	V	X	O	A	O	X	A	
2	O	O	O	X	A	A	A	X	A	A	O	A	X	A	O	A	X		
3	O	O	V	A	A	A	O	V	X	X	O	O	O	O	X	A			
4	V	V	V	O	X	A	O	O	O	O	A	A	V	A	A				
5	O	O	A	A	X	V	O	A	O	O	V	X	O	V					
6	O	O	O	A	O	O	O	O	O	O	O	O	O						
7	X	A	X	O	O	X	V	V	O	O	X	A							
8	V	V	X	O	O	X	A	V	O	O	X								
9	A	A	V	O	A	X	V	O	V	V									
10	A	O	V	O	O	X	O	O	X										
11	A	O	A	A	O	X	O	O											
12	O	A	X	O	A	A	V												
13	O	V	O	V	O	A													
14	V	V	V	O	O														
15	O	O	V	O															
16	V	X	X																
17	O	X																	
18	X																		
19																			

Developing the reachability matrix: Develop a reachability matrix based on the structural self-interaction matrix (SSIM) to calculate the numerical influence, and check

the matrix for transitivity: As shown in Table 6.2, the initial reachability matrix is developed from the SSIM by replacing the V, A, X and O symbols with binary digits of either “1” or “0” based on the below rules:

• If the (i, j) entry value in the SSIM is V, then the (i, j) entry value in the initial reachability matrix becomes one, and the (j, i) entry value becomes 0,

• If the (i, j) entry value in the SSIM is A, then the (i, j) entry value in the initial reachability matrix becomes 0 and the (j, i) entry value becomes 1,

• If the (i, j) entry value in the SSIM is X, then both the (i, j) and (j, i) entries value of the initial reachability matrix becomes 1 and,

• If the (i, j) entry value in the SSIM is O, then both the (i, j) and (j, i) entries value of the initial reachability matrix become 0.

Table 6.2: Initial Reachability Matrix

IFj / IFi	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	1	0	0	0
2	1	1	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
3	1	1	1	0	1	0	0	0	0	1	1	1	0	0	0	0	1	0	0
4	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	1	1
5	0	0	1	1	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0
6	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	1	0	0	0	0	1	0	1	0	0	1	1	1	0	0	1	0	1
8	1	1	0	1	1	0	1	1	1	0	0	1	0	1	0	0	1	1	1
9	0	0	0	1	0	0	1	1	1	1	1	0	1	1	0	0	1	0	0
10	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1	0	0
11	0	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0
12	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0
13	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0

14	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1
15	1	1	1	1	1	0	0	0	1	0	0	1	0	0	1	0	1	0	0
16	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1
17	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	1	1	1	0
18	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	1	1
19	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1

The final reachability matrix is acquired by integrating transitivity. The transitivity of the contextual relationship is a fundamental assumption of the ISM technique, which states that if element X is related to Y, and Y is related to Z, then X is also related to Z. In Table 6.3, '*' indicates the presence of transitivity.

Table 6.3: Final Reachability Matrix

IFj / IFi	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	1	1*	1	1*	1*	1*	1	1	1*	1*	1*	1	1*	1*	0	1	1*	1*	1*
2	1	1	1	0	1*	1*	1	1*	1*	1*	1*	1	1*	1*	0	1	1*	1*	1*
3	1	1	1	1*	1	1*	1*	1*	1*	1	1	1	1*	1*	1*	1*	1	1*	0
4	1*	1	1	1	1*	0	1	1*	1*	1*	1*	1*	1*	1*	1	1*	1	1	1
5	1*	1*	1	1	1	1	1*	1	1	1*	1*	1*	1*	1	1	0	1*	1*	1*
6	1*	1	1*	1	0	1	1*	0	0	0	0	1*	0	0	1*	1*	1*	1*	1*
7	1	1	1*	1*	1*	0	1	1*	1	1*	1*	1	1	1	0	1*	1	1*	1
8	1	1	1*	1	1	1*	1	1	1	1*	1*	1	1*	1	1*	1*	1	1	1
9	1*	1*	1*	1	1*	0	1	1	1	1	1	1*	1	1	1*	1*	1	1*	1*
10	1*	1	1	1*	1*	0	1*	1*	1*	1	1	1*	1*	1	0	1*	1	1*	1*
11	1*	1	1	1*	1*	0	1*	1*	1*	1	1	1*	1*	1	0	1*	1*	1*	1*
12	1	1	1*	1*	1	1*	1*	1*	1*	0	0	1	1	1*	1*	1*	1	1*	0
13	1*	1	1*	1*	1*	1*	1*	1	1*	0	0	1*	1	1*	0	1	1*	1	1*
14	1	1	1	1	1*	0	1	1	1	1	1	1	1	1	1*	1*	1	1	1

15	1	1	1	1	1	1*	1*	1*	1	1*	1*	1	1*	1*	1	1*	1	1*	1*
16	1	1	1	1*	1	1	1*	1*	1*	1*	1*	1*	0	1*	1*	1	1	1	1
17	1*	1*	1*	1*	1	1*	1	1	1*	0	0	1	1*	1*	1*	1	1	1	1*
18	1	1*	1*	1*	1*	1*	1	1*	1	1*	1*	1	1*	1*	0	1	1	1	1
19	1*	1*	1*	1*	0	0	1	1*	1	1	1*	1*	1*	1*	0	1*	1*	1	1

Note: 1* indicates the transitivity relationships.

Table 6.4: Final Reachability Matrix with Driving Power and Dependence of IFs

IFj / IFi	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**Driving power**
1	1	1*	1	1*	1*	1*	1	1	1*	1*	1*	1	1*	1*	0	1	1*	1*	1*	18
2	1	1	1	0	1*	1*	1	1*	1*	1*	1*	1	1*	1*	0	1	1*	1*	1*	17
3	1	1	1	1*	1	1*	1*	1*	1*	1	1	1	1*	1*	1*	1*	1	1*	0	18
4	1*	1	1	1	1*	0	1	1*	1*	1*	1*	1*	1*	1*	1	1*	1	1	1	18
5	1*	1*	1	1	1	1	1*	1	1	1*	1*	1*	1*	1	1	0	1*	1*	1*	18
6	1*	1	1*	1	0	1	1*	0	0	0	0	1*	0	0	1*	1*	1*	1*	1*	12
7	1	1	1*	1*	1*	0	1	1*	1	1*	1*	1	1	1	0	1*	1	1*	1	17
8	1	1	1*	1	1	1*	1	1	1	1*	1*	1	1*	1	1*	1*	1	1	1	19
9	1*	1*	1*	1	1*	0	1	1	1	1	1	1*	1	1	1*	1*	1	1*	1*	18
10	1*	1	1	1*	1*	0	1*	1*	1*	1	1	1*	1*	1	0	1*	1	1*	1*	17
11	1*	1	1	1*	1*	0	1*	1*	1*	1	1	1*	1*	1	0	1*	1*	1*	1*	17
12	1	1	1*	1*	1	1*	1*	1*	1*	0	0	1	1	1*	1*	1*	1	1*	0	16
13	1*	1	1*	1*	1*	1*	1*	1	1*	0	0	1*	1	1*	0	1	1*	1	1*	16
14	1	1	1	1	1*	0	1	1	1	1	1	1	1	1	1*	1*	1	1	1	18
15	1	1	1	1	1	1*	1*	1*	1	1*	1*	1	1*	1*	1	1*	1	1*	1*	19
16	1	1	1	1*	1	1	1*	1*	1*	1*	1*	1*	0	1*	1*	1	1	1	1	18

17	1*	1*	1*	1*	1	1*	1	1	1*	0	0	1	1*	1*	1*	1	1	1	1*	17
18	1	1*	1*	1*	1*	1*	1	1*	1	1*	1*	1	1*	1*	0	1	1	1	1	18
19	1*	1*	1*	1*	0	0	1	1*	1	1	1*	1*	1*	1*	0	1*	1*	1	1	16
Dependence	19	19	19	18	17	12	19	18	18	15	15	19	17	18	11	18	19	19	17	

Partitioning the reachability matrix: The final reachability matrix is used to partition the IFs into different levels by determining the sets of reachability and the antecedent. The reachability set involves the IF and other IF, which it will influence. This set of factors was indicated by '1' in the row that corresponds to the factor in the matrix. In the other hand, the antecedent set involves the IF itself and other IF which it will impact. This set of factors was indicated by a '1' in the column corresponding to the factor in the matrix. Thus, the intersection of these sets is obtained for all 19 IFs. The intersection set consists of the reachability set and the antecedent set (i.e. R∩C). As shown in Table 6, the most similar or the same in their reachability and intersection sets have the the highest rank and given the top-level factor in the ISM hierarchy. (Kumar, 2012; Yang, 2012). Moreover, the process of iteration is repeated until identified all the factors into the hierarchy levels of the model. As shown in Table 6.5, the IFs with the highest rank are the ones that have the same reachability and intersection sets. As shown in Table 6.6, the 19 IFs are divided into several levels (L1 – L8) demonstrated below.

Table 6.5: Iteration of Level Partition

F	Reachability Set	Antecedent Set	Intersection Set	Level
F1	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1
F2	1,2,3,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1
F3	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	1
F4	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	2
F5	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18	1,2,3,4,5,7,8,9,10,11,12,13,14,15,17,18	4
F6	1,2,3,4,6,7,12,15,16,17,18,19	1,2,3,5,6,8,12,13,15,16,17,18	1,2,3,6,12,15,16,17,18	3

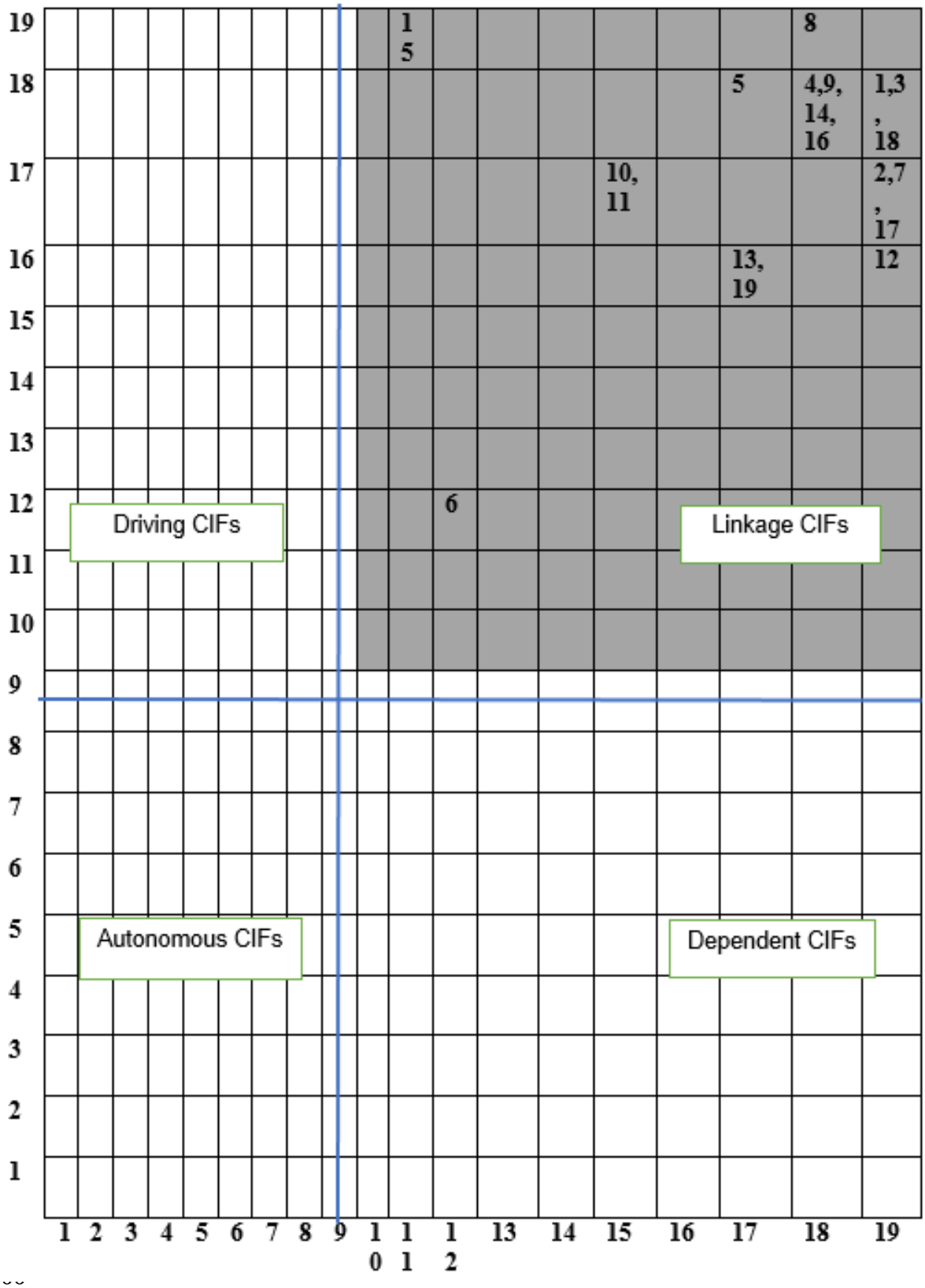
F7	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1
F8	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	4
F9	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1
F10	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,7,8,9,10,11,14,15,16,18,19	1,2,3,4,5,7,8,9,10,11,14,16,18,19	7
F11	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,7,8,9,10,11,14,15,16,18,19	1,2,3,4,5,7,8,9,10,11,14,16,18,19	7
F12	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18	1
F13	1,2,3,4,5,6,7,8,9,12,13,14,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,17,18,19	1,2,3,4,5,7,8,9,12,13,14,17,18,19	6
F14	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1
F15	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	3,4,5,6,8,9,12,14,15,16,17	3,4,5,6,8,9,12,14,15,16,17	8
F16	1,2,3,4,5,6,7,8,9,10,11,12,14,15,16,17,18,19	1,2,3,4,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,6,7,8,9,10,11,12,14,15,16,17,18,19	5
F17	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18,19	1
F18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1
F19	1,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19	1,2,4,5,6,7,8,9,10,11,13,14,15,16,17,18,19	1,2,4,7,8,9,10,11,13,14,16,17,18,19	2

*Full Iteration of all levels provided in the Appendix 2.

Removal of transitive links and drawing directed graph: Based on the relationships given in the final reachability matrix, the transitivity links are removed to draw the directed graph. The matrix of cross-impact multiplications applied to a classification analysis (MICMAC) is analytical technique used to analyse the driving power and dependence power of the final reachability matrix**.** As shown in Table 6.4, the dependence power of each variable is the sum of the total number of variable interactions in the column

(including itself), by which it is influenced, while the driving power of each variable is the sum of the total number of variable interactions in the row (including itself), which it influences.. Consequently, as shown in Figure 6.1, the dependence power and driving power summations of the IFs are highlighted into a digraph of four clusters: autonomous, dependent, linkage and driving clusters.

The first cluster is the autonomous cluster. The autonomous cluster includes IFs with weak dependence and weak driving power and. Furthermore, autonomous cluster IFs can be separated from the entire system, with less or no influence on other IFs. In this study, there are no IFs in the autonomous cluster. The second cluster is the dependent cluster, which contains IFs with weak driving power and high dependence power. The third cluster is the linkage cluster, which includes IFs with strong driving power and strong dependence. It is generally detected that all the factors in this study with a very strong drive power, called the ‘key IF’, falls into the category of linkage IFs. IFs in this cluster can be unbalanced and unstable as any action taken on any of these will affect other IFs and cause feedback on themselves (Kumar and Kumar, 2016). The last cluster is the driving cluster. It contains IFs that have strong driving power and less dependence power.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4,9, 14, 16
1,3, 18
10, 11
2,7, 17
13, 19
12
6
Driving CIFs
Linkage CIFs
Autonomous CIFs
Dependent CIFs
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Figure 6.1: Cluster Formation by MICMAC Analysis

ISM Model: Based on the previous step, convert the directed graph into an ISM-based model by replacing factors nodes with statements. The ISM model is created from the final reachability matrix after removing the transitivity links and replacing the node numbers with statements of the factor names. The levels of influential factors are important in understanding the influential factor of knowledge sharing through social media. Figure 6.2 shows the ISM model of influential factors of social media for knowledge sharing.

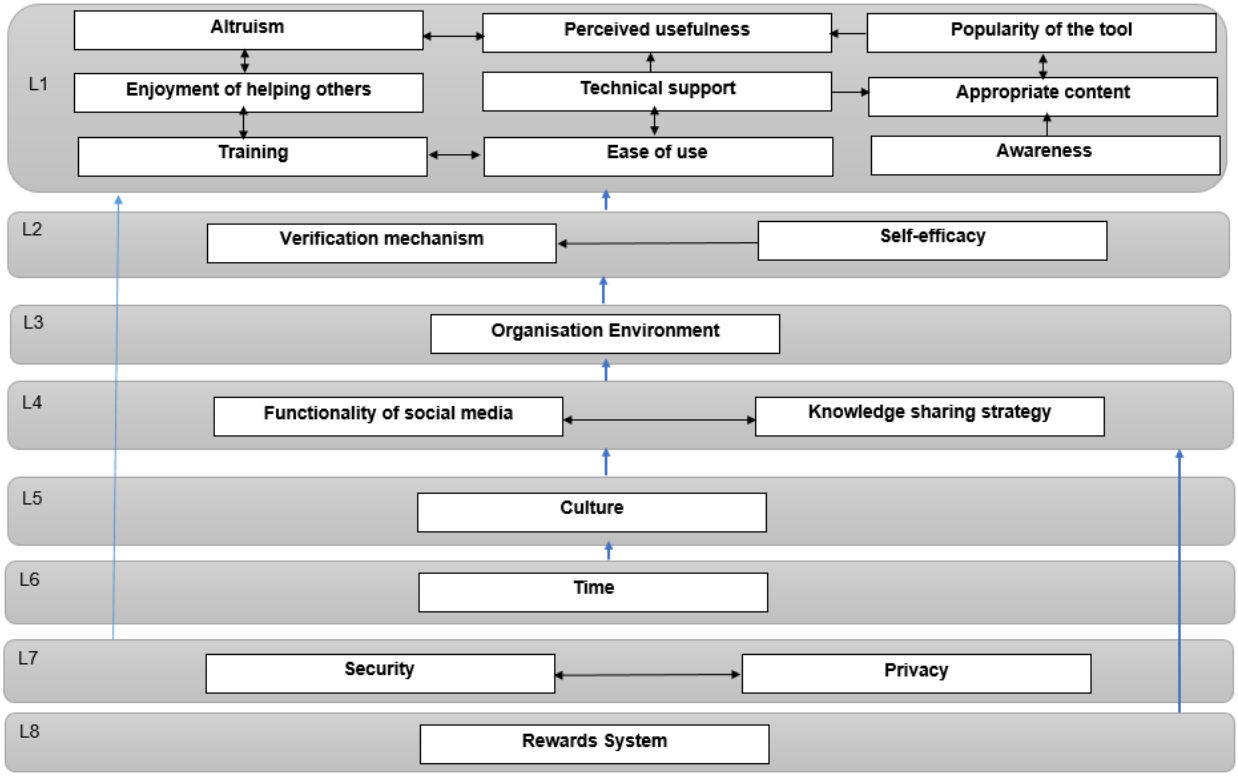

Figure 6.2: ISM-based Model of Influential Factors of Social Media for Knowledge Sharing

6.4.5 Discussion of the ISM Model

A structure or the system in any organisation gets complicated to understand because of the presence of many factors and interactions between them, which makes it difficult to understand and resolve issues arising due to them unless the interacting factors and their relationships are well understood. Interpretative structural modelling (ISM) identifies this structure, which helps identify associating factors and create a comprehensive model that depicts relationships between them. The benefit of this modelling is that the relationships identified between factors are more useful in explaining difficult-to-fathom situations if the factors are considered individually. The process does begin with the identification of individual factors that are relevant to a specific problem which in this case is knowledge sharing, but then, the method extends these individual factors to include more using a group method for problem-solving. For identifying individual factors, nine experts from the education sector were called upon for a discussion. These experts helped identify the factors and evaluated the strength of relationships between them in a workshop. After identifying factors, a paired comparison was used to extend this understanding where experts made the comparison based on their opinion of the strengths of the relationships. In the current research, 19 Influencing Factors (IFs) were identified as critical for the comparison. These included altruism, enjoyment of helping others, awareness of the importance of knowledge sharing through social media, self-efficacy, knowledge-sharing strategy, organisation environment, ease of social media use, functionality of social media, technical support, security, privacy, perceived usefulness of social media, time, training, rewards system, culture, popularity of the tool, appropriate content, and verification mechanism.

Once the structured comparison was made, the next step was to use the insights to develop a structural self-interaction matrix (SSIM) using the paired comparison results, which helped decipher the contextual relationships between IFs using voting from experts. The SSIM entries were made based on the majority obtained in voting for each pair of IFs by experts. It was then converted into a reachability matrix (RM) whose transitivity was checked. While doing this, a matrix of cross-impact multiplications applied to a classification analysis (MICMAC) is prepared to analyse the autonomous, linkage,

independent and dependent IFs. The autonomous factors were the ones displaying weak dependence and drive power. These factors, if segregated from the system, might not have much impact on other factors. The current research did not reveal any autonomous factors. Driving or independent factors have a strong drive but weak dependence power. Dependent factors, in contrast, have a weak drive and strong dependence power. Linkage factors were strong on both but were found unstable in action. The current research found that factor 14, training, was linked with many other factors, including altruism, awareness, self-efficacy, security, privacy, technical support, ease of use. The popularity of the social media tool was found to be connected to enjoyment, ease of use, security, and privacy. Links were also apparent between verification mechanism and other factors like security, ease of use, and technical support. The culture was also found to affect perceived usefulness, time, and verification mechanism. The perceived usefulness of the social media tool was specifically connected with the culture. As the literature suggested, segregating the components into different levels makes it easier to understand the relationships; upon inclusion of transitivity, an updated model was derived by partitioning the elements to create a reachability matrix (RM), including a reachability antecedent set, intersection set, and the level. The 19 IFs were partitioned based on the identified levels. On Level 1 were included altruism, enjoyment of helping others, awareness of the importance of knowledge, ease of use of social media, technical support, perceived usefulness of social media, training, popularity of the tool, and appropriate content. This level suggests that these factors are the greatest contributors in taking decisions related to knowledge sharing on social media. This means that a lack of technical support, lack of training, and lack popularity of the tool in the community would be some other reasons why people in the academic sector may not use a social media tool for knowledge sharing. The second level included self-efficacy and the verification mechanism as important deciding factors for social media sharing. Other factors like organisation environment, functionality and knowledge-sharing strategy, culture, security and privacy, and rewards systems plotted at 3, 4, 5, 7 and 8 levels were less important for academic, social media users when considering knowledge sharing.

As explored in the literature review, the ISM method helps develop factors and relationships that can help understand processes, investigate problems, enablers, and

barriers to the smooth functioning of a system. The resulting model could help planning, decision-making, problem-solving to enhance the use of social media for knowledge sharing in HEIs.

6.5 Framework Development

6.3.1 Introduction

This research aims to develop a framework to enhance the use of social media for knowledge sharing amongst academics in higher education institutions in KSA. Furthermore, research objective five concentrates on the validation of the proposed framework.

Based on the initial framework presented in Chapter 4, the current situation of social media use and knowledge-sharing factors influencing the use was obtained through semi-structured interviews in Chapter 5. The quantitative analysis of the data demonstrated the general and overall perceptions of academics regarding the factors while the qualitative analysis explored the stockholders' perceptions. Moreover, the ISM model developed is based on feedback from higher education experts in the KSA and is presented in this chapter (Chapter 6). This section focuses on the proposed framework that may enhance the use of social media for knowledge sharing by addressing the factors influencing academics in higher education institutions.

The framework is based on the theories of knowledge sharing and social media to address the potential factors that influence the use of social media. The interpretive structural modelling (ISM) models developed in this chapter are used to define the relationships among the many factors that influence knowledge sharing through social media.

Lastly, this chapter presents the validation of the proposed framework. For validation, an interview methodology composed of five experts was conducted. The interview methodology is often used to discuss an issue effectively and obtain more detail with less ambiguity (Ahmed et al., 2016; Bhattacherjee, 2012). Using experts' opinions in the

validation step is common and has been applied by many researchers for framework validation (Haq and Boddu, 2014).

6.3.2 Framework Development

A framework is a conceptual structure elaborated to serve as a guide or support for the building of something that extends the structure into something useful (Cohen, Manion and Morrison, 2002). In research, the framework is the structure that can support the research study from theory view. Furthermore, a conceptual framework is a written or visual representation of an expected relationship between factors, concepts, variables. It explains the relationship among the factors in narrative or graphical form (Miles and Huberman, 1994). The building of a conceptual framework is a structured process that could be constituted by using previous research and theories, and associated with current work to explain the occurring phenomenon (Maxwell, 2005).

The development of a framework should follow a logical step. The development of the proposed framework in this research includes four phases based in the framework development process presented by Almanei et al. (2018). The first phase captures the research specification, which discusses the purpose of the current study, scope and audience. The second phase involves the development of a conceptual framework based on theories or models and identifying the key barriers. The third phase reviews the framework based on the experts' feedback. The final phase is finalising the framework. Figure 6.3 illustrates the development steps for the proposed framework in the current study.

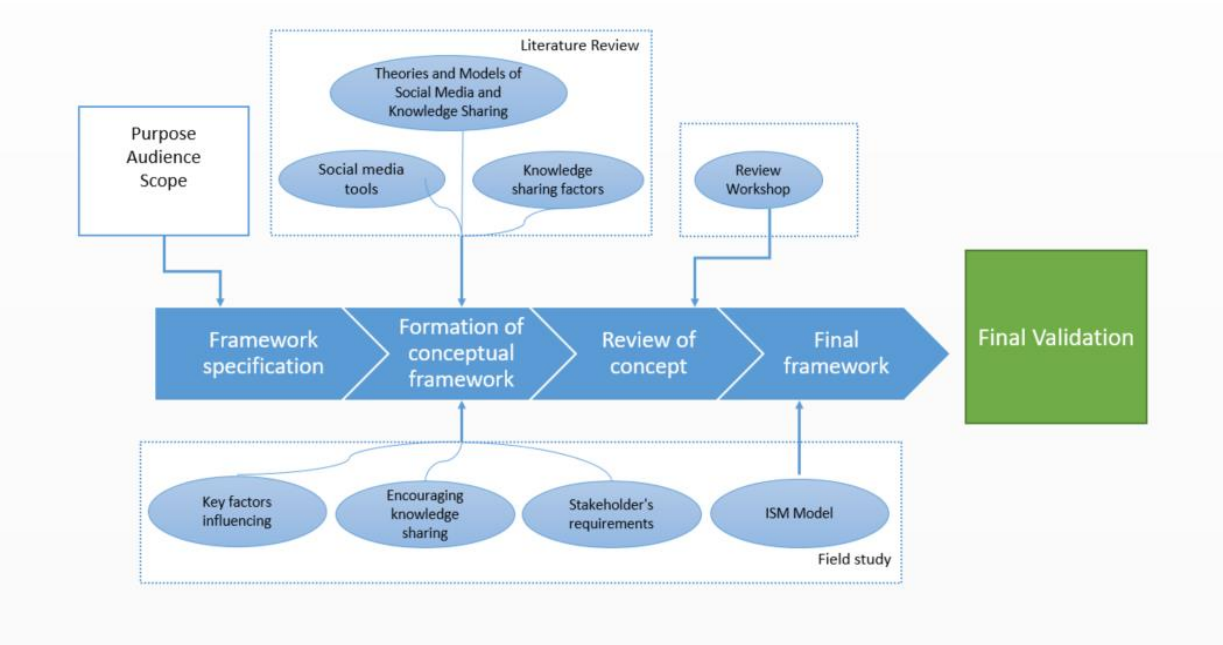

Figure 6.3: A Framework Development Process

6.3.2.1 Specifications Phase

To begin building any framework, it is important to define the purpose of the framework. The clear definition of the purpose of the framework would support the expectation of the framework. Thus, clarifying the purpose of the framework, the scope, and the intended audience is essential in this step. The issues in this step are addressed by considering the main aim and objectives of the current study. The following points clarify these issues:

Purpose: The purpose of the framework is to enhance the use of social media for knowledge sharing among academics

through a series of steps that higher education institutions in the KSA can adopt.

Targeted audience: Top management of higher education institutions, academics; social media providers.

Scope:

(1) Provide a clear definition of the stakeholders' requirements in higher education institutions in the KSA, which can be enhance the use of social media for knowledge sharing.

(2) Provide a sequence of real steps that allows higher education institutions in the KSA to understand how academics are convinced to accept and use social media for knowledge sharing.

(3) Provide useful insights generated from key factors that influence the knowledge-sharing process, and by simply documenting insights to enhance the use of social media for knowledge sharing in higher education institutions in the KSA.

6.3.2.2 Development of Conceptual Framework Phase

During this phase, the building of the conceptual framework was based on two key sources of data that were accessible to the researcher. The secondary data available in the literature review are presented in Chapters 2 and 3. These data supported the researcher in obtaining better understanding of the concepts. The primary data from the field study focused on the stockholders' requirements and the key factors influencing knowledge sharing through social media based on experts' views. The most suitable way of organising the conceptual framework was analysed. This analysis led to the choice of the most appropriate knowledge sharing model to build the basis of the conceptual framework. During the phase of building the framework, the researcher developed the

initial framework based on the literature review, the investigation of factors, and the ISM model to develop the final framework. The conceptual framework includes identifying the requirements, identifying stakeholders' requirements, investigating the key factors, and then identifying ways to enhance the knowledge-sharing process through social media in higher education institutions in KSA. These findings might allow for the step-by-step integration of information from the available data and guarantee that all data will be considered in the framework. Lastly, during the conceptual framework phase, unnecessary activities were removed to ensure the correct flow between the conceptual framework phases.

6.3.2.3 Review of the Conceptual Framework Phase

The third phase of the framework development focused on reviewing the conceptual framework. The necessary amendments as well as new elements were inserted to ensure the compatibility of the framework. As a result of the initial framework review, the final framework was developed.

6.3.2.4 Development of the Final Framework Phase

During the final phase, the final framework was developed based on all the data captured in the previous phase as well as the data collected from the field study and the developed ISM model. The next part presents the final framework phases as well as the final evaluation.

6.4 A Framework for Enhancing Knowledge Sharing through Social Media in Higher Education Institutions in the KSA

As discussed in the framework development process, the literature review supports development as a starting point. The literature review in Chapter 2 highlighted the gap in this research: the need to investigate the factors influencing knowledge sharing through social media tools from the perspective of academia, based on theories and models. This section is focused on the framework for enhancing knowledge sharing through social media in higher education institutions in KSA. The results from the field study and ISM methodology would help to finalise the framework.

The first phase of this framework is the defining phase. During the defining phase, it is important to define the scope and goal. This framework is customised to higher education institutions in the KSA. It is the focused on knowledge-sharing factors through social media tools. In this stage, the definition will support the framework for categorising social media tools for knowledge sharing. The categorisation of social media tools is essential to obtain a better understanding of the benefits of these tools, as these tools are consistently updated to provide users with the best use. During this phase, the definition of the factors influencing knowledge sharing through social media is based on knowledge sharing dimensions.

The assessment phase considers the stockholders' requirements. The framework focuses on the requirements and needs to assess the current situation. The university requirements are emphasised in the clear vision and strategy for knowledge sharing through social media. The presence of strategy at high levels of decision making for HEIs is important to support the knowledge-sharing process as well as to create certain rules and regulations for use of social media. Further, the academic requirements should be taken into account as they are the basis of the knowledge-sharing process in higher education intuitions. Workload relief is an essential requirement for academics. All the academics do not have the time to share knowledge through social media. The capability of academics to share knowledge through social media requires skills in using these tools as some of the tools are complicated. One of the important requirements to encourage academics to use social media, for knowledge sharing, is ease of use. Appreciating the full functionality of social media might help to enhance the knowledge-sharing process. Lastly, there is a need for the academic perspectives of social media tool providers, as many of these tools are essential tools for collaborating and engaging in academic work. The identification of the guidance and procedures for using these tools is essential to ensure that the users have the right tools for use in the organisation. The big focus is the requirements for privacy and security issues, as these issues would hinder academics from using the tools.

The analysis phase presents the factors that influence knowledge sharing through social media. The framework in this step focuses on factors based on knowledge-sharing

models and theories. Most of the knowledge-sharing models for HEIs in the literature review discussed the factors based on one dimension. This study combined all factors and was supported by knowledge-sharing models and theories.

The technological dimension involves factors that affect social media use. The main factors influencing knowledge sharing from the technology aspect include the following. First, there is a need for clear privacy policies for safe use. Second, it is necessary to ensure the security of using these tools. Third, there is a need for improvement in the tools provided for ease of use. The ease of use is an important factor that would support academics in sharing knowledge in an easy way to save time. Fourth, more consideration is needed of the functionality of the tools, as the several functions might be effective for academics. The development of the functions for these tools would play a key role in the elimination of several barriers in the organisation, especially individual barriers. Fifth, the university and social media providers should enhance the technical support for social media tools that help academics create and share knowledge. The lack of technical support might limit the use of social media for knowledge sharing. Sixth, the perceived usefulness of social media in knowledge sharing would provide an effective and efficient approach to sharing knowledge. Seventh, there is a need for a verification mechanism to ensure the real identities. The need for verification arises because of fake identities and information. Eighth, it is necessary to ensure the suitability of content. The content should be appropriate for academics, as they seek knowledge related to scientific content. Lastly, popularity of the tool is considered a technology factor that influences knowledge sharing. The popularity of the tool is related to the high number of members in one community. The university should consider the most popular platforms in the academic field and support the knowledge-sharing process through popular tools.

The individual factors that affect social media use for knowledge sharing are presented in the development framework. Most individual factors are related to the motivation to share knowledge. These factors are supported by social exchange theory (SET), which posits that individuals are inclined to reciprocate actions because they feel they should do the same for appreciating the benefits. First, altruism facilitates the voluntary and continuous sharing of knowledge within an organisation, face to face or through social

media. Altruism supports the elimination of potential barriers to knowledge sharing and leads to mutual benefits among academics. Second, enjoyment of helping others is an essential motivation for individuals to share knowledge through social media. The enjoyment of helping others might help solve the emergent barriers to knowledge sharing and make such an individual actively create and share knowledge. Third, there is a need to raise awareness of knowledge sharing. The university should support awareness of the importance of knowledge sharing to promote knowledge sharing in the organisation. Fourth, self-efficacy is an important factor for individuals, as it influences their behaviour. High levels of self-efficacy help individuals share knowledge with low effort. Fifth, the time spent sharing knowledge affects the quality and quantity of knowledge. As knowledge sharing is not a necessary or primary job, most academics use social media for knowledge sharing in their free time. Lastly, culture is considered an important factor in knowledge sharing through social media in this framework. Culture is a complex factor that needs more attention from HEIs in the KSA because of the sensitivity of this factor. Saudi culture is not a wide and open culture. Culture is related to individuals, as some academics resist the use of new technology such as social media for cultural reasons.

Finally, the organisational dimension involves factors that affect social media use for knowledge sharing. Based on the perceived benefits of knowledge sharing to the organisation, organisational factors arise as important factors that support the organisation's adoption of knowledge sharing among employees. First, there is a need for training to support the use of social media tools for knowledge sharing. Technical knowledge can be acquired through training and workshop sessions that focus on who to use and how to share through social media tools. Moreover, it is necessary to train academics in the use of social media tools to optimise the benefits of these tools, especially for activities related to knowledge sharing. Second, it is imperative to ensure that organisations have specific strategies for knowledge sharing to make the knowledge-sharing process more active and objective. Third, there is a need for a rewards system to encourage knowledge sharing in an organisation. These rewards are necessary for motivating academics to share knowledge rather than hoard knowledge. Lastly, the organisational environment should focus on the types of facilities that relate to knowledge sharing and social media. The organisational environment should facilitate and increase

knowledge sharing by providing facilities that support social media tools and knowledge sharing. The framework is shown below (Figure 6.4).

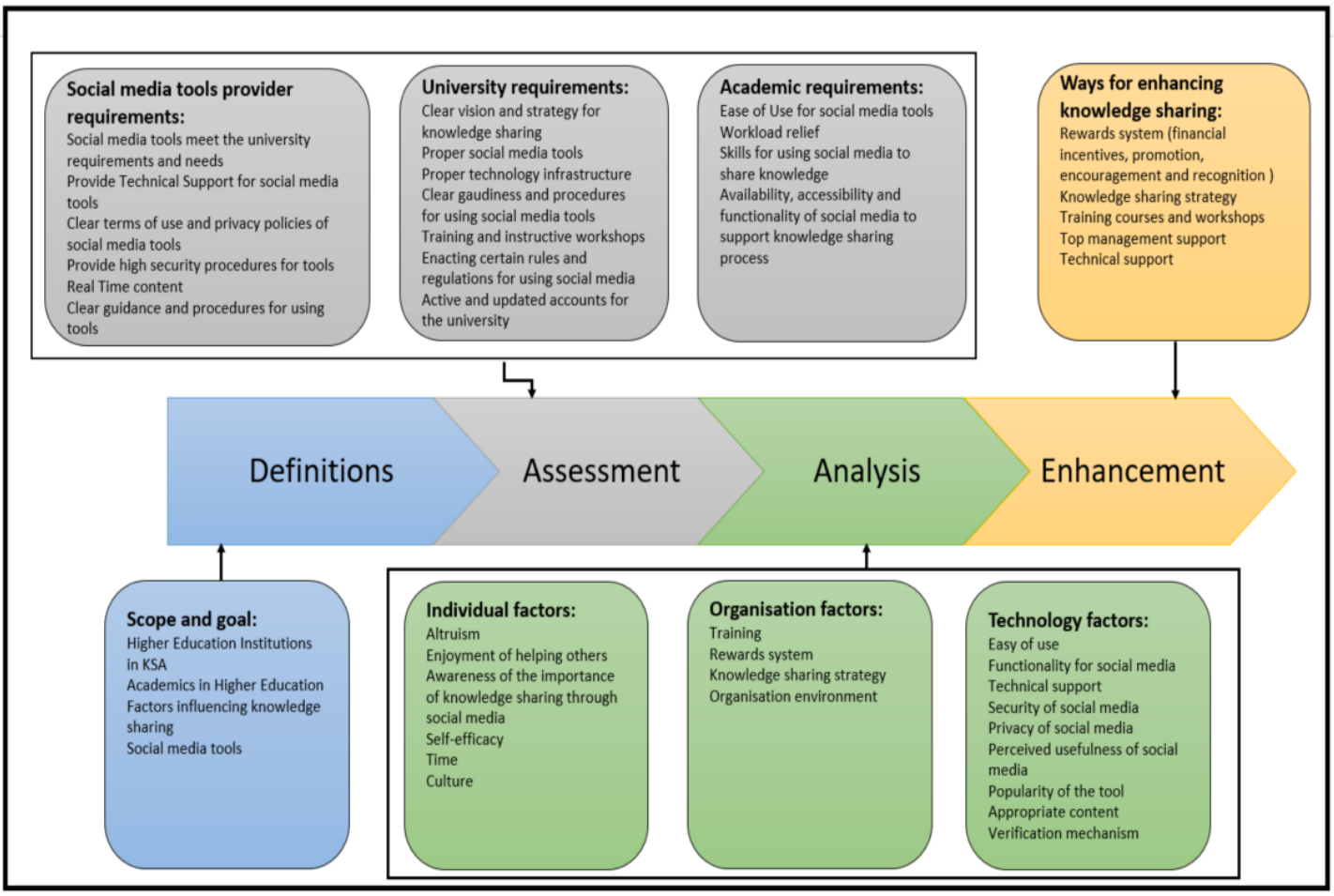

Figure 6.4: A Framework for Enhancing Knowledge Sharing through Social Media in Higher Education Institutions in the KSA

6.5 Framework Evaluation

This section of the chapter focuses on the evaluation of the framework. The proposed framework of knowledge sharing through social media was validated by experts in the field of higher education institutions in Saudi Arabia. This research targets academics in higher education institutions in KSA. The evaluation was conducted with five experts. These experts each had an average of 12 years' experience in higher education institutions in KSA. These experts were academics providing administration, teaching and research. Table 6.6 summarises the background information of the experts who participated in the validation.

Table 6.6: Background Information of Experts Involved in the Evaluation of the Framework

Expert	Characteristics	Age	Years of experience	Organisation
Expert 1	Academic	43	8	HEIs
Expert 2	Academic	48	10	HEIs
Expert 3	Academic	52	14	HEIs
Expert 4	Academic	55	16	HEIs
Expert 5	Academic	50	10	HEIs

Regarding the evaluation of the framework, the experts were asked about the needs of the framework, focusing on the factors that influence the use of social media for knowledge sharing amongst academics in the higher education field. All the experts

agreed on the need for a framework considering the potential factors that influence academics. Expert 4 stated that investigating the factors can help to improve the use of social media for knowledge sharing in the academic field. Moreover, Expert 1 expressed the need to investigate and address all the factors from all aspects to provide a comprehensive framework. Expert 2 believed in the importance of a framework that enhances the knowledge-sharing process through social media to achieve the university's vision of knowledge sharing and to support top management in applying such a framework. However, concerning the knowledge-sharing strategy through social media, Expert 3 argued that the strategy and vision should be set as voluntary rather than mandatory and with full responsibility of the university to provide a suitable and applicable vision.

Second, the comprehensiveness of the proposed framework was also discussed during the interviews. The experts were asked whether the influential factors of knowledge sharing through social media were appropriate and comprehensive. All the experts agreed that the framework covers all the factors. Expert 5 suggested the addition of motivational factors for knowledge sharing through social media, which might support the proposed framework. Expert 2 proposed that the factors should be classified into different aspects based on the relationships of these factors. Although the main aim of this research was not to classify the factors, the initial framework and ISM model classified the factors based on the literature review and the interrelationships among factors.

Third, the experts were asked whether the ISM model and the levels of hierarchy were logical. All the experts agreed that the ISM model and the levels of hierarchy are very logical. However, Expert 4 indicated that the ISM methodology in this research considered many variables and that it is very challenging to manage all these variables. One expert suggested that the ISM methodology would be more logical if the variables were classified into main categories and sub categories were identified under the appropriate main category.

Fourth, the experts were asked whether the framework might contribute to improving the performance of knowledge sharing through social media and universities in the KSA.

There were several responses from experts regarding this question. Experts 2 and 4 agreed that the proposed framework is implementable in higher education institutions in KSA if there is support from top management. Expert 3 emphasised the need to provide all stakeholders with suitable training to have a good understanding of the framework requirements. Expert 5 pointed out that more guidelines would be needed to explain the application of the proposed framework to academics. Further, Expert 1 stated that the model and the proposed framework would contribute to enhancing knowledge-sharing performance if it is implemented in a good manner. They also highlighted the usefulness of this framework for social media providers and policy makers in higher education institutions in the KSA.

The last theme discussed during the interviews with the experts was the adequacy of the framework. The experts were asked to provide any suggestions for future improvements to the proposed framework. All the experts agreed that the framework was very adequate. Expert 1 suggested translation of the framework into Arabic, as the current research focuses on the KSA context. Expert 3 proposed that the social media provider should consider the authorisation of the third-party application, which is related to privacy and security issues. Expert 5 mentioned that the university should pay attention to training, as academics need to be trained more on how to use the tools and how to share through them. Expert 4 emphasised the academic requirements, work load and research work that hinder academics from sharing knowledge. Expert 1 stated that universities should support each university's technical environments by providing good IT infrastructure.

The final phase of this framework is enhancement. There are several ways to enhance knowledge sharing through social media in HEIs in the KSA. Enhancement should include supporting HEIs in KSA by promoting good practice for knowledge sharing through social media. The propositions for improvement include the following. First, the knowledge-sharing strategies align with the university strategies. Second, a real rewards system should support the knowledge-sharing process through social media. These rewards could be financial and non-financial incentives. Third, support from top management would improve the use of social media for knowledge sharing. Top management support could be involved through decision making about the use of social media for knowledge

sharing. Fourth, training courses and workshops would increase the ability to use the social media platforms for knowledge sharing. Lastly, there should be technical support for knowledge sharing through social media. The technical support should enhance social media tools that help academics perform knowledge sharing.

6.6 Conclusion

This chapter has discussed the fourth and fifth research objectives by presenting the interpretive structural modelling methodology and the proposed framework of knowledge sharing enhancement through social media in HEIs in KSA. Interpretive structural modelling was used to identify the interrelationships among the critical influential factors. The results from Chapter 5 and the ISM methodology were used to finalise the proposed framework. Furthermore, a thorough analysis of the framework included individual, organisational and technological aspects. An evaluation of the proposed framework based on experts' opinions was presented.

7 CONCLUSION AND RECOMMENDATION

7.1 Introduction

The aim of this research was to develop a new framework that would enhance the knowledge sharing process through social media in HEIs. The focus was to encourage social media use in HEIs by investigating factors that hinder knowledge sharing and finding strategies to address identified issues. The data were based on qualitative methodology by using primary and secondary data for data collection.

The overall aim was achieved through a methodological study consisting of five phases. This methodology helped to guarantee the reasonable achievement of goals and objectives. The first phase focused on understanding the context. This phase considered the research aim, objectives and background of the research. The second phase included the investigation of social media and knowledge sharing theories, models and the key factors of barriers to using social media for knowledge sharing. The third phase was the field study. In this phase, an academic field study was performed to identify the current factors that influence knowledge sharing through social media. The fourth phase was based on the ISM methodology to identify the relationships among the key factors influencing knowledge sharing by experts consulted in the academic field. The final phase consisted of performing an evaluation of the developed framework by using expert opinions.

This chapter presents the main conclusions of the current research. The research conclusion will summarise the research aim and objectives, research contribution to literature, recommendations, limitations, and future work.

7.2 Conclusion

The introduction chapter (Chapter 1) highlighted the research aim and objectives. The aim of the current research was to develop a framework to enhance the use of social media for knowledge sharing based on knowledge sharing models and IS theories focusing on the KSA HEI sector.

This research set five objectives to achieve this aim and to develop the final framework. The first objective of this research was to categorise the current social media tools used for knowledge sharing. This categorisation was identified through a literature review. The definition of social media tools and features were presented in Chapter 2. There is currently no standard categorisation for social media tools for knowledge sharing and the use of tools may differ for academics based on their regions. This research revealed that the popularity of the tool was considered one of the important factors influencing the use of social media tools, such as WhatsApp and Facebook, for knowledge sharing among academics in HEIs in the KSA.

The second objective of this research was to identify current theories and models for social media and knowledge sharing. Through a literature review, this research identified proposed models of the knowledge sharing. The models of knowledge sharing in HEIs and the factors that influence people's decisions to share knowledge were conducted and discussed in Chapter 2.

The third research objective was to identify the critical success factors and the key barriers to using social media for knowledge sharing. There was a need to identify and understand the influential factors based on the literature review. The literature review revealed that there is a need for organisations or institutions to understand the factors influencing or affecting knowledge sharing at the individual and organisational levels to stand a chance of success based on Orlikowski (1992) model. Findings from the literature review and based on knowledge sharing models and IS theories presented the influential factors for the conceptual framework. The conceptual framework grouped the factors based on three aspects individual, organisational and technological. Results from semi-structured interviews were presented in Chapter 5.

The fourth objective of this research was to develop a framework to develop current social media platforms to enhance the knowledge sharing potential. For a deeper and better understanding of the relationships among the various factors, the current research applied the interpretive structural modelling methodology by using a focus group of academic experts. The findings of the ISM were presented in Chapter 6. The results from

the previous objective, which were the findings from the semi-structured interviews, and this objective were developed into a framework that would enhance the knowledge sharing process through social media in HEIs. The proposed framework might help encourage academics to share knowledge by understanding the potential factors that influence them and hinder the use of social media.

The final objective was to validate the proposed framework based on experts' opinions. The evaluation of the proposed framework was conducted using interview methodology to ensure its validity. The proposed framework was presented in Chapter 6.

7.3 Contributions to Research Knowledge

The contribution of this study is the generation of a deep understanding of the social media tools used for knowledge sharing among academics in HEIs in the KSA context. Social media is considered an area of great interest with respect to its value in academia and industry. The research results could be useful for both researchers and universities. In what follows, the main contribution are listed.

Theoretical contributions

- Identified the good practice of social media for knowledge sharing among academics

- Identified current theories and models for social media and knowledge sharing

- Categorised use of social media tools for knowledge sharing among academics

- Identified all possible factors affecting social media and knowledge sharing attitude and intention

- Developed a framework to enhance the value of social media tools among academics in HEIs in the KSA context

- Examined the relationship between the key influential factors of knowledge sharing through social media tools using interpretive structural modelling

- Provided an important reference to fill the gap in studies on the role of social media and its effectiveness in knowledge sharing among academics in Saudi Arabia

- Developed new knowledge for academics and those interested in understanding the nature of the social media uses, tools, and various forms

Practical contributions

- The findings from this study will inform HEIs in the KSA on strategies for supporting the use of social media tools for knowledge sharing purposes by focusing on influential factors, especially organisational factors

- The findings provide suggestions for HEIs in the KSA to enhance the use of social media for knowledge sharing among academics

7.4 Recommendations

To ensure the effective use of knowledge sharing through social media, HEIs in the KSA should focus on taking advantage of social media tools that support knowledge sharing. These social media tools support the movement from the traditional way of sharing and save time involved in face-to-face sharing. There is a need to guide users on the features and benefits of knowledge sharing through social media beyond its use for the communication. Universities should create a specialised department or research centre responsible for updating social media tools and exploring their impact on the users. The universities should pay more attention to the knowledge sharing process. There is a need to consider issues related to privacy and security to increase users' confidence. Workshops can be organised for academics to share experiences and knowledge in all fields. These workshops would encourage other academics to share their knowledge. The HEIs should provide training courses to academics to learn the use of social media tools and the advantages of sharing knowledge among other users.

7.5 Limitations

One of the study's limitations is its generalisability, which is limited to academics in HEIs in the KSA context. It is essential to determine whether the results apply to students. Another research limitation is the sample size. It is necessary to consider a large and varied sample to generalise the findings across other universities. The discussion and analysis section of this study is considered another research limitation. The lack of studies on the factors influencing knowledge sharing through social media in HEIs in KSA prevented the deep discussion and comparisons of results, as this study addressed factors from many aspects, most of which have not been investigated among academics in HEIs in the KSA context. It is important to link the current results with the previous results. Further, the statistical validation of the interpretive structural modelling represented an additional study limitation. The interpretive structural modelling in this research needs to be tested through structural equation modelling to validate the model. Finally, this research considered three categories of factors - individual, organisational and technological. There is a need to focus on assessing factors from one aspect to gain a better understanding of the relationship in that category.

7.6 Future Work

This research is based on universities in the KSA. There is limited research on knowledge sharing through social media in HEIs among academics, and an understanding of the influence of different knowledge sharing factors would be useful. Future research could include a focus on knowledge sharing through social media for teaching and learning among academics and students. There is a need to test interpretive structural modelling using sequence equation modelling (SEM). This research was focused on the KSA context, hence, further studies can be performed in other contexts, and the results can be compared with the findings of this study. Moreover, future research should consider larger samples and study the effect of the all factors. Scholars could attempt to compare the use of social media for knowledge sharing between developed and developing

countries. In this regard, the comparison will produce a list of the social media tools used for knowledge sharing. Future research could focus on specialised tools for scientific research and educational purpose. Finally, future research could attempt to measure the extent of knowledge sharing through social media and connect findings with the organisational outputs, such as research and innovation.

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APPENDICES

Appendix 1: Interview Questions

Q1: What is your position? What is your job role?

Q2: How many years have you worked in the university?

Q3: What is your age?

Q4: What is your gender?

Q5: Do you use social media? (If answer yes, go to Q6; else go to Q19)

Q6: Have you used these platforms or any of them for professional purpose in your job such as sharing knowledge with your colleagues or with others? (Followed by a list of the identified social media tools, you can choose more than one tool) (If answer yes, go to Q7, else go to Q20)

Facebook

LinkedIn

ResearchGate

Academic.edu

Wikipedia

Blogger

YouTube

Slideshare

Twitter

Instagram

Quora

Others (please specify)

Q7: What type of knowledge do you share through these social media?

Q8: Why do you use social media (your purpose for using these social media)?

Q9: What motivates you to use social media to contribute and share your knowledge instead of the traditional methods like face to face, listening to news, telephone and email?

Q10: How important are the following individual factors to the attitude and intention of knowledge sharing through social media tools? Followed by a list of the identified factors in knowledge sharing model, five-point Likert scale: (very important = 5; important = 4; neither important nor unimportant = 3; slightly unimportant = 2 and definitely unimportant = 1):

Factors	**Very important**	**Slightly important**	**Neither important nor unimportant**	**Slightly unimportant**	**Definitely unimportant**
Altruism					
Enjoyment of helping others					
Face to face interaction					
Lack of Time					
Trust in people through social media					
Awareness of the importance of knowledge sharing through social media					

job security					
Expected reciprocal benefit					
Loss of knowledge power					
Reputation					
Lack of recognition from colleagues					
Lack of technical skills					
Lack of understanding social media					
Language					
Expect relationship					
Unwillingness to do extra work					
Self-efficacy					
Poor verbal/written communication and interpersonal skills					

Could you specify why you score like this? Could you explain why important, Not important?

Q11: How important are the following organizational factors to the attitude and intention of knowledge sharing through social media tools? Followed by a list of the identified factors in

knowledge sharing model, five-point Likert scale: (very important = 5; important = 4; neither important nor unimportant = 3; slightly unimportant = 2 and definitely unimportant = 1):

Factors	**Very important**	**Slightly important**	**Neither important nor unimportant**	**Slightly unimportant**	**Definitely unimportant**
Lack of knowledge sharing strategy (vision and goal)					
Lack of rewards					
Lack of recognition from organisation					
Management support					
Organisation Environment (Physical work environment)					
Organisation structure					
Organisation size					
Work procedure					

Could you specify why you score like this? Could you explain why important, Not important?

Q12: How important are the following Technological factors to the attitude and intention of knowledge sharing through social media tools? Followed by a list of the identified factors in knowledge sharing model, five-point Likert scale: (very important = 5; important = 4; neither important nor unimportant = 3; slightly unimportant = 2 and definitely unimportant = 1):

Factors	Very important	Slightly important	Neither important nor unimportant	Slightly unimportant	Definitely unimportant
Ease of use for social media					
Functionality for social media					
Lack of training (how to use, how to share)					
Lack of technical support					
Information overload					
Security of social media					
Privacy of social media					
Perceived usefulness of social media					

Could you specify why you score like this? Could you explain why important, Not important?

Q13: In your opinion, what other important factors need to be considered when an individual's intents to share knowledge through social media?

Q14: Suggest ways in which your university or organisation can increase (improve) knowledge sharing through social media?

Q15: Suggest ways in which social media tools can increase (improve) knowledge sharing value?

Q16: Is knowledge sharing through social media recognized in your organization? (If answer yes, go to Q17; else go to Q18)

Q17: How is knowledge sharing encouraged in your organisation?

Q18: In your opinion, what type of encouragement or specific incentives do you think your organisation could put in place to increase knowledge sharing?

Q19: Why do you not use social media? (If answer no, on Q6)

Q20: Why do you not use social media for sharing your knowledge with your colleagues or with others? (If answer no, on Q7)

Q21: Does your university or your department have a clearly stated knowledge sharing strategy?

Q22: Does the university or your department have any account in social media platforms? What is these platforms?

Appendix 2: ISM Iterations

Iteration 1

F	Reachability Set	Antecedent Set	Intersection Set	Level
F1	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1
F2	1,2,3,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1
F3	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	1
F4	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	
F5	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18	1,2,3,4,5,7,8,9,10,11,12,13,14,15,17,18	
F6	1,2,3,4,6,7,12,15,16,17,18,19	1,2,3,5,6,8,12,13,15,16,17,18	1,2,3,6,12,15,16,17,18	
F7	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1
F8	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	
F9	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1
F10	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,7,8,9,10,11,14,15,16,18,19	1,2,3,4,5,7,8,9,10,11,14,16,18,19	
F11	1,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,7,8,9,10,11,14,15,16,18,19	1,2,3,4,5,7,8,9,10,11,14,16,18,19	
F12	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18	1
F13	1,2,3,4,5,6,7,8,9,12,13,14,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,17,18,19	1,2,3,4,5,7,8,9,12,13,14,17,18,19	
F14	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19	1

F15	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	3,4,5,6,8,9,12,14,15,16,17	3,4,5,6,8,9,12,14,15,16,17	
F16	1,2,3,4,5,6,7,8,9,10,11,12,14,15,16,17,18,19	1,2,3,4,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,6,7,8,9,10,11,12,14,15,16,17,18,19	
F17	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,12,13,14,15,16,17,18,19	1
F18	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19	1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19	1
F19	1,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19	1,2,4,5,6,7,8,9,10,11,13,14,15,16,17,18,19	1,2,4,7,8,9,10,11,13,14,16,17,18,19	

Iteration 2

F	Reachability Set	Antecedent Set	Intersection Set	Level
F4	4,5,8,10,11,13,15,16,19	4,5,6,8,10,11,13,15,16,19	4,5,8,10,11,13,15,16,19	2
F5	4,5,6,8,10,11,13,15,19	4,5,8,10,11,13,15,16	4,5,8,10,11,13,15	
F6	4,6,15,16,19	5,6,8,13,15,16	6,15,16	
F8	4,5,6,8,10,11,13,15,16,19	4,5,8,10,11,13,15,16,19	4,5,8,10,11,13,15,16,19	
F10	4,5,8,10,11,13,16,19	4,5,8,10,11,15,16,19	4,5,8,10,11,16,19	
F11	4,5,8,10,11,13,16,19	4,5,8,10,11,15,16,19	4,5,8,10,11,16,19	
F13	4,5,6,8,13,16,19	4,5,8,10,11,13,14,15,19	4,5,8,13,19	
F15	4,5,6,8,10,11,13,15,16,19	4,5,6,8,15,16,17	4,5,6,8,15,16	
F16	4,5,6,8,10,11,15,16,19	4,6,8,10,11,13,15,16,19	4,6,8,10,11,15,16,19	
F19	4,8,10,11,13,16,19	4,5,6,8,10,11,13,15,16,17,18,19	4,8,10,11,13,16,19	2

Iteration 3

F	Reachability Set	Antecedent Set	Intersection Set	Level

F5	5,6,8,10,11,13,15	5,8,10,11,13,15,16	5,8,10,11,13,15	
F6	6,15,16	5,6,8,13,15,16	6,15,16	3
F8	5,6,8,10,11,13,15,16	5,8,10,11,13,15,16	5,8,10,11,13,15,16	
F10	5,8,10,11,13,16	5,8,10,11,15,16	5,8,10,11,16	
F11	5,8,10,11,13,16	5,8,10,11,15,16	5,8,10,11,16	
F13	5,6,8,13,16	4,5,8,10,11,13,14,15	5,8,13	
F15	5,6,8,10,11,13,15,16	5,6,8,15,16,17	5,6,8,15,16	
F16	5,6,8,10,11,15,16	6,8,10,11,13,15,16	6,8,10,11,15,16	

Iteration 4

F	Reachability Set	Antecedent Set	Intersection Set	Level
F5	5,8,10,11,13,15	5,8,10,11,13,15,16	5,8,10,11,13,15	4
F8	5,8,10,11,13,15,16	5,8,10,11,13,15,16	5,8,10,11,13,15,16	4
F10	5,8,10,11,13,16	5,8,10,11,15,16	5,8,10,11,16	
F11	5,8,10,11,13,16	5,8,10,11,15,16	5,8,10,11,16	
F13	5,8,13,16	4,5,8,10,11,13,15	5,8,13	
F15	5,8,10,11,13,15,16	5,8,15,16,17	5,8,15,16	
F16	5,8,10,11,15,16	8,10,11,13,15,16	8,10,11,15,16	

Iteration 5

F	Reachability Set	Antecedent Set	Intersection Set	Level
F10	10,11,13,16	10,11,15,16	10,11,16	
F11	10,11,13,16	10,11,15,16	10,11,16	
F13	13,16	10,11,13,15	13	
F15	10,11,13,15,16	15,16,17	15,16	
F16	10,11,15,16	10,11,13,15,16	10,11,15,16	5

Iteration 6

F	Reachability Set	Antecedent Set	Intersection Set	Level
F10	10,11,13	10,11,15	10,11	
F11	10,11,13,	10,11,15	10,11	

F13	13	10,11,13,15	13	6
F15	10,11,13,15	15,16	15	

Iteration 7

F	Reachability Set	Antecedent Set	Intersection Set	Level
F10	10,11	10,11,15	10,11	7
F11	10,11	10,11,15	10,11	7
F15	10,11,15	15	15	

Iteration 8

F	Reachability Set	Antecedent Set	Intersection Set	Level
F15	15	15	15	8