Applying Social Capital Theory and the Technology Acceptance Model in information and knowledge sharing research

Sani A. Fari[1]
Umaru Musa Yar'adua University
and
Department of Information Studies
University of Zululand
safari3152@yahoo.com

Abstract

The paper discusses Social Capital Theory (SCT) and the Technology Acceptance Model (TAM) as theoretical foundations for information and knowledge sharing research. Qualitative content analysis through conceptual and literature analysis is used to explore previous studies in the research domain. It is found that despite the complexity of information and knowledge sharing activities and processes, the two theoretical foundations can strongly inform knowledge sharing research. The paper explains the components, relevance and practical applicability of the two theories to information and knowledge sharing research.

Keywords: Social capital theory, technology acceptance model, information sharing, knowledge sharing, research collaboration.

1 Introduction and background

The World Summit on the Information Society (WSIS 2003) defines an information and knowledge society as one which understands the relevance and integrates the application of technology in the acquisition and transfer of information and knowledge at all levels for global competitive advantage. Jiyane *et al.* (2013) emphasise the importance of information and knowledge transfer and sharing in the society, stating that many societies today understand the role that information plays in the overall success of their existence. These societies explore the contents of information resources through modern technologies for educational, economic and political gains. Thus information and knowledge sharing facilitates growth, enhances development, widens and expands opportunities and equips the society with the necessary inputs for decision making. Studies by Martin (1995), Nassimbeni (1998), Webster (2002), Lor and Britz (2007) and others share the belief that societies develop the culture of information and knowledge sharing for growth and development over time.

Information and knowledge sharing is an activity that requires the interaction, transfer and exchange of ideas and expertise among individuals, organisations and/or nations. The effectiveness and viability of such interactions are motivated by certain variables such as intentions, characteristics, environment and benefits and, more importantly, modern technologies, which are referred to as ICTs, that largely contribute to the rapid and remote transfer of information and knowledge. This study examines various literatures in relation to the application of Social Capital Theory (SCT) and the Technology Acceptance Model (TAM) to support their relevance and applicability to information and knowledge sharing research.The study provides and explains the structure and components of the two theories in relation to the sharing of information. Criticisms of the theories were reviewed and their advantages were also explored in order to understand their application and implication to LIS research.

The Centre for Research on Education, Diversity and Excellence (2002) explains that a Theoretical Framework (TF) is a planned structure that has been conceptually developed around theories to guide research. Eisenhart (1991:205) describes it as 'a structure that guides research by relying on a formal theory … constructed by using an established, coherent explanation of certain phenomena and relationships'. A theoretical framework serves to guide a researcher in his or her investigation in a broad field of expertise by expounding on an underlying principle(s), rationale, or foundation with respect to the research topic (Khan 2010). Thus, a theoretical framework is objectively geared towards enhancing clarity, appropriateness and effectiveness in research (Ocholla & Le Roux 2011). It also unearths broader issues that should be accommodated or refined in relation to the topic under investigation. Thus, Ocholla and Le Roux (2011) understand Herek's (1994) four components to be informed by: the hypothesis, the theoretical model, the research methodology (to be used to answer the hypothesis/research questions) and a well-defined literature review (supporting the focus of the research). The two viewpoints make TF broader than traditionally understood to focus on models or theories.

1. Sani Fari PhD is a lecturer at Umara Yar'adua University, Nigeria. He recently completed his PhD in Knowledge Management at the University of Zululand, South Africa.

This paper aims at discussing SCT and the TAM in relation to information and knowledge sharing research. The paper is concerned about information and knowledge sharing activities and the research collaboration ties established from academic interactions. Thus, the study examines various knowledge management theories and focuses on the applicability and relevance of the Social Capital Theory (SCT) and the Technology Acceptance Theory (TAM). The concept of information/knowledge sharing cuts across all fields, and is a multidimensional practice aimed at communicating expertise, scholarly ideas and research contents to facilitate effective access to and use of information and knowledge. The application of modern technologies referred to as ICTs facilitates easy, remote and timely communication, and guarantees wider participation among individuals with common interests through various platforms and networks via the Internet. Hence we feel, based on the suitability of the relevant structures/composites/variables of the two theories to information and knowledge sharing research, that SCT could be used to understand the patterns, preferences and characteristics of the academics while the TAM could be used to address the academics' acceptance and use of technology for sharing. We discuss and analyse relevant knowledge management theories and explain the relevance of the two theories to information and knowledge sharing.

2 Knowledge management theories

Library and Information Science research is informed by several theories (see *www.is.theorize.org*) of which most originate from other disciplines (Ocholla & Le Roux 2011). Research on information and knowledge sharing has been informed by a wide range of theories that include but are not limited to:

- Theory of Planned Behaviour (TPB) (Ajzen1988) which focuses on designing strategies and guidance towards planning and executing behavioural actions;
- Theory of Reasoned Action (TRA) (Fishbein 1967) which deals with the variables determining behavioural decisions;
- Social Cognitive Theory (SCT) (Bandura 1977) which examines the processes of cognitive experiences and values in the assessment and/or judgement of individuals;
- Technology Acceptance Model (TAM) (Davis 1985) which has to do with the acceptance and adaptation of new technologies for relative practices;
- Social Capital Theory (SCT) (Johnson 1960) which deals with the relationships between individuals for the crosspollination of ideas and innovation based on their knowledge and expertise.

Other theories include: Expectancy Theory (ET) (Vroom 1964) which examines the effect and influence of rewards and benefits that can be derived as a result of an individual's actions and performances; the Social Exchange Theory (SET) (Malinowski 1922) used to study work based behaviour among employees and communities of practice; Social Construction of Technology (SCOT) (Pinch & Bijker 1987) that examines the social aspect of using technology and the influences therein as it affects individuals; Diffusion of Innovation Theory (DIT) (Rogers 2003) which investigates the attributes of innovative outcomes and the different effects that they have on the rate of adoption by individuals; SECI Model (Nonaka & Takeuchi 1995) that examines the transformation of knowledge with regard to experience and literature; and the Self Determination Theory (SDT) (Deci & Rayan 1985) which deals with the psychological needs of individuals for the attainment of independence, capability and understanding.

These theories are diverse and would be very difficult to address at the same time. The diversity and appropriateness of these theories makes it possible for researchers to apply them in different contexts depending on the research topic and their perceived relevance.

2.1 The theories

Sharing is a good measure of the value of information and knowledge, primarily because it increases productivity and more knowledge acquisition (Cohen and Levinthal 1990). The sharing of information and knowledge is not and cannot be one-directional as it benefits both the supplier and the recipient and equips both the organisation and society with the necessary inputs for competitive growth.

However, the challenge in information and knowledge sharing lies in the factors that need to be considered where individuals are concerned. These factors range from 'social factors' such as trust, care, mutual understanding and expressive dedication (von Krogh 1998, McDermott and O'dell 2000, Yang 2004) to 'technological factors' such as ICTs (Goh 2002; Willcoxson 2003; Syed, Ikhsan and Rowland 2004; Kim and Lee 2006). Van den Brink (2003) categorised these factors into three namely: individual, organisational and technological. The three factors identified by Van den Brink were also highlighted as being crucial in a study on a technology model by Orlikowski (1992).

The argument here is that, for the full control and utilisation of organisational resources there has to be a well-conceived understanding of the factors affecting individuals with regards to sharing. The proper understanding of the factors affecting individuals would facilitate an effective sharing process where information and communication technologies would be used to provide speedy, timely and remote operations.

This study considers a conceptual approach that reflects on the three categories mentioned by Van den Brink (2003); individual, organisational and technological. Based on this, two theories were chosen to prove their relevance and applicability to information and knowledge sharing, namely the Social Capital Theory and the Technology Acceptance Model.

2.1.1 Social Capital Theory (SCT)

Fukuyama (2002:27) believes that social capital is a mutual standard or set of ideals through which social co-existence is achieved and developed into a constructive beneficial outcome, while Garip (2008) defines social capital as a means of producing goods and services through constant and casual networks involving mutually benefiting parties or individuals. The World Bank (2000) states that 'Social capital is the institutions, relationships and norms that shape the quality of a society's social interaction, thus social capital is explicitly relational'. By all accounts, the purpose of social capital is to build ties, create mutual benefit avenues, establish formal and informal networks, bridge the gap between different people, and ensure reciprocity (Godowin&Quisumbing 2008; Chalupnicet 2010). The core components of any organisation are the individuals who contribute towards the overall success of the system from its inception to the sharing of knowledge with each other and outside parties. Although Information and Communication Technology influences sharing, it would be quite impossible to conceive knowledge without individuals in an organisation (Coleman 1999).

The Social Capital Theory (SCT) establishes the relationship and relevance of individuals in information and knowledge sharing (Nahapiet and Goshal 1998, Adler and Kwon 2002). It effectively highlights the circumstances required for sharing and transmitting to take place (Nahapiet and Goshal 1998). Research has also established that social capital is able to motivate individuals to share their expertise within social communities (Wasco and Faraj 2005) or groups (Kanhalli *et al*. 2005). Social capital is about the importance and value of communication between individuals especially through social networks. It links a variety of individuals whoshare common interests and creates enabling platforms for people with a desire for mutual benefits through common practices.

A social capital expert, Robert Putnam (2000:19), summarises it thus:

> Whereas physical capital refers to physical objects and human capital refers to the properties of individuals, social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them. In that sense social capital is closely related to what some have called "civic virtue." The difference is that "social capital" calls attention to the fact that civic virtue is most powerful when embedded in a sense network of reciprocal social relations. A society of many virtuous but isolated individuals is not necessarily rich in social capital.

The scope and components of SCT are presented in Figure 1 below:

Figure 1 Social capital framework (adapted from: Halpern 2005)

The decision to use Halpern's (2005) Social Capital Theory to explainSCT applicability to information and knowledge sharing was informed by the fact that the theory highlights important issues with respect to: the nature and characteristics

of individuals, what they tend to contribute, and the benefits that they derive. Significant components of the SCT are discussed below, touching across the following issues:

Sense of belonging
Individuals feel more secure when they are surrounded by others who will contribute towards their overall success. In essence, a sense of belonging and working side by side builds confidence and boosts an individual's morale (Chow & Chan 2008).

Network
A network provides an enabling platform for communication regardless of geographical or time constraints and brings people together for participation and the mutual exchange of ideas and innovations (Ritter *et al*. 2004).

Feelings of trust and safety
People who are in the company of others and share common interests and philosophies feel more secure than those who are alone; it assures them of less risk. In essence, trust positively influences sharing among individuals (Andrews and Delahay 2000).

Diversity
Diversity is another important aspect of mingling with others. When people of the same profession come together, their individual characteristics and backgrounds add value to the community of practice. Common ideas and perspectives are fine-tuned to pave the way for the emergence of unified standards (Fernandez *et al*. 2000).

Reciprocity
Individuals are assured of some form of reward in return for their participation and contributions, be it information/ knowledge, recognition, self-development (Rosenthal 1997).

Values, norms and outlook on life
Those who belong to formal communities of practice and/or networks derive some values and norms from that society that define them as professionals or practitioners. This position defines an individual's outlook on life (Lin 1999).

Power
The participation and contribution of individuals in communities of practice gives them collective power and authority as a group and to practice as members of a formal entity (Jones & Taylor 2012).

Pro-activity and participation
Individuals become more enthusiastic when working together towards achieving a common goal and when they are charged with some responsibilities and tasks to accomplish, thereby contributing to the overall success of the system (Weber & Weber 2007).

Wang and Noe (2009) report that many studies have adopted Social Capital and Network Theories to explore the practice of knowledge sharing among different groups and Communities of Practice (CoP). Examples include: Widen-Wulff (2007) in 'The challenges of knowledge sharing in practice: A social approach'; John, Helliwell and Putnam (2007) in 'Studying the effect of education on accumulated social capital'; Brand (2009) in 'The effect and relationship of educational level on civic participation'; and Ashiq, Mahmood and Siraj (2013) in 'The use and effect of mobile communication on college-going teenagers'.

Despite the importance of this theory, we observe that it has been largely focused on the individual contributions of members of a social network in an organisation, while placing less emphasis on the attitudes and characteristics of the individual contributors, the factors influencing their willingness to contribute to organisational efforts, their acceptance or adaptation of the sharing platforms, and technology issues. But the SCT can be used in information and knowledge sharing research to examine and explain the individual approach and contribution of researchers as members of academic and research institutions and their participation in information and knowledge sharing platforms and networks.

2.1.2 Technology Acceptance Model (TAM)

The application of ICTs facilitates the speedy, remote and timely sharing and transfer of information and knowledge. ICTs tackle different barriers to communication through network and knowledge integration. Technology improves information/knowledge acquisition and sharing by providing the necessary tools to overcome secular and spatial obstacles between individuals and colleagues, and by enhancing accessibility to information and knowledge sources (Hendriks 1999). The term technology is used to refer to all ICTs that are used in relation to the sharing of information and knowledge, which includes information and knowledge management systems in organisations and institutions. These systems are specifically designed to provide the necessary support in the search for, retrieval, processing, storage, dissemination and use of information and knowledge (Alavi and Leidner 2001). Information and Communication Technologies (ICTs) have become vital resources in organisations and the Technology Acceptance Model (TAM) is very relevant in the study of their (ICTs') application in Information Science research (Orlikowski and Robey 1991, DeSanctis

and Poole 1994, Salisbury *et al*. 2002). The Technology Acceptance Model addresses the inter-relationship and relevance of technology in routine activities, interactions and communication between individuals or members of a group or society. The model is especially interested in people's understanding, adoption and utilisation of ICTs in their day-to-day activities.

In essence, the TAM focuses on the importance and relevance of modern technological tools for the smooth execution of work-based tasks and accords much importance to ICTs in the overall success of individual and/or organisational activities. While the importance of modern technologies cannot be overstated, the theory falls short of critically addressing the fact that human beings operate these tools and that an enabling environment is essential for the adoption and utilisation of these tools. Hence, in this study, the theory is considered to be useful to support the quest for studying and understanding the acceptance and application of modern technologies by researchers to achieve their goal of sharing information and knowledge.

The scope and components of the TAM are illustrated and described in Figure 2 below:

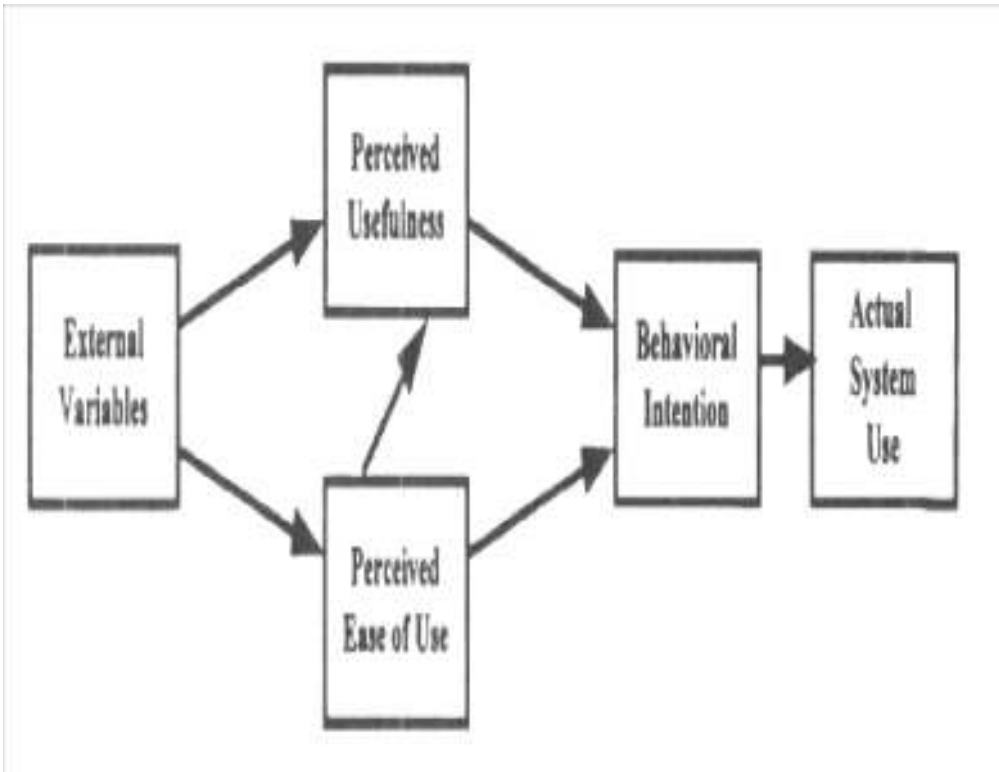

Figure 2 Technology Acceptance Model (adapted from Venkatesh& Davis 1996:453)

The Technology Acceptance Model received more than 700 citations when it was originally proposed by Davis in 1989. The model has since been used in many different ways with notable extensions and contributions by Lee, Kozer and Larsen (2003); Ma and Liu (2004); King and He (2006); and Yousafi, Foxall and Pallister (2007) who studied and analysed the application of the TAM in many research areas. Some of the areas studied included: expert support systems, e-government systems, hospital information systems, networking, etc. These studies took place in many countries across the globe such as China, Canada, France, USA, Nigeria, Taiwan and many more and the participants included: computer programmers, knowledge workers, medical practitioners, corporate managers, web designers, etc. Other studies on various aspects of technology acceptance and use include Lule, Omwansa, and Waema's (2012) study of m-banking adoption in Kenya; Chuttur's (2009) study on the development and future directions of the TAM use in the USA; Park's (2009) study on the use of the TAM to understand university students' behavioural intentions to use e-learning; Neil's (2009) investigation into the adoption rate of cell-phone banking at Stellenbosch University, South Africa; Osunade, Philips and Ojo's (2007) study of the limitations of knowledge sharing in academia in Nigeria; and Evans's (2014) study of user acceptance of electronic learning at the University of Zululand, South Africa.

The Technology Acceptance Model was selected and examined in this study to explain the relevance of ICTs in information and knowledge sharing because many important aspects of individuals' behaviour, understanding, and intentions with respect to these tools are evident in sharing activities. The TAM critically addresses the issues below with regard to the acceptance, application and use of technology:

External variables

While investigating the variables influencing the acceptance and use of technology by individuals Compeau & Higgins (2006) posit that external variables are very crucial and need to be addressed before any system is accepted for use. External variables include the training of users, features of the system, specifications and process. This also determines the adaptation of the system.

Perceived usefulness

These are the users' or participants' perceptions about the importance and relevance of technologies in their routine activities. Perceived usefulness is the degree to which an individual accepts a technological system based on the systems' ability to supplement or ease their mental and physical efforts (Pearlson & Saunders 2006).

Perceived ease of use

These are the users' perceptions about the ease with which they can use a technology. Some technological systems are very sophisticated and sometimes pose a threat or difficulty to individuals. It is important for users to ascertain whether the equipment is handy to use in their routine operations. This also determines choice, acceptance, preference and ultimately the frequency of usage (Abrami & Barrett 2005).

Behavioural intentions

Yi and Hwang (2003) found that behavioural intention to accept and use a particular system is largely influenced by its perceived ease of use and perceived usefulness. These are indicators of the behaviour of the user in accepting and using the system.

Actual system use

This is the end result and an indicator of whether the system has been accepted and utilised by the users/participants. It is ideally informed by perceived usefulness and ease of use, leading to behavioural intention and subsequently utilisation (Thompson *et al*. 2006).

Despite the usefulness of this model, it falls short of extending beyond users' perceived usefulness and ease of use of ICTs, meaning that reasons for the user's perceptions on these points cannot be determined. A more detailed appraisal of the TAM is provided in the critique that follows.

3.0 Appraisal, critique and application of the theories to information and knowledge sharing research

3.1 Critiques on SCT

The Social Capital Theory has been criticised by scholars from a functional versus interpersonal perspective and in regard to whether social capital initiatives guarantee mutual or personal benefits (Portes 1998; Sceffler *et al*. 2008). Furthermore, social capital has been criticised in terms of individual inputs for collaborative participation and for the usefulness of social capital into real practice in community and corporate organisations (Bourdieu 1986; Coleman 1990; Putnam 1993, 1995; Brown *et al*. 2006). Bourdieu (1986) believes that social capital is largely beneficial to the dominant members of a group, society or organisation for maintaining supremacy. He views restrictions in a group or network as an advantage towards maintaining trust, culture, authority and norms which hinder wider participation and evaluation. Other forms of criticism are that social capital is too simplistic and narrow as it undermines the status of individuals in an organisation by regarding them as mere employees (Desjardins 2003:11-12). It is also criticised for undermining the capabilities of individuals outside socio-economic and organisational boundaries (Duke, Osborne and Wilson 2005) and emphasising learning processes that are perceived to potentially possess only reciprocal outcomes (Kerka 2000; Cruikshank 2008:67-8).

3.1.2 Application of SCT

Those in favour of social capital would point to the fact that despite the criticisms, a significant benefit of social capital is information and knowledge sharing, and that information and knowledge has great influence on social capital and individual participation (Milligan *et al*. 2004; Dee 2004; Wilson 2000; Jones 2006). Falk (2001:316) also reveals that social capital has been characterised as the building block of socio-economic advancement. Many researchers have associated social capital with political, social and economic gains, as it has the tendency to increase societal productivity (Westell 2005:17). Social capital has been used in the study of economic issues in low and middle income countries, although it has not yielded consistent results (Yip *et al*. 2007; Wang *et al*. 2009). The World Health Organisation (WHO) also used social capital in the early 2000s in a survey on world health covering 71 countries, which to date is considered one of the most comprehensive surveys showing the influence of social capital on health (CSDH 2008). Judging from these assertions, social capital can be recognised as a means of bringing people together for enhanced productivity through the exchange

of information and knowledge and the cross-pollination of ideas. This is why social capital is considered to be the hub of individual and societal cooperation (Grootaert 1988:iii).

Hence, we believe that in academia common goals may include research, achieving world standards, communicating beyond boundaries and gaining competitive advantage. These and more can be achieved through information and knowledge sharing efforts and social interactions, such as Communities of Practice (CoP) in academic and research institutions. Our position is supported by Saunders (2006:9) who posits that social networks influence and facilitate the acquisition and utilisation of individual expertise. Therefore, essentially social capital can facilitate the development of knowledge and expertise through knowledge exchange thereby promoting trust and reciprocal ties.

3.2 Critiques of the TAM

There are a number of criticisms of the TAM, especially with respect to methodology. Legris, Ingham and Collerette, (2003) and Yousafzai, Foxall and Pallister (2007) note the use of individualistic data processing (a subjective measure) to measure systems instead of using data obtained by evaluating system utilisation and viability. The argument here is that the individualistic data may be insufficient or irrelevant to measuring the reality of system use. Other studies have used participants in a pre-planned set-up, which makes it impossible to generalise in the real sense (Lee, Kozer, & Larsen 2003). Yang and Yoo (2003) argue that system use is affected by the attitudes of the user, and this is not being addressed in the TAM. Furthermore, the relationships between different constructs in the TAM are poor (Bogazzi 2007), especially the theoretical strength of the link between intention and actual use. In this sense Bogazzi (2007) argues that behaviour is far from being a terminal goal and should rather be seen as a motive towards enriching vital goals. In contrast the TAM is deficient in explaining the gap between intention and adoption, where many other factors could come into play to speed up or delay the decision to adopt. Finally, TAM is considered to be a deterministic model; an individual's actions are largely driven by his/her intentions.

3.2.1 Application of the TAM

Despite the criticisms, the TAM can be used to understand the acceptance, application, relevance and effectiveness of modern technologies in information and knowledge sharing research. This also provides an indication of the information literacy levels of the researchers.

Inter and intra-disciplinary ties are a means of facilitating knowledge flow through the exchange, refinement and transfer of ideas and expertise. In contemporary society, these processes are best achieved through online platforms. Researchers are increasingly exploring the Internet for social benefits in this respect, and doing so means that they are more likely to adopt these technologies in their professional capacity. Therefore, professional networks that were previously maintained through personal contact have now been transformed into virtual communities. This gives technologically driven professionals enormous advantages over those who are not privy to technology.

Harrison (2006) shows that the main players in virtual communities of practice occupy a central position. In this context, we believe that professional social ties through modern technology yield increased participation, more output, and teamwork and shared responsibilities in practice. This gives members a central focus, and monitored and controlled standards. But despite the opportunities associated with modern technologies many people do not explore those advantages. Studies have also shown that despite the significant investment in educational technology, many of these technologies are being under-utilised (Park 2009; Teo 2009; Liu, Liao & Pratt 2009). Therefore to augment the efforts of governments and other organisations, the application of the TAM in information and knowledge sharing research has the advantage of determining behavioural intentions to use technology versus actual utilisation. There are also more explanations regarding the acceptance of technology in diverse contexts (see Sun and Zhang 2006).

4.0 Conclusion and recommendations

The activities in information and knowledge sharing are always mutual, so much so that the individuals (researchers in this case) play an important role in performing these functions with the application of their knowledge, expertise and experience. The latter (knowledge, expertise and experience), coupled with the willingness to participate and the extent of participation, are key to the exchange or cross-pollination of ideas and innovations. The necessary and conducive environment (institutions/affiliation) for the conduct of research duties is another crucial aspect, without which the whole process would be impossible as the environment provides the necessary support, incentives, motivation and logistics. Furthermore, information and knowledge sharing can only be hassle-free, timely and effective with the application of the necessary technology (ICTs). The success of any process in the 21st century, especially with regard to information and knowledge searching, acquisition, processing, storage and transfer, is strongly based on the adoption, utilisation and effectiveness of these tools.

The aggregate of these factors provides the inputs and the required ingredients for the effective sharing of information and knowledge. This study confirms the relevance and appropriateness of the use of the Social Capital and the Technology Acceptance Model to understand the various complementary factors for effective information and knowledge sharing.

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