Models for Describing Knowledge Sharing Practices in the Healthcare Industry

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Abstract: Recently, healthcare organisations realised that if they want to gain or sustain advantages, medical knowledge needs to be not only managed but also shared among professionals and patients. Inadequate knowledge sharing in healthcare organisations can lead to medical errors. As a result, knowledge sharing in healthcare industry may no longer be a "nice to have" process but changes into a "must have" one. Acknowledgement of the importance of knowledge sharing in healthcare organisations has resulted in some valuable contributions trying to understand this phenomenon. Most of these contributions are about the nature of knowing, knowledge sharing means, and governance mechanisms. Despite the richness and depth in these three streams of research, at present there is no study integrating these various insights. Hence, there remains uncertainty about the intrinsic relationship among these three kinds of concepts. Therefore, it is worthwhile to examine firstly, the relationship among these concepts and secondly, their impact on knowledge sharing performance.

This study provides a comprehensive view of knowledge sharing practices from the three mentioned perspectives. Drawing upon the descriptive process of theory building, a model for these three aspects of knowledge sharing practices is built through literature review, and the relationship among them is explored. It is proposed that both knowledge sharing means and governance mechanism impact the knowledge sharing process directly. Also, the governance mechanism has an indirect impact on the knowledge sharing process by influencing the choice and usage of the means. This study will provide organisations and policy makers with a framework to better understand knowledge sharing practices from different perspectives. It also provides a valuable insight of how to choose the appropriate knowledge sharing means and take into account the governance mechanism to enable the knowledge sharing process to be more effective.

1. Introduction

In recent studies, knowledge has been recognised as a principal source of value creation (Poston and Speier, 2005). The availability of accurate and timely knowledge enables organisations to respond rapidly and with the appropriate measures to create high quality services, products, and processes (Nonaka et al., 2000). Therefore, the competitive advantage of organisations lies in their ability to effectively manage knowledge. However, individuals and organisations are faced with huge amounts of data and information which is crucial in nature but hard to manage appropriately (Carayannis, 2005). Therefore, a business philosophy namely Knowledge Management (KM) has been introduced. KM is concerned with all processes related to knowledge creation, storage, sharing, and application (Alavi and Leidner, 2001). Since the benefit of knowledge is limited if it is not shared, knowledge sharing is perceived to be the most important process of KM (Leonard-Barton, 1995). The sharing of knowledge while largely invisible plays a critical role in achieving greater access and equity (Boisot, 1998). Knowledge sharing is especially important in industries where knowledge is a key asset like healthcare organisations. The healthcare industry is a knowledge rich community which deals with patients' lives and wellness. Losing the opportunity of having the right knowledge at the right time can lead to medical errors (Kilo, 2005). Therefore, knowledge sharing is a must in healthcare organisations.

Acknowledgement of the importance of knowledge sharing in the healthcare industry has resulted in some valuable contributions trying to understand this phenomenon. Most of these contributions are about the nature of knowing (e.g. Miller, 2012; Zigan et al. 2010), knowledge sharing means (e.g. Bradley et al., 2012; Ozdemir et al., 2011), and the governance mechanisms needed (e.g. Currie and Suhomlinova, 2006; Aron et al., 2011). Despite the richness and depth in these three streams of research, at present there is no study integrating these various insights. Therefore, there remains uncertainty about the intrinsic relationship among these concepts as knowledge sharing is a combination of process, technology, and people and cannot be considered in isolation (Awad and Ghaziri, 2007). Thus, it is worthwhile to examine firstly, the relationship among these concepts and secondly, their impact on knowledge sharing performance.

This study provides a comprehensive view of knowledge sharing practices from the three mentioned perspectives. Drawing upon the descriptive process of theory building, a model for these three aspects of knowledge sharing practices is built through literature review, and the relationship among them is explored. The study is organised as follows. First, the concept of knowledge sharing is discussed in general and in the healthcare industry in particular. Next, the research methodology is described. The knowledge sharing process, means, and governance mechanism are respectively discussed in the following sections. Further, the relationship among these concepts is explored and the research model of the study is proposed. Finally, we conclude with the discussion of key findings.

2. Knowledge sharing

Knowledge is one of the few assets that tends to grow when it is shared (Quinn, 1996). Knowledge sharing can be defined as "team members sharing task-relevant ideas, information, and suggestions with each other" (Sirvastava et al., 2006; p.4). The availability of shared knowledge is necessary for adapting, extending and creating new knowledge and innovation (Hislop, 2007). Despite the importance of knowledge sharing, it is not easy to implement. Due to the nature of knowledge (i.e. tacit and explicit) and people's diverse intentions, knowledge sharing is a fragile process. Knowledge is a valuable asset which is often considered as a source of power so people might be reluctant to share their knowledge to others (Kankanhalli et al., 2005). Also, knowledge sharing is severely constrained in the absence of knowledge sharing means. Reliable knowledge and effective communication are critical factors that can be achieved by use of appropriate knowledge sharing means (Bradley et al., 2012). Therefore, managing knowledge and people effectively and using proper knowledge sharing means is key to a successful knowledge sharing practice. To study these factors deeply, it is also necessary to study knowledge sharing process. Thus, our view is that; three factors influence knowledge sharing performance, that is, process, means, and governance mechanisms. Process of knowledge sharing refers to the nature of knowing and the stages of how knowledge is shared from one party to another. Knowledge sharing means refers to what kinds of means are adopted to realise the movement of knowledge during the process of knowledge sharing. Governance mechanisms can be defined as how the event in each stage is supported or motivated during the process of knowledge sharing.

2.1 Knowledge sharing in healthcare industry

Improved quality of care in medical areas is an overriding strategic goal of most healthcare organisations. Knowledge sharing is seen as a means to facilitate knowledge acquisition and knowledge distribution to reach this goal (Aron et al., 2011). However, knowledge sharing in the healthcare industry is complicated due to time pressure, shift work, mobility of knowledge, and professional boundaries, amongst of other factors. First, delivering healthcare to patients is complex and is highly dependent on available knowledge. Healthcare providers need to have access to the right knowledge at the right time, in order to be able to make decisions in a more timely and effective manner (Lin and Chang, 2008). Second, in healthcare organisations knowledge is mobile. Healthcare providers use knowledge from multiple sources and this knowledge should be shared by different actors. Patients are now managed by a team of professionals each specialising in one aspect of care. This shared care needs the ability to share knowledge easily among professionals (Singh et al., 2010). Third, one of the most important aspects about healthcare organisations is the sharing of knowledge between the different shifts. It is very important that workers share their knowledge about events and problems that occur during previous shifts. Otherwise, for instance, a nurse might have not the knowledge to complete the process from the previous shift. In this case, a patient could be placed at risk for injury (Kilo, 2005). Therefore, shift workers are strongly dependent on a shared network of knowledge and knowledge based artefacts that help them to share knowledge appropriately. Finally, another aspect that makes knowledge sharing difficult in healthcare is professional boundaries. Bate (2000) described professional boundaries as 'endemic tribalism' between medical professionals. Although it is very important to have the right knowledge at the right time in healthcare, professional boundaries impede knowledge sharing in this industry. To overcome these challenges, knowledge sharing in the healthcare industry requires special attention, in order to create an environment to facilitate knowledge sharing.

3. Methodology

The theory building process has two stages: descriptive stage and normative stage (Carlile and Christensen, 2005). This study is based on the descriptive stage as the purpose of the study is to build a model for knowledge sharing practices. Both stages of the theory building process contain three steps namely observation, categorisation, and association. In the first step, observation, the phenomena will be observed. In this study, the phenomenon is the existing literature on knowledge sharing in healthcare and the observation step is to identify attributes of knowledge sharing practices via a literature review. In the second stage, categorisation, phenomena will be classified into categorises which in this study are based on attributes of knowledge sharing practices. Finally, the association step is to define relationships between step one and two. In this study, the links among different kinds of knowledge sharing attributes is explored.

In exploring the phenomenon from a broad view, this study collected articles dated from 2000-2012 by using a systematic review. The literature mainly came from the journals in field of Healthcare, KM, and Information Technology (IT). Three top journals from each research field were chosen. Then, each journal was searched issue by issue by looking at paper titles and abstracts. For any that were relevant to knowledge sharing in healthcare, the full text would be read. It should be highlighted that in the case of KM journals, there were many articles related to knowledge sharing. Therefore, to ensure that no articles were missed and to save time, key words i.e. "knowledge sharing in healthcare AND PUB.exact ("journal of knowledge management")" were used in ProQuest. The retrieved articles were then reviewed with the same method as described earlier. The breakdown of sources that contributed to the final report is shown in Figure 1. In addition, other papers published in other outlets were used in this study. For instance, most of the widely cited papers on knowledge sharing such as Alavi and Leidner (2001), Nicolini et al. (2008), etc. were included. References of articles used in final reports which were relevant to this study were also included.
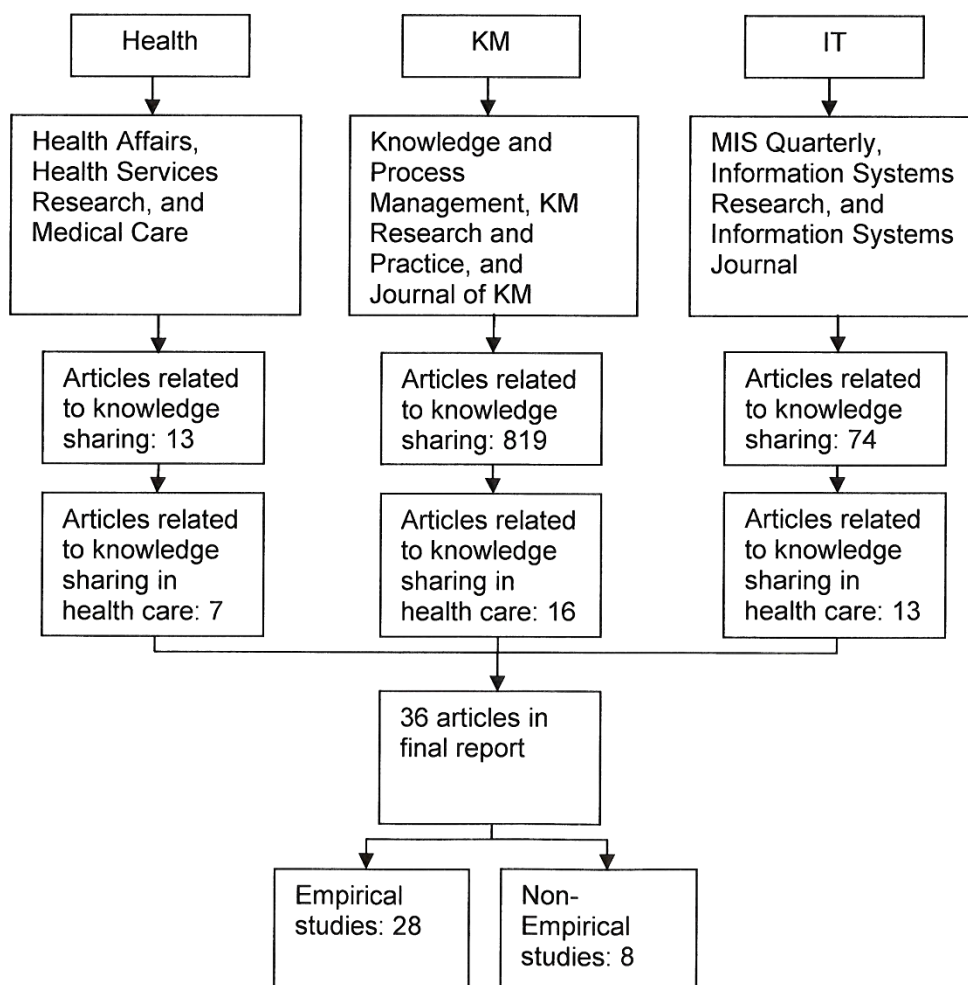

Figure 1: Summary of Sources Contributing to the Systematic Review

4. Knowledge sharing process

The knowledge sharing process has been studied by several researchers. Davenport and Prusak (1998), Lin et al. (2005), and Hansen (1999) suggested a two-stage model: sending and receiving. Szulanski (1996) proposed a model with four stages: Initiation, Implementation, Ramp-up, and Integration. This model is developed based on the investigations of the rich empirical researches on technology transfer, social change, innovation diffusion, and implementation. Based on their model, a four stage model is developed in this study which is shown in Figure 2. The proposed model of this study differs from the previous models in several ways:

- The knowledge sharing process is also analysed from the perspective of project management, since they have some similar processes (Busby, 1999; Kamara et al., 2002). Investigating knowledge sharing in this way helps to overcome some limitations in unpicking knowledge sharing.
- Our model considers another stage namely, requirements stage, as the requirements associated with the sharing of knowledge need to be specified as clearly as possible.
- Our model also adds another stage called follow-up stage. Despite the importance of follow-up stage, this phase is often neglected. The net benefits and acquired relevant experiences and lessons which can reflect the effect of shared knowledge can be clarified in this stage.
- Our model considers ramp-up and integration stages as activities of implementation stage and labels the ramp-up stage as knowledge absorption and utilisation.
- In our model, the stages of the knowledge sharing process are subdivided into several specific sub-stages, in order to make knowledge sharing clearer.
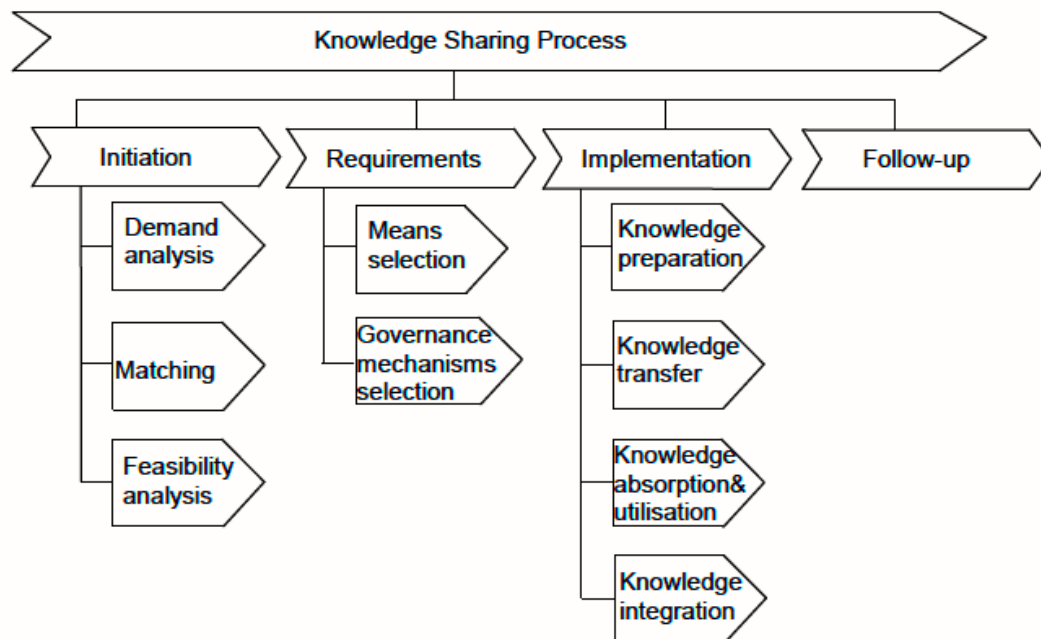

Figure 2: A model of knowledge sharing process

Initiation stage is the beginning of the knowledge sharing. In this stage, the idea for the knowledge need is explored by the receiver or by the source (demand analysis). In addition, they need to search for suitable partner (Matching). Then, the knowledge source will decide to share his/her knowledge or not (feasibility analysis). In the *requirements stage*, both knowledge source and knowledge receiver need to choose appropriate knowledge sharing means and corresponding governance mechanisms. Knowledge sharing takes shape during the *implementation stage*. Knowledge source first needs to prepare knowledge in terms of collecting the necessary parts of knowledge and then parcelling them up in order to meet the receiver's knowledge requirement. Then, the knowledge source tries to transfer the prepared knowledge. The knowledge receiver tries to absorb the knowledge and utilise it based on his requirements. For instance, he tries to remove the noise or disturbance in the shared knowledge to obtain the useful part of it to solve the target problem. Finally, the knowledge receiver integrates the useful part of knowledge into organisation's knowledge base. During *follow up stage*,

knowledge source and knowledge receiver need to evaluate the issues concerning both during the knowledge sharing process, for instance, whether the knowledge sharing means is valid, whether the selected knowledge sharing means is appropriate, etc.

5. Knowledge sharing means

Knowledge sharing means has been described by Ruggles (1997) as technologies used to enable and improve the implementation of knowledge sharing. Not all knowledge sharing means are IT based, as everyday means such as face to face interactions, training, etc. can be utilised to support knowledge sharing. In this study, two different types of knowledge sharing means will be discussed: techniques and Information Communication Technologies (ICTs). For the purpose of this study, techniques are defined as non-IT based means and ICTs are defined as tools that facilitate the sharing of knowledge by electronic means. Tacit and explicit nature of knowledge is also taken into account in this study as there are particular means for each of these types of knowledge. Some of the knowledge sharing means that have been identified in the literature are summarised in
Table 1. This list is not conclusive; it provides an overview of knowledge sharing means adopted by healthcare organisations to share knowledge.

Table 1: Knowledge sharing means

Type	Means	Definition	Tacit/ Explicit
Techniques	Communication Channels	Channels for communicating among staff members and between staff and patients including face-to-face, written communication, etc. (Olsson et al., 2008)	Tacit/ Explicit
	Social means	A useful environment (e.g. meetings) for sharing knowledge (Zigan et al., 2010)	Tacit/ Explicit
	Communities of Practice	A group of individuals who share a concern about a topic and who deepen their knowledge in that area by interacting on an ongoing basis (Wenger, 2002)	Tacit
	Training	Learning opportunities provided to share and receive required knowledge (Zigan et al., 2010)	Tacit
ICTs	Social Technologies	Cover broad types of tools, all using technology to build collaboration and sharing knowledge, they are mainly internet-based tools (Kahn et al., 2010)	Explicit
	Clinical Decision Support Systems	An application that analyses data to help clinicians make clinical decisions (Ozdemir et al., 2011)	Explicit
	Electronic Health Record	computerised health records to improve knowledge sharing among clinicians (Fichman et al., 2011)	Explicit

Table 2: Knowledge sharing means continue

Type	Means	Definition	Tacit/ Explicit
	Mobile Phones	A useful tool for sharing medical knowledge by using text messaging service or voice mail service (Gerber et al., 2010)	Tacit
ICTs	Personal digital assistants	Shirt pocket sized tools that enable healthcare providers to gain access and share knowledge (Kahn et al., 2010)	Tacit
	Telemedicine	Delivery of healthcare services using ICTs for sharing of vital knowledge for diagnosis, treatment and prevention of disease and etc. (Singh et al., 2010)	Tacit

Therefore, knowledge sharing can occur through different means. Techniques are affordable as no sophisticated infrastructure is required. They are also easy to implement because of their simple and straightforward nature. However, techniques might be too slow and less effective, especially, for health care organisations that need accurate knowledge at the right time (Olsson et al., 2008). In contrast, the use of ICTs makes knowledge sharing more efficient, faster, and more convenient (Ruikar et al., 2007). These types of knowledge sharing means have the potential to greatly facilitate knowledge access, improve communication, eliminate double documentation, and as a result increase quality of healthcare services in the long run (Gerber et al., 2010). Although ICTs play a significant role in facilitating knowledge sharing, they are not easy to implement due to the requirement of IT infrastructure and IT skills. Also, they are expensive and difficult to acquire and maintain (Aron et al., 2011).

6. Knowledge sharing governance mechanism

Governance mechanism refer to the governance structures and coordination mechanism to facilitate KM activities i.e. knowledge creation, knowledge sharing, etc. (Grandori, 2001). At present, many studies have investigated governance mechanisms so as to favourably impact knowledge sharing. General speaking, all these studies are seeking to find the facilitating factors to motivate relevant actors to participate in the knowledge sharing process and to make the knowledge sharing process be efficiently conducted. These factors can be categorised into different groups: organisational culture, technical support, and organisational context (Aron et al., 2011; Guah and Currie, 2004; Sensky, 2002; Currie and Suhomlinova, 2006). Those factors which try to motivate actors to participate in knowledge sharing mainly provide an incentive effect for knowledge sharing and they include organisational culture. On the other hand, those factors which try to make knowledge sharing be efficiently conducted provide supportive conditions for knowledge sharing. Organisational context and technical support are among this group. The governance mechanisms of knowledge sharing are shown in Figure 3. It is highlighted that most of the governance mechanism in hospitals are not different from those identified in other industries (Sensky, 2002; Nicolini et al., 2008).
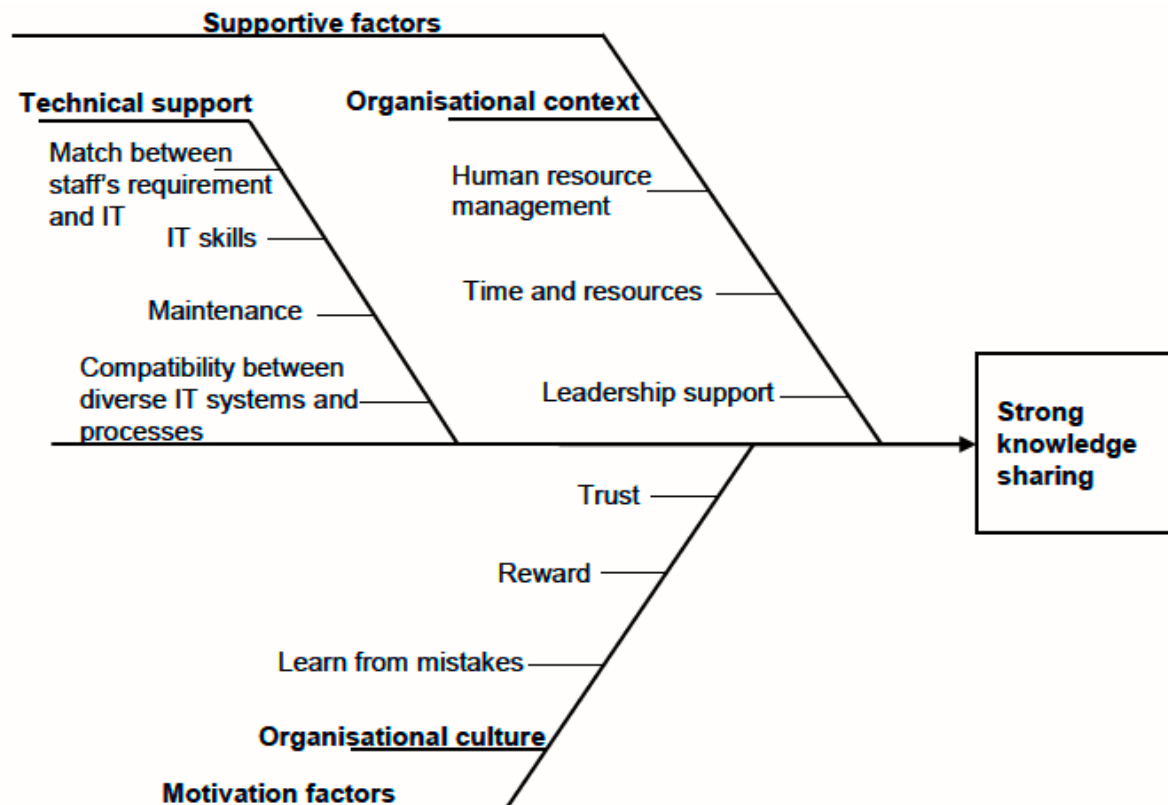
Figure 3: Governance mechanisms of knowledge sharing; Source: Based upon literature review

Technical support: There is little doubt that knowledge sharing can be improved, (especially in terms of reducing cost caused by time and distance), by the use of ICTs (Fichman et al., 2011). The key issue, however, is to choose and implement appropriate ICTs that provide a close fit between workers and their requirements. Sufficient technology skill, maintenance of ICT systems, and compatibility between ICTs and processes are also reported as a cause of strong knowledge sharing. Lack of any of these issues can lead to knowledge sharing failure even with having appropriate ICTs in place (Bradley et al., 2012; Aron et al., 2011; Guah and Currie, 2004).

Organisational context: For successful knowledge sharing, it is very important that knowledge sharing be supported by the organisational context (Hislop, 2007). Leadership support, time and resources, and human resource management are reported as the main factors of organisational context in the literature. Leaders set the example for others, they have a direct impact on the organisational culture and how the organisation approaches and deals with knowledge sharing practices (Sensky, 2002). It is also important that hospitals offer enough time and resources to allow staff to share their knowledge (Currie and Suhomlinova, 2006). Furthermore, people are the core of creating organisational knowledge, because it is people who create and share knowledge. Therefore, it is critical to manage those who are willing to create and share knowledge (Sensky, 2002).

Organisational culture: It defines the main beliefs, norms, values, and social customs that govern the way people act and behave and therefore it influences the efforts that individuals are willing to share their knowledge (Taylor and wright, 2004). The biggest challenge for hospitals actually lies in building an environment in which professional communities can trust each other; otherwise they are unlikely to share their knowledge (Dean, 2002). Tolerance of making mistakes also plays a significant role in the knowledge sharing, especially in healthcare. Since healthcare professionals are harshly blamed for errors, they hesitate to report errors. However, if hospitals create an environment in which mistakes can be tolerated, professionals will be motivated to report errors and learn from them to improve quality services (Currie and Suhomlinova, 2006). Reward is also very important to motivate actors to participate in knowledge sharing. Knowledge sharing participants need to see benefit for themselves in the knowledge sharing process. Otherwise, they can abandon knowledge sharing processes when they face the first problem in sharing/receiving knowledge (Lin and Chang, 2008).

7. Knowledge sharing influencing factors relationship

So far it is clear that knowledge sharing process could only occur when appropriate governance mechanism and means are in place. First, both knowledge source and receiver, and all necessary actors, need to align their interest in participating in knowledge sharing process. To do this, they need to be supported and motivated by organisational and cultural issues to overcome their obstacles (Sensky, 2002). Take time for example. If knowledge source/receiver does not have enough time to share/receive knowledge, knowledge sharing cannot be implemented. Therefore, governance mechanisms have direct impact on knowledge sharing process.

Second, when all actors decide to participate in knowledge sharing process, they need to adopt appropriate means to share knowledge from source to receiver. Content and richness of knowledge should be handled by knowledge sharing means (Zigan et al., 2010). Thus, it is very important to choose an appropriate means. As a result, knowledge sharing means directly prompt knowledge sharing process forward. However, the challenge of taking advantage of knowledge sharing means, especially ICTs, is to integrate them with different aspects of knowledge sharing. Hospitals can encounter weak knowledge sharing process even by adopting appropriate means due to the lack of organisational, cultural and technical support (Nicolini et al., 2008). Hospitals invest in ICTs to enable knowledge sharing, since they believe knowledge is crucial for their success (Sensky, 2002). However, if these means are not supported by technical support, knowledge sharing failure can result. Also, organisational and cultural issues influence the choice and usage of the knowledge sharing means by motivating the willingness and cognition of the units of knowledge sharing, which will further impact the knowledge sharing process.

Finally, based on the descriptive process of theory building, key concepts from the literature are integrated into a model to identify mechanisms and elements, when present/absent, that contribute to a strong or weak approach of knowledge sharing processes in complex environments such as hospitals (Figure 4). So far the descriptive process of theory building has not been used to develop comprehensive frameworks for different aspects of knowledge sharing and their relationship. This model provides organisations and policy makers in healthcare industry with a framework to better understand how strong knowledge sharing process can be achieved with the presence of appropriate knowledge sharing means and governance mechanisms. This model, especially, can be discussed in terms of the role of ICTs in facilitating knowledge sharing and challenges around use of ICTs for the purpose of knowledge sharing. This can help healthcare organisations to create an environment to reduce the extra time and efforts required to share and use knowledge, to increase the exchange of knowledge through mobility of knowledge and in different shifts, and to extend the culture and skills for engagement in the knowledge sharing process across professional boundaries by better use of knowledge sharing means.
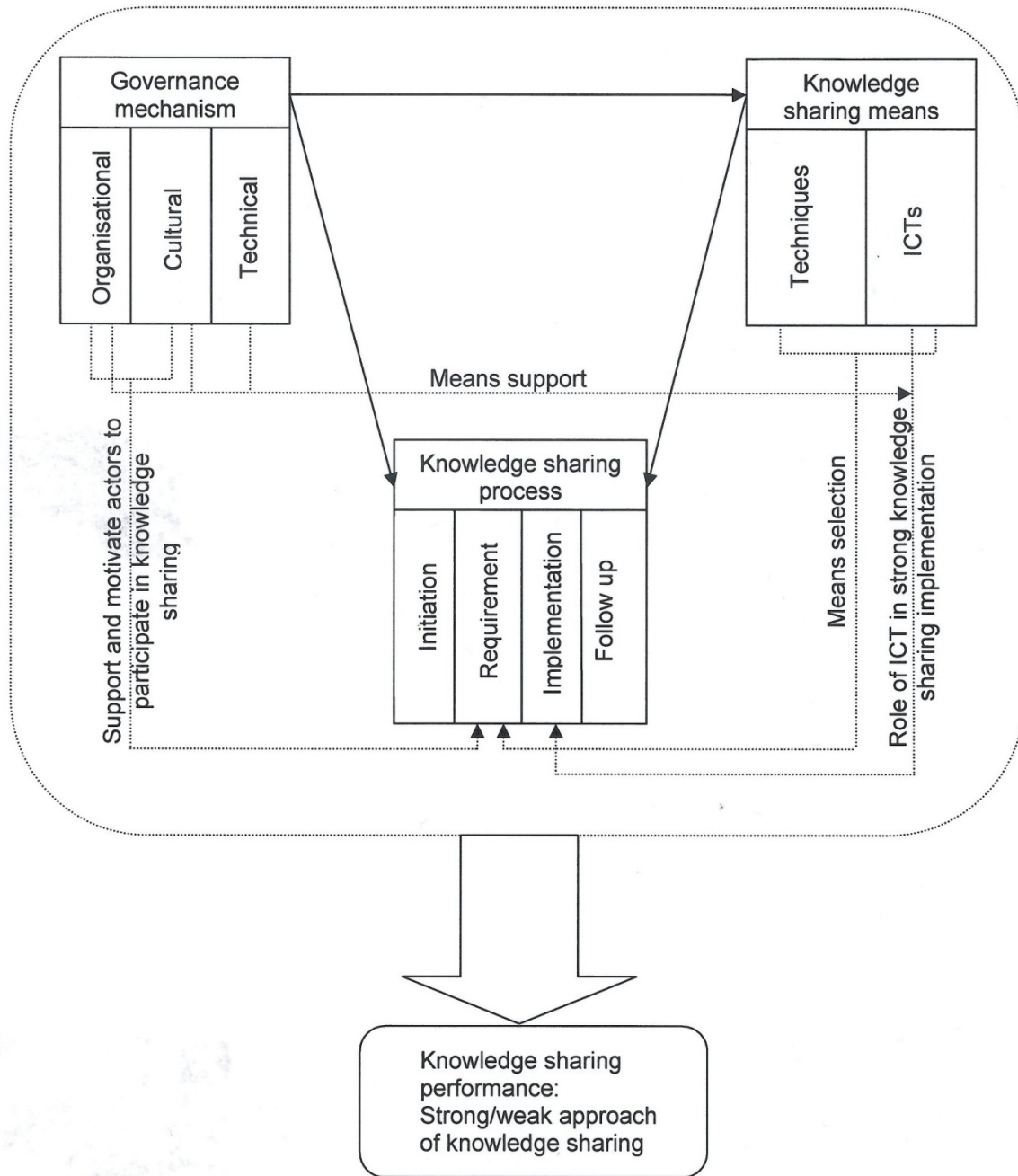
Figure 4: Proposed Model for Describing Knowledge Sharing

8. Conclusion

Strong approach of knowledge sharing supports the day-to-day activities in knowledge intensive organisations such as the healthcare industry. This study integrates key concepts from the literature into a model to explain a strong approach of knowledge sharing. It is proposed that knowledge sharing performance is influenced by the impact of knowledge sharing means and governance mechanisms on the knowledge sharing process. An analysis of these three aspects of knowledge sharing has been carried out and their relationship among them explored. Knowledge sharing means impact knowledge sharing process directly. Governance mechanism not only directly impacts the knowledge sharing process but also indirectly influences the choice and usage of knowledge sharing means. These three kinds of interrelated influencing factors of knowledge sharing have an impact on knowledge sharing performance.

9. References

Alavi, M., & Leidner, D.E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly,* 25(1): 107-136.

Aron, R., Dutta, S., Janakiraman, R., & Pathak, P.A. (2011). The Impact of Automation of Systems on Medical Errors: Evidence from Field Research. *Information Systems Research*, 22(3): 429-446.

Awad, E.M. & Ghaziri, H.M. (2007). *Knowledge Management*, Dorling Kindersley, Delhi.

Bate, P (2000). Changing the Culture of a Hospital: From Hierarchy to Networked Community, *Public Administration*, 78(3): 485–512.

Bradley, R.V., Pratt, R.M.E., Byrd, T.A., Outlay, C.N., & Wynn, J.,Donald E. (2012). Enterprise Architecture, IT Effectiveness and the Mediating Role of IT Alignment in US Hospitals. *Information Systems Journal*, 22(2): 97-127.

Boisot, M. (1998), *Knowledge Assets: Securing Competitive Advantage in the Information Economy*, Oxford University Press, Oxford.

Busby, J.S. (1999). An Assessment of Post-Project Reviews. *Project Management Journal,* 30(3): 23-29.

Carayannis, E. (2005). Fostering Synergies between Information Technology and Managerial and Organisational Cognition: The Role of Knowledge Management, in *Knowledge Management: Critical Perspectives on Business and Management*. I. Nonaka, Taylor & Francis, New York, 141-162.

Carlile, P. & Christensen, C. (2005). Academic Malpractice and Practice in Management Research. Working Paper. Harvard Business School, Cambridge, MA.

Crites, G., McNamara, M., Akl, E., Richardson, W., Umscheid, C. & Nishikawa, J. (2009). Evidence in the Learning Organization, *Health Research Policy and Systems*, 7 (4): 1-13.

Currie, G. and Suhomlinova, O. (2006). The Impact of Institutional Forces upon Knowledge Sharing in the UK National Health Service: The Triumph of Professional Power and the Inconsistency of Policy. *Public Administration*, 84(1): 1–30.

Davenport, T.H.& Prusak, L. (1998). *Working Knowledge: How Organisations Manage What They Know*. Harvard Business School Press, Boston.

Dean, B. (2002). Learning from Prescribing Errors. *Quality and Safety in Health care*, 11(3): 258–260.

Fichman, R.G., Kohli, R., & Krishnan, R. (2011). The Role of Information Systems in Healthcare: Current Research and Future Trends. *Information Systems Research*, 22(3): 419-428.

Gerber, T., Olazabal, V., Brown, K., & Pablos-Mendez, A. (2010). An Agenda for Action on Global E-health. *Health Affairs*, 29(2): 233-236.

Grandori, A. (2001). Neither Hierarchy Nor Identity: Knowledge Governance Mechanisms and the Theory of the Firm, *Journal of Management and Governance,* 5(3/4): 381-399.

Guah, M.W. and Currie, W.L. (2004). Factors Affecting IT-Based Knowledge Management Strategy in the UK Health Care System. *Journal of Information and Knowledge Management*, 3(4): 279–290.

Hansen, M.T. (1999). The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organisation Sub-Units, *Administrative Science Quarterly,* 44(1): 82-111.

Hendriks, P.(1999) Why Share Knowledge? The Influence of ICT on the Motivation for Knowledge Sharing. *Knowledge and Process Management*, 6(2): 91-100.

Hislop, D. (2007). Knowledge Processes and Communication Dynamics, in *Rethinking Knowledge Management: From knowledge objectives to knowledge processes,* C.R. McInerney, & R.E. Day, Springer, Heidelberg, 187-208,.

Kahn, J.G., Yang, J.S., & Kahn, J.S. (2010). Mobile Health Needs and Opportunities in Developing Countries. *Health Affairs*, 29(2): 252-8.

Kamara, J., Anumba, C., & Carillo, P. (2002). Learning to Learn, from Past to Future, *International Journal of Project Management,* 20: 205-211.

Kankanhalli, A., Tan, B.C.Y. & Wei, K. (2005). Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation, *MIS Quarterly,* 29(1): 113-143.

Kilo, C.M. (2005). Transforming care: Medical Practice Design and Information Technology. *Health Affairs*, 24(5): 1296-301.

Leonard-Barton, D. (1995), *Wellsprings of Knowledge*, Harvard Business Press, Boston.

Lin, C., & Chang, S. (2008). A Relational Model of Medical Knowledge Sharing and Medical Decision-Making Quality. *International Journal of Technology Management*, 43(4): 320.

Lin, L.H., Geng, X.J. and Whinston, A.B. (2005). Sender-Receiver Framework for Knowledge Transfer, *MIS Quarterly,* 29(2): 197-219.

Miller, R.H. (2012). Satisfying Patient-Consumer Principles for Health Information Exchange: Evidence from California Case Studies. *Health Affairs,* 31(3): 537-47.

Nicolini, D., Powell, J., Conville, P. & Martinez-Solano, L. (2008). Managing Knowledge in the Healthcare Sector. A Review. *Journal of Management Reviews*, 10(3): 254-263.

Nonaka, I., Toyama, R., & Nagata, A. (2000). A Firm as a Knowledge-Creating Entity: A New Perspective on the Theory of the firm. *Industrial and Corporate Change*, 9(1): 1-20.

Olsson, E., Wismen, M. & Carlsson, S. (2008). Permanent and temporary work practices: knowledge integration and the meaning of boundary activities. *Knowledge Management Research & Practice*, 6(4): 260-273.

Ozdemir, Z., Barron, J., & Bandyopadhyay, S. (2011). An analysis of the adoption of digital health records under switching costs. *Information Systems Research*, 22(3): 491-503.

Poston, R.S., & Speier, C. (2005). Effective Use of Knowledge Management Systems: A Process Model of Content Ratings and Credibility Indicators. *MIS Quarterly*, 29(2): 221-244.

Quinn, J.B. (1996), Leveraging Intellect, *Academy of Management Executive*, 10(3): 7-27.

Ruggles, R, (1997). Knowledge Tools: Using Technology to Manage Knowledge Better. Working paper for Ernst and Young, [online] Retrieved 29 March 2012, from http://www.businessinnovation.ey.com/mko/html/ toolsrr.html.

Ruikar, K., Anumba, C.J., & Egbu, C. (2007). Integrated Use of Technologies and Techniques for Construction Knowledge Management. *Knowledge Management Research & Practice*, 5(4): 297-311.

Sensky T. (2002). Knowledge Management. *Advances in Psychiatric Treatment*, 8 (5): 387-395.

Singh, R., Mathiassen, L., Stachura, M.E., & Astapova, E.V. (2010). Sustainable rural telehealth innovation: A public health case study. *Health Services Research,* 45(4): 985-1004.

Srivastava, A., Bartol, K.M. and Locke, E. (2006). Empowering Leadership in Management Teams: Effects on Knowledge Sharing Efficacy, and Performance, *Academy of Management Journal*, 49 (6): 1239-1251.

Szulanski, G. (1996). Exploring Internal Stickiness: Impediments to the Transfer of Best Practice within the Firm, *Strategic Management Journal,* 17: 27-43.

Taylor, W. & Wright, G. (2004). Organisational Readiness for Successful Knowledge Sharing: Challenges for Public Sector Managers. *Information Resources Management Journal*, 17(2): 22-37.

Wenger, E. 2000. Communities of Practice and Social Learning Systems in Reeve, F., Cartwright, M. & Edwards, R. 2002. Supporting Lifelong Learning Volume 2: Organizing Learning. London: RoutledgeFalmer/OUP. Chapter 10, 160-179.

Zigan, K., Macfarlane, F., & Desombre, T. (2010). Knowledge Management in Secondary Care: A Case Study. *Knowledge and Process Management*, 17(3): 118.