FACTORS INFLUENCING KNOWLEDGE SHARING AMONGST HIGHER EDUCATION ACADEMICS AT A UNIVERSITY IN SOUTH AFRICA

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Abstract

The aim of this paper is to explore the factors influencing knowledge sharing amongst higher education academics, using the actor-network theory (ANT) as a theoretical lens. Knowledge sharing in higher education is not institutionalised, therefore knowledge is not always captured nor systematically stored and organised. This leads to a lack of retention of valuable institutional know-how, inefficient work processes and reinventing the wheel. The research questions revealed social, process and technology factors as affecting the formation, growth, stability, and institutionalisation of knowledge sharing in a network of aligned interests. ANT was utilised in conjunction with historical and contextual analysis, tracing the development of the explicit sociotechnical conditions within which to enable sharing of knowledge amongst academics. The study was qualitative in nature, employing an interpretive case study methodology. Semi-structured questions were used to interview eighteen academic staff members as actors from a University of Technology in South Africa, exploring the factors inductively. Culture and management support emerged as the most important social factors. Management is identified to hold a significant position in influencing the uptake and sustainability of knowledge sharing. Factors of technology and processes are centred on facilitating opportunities to share and ensuring effectiveness and efficiency. Knowledge sharing strategies should adopt a blend of personal interaction and technology-based approaches. A general framework of factors influencing the formation, growth and institutionalisation of knowledge sharing was developed to inform knowledge sharing strategies in higher education. Recommendations are made in light of these factors for implementation by higher education managers.

Keywords: Knowledge Management, Knowledge Sharing, Actor-network Theory, Higher Education, Sociotechnical Factors

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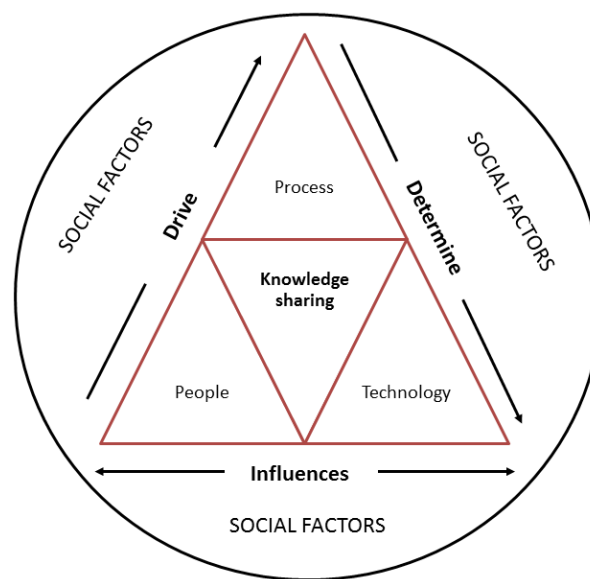
1 Introduction

Educational institutions generate operational knowledge in a similar manner to that of businesses, including operational knowledge generated through the processes of teaching and learning (Chen & Lin, 2009). Academics want to know what their colleagues are doing and what methods and approaches they are using (Aczel, Clow, McAndrew & Taylor, 2004) to avoid duplication and inconsistencies in lectures especially when newly-appointed academics recreate their own lectures (Arntzen, Ribière & Worasinchai, 2009). Higher education institutions (HEI) are increasingly compelled to operate like a business (Malik, 2005; Sulisworo, 2012). As a result, they are also exposed to market pressures, which means that innovation and competition should be placed high on their agenda. It is arguable that knowledge management is not institutionalised in higher education and therefore knowledge in higher education is not always captured nor systematically stored and organised. This leads to the lack of retention of valuable institutional know-how, inefficient work processes and reinventing the wheel. The research objective was to develop a framework to guide the implementation of knowledge management strategies for the higher education context. In order to achieve this objective, four research questions had to be explored. The first research question sought to determine those factors that have an influencing role on the success of forming a knowledge sharing network. The second question sought to determine those factors that can have a positive influence on the growth of the knowledge sharing network. The third question sought to determine those factors that pose a threat to the stability of a knowledge sharing network and the fourth question sought to determine those factors which can help to institutionalise the knowledge sharing network. The factors that emerged from the research, and which serve to answer the four research questions, provided insight into how to implement knowledge sharing strategies in higher

education in South Africa. This paper therefore seeks to determine the factors that influence knowledge sharing in an academic context, ensuring that not only is explicit knowledge systematically shared, but that personalisation of this knowledge occurs through the systematic sharing of tacit knowledge. The factors were explored using the actor-network theory (ANT) as a theoretical lens. The study considered the lack of knowledge sharing amongst academics as a social phenomenon and as such can be studied using a social theory, ANT, to tease out factors influencing knowledge sharing. ANT was utilised in conjunction with historical and contextual analysis, tracing the development of the explicit sociotechnical conditions within which to enable sharing of knowledge amongst

academics. As argued by Hong, Kim and Suh (2012), the paper considers knowledge sharing to be the main process which sustains knowledge management. Furthermore, Armistead (1999), and Biloslavo and Zornada (2004) argue that the key variables for knowledge sharing are people, technology and processes. Thus, people initiate and sustain knowledge sharing, technology facilitates efficient sharing and use and eliminates sharing barriers, and processes ensure that knowledge sharing takes place. Therefore drawing from the work of Armistead (1999), effective teaching and learning through knowledge management is achieved when people, processes and technology come together. The Figure 1 was used to conceptualise the social phenomenon.

Figure 1. Problem conceptualisation

2 Current work

2.1 Introduction

Literature on knowledge management makes it clear that the most valuable resource of an organisation is the knowledge of its employees. The importance of knowledge management has been highlighted in studies within business and academia (Lubega, Omona & Van der Weide, 2010). Studies on knowledge management show that by effectively harnessing the knowledge of an organisation through various knowledge management techniques, the right knowledge can be supplied to the right people at the right time. This will enable people to put this knowledge into action to enhance organisational efficiency and effectiveness (Holsapple, 2001; Bush & Tiwana, 2005; Hong et al., 2012). It is posited that knowledge management is an enabler of improved organisational performance, improved decision making, creating core competences, a source of competitive advantage, and an enabler for improved problem solving (Holsapple, 2001; Liao, 2003; Bush &

Tiwana, 2005; Durcikova & Gray, 2005; Hewett & Watson, 2006; Lubega et al., 2010). As Martin (2000:17) puts it, "[t]hat knowledge is of fundamental importance for organisations of any size and industry is no longer a question". Knowledge management is also an enabler of organisational learning as it facilitates the continuous sharing and exchange of knowledge that perpetuates the learning process within the organisation (Lubega et al., 2010). Work done by Olfman, Raman and Ryan (2005), and Khalil (2012) indicate that knowledge management was a thing of the corporate world and very little research exists on management practices in higher education and on sharing amongst academics. Furthermore, Baskerville and Dulipovici (2006), Bhatt (2001), Choi, Kang and Lee (2008), and Biloslavo and Zornada (2004) suggest that research into knowledge management has gained more focus theoretically rather than empirically and that this gap is not adequately addressed by existing empirical research. There is a lack of empirical research which fully encompasses people, processes and technology which should be considered together for successful knowledge management. There is also a

lack of empirical research that adequately addresses the dynamics of knowledge management postulated in the research. These findings validate the need for empirical research into the sociotechnical aspect of knowledge sharing for sustaining knowledge management.

2.2 Knowledge management in higher education

Drawing from the work of Biasutti and El-Deghaidy (2012) it is arguable that knowledge management in higher education is not a high priority to the point where knowledge sharing processes are integrated into daily routines. HEIs are engaging in dissemination of information, rather than knowledge sharing activities, resulting in a lack of knowledge to support academic action and decision making (Rowley, 2000). There should therefore be recommendations for its implementation so that these institutions can harness its full potential. The knowledge management that originated from the business context cannot simply be reapplied to the educational context (Sulisworo, 2012). As a result, HEIs should have their own framework in place for knowledge management, and hence knowledge sharing, which should encompass the organisational culture, store of experiences, insights, values and the information technology (IT) infrastructure (Sulisworo, 2012).

2.3 Knowledge sharing

Knowledge management consists of a collection of methods, techniques and tools (Liao, 2003) that facilitate four activities, including the capturing, storing, sharing and using of knowledge (Lee, 2001). Knowledge sharing is considered to be the main process of knowledge management and hence the focus of this study (Hong et al., 2012). Knowledge sharing in particular has become an area of concern (Choi et al., 2008). This is because knowledge management can only be sustained through continuous sharing, which is dependent on people. Therefore the aim of preserving knowledge management efforts is to create a culture of sharing in an organisation (Ahmad, Ives & Piccoli, 2000). Given the importance of knowledge sharing and the reliance on people to sustain knowledge sharing activities, knowledge sharing barriers has received significant focus in the literature. It is considered the most difficult of the knowledge management activities (Ruggles, 1998).

Due to the high reliance on people to initiate and sustain knowledge sharing, often the reluctance to share has impeded on knowledge management initiatives. As a result, many organisations have had to implement reward schemes to encourage knowledge sharing. This initiative has led to increased focus in literature on how to increase knowledge sharing (De Pablos, Zhang & Zhou, 2013). Kankanhalli, Tan, and Wei (2005) actually characterised knowledge sharing

as the provision of one's personal expertise and knowledge for economic reward or social benefits. However research on this topic has led to divergent results (De Pablos et al., 2013). Given the fact that the incentives that have been implemented in response to knowledge sharing problems have not proved to succeed in some cases, begs the question as to whether knowledge management strategies have considered knowledge sharing dynamics from all perspectives. These dynamics not only include social factors such as willingness or perceived usefulness, but also the processes and technologies that facilitate knowledge sharing initiatives. This is why an all-encompassing sociotechnical view is needed. This research will consider knowledge sharing from all perspectives to provide a comprehensive framework for implementing knowledge management strategies.

2.4 Knowledge sharing factors

The review of literature revealed that those studies employing theories in the study of knowledge sharing factors focused mainly on social factors. Very little studies focus on sociotechnical factors and in particular the influence of processes on knowledge sharing intentions. Very little data were found on the factors that would impact on the formation and growth of a knowledge sharing actor-network. However, it was found that there is a high reliance on people to initiate and sustain knowledge sharing. Factors influencing institutionalisation of knowledge sharing have not explicitly received focus in the literature, but the implication is that technology and processes have a strong influence on institutionalisation. Most factors reported were factors that are strongly related to those impacting on the stability of a knowledge sharing actor-network, that is, the factors that negatively impact on people sharing their knowledge. However, the researcher attempted to glean as many factors from the literature that could be mapped to the concepts of ANT to obtain an historical analysis of factors. This historical analysis is presented as a conceptual framework in Figure 2, which follows under the underpinning theory.

The review of literature revealed that there is a growing body of research on the enablers for knowledge sharing. Call (2005) argues that people and processes are key to the success of a knowledge management system. Furthermore, Armistead (1999) argues that effective learning through knowledge management is achieved when people, technology and processes come together. However, it has been noted in the literature that technology should feature as an enabler for knowledge sharing, and should not be the core focus. A strong relationship between culture and suitable technology has been reported in the literature (Hackett, 2000). It has also been asserted that cultural, behavioural and organisational issues should be addressed before technical issues (Annansingh, Eaglestone, Nunes & Wakefield, 2006).

Further observations revealed that knowledge sharing processes are not integrated into the daily routines in higher education (Biasutti & El-Deghaidy, 2012). In particular it was reported that a key factor that impacts on processes in academia is knowledge sharing mechanisms (Arntzen et al., 2009). Processes were highlighted as very important, particularly by Sulisworo (2012) and Rowley (2000), who asserted that HEIs must consciously and explicitly manage their knowledge management processes. Studies have noted the importance of a systematic approach to knowledge sharing for access to quality knowledge resources and to make communication with relevant persons possible for the exchange of tacit knowledge (Ravitz & Hoadley, 2005; Wang & Wedman, 2005).

3 Underpinning theory

3.1 Background

Information technology is able to efficiently process data into information. However, it is human interaction that adds the meaning to information to create knowledge. Humans are slow at transforming data into usable knowledge, which is why various technologies and subsystems are better suited to the task (Bhatt, 2001). There must be interaction between technology, people and techniques for representing knowledge for knowledge management to be successful. Within the academic domain, and particularly in sociotechnical studies, the actor-network theory (ANT) has been utilised as a theoretical lens for analysing interactions between technology and humans (Goody & Hall, 2007). Knowledge sharing issues in organisations not only relate to technological but also behavioural factors (Liao, 2003). Furthermore technical and social issues have proved to influence the institutionalisation, implementation and operation of technology-based systems (Kling & Scacchi, 1982; Goody & Hall, 2007).

3.2 Overview of actor network theory

The actor-network theory was developed in the 1980s by Callon and Latour (Goody & Hall, 2007). It is particularly applied in the study of technologies. ANT regards both humans and non-humans, such as technology, documents, concepts (like knowledge management), data repositories, and the like, as actors (Goody & Hall, 2007). The reason why ANT also considers non-human actors is to examine the enabling or restrictive role that they play in a particular context (Sarker, Sarker & Sidorova, 2006). It examines the shifting relationships between the actors (or members) of a network. These shifting relationships are examined in respect of the four moments of translation. 'Translation' in the context of ANT is the alignment of interests of the actors in a network with that of a focal actor. The four moments of translation include: Problematisation, interessement, enrolment and

mobilisation (Sarker et al., 2006). They address the formation, growth and stability of a network of aligned interest. Successful network formation is dependent on the successful implementation of the four moments of translation. The four moments of translation involve the rallying of support from all the actors in a network and maintaining alignment with the obligatory passage point (OPP) (Sarker et al., 2006). The OPP is "[a] situation that has to occur for all of the actors to be able to achieve their interests, as defined by the focal actor" (Sarker et al., 2006:56). In this context, the OPP would be knowledge sharing.

3.3 Actor network theory and information systems research

Lee (2001:iii) states that "[r]esearch in the information systems field examines more than just the technological system, or just the social system, or even the two systems side by side; in addition, it investigates the phenomena that emerge when the two interact." It is for this very reason that ANT is promoted by Aanestad, Berg and Hanseth (2004) as making a significant contribution to IS research. Their argument in favour of ANT as a suitable analysis tool is that it can help researchers understand the interaction between social and technical systems. ANT is therefore a suitable theoretical lens for understanding the sociotechnical factors influencing knowledge sharing in higher education. ANT not only encompasses technological and human factors, but also actors on an individual level and organisational level, thereby lending itself to varying levels of analysis (Sarker et al., 2006). Not only did ANT enable the researcher to explore the formation of the actor-network, but the stability of the network of aligned interest was analysed in terms of the extent to which the institutionalisation of knowledge sharing process will contribute to the institutionalisation of the network. Furthermore, due to the fact that actor-networks are often competing with other actor-networks, particularly for resources, actor loyalty must be maintained to prevent the network from fragmenting (Goody & Hall, 2007). This is why factors of betrayal were also explored.

3.4 Conceptual framework

A conceptual framework based on ANT was developed to guide the collection, analysis and interpretation of data. This framework is depicted in Figure 2 which follows. The components of ANT are incorporated into the framework from two perspectives:

a) Those components which lead to the formation and growth of a knowledge sharing actor-network, and

b) Those components which could impact on the stability of the actor-network

The actor network is formed by the application of the four moments of translation by the focal actor.

These four moments of translation are aimed at identifying heterogeneous actors in the actor-network, including people, processes and technology. The role of each actor is determined, and methods for negotiating with actors to align with the interest of the focal actor are applied to encourage the actors to pass through the OPP. Once the actors are enrolled into the actor-network, mobilisation must occur in order to formalise the network through a process of inscription. This is a matter of institutionalisation. Punctualisation was incorporated into the framework as a potential threat to the strength of the actor network, as this is a typical issue within knowledge sharing research. Other elements of ANT are incorporated into the framework

as potential threats to the stability of the actor network, including the threat of power issues, competing networks, and the betrayal of the respective actors within the network. The knowledge sharing factors gleaned from the literature were incorporated into the framework under the respective ANT components. From this perspective typical knowledge sharing factors can be viewed through ANT as a lens. The collection of data, and the analysis and interpretation from the perspective of the conceptual framework will either validate or refute these factors in respect of the higher education context and may reveal new factors, all of which will lead to the refinement of the original conceptual framework for the academic context.

Figure 2. Conceptual framework
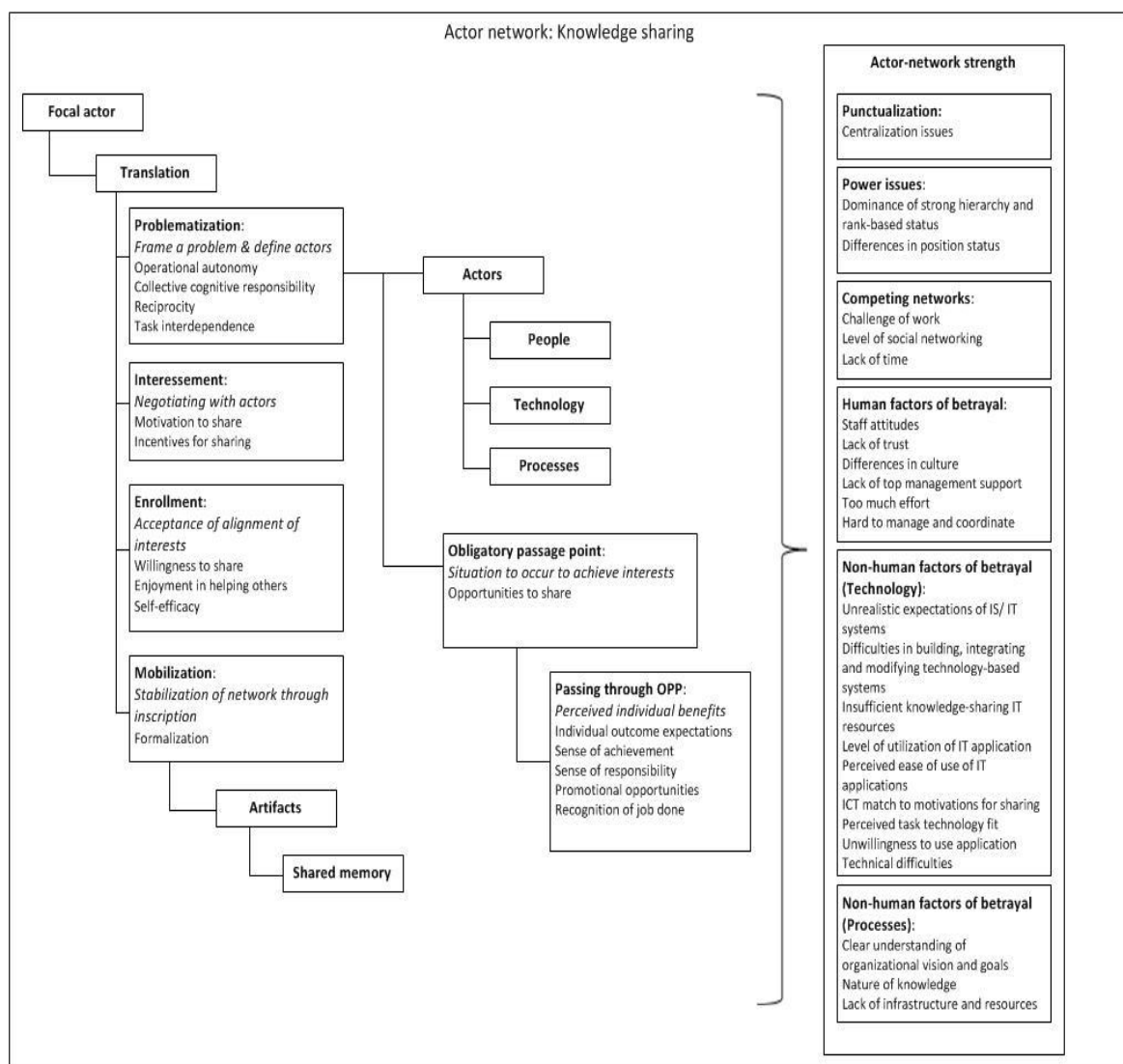
4 Methodology

4.1 Research approach

The research was an interpretive case study based on the theoretical framework of ANT. Rich qualitative empirical material was collected that communicated

the views of the actors in the context of the study. The factors were explored inductively, but the use of ANT employed deductive analysis to conceptualise the factors and explain them in relation to each other. Given that the purpose of case study research is to obtain an in-depth understanding of a given situation,

the interest of a study of this nature was in discovery rather than confirmation (Laws & McLeod, 2004).

4.2 Population

The population included all academic staff members from a selected university of technology (UoT) who are actively participating in teaching and learning activities and are appointed at a level of junior lecturer, lecturer or senior lecturer. The selection from varying levels of tenure and several faculties ensured a variety of responses from different disciplines and levels of experience in order to obtain a well-rounded view of the academic domain.

4.3 Sampling

A purposive sampling method was used. The sample constituted eighteen academic staff members from the population. This sample included one academic from each level of tenure from Applied Sciences, Business, Education and Social Sciences, Engineering, Health and Wellness Sciences and Informatics and Design. An email was sent to each academic selected to invite them to take part in the research. In the event that this was unsuccessful, convenience sampling was used.

4.4 Data collection

Face-to-face interviews, with semi-structured interview questions, were used to obtain the views of the academic actors. Interview questions were developed based on the review of literature where gaps were identified. Furthermore, the conceptual framework of ANT guided the interview questions. The major themes that emerged from the review of literature included social factors, technology factors and process factors. Eighteen (18) interviews were

completed in total, with one respondent of the total sample not holding a position in line with the sampling criteria, that is, their level of tenure. This was mainly due to accessibility and willingness of the participants.

4.5 Data analysis

Data organisation and reduction was performed using coding (Ary, Jacobs & Razavieh, 2002). Coding involved selecting keywords or phrases that related to the major themes, including social factors, technology factors and process factors. The main themes were related to the concepts of ANT, used as a lens for interpretation. Table 1 below provides an example of how the data were coded.

4.6 Reliability and validation

The reliability of this study is grounded in the detailed description of the research processes, offering opportunities for its replication. Reliability is enhanced by the interview schedule testing via a pilot, and the fact that the researcher conducted the interviews, transcribed the interview responses and performed the content analysis, all of which ensured that the researcher engaged with the data to ensure an enhanced understanding of the data and the responses in its entirety. The validity of interview data was assessed by correlations made with other responses given by the interviewee (Fowler, 1993), and data that feature in several places in the analysis. Validity was further enhanced by the transcribed interviews being subjected to scrutiny by all of the eighteen respondents. The systematic methodology also contributes to validating the findings (Clifton, Larkin, & Watts, 2006).

Table 1. Coding scheme

Category	Code	Meaning unit
Technology	Lack of a technology-based resource or lack of suitable technology	"A FAQ facility should be available to provide solutions for these problems. If a resource that provides solutions to problems is not available, staff give up or don't get things done" "Trying to find something on the MIS was a problem because the steps to find it changed"
Processes	Lack of structure and opportunities to share	"There is no systematic manner of accessing that knowledge which is needed" "There should be sharing on technical knowledge" "There needs to be regular reviews of subjects in terms of the content and what industry needs" "Record keeping – if you are looking for a book or course work, what you need should be available within the department, there are things staff should know, basic things should be available and clear to new staff"
Social	Lack of communication and sharing	"Staff don't share, they are holding on to their knowledge" "Lack of communication that keeps staff informed about current work. This leads to lack of harmonisation" "There is a lack of social cohesion, which impacts on the level of sharing" "People are not open"

5 Results and discussion

5.1 Factors influencing the formation of knowledge sharing actor-network

The findings show that a focal actor to drive the formation of a network of aligned interest for knowledge sharing should be a person equipped with both management and academic skills. Such a person would be better suited to filter knowledge between levels. The factors constituting problematisation were found to be the lack of accessible knowledge, lack of effectiveness and efficiency, and a lack of social cohesion. The lack of accessible knowledge was reported to be caused by a lack of available knowledge resources and a systematic approach to knowledge sharing. A systematic approach for the exchange and supply of knowledge is required for access to quality resources (Ravitz & Hoadley, 2005). The lack of access to knowledge has an impact on effectiveness and efficiency. Effective harnessing and supply of knowledge enables people to put this knowledge into action to enhance organisational efficiency and effectiveness (Holsapple, 2001; Bush & Tiwana, 2005; Hong et al., 2012). The lack of collaboration on academic activities also impact on effectiveness. This lack of social cohesion was reported to be influenced by issues of trust and communication. Kankanhalli et al. (2005) assert that the level of trust can have an impact on the level of collaboration in the organisation. This leads to a lack of communication to share tacit knowledge.

It was found that the main factor influencing interessement was culture. Developing a culture for knowledge sharing emerged as a factor influencing efforts to solicit academic support for knowledge sharing. Call (2005), Ahmed et al. (2000) and, Cranfield and Taylor (2008) cite culture as fundamental for the success and preservation of knowledge sharing in an organisation. However, it seems that culture in this context is not so much an issue of willingness, but more emphasis must be placed on the way people work. The variables reported to influence culture are that of a knowledge sharing driver and nurturing of a sharing culture amongst academics. An enabling environment was also found to impact on interessement, underpinned by time, environment and manageability. These variables relate strongly to knowledge sharing processes. Aczel et al. (2004) postulated that the biggest incentive for sharing knowledge lies in the system which facilitates such sharing. Management support also emerged as a factor of interessement, but in the effort to develop and nurture a knowledge sharing culture. Fong and Lee (2009) found that top management support was the most important motivating factor to share knowledge. Incentives also materialised as a factor of interessement in the form of workload alleviation, thereby reinforcing incentives for sharing to be context-specific (Kankanhalli et al., 2005). A

systematic knowledge resource, or structured system, facilitated by processes and technology, was reported as necessary for facilitating opportunities to share, and hence interessement efforts.

Factors of enrolment were discovered for each of the heterogeneous actors in the knowledge sharing actor-network. Human factors of enrolment relate to the academics' responsibility to the institution, underpinned by collective cognitive responsibility, reciprocity and the benefit to the student. Chen and Lin (2009) found collective cognitive responsibility as important in the academic context, while Kankanhalli et al. (2005) also found reciprocity to be constrained by context. In particular, the academic context compels academics to share, as knowledge production is a key element of their job. Factors of personal development, underpinned by recognition, personal growth, enjoyment in helping others and self-efficacy also emerged. Personal factors of enrolment overlap with that of the corporate context, as internal motivating factors are not constrained by context (Kankanhalli et al., 2005), showing that knowledge sharing increases when employees understand that it helps them to develop personally and earn personal recognition (Kogut & Zander, 1992). Factors of manageability, operational effectiveness and efficiency, and access to professional knowledge emerged as those factors for the enrolment of processes and technology. Therefore the role of the nonhuman actors are to make knowledge sharing manageable, ensure access to professional knowledge and ensure operational effectiveness and efficiency, thereby affirming the notion that effective learning through knowledge management is achieved when these heterogeneous actors interact and when time and opportunity is created for such sharing (Armistead, 1999; Mårtensson, 2000).

5.2 Factors influencing the growth of knowledge sharing actor-network

The growth of the knowledge sharing actor-network was analysed from two perspectives, including enablers and factors of sustainability. The main enablers for knowledge sharing emerged as a structured system, technology, support and institutionalisation. Structure is created through employing technology and processes, facilitating opportunities, platforms and mechanisms for sharing. This is regarded as positively influencing knowledge sharing (Daud and Sohail, 2009; Sulisworo, 2012). Support also emerged as IT support, management support, a coordinator of knowledge sharing activities, and training on how to use technology and processes, as staff attitudes to knowledge sharing are linked to the level of organisational commitment in the form of support from superiors (Daud & Sohail, 2009). Institutionalisation was suggested to include standardisation, recognition and ensuring that there are opportunities and time to share. The organisation

should develop and nurture transformation amongst staff by nurturing an environment for sharing, and changing the culture and procedures to enable sharing (Bhatt, 2001; Nonaka & Takeuchi, 1995).

The respondents revealed issues of time constraints and workloads as potentially impacting on the sustainability of knowledge sharing in an environment where there are competing networks. The respondents revealed four main categories that encompass sustainability. These main categories included review, leadership, accountability and institutionalisation. Leadership emerges through the promotion of the value of knowledge management, identifying opportunities to share and developing metrics for assessing the impact of knowledge sharing (Lee & Roth, 2009). A system of review and evaluation is critical for ensuring that systems are responsive to the changing culture and environment of the organisation (Mårtensson, 2000). Accountability is seen to prevent academics from operating in 'comfort zones' which is in contradiction to a knowledge sharing culture and learning environment.

5.3 Factors influencing the stability of knowledge sharing actor-network

The respondents felt that centralisation is positive as it pertains to generic knowledge that is applicable to all academics, but not discipline-specific knowledge. Centralisation of control and knowledge sharing processes was seen to be negative. Increased flexibility, as it pertains to the influence of organisational structures, will promote collaboration (Kim & Lee, 2006). Centralisation can reduce the interest in knowledge sharing due to a reduced level of knowledge sharing initiatives and a decrease in communication amongst employees and between employees and their supervisors (Kim & Lee, 2006). Centralising a knowledge resource, or systematic store of knowledge, was however found to be positive in increasing accessibility to professional knowledge to the institution at large and facilitating its dissemination (Sulisworo, 2012).

There is a link between the level of punctualisation and the power issues that could emerge out of punctualisation. The respondents revealed three variables that would generate power issues that could undermine the knowledge sharing actor-network. These variables are centralisation, self-preservation and politics. Kim and Lee (2006) suggest that participatory management practices for knowledge sharing can balance the involvement of both managers and their subordinates. Not only did Bhatt (2001) assert that the culture and procedures of an organisation must change to enable knowledge sharing, but also the power structures. Therefore, the gradual entrenchment of knowledge sharing behaviour in the organisation will not only affect the way people work, but also the power structures that existed prior to the knowledge sharing initiative.

Factors of competing networks of aligned interest were explored as factors in the work environment that would impact on the academics' willingness and the opportunity to share their knowledge. Two broad themes emerged, including the level of social networking and time. The level of social networking is perceived to have an impact on the respondents' willingness to share their knowledge while time is perceived to impact on their opportunity to share knowledge. The lack of time has been ranked amongst the top inhibiting factors of knowledge sharing while social networking is related to the organisational culture (Fong & Lee, 2009; Mårtensson, 2000).

Human factors of betrayal in the context of this research pertains to the personal factors that the respondents perceive to impact on their willingness to share their knowledge. Those respondents harbouring personal factors revealed them to be the lack of trust and recognition, the level of participation of colleagues and management support. There is an alignment with personal factors of betrayal and personal motivations to share and align with the knowledge sharing actor-network. Daud and Sohail (2009) found management support to be a significant predictor for positive knowledge sharing. Lack of trust and the level of participation of colleagues might go hand in hand, as Kim and Lee (2006) consider both to be factors of organisational culture.

The broad themes that have emerged as the factors relating to technology include the lack of or insufficient knowledge sharing IT resources, insufficient IT support, technical difficulties or accessibility to IT resources, task technology fit and skill in using IT resources. Some of these factors are attributed the fact that knowledge sharing is not an established practice in the institution. Technical problems seem to have a negative impact on opinions about using technology. These perceptions, however, stem from existing problems, not necessarily in a knowledge sharing context. Accessibility pertains to mobility, which satisfies the culture of the institution. Task technology was one of the most important issues to the respondents after the reliability of technology, as this is important for defining the role of technology in the knowledge sharing actor-network. Skill in using technology, however, seemed to be the prevailing factor that would undermine the role of technology as an actor in the knowledge sharing actor-network. Skill in using IT resources is composite of the perceived ease of use of IT applications, lack of skills, and lack of training. Without the proper training, HEIs cannot expect technology to be effective in facilitating knowledge sharing (Lee & Roth, 2009). The perceived ease of use and lack of skill could eventually lead to the unwillingness to use applications and as such impact on the level of utilisation of IT applications. The factor of insufficient knowledge-sharing IT resources as discovered in this research, however, shows that there is a need for IT to support knowledge

sharing activities, as long as there is an abundance of tools for interaction, are easy to use, and helps its users to locate knowledge required for professional application (Carroll, Choo, Dunlap, Isenhour, Kerr, MacLean & Rosson, 2003).

The analysis revealed that processes rank as the most important enabler for knowledge sharing. This provided an indication of where there are shortcomings. The role of processes in the actor-network is that of a facilitator. Process factors included the lack of management of processes, process structure, lack of guidance and the organisational culture. Sulisworo (2012) and Rowley (2000) emphasised the importance of consciously and explicitly managing knowledge sharing processes while Biasutti and El-Deghaidy (2012) suggested that knowledge sharing processes must be integrated into the daily routines. The process structure was important to the academics, as it was raised as a factor by the majority of the respondents, with the focus on manageability. The lack of guidance relates to guidelines for sharing and training for utilising processes. When new tools, technologies, processes and procedures are employed for knowledge sharing, the organisation must update the skills of its employees to adapt to these changes (Bhatt, 2001). The respondents also felt the organisational culture will impact on the uptake of knowledge sharing processes. This is because in the absence of trust, even formal methods of sharing are insufficient to encourage sharing with others in the same environment (Kim & Lee, 2006).

5.4 Factors influencing the institutionalisation of knowledge sharing actor-network

The respondents offered their views on how knowledge sharing can be formalised, including implementing processes, incorporating a structured, systematic platform, using technology, offering support, standardisation, and institutionalisation. Support manifested in various forms, including that of management, training support and administrative functions. The notion of support shows that the emphasis within the institution is on enabling, rather than coercing, staff to share knowledge. Both standardisation and institutionalisation lead to formalisation. Standardisation focuses on formulating and implementing the guidelines that ensure order and uniformity in the context of knowledge sharing. Institutionalisation aims to integrate knowledge sharing into the workloads of staff so that a knowledge sharing culture is institutionalised. Kim and Lee (2006:374) define formalisation of employee knowledge sharing as "the degree to which organisational activities are manifest in written documents regarding procedures, job descriptions, regulations and policy manuals".

The findings that emerged from the analysis served to inform the development of the general framework in Figure 3 which follows. The framework is guided by the theoretical framework of ANT and the problem conceptualisation in Figure 1. The general framework represents new knowledge about knowledge sharing in the academic domain from the perspective of the participants in the research. The framework in Figure 3 demonstrates a new approach to knowledge sharing where the knowledge sharing strategy of the institution is aligned to ANT.

6 Conclusion and recommendation

6.1 Introduction

This research set out to determine the factors that affect knowledge sharing amongst higher education academics. The factors were explored using ANT as a theoretical lens. Therefore, this research presented a novel way of exploring knowledge sharing factors. A similar study has not been undertaken and hence there are no studies that have presented results similar to that expected by the researcher for the academic context. However, the literature did provide the background to what would constitute the actors in a knowledge sharing actor-network, or the main themes of the research. The themes were based on the prevailing factors in the literature that impact on knowledge sharing not only in the business context but also in academia. The main research objective was to develop a framework to guide the implementation of knowledge management strategies for the higher education context. In order to achieve this objective, four research questions had to be explored to reveal factors affecting the formation, growth, stability and institutionalisation of a knowledge sharing actor-network.

6.2 Summary of findings

The findings of this study support the problem conceptualisation in Figure 1. Effective knowledge sharing is achieved when people, processes and technology come together. This study affirms these concepts to be a socially constructed phenomenon, as people continuously have an influence on the processes and technology that support knowledge sharing. The exploration of problematisation in this context revealed process factors to receive significant focus before human and technology factors. The organisational culture and management support emerged as the most important human factors, influencing several areas of the framework, including factors influencing the formation, growth and stability of the actor-network. Management is identified to hold a significant position in influencing the uptake and sustainability of knowledge sharing. Factors of technology and processes were centred on facilitating opportunities to share and ensuring effectiveness and

efficiency. Hence, they are reported to hold a significant influence on enabling and sustaining knowledge sharing. People, process and technology factors that emerged indicate that knowledge sharing as a process is not yet well established and thus the factors for the formation and growth of a knowledge sharing actor-network are important. This is why nurturing a culture for knowledge sharing, and leadership and support have emerged as human factors. Technology factors relate mainly to the provision of suitable IT and support, and process factors are centred on identifying and creating opportunities to share, as well as making provision for sharing in the core responsibilities of the academic staff. Factors of institutionalisation affirm the need for a certain level of formalisation in the higher education context. The findings show that the culture of the institution has determined its entrenched behaviour.

The views of the respondents show that management are tasked to embody the leadership skills that are required for the gradual assimilation of the principles of knowledge sharing in the institution. Management support is a very important factor, as leadership is seen to be important for the promotion of the value of knowledge management, identifying opportunities to share and developing metrics for assessing the impact of knowledge sharing. The findings also suggest that knowledge sharing strategies should adopt a blend of personal interaction and technology-based approaches. Hence the approach to knowledge sharing is context driven and designed around the shared culture of the institution. The outcomes of this study has contributed to the development of a general framework for the formation, growth, stability and institutionalisation of knowledge sharing to guide the development and implementation of knowledge sharing strategies not only in higher education but in every organisation.

6.3 Research implications and recommendations

The structure of the institution suggests the focal actor should change at different points in time during the translation process. The initial stages of the translation process could be driven at the institutional level so that supporting departments could also share in the interest of the actor-network from an enabling point of view. For interessement it is recommended that institutional-level management negotiate with a representative of the faculty, being the dean. This way the dean can negotiate with the respective heads of departments (HOD), and the HODs with their respective departments. This is more suitable given the different cultures of each faculty and of each department within a faculty. The HOD possesses management and academic experience, liaising not only with their academic staff, but also with higher levels of management. Furthermore, power issues are less likely to eventuate in a situation where

management simply play a supportive role while the HOD drives the knowledge sharing within their respective departments. The focal actor should show sustained support for knowledge sharing to enable a culture for sharing, and this culture should be nurtured during interessement. Stagnation in positions can lead to the idea that knowledge acquisition is not necessary.

Therefore rotation in positions such as subject coordinator, teaching different subjects, and academics sitting on committees can prevent staff from creating silos and also serve to nurture a knowledge sharing culture through sustained learning. Senior staff members also need to provide guidance in knowledge sharing within their departments to encourage younger staff to share their ideas. The workload model ideally should incorporate knowledge sharing as a core responsibility, such as time allocation on timetables for staff to meet. A centrally accessible knowledge sharing platform that not only houses a knowledge repository, but is able to push knowledge to relevant persons, is needed. It creates a store of knowledge, or collective memory of the institution. This will enable knowledge resources to be harnessed in a systematic manner. Processes must be carefully designed to consider the needs of the users, or academic actors. The strength of the knowledge sharing actor-network lies in the ability to integrate knowledge sharing processes into daily work processes. The structure of the institution lends itself to varying levels of punctualisation. The unique nature of knowledge at these varying levels need to be shared, which implies that a punctualised actor be formed at the institutional level. However, sharing must be more vigorously pursued at lower levels, such as within subjects and departments, as these are the kinds of knowledge that academics encounter on a daily basis and which is more dynamic. Here tacit knowledge is exchanged through personal, non-formal methods to improve on the way that academics perform and improve effectiveness and efficiency. The infrequency of sharing at the faculty and institutional level means that sharing can occur on technology-based platforms where these kinds of knowledge can be kept and where change is infrequent. A less dynamic knowledge environment would require non-personal or formal methods of sharing knowledge, such as through knowledge repositories. Here the academics are not required to meet on a personal basis, which means that they are able to retrieve only that knowledge which is applicable to them.

Given that the aligned interest should be a collective interest of the entire institution, it should be interpreted as a strategic plan and should be put into practice via a policy with guidelines for what must be shared and how it must be shared. The policy and the guidelines should be drafted in consultation with the academics and key players. Implementing knowledge sharing is not a once-off initiative but a continuous process of consultation and revision in response to the

changing dynamic of the institution (Sulisworo, 2012). This will prevent irreversibility. Management need to review knowledge sharing strategies to ensure that systems are responsive and not rigid. This can be achieved through annual knowledge sharing strategy review workshops with knowledge champions to gauge the suitability of the current knowledge sharing strategies to change in response to the changing needs of the academic actors. This would require processes and technology to change in order to prevent the betrayal of these actors. Training should also be part of the efforts to institutionalise knowledge sharing. Training should not only address the technological skills gap, but also be aimed at equipping individuals with the skills for knowledge sharing processes. The general framework in Figure 3 could also be used in contexts other than the academic domain to align the

development and implementation of a knowledge sharing strategy to ANT. The knowledge sharing strategy should emerge out of problematisation. Out of the strategy, or its annual reviews, will come new policies, guidelines and procedures which will inform, formalise, direct and establish the roles of people, technology and processes for the knowledge sharing actor-network and entrench knowledge sharing in the organisation. The interessement stage of translation should involve the development of knowledge sharing policy, emerging out of the knowledge sharing strategy. Enrolment of the actors should involve the development of guidelines for the actors and mobilisation will achieve institutionalisation of knowledge sharing through integration of knowledge sharing in the procedures of the organisation.

Figure 3. General framework
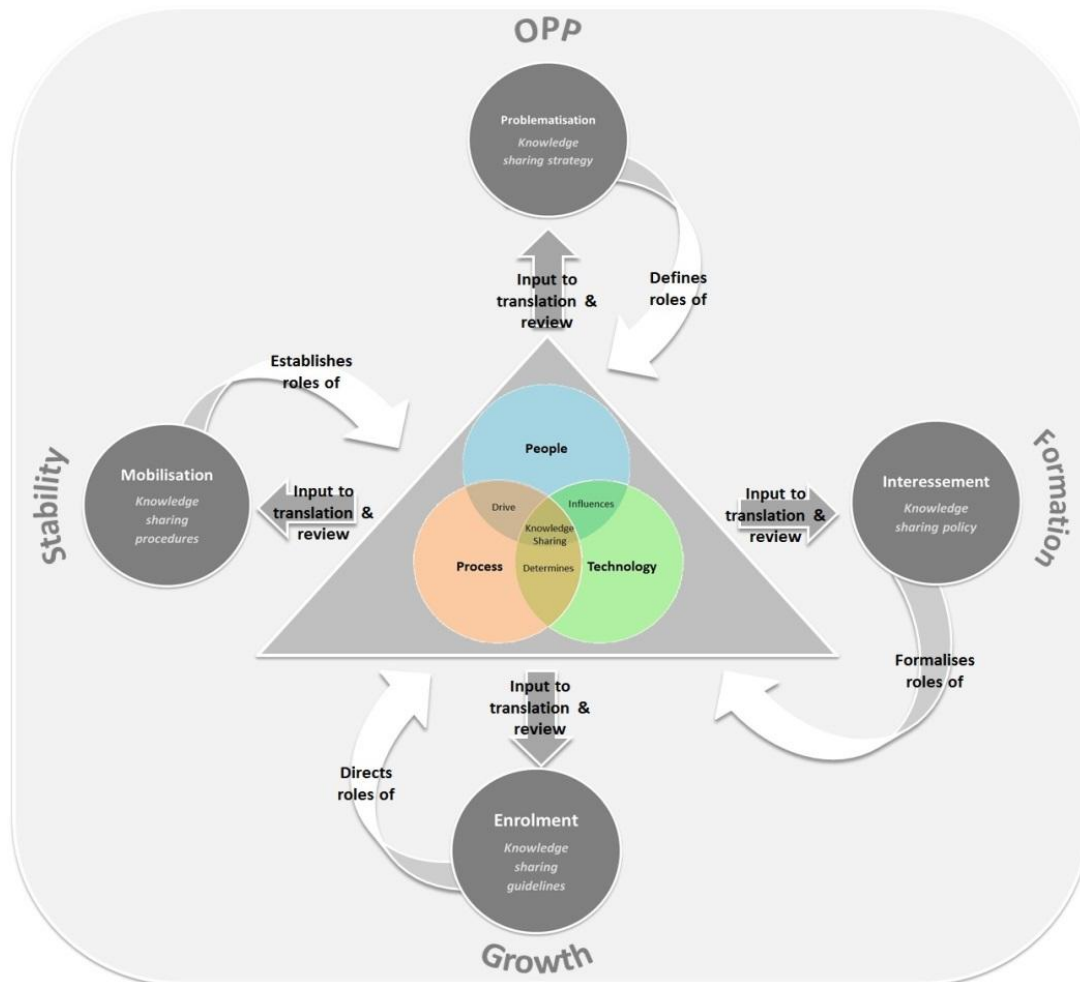
6.4 Research limitations and future research

Although this research has followed a rigorous process of analysis, the findings should be considered with caution due to some limitations of the research. The research utilised data that were collected from a single

institution. Therefore the findings cannot be interpreted for contexts beyond the institution of study. Future research could replicate this study in other HEIs to validate these findings and verify the external validity of the findings. Future research could also use quantitative techniques to further validate the findings in other HEIs. Quantitative methods of

survey are more reliable and have higher validity than qualitative interviews and would improve the generalizability of the data. This research only focused on academic employees of an HEI. Future studies could include supporting departments, as it has emerged that they have an influence on the overall effectiveness and efficiency of the institution. It should also be noted that the institution under study did not have established knowledge sharing processes, and as a result the findings for an institution that already engages in formal knowledge sharing activities might reveal different factors. Future studies could compare the factors that emerge out of such institutions with those institutions that do not have mature knowledge sharing processes. Furthermore, the dynamics of a UoT may be different to that of a traditional university. Future studies could explore these differences. Given the novelty of this research and the scant use of ANT as a guiding framework in a study focusing on knowledge sharing, further studies should explore whether these factors are in fact specific to the case or if there are overlapping factors between different HEIs. Further studies could also use a similar methodology in the corporate context. It should be determined whether the same research instrument will generate similar or different results for a different context.

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