UNIVERSITY OF KWAZULU-NATAL

KNOWLEDGE CREATION AND TRANSFER AMONGST POST-GRADUATE STUDENTS

A RESEARCH PROJECT

BY

KREESEN NAICKER

A dissertation submitted in part fulfilment of the

Requirements for the degree of

Masters in Commerce (Management)

School of Management, IT and Governance

College of Management Studies

Co-Supervisors: Mr. K. Naidoo and Professor K. Govender

2014

PERMISSION TO SUBMIT FOR EXAMINATION

DECLARATION

I Kreesen Naicker declare that:

(i) The research reported on in this dissertation/thesis, except where otherwise indicated, is my original research.

(ii) This dissertation/thesis has not been submitted for any degree or examination at any other university.

(iii) This dissertation/thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

(iv)This dissertation/thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

a) Their words have been re-written but the general information attributed to them has been referenced:
b) Where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

(v) This dissertation/thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the dissertation/thesis and in the References sections.

Signature:

Kreesen Naicker (203505637) Date: 28/11/2013

ACKNOWLEDGMENTS

Upon completing my research I would like to express my sincere appreciation and heartfelt gratitude to the following persons and institutions:

I would like to thank Mr. K. Naidoo and Professor K. Govender for agreeing to be my supervisors. Thank you for your information, critique and valuable advice; you have been very good supervisors.

I would like to acknowledge my parents for pushing me to achieve my goals and always being there for me throughout this post-graduate degree. To my dad, thank you for sacrifices you made to get me to where I am today – I will never ever forget this. Thank you mom and dad for your love, guidance, inspiration, support and belief in me. You have showed me to never to give up and to persevere through adversity.

To my older sister Aveshni, thank you for setting the bar and showing me the correct path to follow in life.

To my younger sister Renita, thank you for assisting me with the data capturing, proof reading my research proposal and the dissertation. Thank you for the encouragement to achieve my goals.

To my respondents, thank you for taking time out to answer my questionnaires. I truly appreciated your assistance during the mid-weeks of October.

I would like to thank Ms. AB Pearce for her assistance throughout these past few years, and her unwavering dedication to assisting post-graduate students. The University of KwaZulu-Natal is truly lucky to have you as part of their team.

To the lecturers from the School of Management, IT, and Governance and everyone else who I have not named per se but who has in some way contributed, I thank you.

ABSTRACT

Knowledge is believed to be the last competitive advantage that organizations have, be it academic or corporate, small to medium enterprises, and non-government and government organizations. The knowledge that an organization has stems from the individuals they develop and the tangible and intangible resources available. The skill shortages, hyper-competitive economic environments, and untapped economies that exist have created great deal of focus in knowledge. Continuously creating and transferring the valuable resource of knowledge is integral for every organization.

The purpose of the research project is to address by what methods post graduate students are generating along with transferring knowledge in the School of Management, IT, and Governance at the University of KwaZulu-Natal. The primary focus of the research project is established from the knowledge (SECI) spiral model which was developed by Nonaka and Takeuchi (1995), and the knowledge conversion modes that are embedded within the knowledge spiral.

An extensive literature review was carried out to gain valuable insight and understanding of the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995). The literature review focused on the interpretations of tacit and explicit knowledge, the interplay between the two concepts (knowledge conversion), the knowledge spiral, the theory of Ba, the knowledge enablers, as well as the building blocks of the knowledge spiral - data, information, and knowledge. An e-mail and personally administered questionnaire survey was employed to collect data from post-graduate students at the School of Management, IT and Governance in the University of KwaZulu-Natal. The data was analyzed and utilized to distinguish in Nonaka and Takeuchi's model is in use or not based on the four modes of knowledge conversion. Frequency tables provided the researcher with a means to study differences between respondents. What has been identified is that the School of Management, IT and Governance in the University of KwaZulu-Natal has the mechanisms in place to facilitate knowledge creation and transfer but tend to focus on the four modes of knowledge conversion in varying degrees.

TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION

CHAPTER 2 - LITERATURE REVIEW

CHAPTER 3 - RESEARCH DESIGN AND METHODOLOGY

TABLE OF FIGURES

TABLE OF TABLES

CHAPTER 1

INTRODUCTION

1.1. Introduction

Information on demand is a powerful aspect of the mode in which academic organizations, teams and individuals operate. There is a constant need for academic organizations, teams and individuals to accelerate the communication of information and knowledge to each other and organizations outside the academic sphere (Nelson & Economy, 2005). An individual often has a tendency to protect their knowledge, experience, and ideas; selectively release the knowledge; or often afraid to engage in knowledge transfer. This tendency for an individual to stockpile knowledge is often cited as a core problem when working in a team and, the cause of poor collaboration between team members (Gilmour, 2003). In order to leverage on innovation as one of the most important sources of competitiveness and success, academics have to have access to and mobilize their knowledge resources (Voelpel, von Pierer & Streb, 2006).

Rai (2011) agrees with Nonaka (1994) and Nonaka, Toyama, and Konno (2000), and asserts that the logical exercise of generating knowledge requires ‘‘Ba’’ or shared context. Rai (2011:783) stresses Nonaka and Konno’s (1998: 41) idea of *Ba*; the concept is key in providing the impetus to proceed through the knowledge spiral. New problems are solved by academics through knowledge generation and development, and the application of existing knowledge, and then further development and application of the awareness through problem solving. Knowledge creation at an academic institution is a repetitive transformational process, through which the acquisition of a new context specific understanding transforms one to the new self by transcending the boundary of the old self; a new view of the world is obtained. As knowledge is created through the interactions amongst individuals and their environment; knowledge creation and transfer focuses on the knowledge

(SECI) spiral model developed by Nonaka and Takeuchi (1995) is reliant on single (individual) and multiple (environment) interactions and transformations occur at both levels. One is effected by and effects the environment with which they interact (Little, Quintas & Ray, 2002). Generally knowledge consists of two distinct elements, namely, explicit and tacit knowledge. Hautala (2011: 605) explains that, "Academic knowledge aims at creating or exploring the new. It is formed of tacit and explicit elements, as well as theory and practice (Carley and Palmquist, 1992; Nonaka and Takeuchi, 1995). Tacit knowledge is a personal, contextual and practical entity that is difficult to communicate (Polanyi, 1966). For example, balancing a bicycle to ride it requires tacit knowledge which is not easy to explain to someone who has never actually ridden one. Similarly, understanding and conducting a research project as part of an academic field, research group and society includes tacit knowledge (Hautala, 2011: 605). "

The argument put forward by Davenport and Pusak (1998: 81) is that "codifying tacit knowledge is difficult, but that its substantial value makes it worth the effort." Even though some academics and subject matter experts oppose the theories relating to the codification of tacit knowledge, the value and competitive advantage that it may bring to the organization is a key factor in exposing this particular intangible asset (Suppiah and Sandhu, 2011). The conscious decision for the modern organization to generate new understanding, share experiences, and store the new and existing knowledge in repositories is a primary means to compete (Hayashi, 2004). Nonaka and Takeuchi's (1995) knowledge (SECI) spiral theory face many organizational difficulties, however, by gathering and synthesizing multiple sources of specialized knowledge the difficulties may be overcome. The ability to gather external knowledge and synthesise existing internal knowledge will result in positive outcomes. The internalization of knowledge represents the acquisition of external sources of knowledge, while internal knowledge integration captures an experience shared among individuals (Sandhawalia and Dalcher, 2011).

In light of the above, this study/research project focuses on which of the four modes of knowledge conversion assists post-graduate students to access information on demand. Moreover, the study reflects on why a post-graduate student holds or shares their

knowledge when working in a team, and to ascertain whether post-graduate students feel comfortable expressing their experiences, opinions, thoughts and other information they have gathered. The study also ascertains if post-graduate students are disseminating data and information, and applying existing knowledge to solve new problems; and does a common environment and understanding create a space for interaction with the data, information, and existing knowledge, that is, is interaction pivotal to create and transfer knowledge. Furthermore, the study assesses whether post-graduate students prefer interacting with the tacit or explicit sources of knowledge, or do both sources of knowledge play an integral role when engaging in knowledge creation and transferring activities. It is widely accepted that one possesses knowledge that is personal and understandable to them which is difficult to transfer, this knowledge is known as tacit knowledge (Alavi and Leidner, 2001; Polanyi, 1966; Nonaka and Takeuchi, 1995). Therefore, the study establishes through an assessment of the knowledge spiral, if extracting this tacit knowledge and/or engaging with explicit knowledge is essential to transcending from the old self to the new self, that is, for a paradigm shift to come about for a post-graduate student.

1.2. Problem Statement and the Research Question

The influence of the knowledge (SECI) spiral theory developed by Nonaka and Takeuchi (1995) has not been investigated to ascertain its impact on post-graduate students. Little evidence also exists of its application in tertiary institutions within South Africa. Furthermore, the use of the knowledge conversion spiral to understand how post-graduate students create and transfer their knowledge has not been widely researched.

The Post-Graduate students' in motivations for creating and transferring knowledge are not well documented. As post-graduate students are affected by changing environmental conditions, which have re-defined the conventions that are used to rule relationships between individuals and the academic institutions, urging for a deeper understanding of knowledge creation and transfer mechanisms is pivotal. Knowledge creation and transfer is fundamentally, the capturing of tacit and undocumented/unstructured knowledge and

transforming it into explicit and documented knowledge (Gorelick, Milton & April, 2004). If knowledge is not created and transferred amongst post-graduate students, tacit knowledge will not be converted into explicit and there will be no mechanisms in place to extract this knowledge. It will be unknown how socialization, externalization, combination and internalization drive knowledge creation and transfer amongst post-graduate students at the School of Management, IT and Governance at the University of KwaZulu-Natal.

After a close examination of the problem statement, the researcher is able to define the research question as follows:

How are post-graduate students in the School of Management, IT and Governance at University of KwaZulu-Natal creating and transferring knowledge?

1.3. Objectives of the Research

The research project's ambition is to explore how knowledge is created and transferred among Post-Graduate Students in the School of Management, IT and Governance, using the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995).

The objectives which guide the research project are:

- To explore how knowledge is created and transferred amongst the post-graduates students,
- To determine which of the four modes of knowledge conversion, that is, socialization, externalization, combination, and internalization, are mainly utilized in the knowledge creation and transfer process,
- To ascertain if post-graduate students transcend from the 'old self' to the 'new self' when engaging in knowledge creation and transfer, and
- To determine the most trusted of source of information and knowledge used by post-graduate students.

1.4. Research Questions

The research questions are as follows:

- How is knowledge created and transferred amongst the post-graduates students?
- Which of the four modes of knowledge conversion are utilized predominantly in the knowledge creation and transfer process?
- Are post-graduate students transcending from the old self to the new self when engaging in knowledge creation and transfer?
- Which is the most trusted of source of information and knowledge used by post-graduate students?

1.5. Significance of the Study

This study of how knowledge is created and transferred amongst Post-Graduate Students in the School of Management, IT and Governance provides exploratory insights into the way an intangible asset like knowledge is transformed into a valuable organizational re-source. Knowledge has always been around, but what organizations may lack are the technologies to store their knowledge into a central repository (Serenko, Bontis, Booker, Sadeddin, and Hardie, 2010; Davenport and Prusak, 1998). Knowledge strategies and knowledge in the different fields of study are constantly changing due to hypercompeti-tive markets and as a result, a strong knowledge pool is needed to manage resources, people, information, finance and technology effectively. Talented, flexible and intelligent individuals are in many ways improvising on common assignments, and bringing their own special skills and knowledge to their teams (Voelpel, von Pierer & Streb, 2006; Davenport and Prusak, 1998).

The findings of this study may be beneficial to future researchers who would specialize in researching specific knowledge management activities established on the knowledge (SECI) spiral theory developed by Nonaka and Takeuchi (1995), or those who would like to build on areas that they feel needs further concentration.

1.6. Limitations of the Study

The study is based on a small sample of Post-Graduate students at the University of KwaZulu-Natal (UKZN), compared to the total number of registered Post-Graduate students at the UKZN and at other tertiary institutions within South Africa. Thus, the findings may not be generalizable to the all of the Post-Graduate at UKZN, or the country.
In relation to the literature review, there are not many documented studies with regard to the knowledge (SECI) spiral theory developed by Nonaka and Takeuchi (1995) and the knowledge creation and transfer process in South Africa, and therefore may be a shortcoming, as mostly European, Asian and American literature is used.

1.7. Organization of Study

The first of five chapters will be an introduction into the background to the research, which will focus on the knowledge creation and transfer amongst the post-graduates students. In addition, the first chapter focused on the problem statement, objectives of the research, significance of the proposed study, and the limitations of the study.

The second chapter will look at some literature addressing various authors' views pertaining to data, information, knowledge, knowledge conversion, the knowledge (SECI) spiral model, the concept of Ba, and knowledge enablers. The literature review will comprise of text books, articles, journals, and research papers. Moreover the chapter will predominantly focus on the knowledge (SECI) spiral model, the genesis of the knowledge spiral, and the conditions for the model. In addition, the second chapter will include an important diagram/model of Nonaka and Takeuchi's (1995) knowledge (SECI) spiral model.

The third chapter will comprise of the theoretical framework, and research design and methodology of the study. It will look at how the sample was determined, and the methods to be used for data collection. Chapter three will focus on the type of study undertak-

en, whether the study makes use of qualitative or quantitative research methods or both. In addition, the chapter will look at whether the study is cross-sectional or longitudinal, the sampling design, and finally the measurement.

In the fourth chapter, the findings will be reported and discussed. In addition, the chapter will focus on how knowledge is created and transferred amongst the post-graduates students; which of the four modes of knowledge conversion, that is, socialization, externalization, combination, and internalization is utilized predominantly in the knowledge creation and transfer process; and finally are post-graduate students in the School of Management, IT and Governance transcending from the old self to the new self when engaging in the knowledge creating and transfer activities.

The fifth chapter consists of bringing the research study to a conclusion. The chapter will consist of the conclusion from the findings, recommendations from the conclusions, and opportunities for future studies.

1.8. Conclusion

In conclusion, the researcher will leave no stone unturned to investigate and ascertain the influence and impact of the knowledge (SECI) spiral theory developed by Nonaka and Takeuchi (1995) on post-graduate students in the School of Management, IT, and Governance at the University of KwaZulu-Natal. The next chapter, namely, the literature review, is to ensure that no important variable is ignored to determine its impact on the research, and specific sources of data and information of published and unpublished works are comprehensively reviewed by the researcher.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

In light of the aforementioned, this chapter focuses on the literature review. Moreover, the context for the research project objectives and research questions are set in this chapter of the study. This chapter has a direct bearing on the following three chapters. Serenko, Bontis, Booker, Sadeddin, and Hardie (2010) deem that the field of knowledge management is appealing and valuable discipline for an organization to pursue; the core concepts contain multi-disciplinary perspectives, and the field itself has been in the sight of many for over a decade. The aforementioned authors further argue that knowledge management is still considered to be in its embryonic stages and they demonstrate that though knowledge management has its own conceptualizations, theories, refereed journals, academic courses, and productivity rankings and citation impact measures, which are considered critical attributes of an academic domain – the eventual goal is to establish a unique identity of knowledge management as a scholarly field and to gain recognition among peers, university officials, research granting agencies, and industry professionals (Serenko, Bontis, Booker, Sadeddin, and Hardie; 2010).

Donate and Canales (2012) believe that the knowledge economy is a reality, and many organizations, leaders, academics and subject matter experts could attest to this. The paramount importance of knowledge has been recognized by many scholars in recent years, and knowledge is different to that of tangible resources, in that it grows when used. In contrast, most tangible resources tend to depreciate with use, whereas when one person transfers knowledge to another, both now have access to and share that knowledge. An example of this being lecturers sharing knowledge with post-graduate students, or post-

graduate students sharing knowledge amongst each other. In practice, the process the giver uses to access knowledge may result in him/her seeing the subject from a new perspective, as well as allowing the receiver to combine the new knowledge with that gained from previous experience to generate a completely new insight (McKenzie and van Winkelen; 2004). It is more and more imperative to cope with the challenges of creating, sharing and applying knowledge in order for knowledge to produce desired outcomes (Donate and Canales, 2012).

Before concepts such as tacit and explicit knowledge, the interaction between the concepts (knowledge conversion), the knowledge (SECI) spiral, the concept of Ba, and the knowledge enablers are discussed, it is important to understand data, information, and knowledge, which are the building blocks of knowledge management. Any grasp of data and information paves the way for understanding knowledge, along with its creation and transfer activities.

2.2. Data, Information, Knowledge and Knowledge Management

According to Boisot and Canals (2004:43), "some associate information with data and others associate information with knowledge". Stair and Reynolds (2001) assert that data consists of raw facts, and Davenport and Prusak (1998) in Qureshi, Briggs, and Hlupic (2006) suggest that a set of facts which are unbiased and distinct as result of it being context specific is known as data. The aforementioned authors view data as a collection of simple facts, and it lacks any meaning outside the context it was collected. Signs, symbols, characters and figures are not accurately understood even if one recognizes them if there is a lack of shared context (Qureshi, Briggs, and Hlupic, 2006). Data is a product of observation; information is a transformation of data into a more effective and usable forms (Dadzie, Lanfranchi, and Petrelli, 2009).

Information is considered as the understanding of the relationships among data in the context in which they are presented (Qureshi, Briggs, and Hlupic, 2006). Boisot and Ca-

nals (2004:44) provide the following example to understand the term information, ". . . receiving an encrypted message for which you possess the key and from which you extract the following information: 'The cat is tired'. Unless you possess enough contextual background knowledge to realize that the message refers to something more than an exhausted cat – possibly a Mafia boss, for example – you may not be in a position to react in an adaptive way. To understand the sentence is not necessarily to understand the message. Only prior knowledge will allow a contextual understanding of the message itself, and the message, in turn will carry information that will modify that knowledge."

Suppiah and Sandhu (2011) pose an effective question, *what is knowledge?* To answer this question the authors interpret Guba (1990), and accept as truth that there is no particular widespread explanation of the term knowledge. "H*aving the term not cast in stone is intellectually useful* as the possibility of reshaping according to our understanding of its implications improves" (Suppiah and Sandhu, 2011: 464).

"Debates and discourses in knowledge management articulate the need for better understanding of the emerging community view of knowledge, where knowledge is embedded in human actions and interactions, in situated practices" (Jakubik, 2011: 375). Practices, guideline, rules, and routines generally contain knowledge, this is in addition documents and repositories where one would normally detect it. "Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information"(Rai, 2011: 780). Pinho, Rego and e Cunha (2012: 216) alludes to an array of contemporary authors (such as Kazemi and Allahyari, 2010; Zyngier, 2006; Chen et al, 2010) to advise that the objective of knowledge is to achieve the truth, that is one's personal belief is justified through dynamic interactions. To achieve organizational success, tacit knowledge should be dynamically managed. Therefore, managing this knowledge is one of the central challenges of our time, and extracting the experience and understanding one has in an organization is essential to attain this invaluable resource ((Pinho, Rego and e Cunha; 2012) and (Rai; 2011)).

Rai (2011) points out that there are multiple definitions for knowledge management. The first definition acknowledges that the creative capacity of human beings combined synergistically with information technologies is used to process data and information. ‘‘A systematic and integrative process of coordinating organization-wide activities of acquiring, creating, storing, sharing, diffusing, developing, and deploying knowledge by individuals and groups in pursuit of major organizational goals’’(Rai, 2011: 781) is the second definition worth mentioning from Rai's paper. People have incorporated managing knowledge in their daily routines for quite some time (Suppiah and Sandhu, 2011). For knowledge management to flourish an ecosystem that motivates individuals to share experiences and understanding must exist to ensure data has context and encourage information flow, which is critical to producing new usable useful knowledge (Pinho, Rego and e Cunha, 2012).

Teams and persons create, develop, share, and store knowledge through the facilitation of management (Suppiah and Sandhu, 2011). Ngcamu (2009) affirms that technology, people, and processes once integrated require management measures. Organizational achievement is dependent on individuals and teams receiving the right information at the right time, and an important aspect of knowledge management (Pinho, Rego and e Cunha; 2012: 217).

2.3. Tacit and Explicit Knowledge

Arling and Chun (2011: 232) are not the first or the last author’s to state that “Nonaka’s theory is based on Polanyi’s (1966) notion that there are two types of knowledge, explicit and tacit.” Joia and Lemos (2010: 412) propose that Nonaka and Takeuchi’s (1995) new outlook with regard to knowledge in an organizational setting, has its origin from Michael Polayani’s work on personal knowledge. Joia and Lemos (2010: 412) presented explicit and tacit knowledge as core elements of organizational knowledge, which are distinctive from each other. McNichols (2010: 25) makes known that “one of the earliest and best known method’s to classify knowledge is the discrimination between tacit and

explicit knowledge." Polanyi (1966:4) noted, '*We can know more than we can tell*', distinguishing that all awareness of information (knowledge) as either tacit or explicit knowledge. "Polanyi (1966) categorized knowledge into two types: explicit knowledge and implicit (tacit) knowledge – the extent to which the knowledge consists of implicit and non-codifiable skills or 'know-how'. Explicit knowledge can be codified and easily articulated since it can be expressed formally and systematically. Thus, this type of knowledge is easy to learn and disseminate" (Wang and Han, 2011: 804).

"Explicit knowledge can be articulated, codified and transmitted in some type of symbolic form or natural language" (Arling and Chun, 2011: 232). Knowledge that is documented and distributed, logical, and is objective in nature is known as explicit knowledge. Rai (2011:781) implies that "Knowledge may dynamically shift between tacit and explicit over time, but some knowledge will always remain tacit."

Oguz and Sengün (2011: 446) put forth the argument that understanding human knowing was the incentive that drove Polanyi to bring tacit knowledge to the fore, thus the origin of the concept is embedded in his pioneering writings. Tacit knowledge is an antonym to explicit knowledge. Rai (2011: 781) by taking to Polanyi (1966) reveals that "Tacit knowledge, also known as embedded and sticky knowledge, is subjective and experience based knowledge, which cannot be expressed in works, sentences, number or formulas, etc. This also includes cognitive skills such as beliefs, images, intuition, and mental models as well as technical skills such as craft and know-how." "Tacit knowledge has a personal quality, and is rooted in action, commitment and involvement in a specific context. Tacit knowledge is difficult to articulate, and is often characterized as personal skills, mental models and 'know-how' that are deeply ingrained in an individual" Arling and Chun, 2011: 232). Rai (2011: 781) by evaluating Nonaka and Konno (1998) proposes that "Tacit knowledge is deeply embedded in an individual's actions and experience as well as in his/her ideals, values, or emotions." Inner individual processes results in tacit knowledge, that is, experience, reflection, internalization and individual talent leads to the generation of tacit knowledge (Joia and Lemos, 2010). As tacit knowledge is personal

and intangible, it is a factor for sharing. Knowledge creation, sharing, and conversion require explicit and tacit knowledge to complement each other.

Formal and informal tacit knowledge transfer requires a trusting relationship to reduce uncertainty and increase the willingness to share amongst individuals and groups. The key components of tacit knowledge, namely, understanding and experience is often transferred through face-to-face communication. The transfer of tacit knowledge is by no means a voluntary action. The individual in a group/social context should make their peers aware of the tacit knowledge they possess, thus reducing the groups limited awareness. Tacit knowledge distribution may be perceived as a risk for individuals; principally as one may deduce that their competitive advantage over peers will dwindle away (Holste and Fields, 2010).

2.4. The Genesis of the Knowledge (SECI) Spiral Process

Knowledge is sought and shared in a global arena, whether be it at a corporate or academic level (Hautala, 2011). McKenzie, van Winkelen and Grewal (2011: 403) plainly argue that "Sound decisions rely on having the right knowledge in the right place at the right time, to be able to act effectively. ''Right'' knowledge may be different for every decision – some decisions require only surface knowledge, some require more investigation and an evidence base, some use tacit expertise, and others creative insight, intuition and judgment." The raw materials of knowledge, which is steadfastly worked upon or continuously improved, and deliverable in almost any context; critical organizational, group, team and individual decisions is dependent on what knowledge to use when. Organization achievement is dependent on effective and efficient knowledge management activities, this even though there are differences among the knowledge definitions as agreed to by many academics and practitioners (Rai, 2011). To determine if new knowledge is "new", the term knowledge must be defined. Knowledge as defined by

Arling and Chun (2011), rational understanding increases an entity's capability for a compelling reason to act.

The groundwork of new knowledge creation is directly linked to the formalization of knowledge through tacit to explicit knowledge transfer. The subsequent us of analogy, metaphors, and models determines if tacit knowledge into explicit knowledge has been successfully converted (Rai, 2011). The materialization of new knowledge always begins with the individual. A resourceful individual may become conscious of a position that has not been developed which may lead to the growth/advancement of a product, service or theory. The knowledge creating company requires its employees to make their individual personal knowledge available to the organization, the intangible knowledge once made explicit for a specific context, is valuable to the company. (Nonaka, 1998: 26) argues that "it takes place continuously and at all levels of the organization". The exchange between tacit and explicit knowledge, results in personal knowledge being transformed to organizational knowledge.

Synergy between tacit and explicit knowledge, enables knowledge to be created, transferred, and stored. Tacit and explicit knowledge's synergistic relationship is known as knowledge conversion. Within several loops of interaction where community members share their experiences, ideals and ideas, new knowledge – individual as well as collective knowledge emerges through this process (Renzl, 2006). "Nonaka and Takeuchi (1995) popularized tacit knowledge in the management literature. Using the example of the bread master, they promoted the link between tacit and explicit knowledge. Their work legitimized the tacit-explicit dichotomy by viewing the two as separate spheres of knowledge. Even though they cited and used Polanyi (1966) approvingly, the ontological dimension of knowing remained inconspicuous. In their view, knowledge creation is the result of an interactive spiral between tacit and explicit knowledge. This rendition has been widely accepted in most of the following literature and has created the tendency to see tacit and explicit knowledge as substitutes. According to Nonaka and Takeuchi (1995), there are four ways of knowledge conversion between tacit and explicit knowledge, and these are:

1. socialization (tacit to tacit);
2. externalization (tacit to explicit);
3. combination (explicit to explicit); and
4. internalization (explicit to tacit)" (Oguz and Sengü, 2011: 446).

Nonaka (1991) provides an example of Matsushita Electric Company, the Osaka-based product developers at this organization were creating bread making machine which was meant to be a game changer in the industry. The product developers were halted as the dough kneading technique was incorrect and yielded negative results. The employees tried analyzing the problem exhaustively, but failed to come up with a solution. Software developer, Ikuko Tanaka stepped up to the plate and suggested a creative solution as well as proposed that she train in Osaka International's hotel with the head baker. Through observation she and the project engineers developed a successful product that was based on the head baker's distinctive technique of stretching the dough. The result for the Matsushita Electric Company's product was record sales in its first year for it's new product (Nonaka, 1991).

Ikuko Tanaka's innovation (the by-product of knowledge creation) illustrated a movement among the two distinct varieties of knowledge. "The end point of the movement is 'explicit' knowledge, which is the product specification for the bread making machine. Explicit knowledge is formal and systematic. For the aforementioned reason, explicit can be easily communicated, transferred, and shared, in product specifications or a scientific formula or a computer program," (Nonaka, 1998: 27). Explicit knowledge is effortless to detect and capture, but this knowledge represents only a fraction of the organizational knowledge (Mooradian, 2005). Tacit knowledge ascends to explicit knowledge, that is, a movement from the old level of awareness to a new understanding.

The starting point of Tanaka's innovation as per Nonaka and Takeuchi (1995) is from another kind of knowledge that is tacit knowledge. Dayan and Evans (2006) consider tacit knowledge as the knowledge that individuals carry around in their minds, that is, it is their experience and their expertise, and transforming it into an organizational asset is not

straightforward. The tacit knowledge stemmed from the head baker at the Osaka International Hotel. "Tacit knowledge is highly personal. It is hard to formalize and, therefore, difficult to communicate to others. . . Tacit knowledge is also deeply rooted in action and in an individual's commitment to a specific context – a craft or possession, a particular technology or product market, or the activities of a work group or team. Tacit knowledge consists partly of technical skills – the kind of informal, hard-to-pin down skills captured in the term 'know-how'. At the same time tacit knowledge, has an important cognitive dimension. It consists of mental models, beliefs, and perspectives so ingrained that we take them for granted, and therefore cannot easily articulate them. For this very reason, these implicit models profoundly shape how we perceive the world around us" (Nonaka, 1998: 27-28). Grant (2007) views tacit knowledge as the ability or skill of an individual to use their own experience and learning to resolve a problem or to do something. Grant (2007) further states that with the appropriate use of language, perhaps most but probably not all, of this knowledge can be shared between individuals. Tacit knowledge is a hidden resource; the challenge organizations face is detecting and then extracting the pertinent information. Once the data and information is brought forward, understood, and given organizational context, the knowledge can then be shared (Mooradian, 2005).

The aforementioned development led to the belief that the two forms of knowledge, namely, tacit and explicit, are mutually interdependent entities, and not entirely independent by the pioneers of the knowledge (SECI) spiral model, that is, Nonaka and Takeuchi. This led them to further develop the notion that human beings who are engaging in creative activities contribute to the two forms of knowledge synergistic relationship, and the distinct knowledge categories interchange into each other. Reciprocity is central to the tacit and explicit knowledge, through this knowledge is created, transferred, and stored. The reciprocity between the distinct forms of knowledge is known as knowledge conversion, which consists of four modes. The four modes of knowledge conversion consist of socialization, externalization, combination and internalization which are represented by Figure 2-1. The culture and leadership of the organization and team has a direct bearing on each modes success within the knowledge conversion process. After all, institutionalizing trust and facilitating knowledge creation transfer and storage

is all about creating a culture where knowledge is easier to manage (Kermally, 2002). The mode of socialization facilitates movement of intangible tacit knowledge between individuals (in this instance post-graduate students), insights which are generally not expressed aloud but are utilized on a foreign entitiy is known as externalization, the mode of combination targets the synthesis of explicit pieces of knowledge, and finally internalization is the process whereby one increases their knowledge by learning from external events (Desouza and Awazu, 2006). Girard (2006) believes that it is of paramount importance for leaders/organizations to strive to maximize the use of the knowledge conversion.

Figure 2-1: Four Modes of Knowledge Conversion

	Tacit Knowledge	*To* Explicit Knowledge
Tacit Knowledge	**SOCIALIZATION**	**EXTERNALIZATION**
From Explicit Knowledge	**INTERNALIZATION**	**COMBINATION**

Source: Nonaka and Takeuchi (1995).

Socialization (from tacit knowledge to tacit knowledge) represented by the top-left box in figure 2-1, is a mode of transferring and sharing experiences and thereby creating tacit knowledge. Socialization requires mutual trust for individuals to share experiences amongst each other. The tacit knowledge transfer may include sharing and creating mental models and world views (Rai, 2011). Handzic and Chaimungkalanont (2004) assume

that through shared experience, space, and time, tacit knowledge is shared between individuals. Mooradian (2005) implies tacit to tacit transfers bypasses explicitness and is embedded in the mind of the receiver(s). Without a verbal language being used, the attainment of tacit knowledge may occur (Kim & Trimi, 2007). Handzic and Chaimungkalanont (2004) believe that new tacit knowledge is created by interpretation of other individuals' ideas and perspectives. Despres and Chauvel (2000) view socialization as a process of sharing experiences through joint activities such as being in the same social space, this is crucial for the conversion. Kermally (2002) proposes that socialization occurs through brainstorming, informal meetings, discussions, dialogues, observation, mentoring, and learning groups. Difficult to formalize and highly personal knowledge may be difficult to obtain, however, through social interaction this knowledge may be extracted (Girard, 2006).

"An individual can acquire tacit knowledge directly from others without using language. Individuals acquire the skills and expertise through observation, imitation, and practice, and the key to acquiring tacit knowledge is experience" (Nonaka and Takeuchi, 1995: 62-63). The contacts are rather informal between individuals during this phase of knowledge conversion (Hermans and Castiaux, 2007).

Externalisation (from tacit knowledge to explicit knowledge) represented by the top-right box in figure 2-1, is a mode of creating explicit knowledge by the comprehension of tacit knowledge. New knowledge requires a platform for assimilating tacit knowledge to explicit, which may be circulated by others. Subject matter knowledge held by experts, practitioners, or specialists is characterised by the conversion of tacit knowledge to explicit easily understandable form defined as externalisation (Rai, 2011). Meaningful dialogue or collective reflection sets off the mode of externalization; teams are able to uncover hidden intangible insights and beliefs that is otherwise hard to communicate through the use of fitting metaphors or analogies (Morey, Maybury and Thuraisingham, 2002). "It is a quintessential knowledge creation process in that tacit becomes explicit, taking the shape of metaphors, analogies, concepts, hypothesis, or models" (Nonaka and Takeuchi, 1995: 64). Kermally (2002) believes that externalisation occurs through meet-

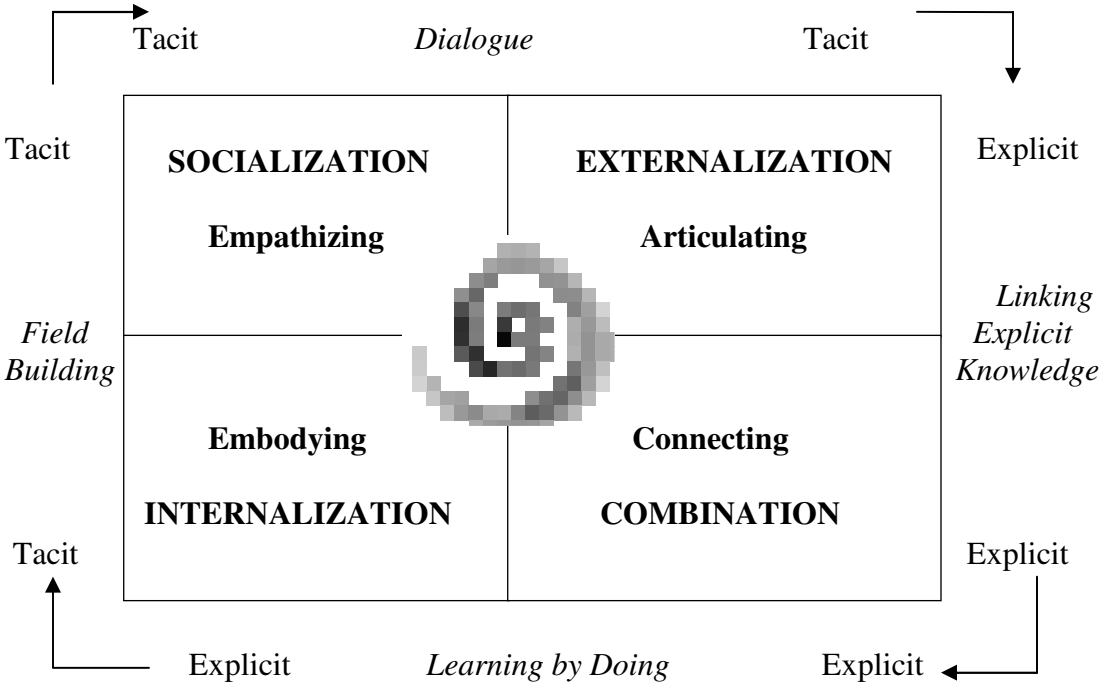
ings, building hypotheses and models, pictures to communicate, after action reviews, workshops, master classes, assignment databases, best practice exchange, diagrams, illustrations, sketches, metaphors and analogies all of which is used in clearly expressing tacit knowledge, that is normally incomprehensible in a verbal or written language. Metaphor and analogy are used to translate an individual's subjective knowledge. This tacit to explicit conversion does include a loss of precision; however, the knowledge may be shared in the public domain (Mooradian, 2005).

Combination (from explicit knowledge to explicit knowledge) represented by the bottom-right box in figure 2-1, is a mode of connecting/systemising concepts into a knowledge system. "Combination is the next stage where existing explicit knowledge is articulated, shared, and reconfigured into more complex and systematic sets of explicit knowledge . . . This process is facilitated by large-scale databases and computerised communication networks" (Rai, 2011: 783). This type of knowledge does not require face-to-face communication to transfer pertinent insight. "This mode of knowledge conversion involves combining different bodies of explicit knowledge. Individuals exchange and combine knowledge through such media as documents, meetings, telephone conversation, or computerised communication networks. Reconfiguration of existing information through sorting, adding, combining, and categorising of explicit (as conducted in computer databases) can lead to new knowledge" (Nonaka and Takeuchi, 1995: 67). Previously acquired know-how is exploited by the organization in this phase (Hermans and Castiaux, 2007).

Internalization (from explicit knowledge to tacit knowledge) represented by the bottom-left box in figure 2-1, is a mode of embodying explicit knowledge into tacit knowledge. The internalization mode is related to the lessons learned from application. "The internalization mode is the process where explicit knowledge is embodied and internalized through knowledge interpretation and is converted into tacit knowledge" (Rai, 2011: 783). Kermally (2002) proposes that internalization occurs through facilitation skills, knowledge zones, customer feedback review, and development counselling. Manuals, documents and oral stories assist explicit knowledge to develop into tacit. Valuable assets such as technical know-how or shared beliefs, images and notions are the foundation of

an individual's tacit knowledge. Reflection and practice contributes to the internalization of socialization, externalization and combination; learning by doing is closely linked to internalization. Nonaka and Takeuchi (1995: 69) are of the view that "documentation helps individuals internalize what they experienced, thus enriching their tacit knowledge. In addition, documents or manuals facilitate the transfer of explicit knowledge to other people, thereby helping them experience the experiences of others indirectly." In an organization the transfer of knowledge occurs through internalization; therefore, internalization creates a new awareness and transforms the organizational members' beliefs, notions and perceptions (Tsai and Lee, 2006).

Figure 2-2: Knowledge Spiral



Source: Adapted from: Nonaka and Takeuchi (1995).

The knowledge conversion (SECI) process (Figure 2-1) is deemed to be the blue print for the knowledge spiral model (Figure 2-2), where, the interaction/dialogue between the modes plays an integral role in knowledge creation and transfer. Kaiser and Fordinal (2010) identifies knowledge creation as a continuous, self-transcending process through

which one transcends the boundary of the old self into a new self by acquiring a new context, a new view of the world, and new knowledge. As knowledge creation is referred to as a continuous, self-transcending process in the presence of the knowledge spiral – knowledge through this process has an origin however it does not have a conclusion, as it builds on the foundational knowledge which was generated, transferred, and acquired through the knowledge conversion process. Arling and Chun (2011) posit tacit and explicit knowledge conversion creates new knowledge. As mentioned in the paragraphs above there are four modes of conversion which are vital for the survival of the knowledge spiral: socialization, combination, externalization and internalization. Arling and Chun (2011) and Perez-Araos, Barber, Munive-Hernandez, and Eldridge (2007) after an examination of the Nonaka and Takeuchi's (1995) and Alavi and Leidner's (2001) research respectively, explain that:

-Socialization the creation of tacit knowledge through direct contacts is a process of sharing experiences, often done through the sharing of beliefs, ideas, thoughts, world views, technical know-how, and reflection;
-The knowledge creation process of externalization is dependent on tacit knowledge being expressed through analogies, theories, archetypes, drafts, reports (an explicit form);
-The combination mode consists of the bringing together of multiple sources of explicit knowledge, the target is a synthesis of the explicit forms of knowledge; and
- Internalization synonymous with the learning by doing approach is a process of experiencing another individual's technical know-how, beliefs, and reflections through the explicit sources of knowledge.

Knowledge created by individuals is a part of an optimal spiral of knowledge, that is, the modes of knowledge strengthens and adds to the contextual awareness, instead of advancing through a sequence (Rai, 2011). Dynamic interaction between the modes leads to the generation of new organizational knowledge – *the knowledge spiral (*Arling and Chun, 2011). Sandhawalia and Dalcher (2011) believe that dynamic interactions in the knowledge spiral are highly interdependent and intertwined. Organizations, individuals and teams/groups maybe be engaged in knowledge creation, transfer, and storage at any

point of time. “Hands-on application of knowledge is often termed ‘learning by doing’ and is one way in which explicit knowledge is internalized and converted to new tacit knowledge for an individual. The category of demonstrations also includes the sharing of experiences and perspectives. By just being around others, common perspectives develop, and socialization or tacit to tacit knowledge conversion can arise (Nonaka, 1994). Demonstrations can also provide opportunities for the externalization of knowledge as they provide the opportunity to convert tacit knowledge to explicit knowledge that is shown to others. Metaphors and analogies aid in creating new knowledge by helping individuals to articulate their own perspectives. They help capture the complexities of issues, revealing otherwise hidden tacit knowledge (Nonaka, 1994). For similar reasons pictures, examples, interpretations, paraphrases and inferences aid in creating relationships and thereby help make tacit knowledge explicit” (Arling and Chun; 2011: 234). Knowledge created though the knowledge conversion process triggers a new spiral of knowledge creation, as a result knowledge is created from the spiral process, the individual is at the heart of the process and moving up through expanding communities of interaction that in some instances traverse sectional, divisional, organizational, and governmental boundaries (Little, Quintas, and Ray, 2002; Morey, Maybury, and Thuraisingham, 2002). Knowledge generated within the knowledge spiral is simply put as ‘‘from being to becoming’’ (Nonaka et al., 2000, p. 8).

2.5. The Concept of Ba, Knowledge Creation, and Knowledge Transfer

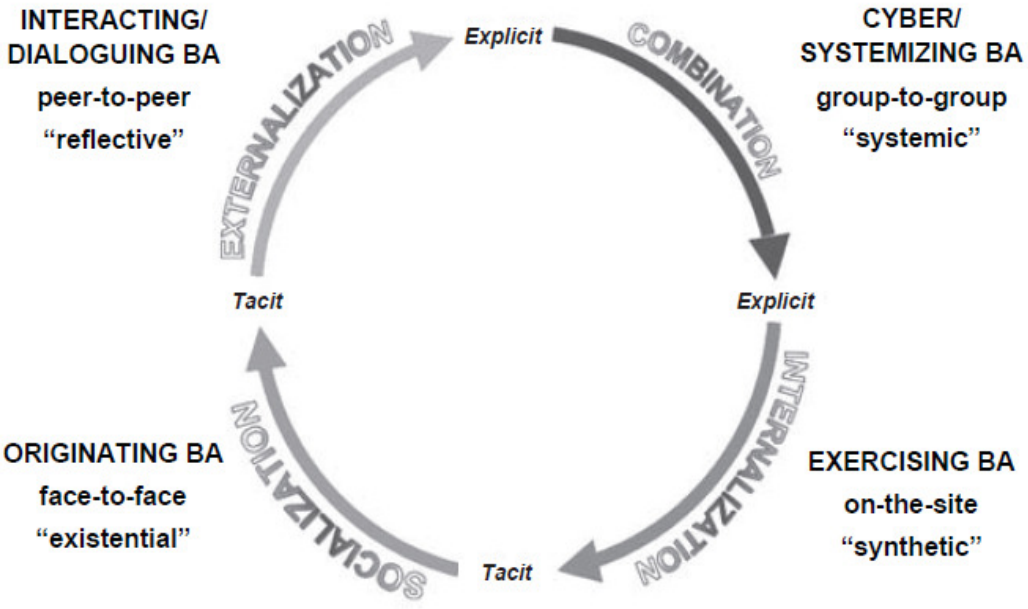
Kaiser and Fordinal (2010) make clear that self-transcending knowledge:
- is the intuition or hunch one has to unlock what may not exist yet, an understanding to realize potential though an inclination,
- is where inclinations and activity are brought to reality, an area or origin for knowledge to be seized, and
- is the knowledge about the highest future possibility.

To take advantage of self-transcending knowledge a medium is required; the concept of Ba is this medium. Ba is described as a space (not just a physical space), that is a freedom

that allows one to bring hunches, thoughts, notions, intuition, or tacit knowledge into reality. “The key idea in understanding Ba is *interaction* among those who share the context, and such interactions consequently results in knowledge creation (Nonaka et al., 2000). There are two dimensions of interactions: one dimension characterizes whether the interaction takes place individually or collectively, and the other dimension characterizes whether the interaction takes place through face-to-face contact or virtual media such as books, manuals, e-mails, etc. (Nonaka et al., 2000). Ba is classified into four types on the basis of the dimensions of interactions: originating ba, dialoguing ba, systemizing ba, and exercising ba (Nonaka et al., 2000). While the relationships between each single Ba and conversion mode is not exclusive, each Ba offers a context for a specific step in the knowledge-creation process” (Rai, 2011: 783).

Choo and Drummond de Alvarenga Neto (2010) reflecting on Nonaka and Konno’s (1998) outlook, explain the significance of Ba in relation to the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995), and the need for Ba to ensue requires tacit and explicit knowledge to regularly interact, which eventually result in the creation of new knowledge or the advancement of pre-existing knowledge. A fundamental point is brought forward, namely, Ba is the shared space that allows for interactions to generate knowledge (Choo and Drummond de Alvarenga Neto , 2010).

Figure 2-3: Four Types of Ba



Sources: Adapted from Nonaka and Konno (1998); Nonaka *et al.* (2000)

Source: Choo and Drummond de Alvarenga Neto (2010).

By means of Figure 2-3 the author's illustrated and explained each kind of Ba. An explanation follows:

"1. Originating ba. The world where individuals share feelings, emotion, experiences and mental models; emergence of care, love, trust and commitment; direct encounter between individuals; physical, face to face experiences are key to conversion and transfer of tacit knowledge; related organizational issues are knowledge vision and culture, open organizational designs, customer interfaces;
2. Interacting/dialoguing ba. More consciously constructed than the former; critical issue is selecting people with the right mix of specific knowledge and capabilities for a project team, taskforce or cross-functional team; this ba has a reflective characteristic; tacit knowledge is made explicit and dialogue is key for such conversions; extensive use of metaphors;

3. Cyber/systemizing ba. Place of interaction in a virtual world; the combination of explicit knowledge is most efficiently supported in collaborative environments utilizing IT: online networks, intranets, portals, groupware, documentation and databases; this ba is systemic or system-mediated in its nature;
4. Exercising ba. Supports the internalization phase of the SECI model; focused training with senior mentor and colleagues; rather than teaching based on analysis, learning by continuous self-refinement through OJT (on-the-job training) or peripheral and active participation; this ba is synthetic" (Choo and Drummond de Alvarenga Neto; 2010: 596-597).

Knowledge conversion as a process leads to new insights and notions (Jakubik, 2011).
"[. . .] in knowledge creation, generation and regeneration of ba is the key, as ba provides the energy, quality and place to perform the individual conversions and to move along the knowledge spiral. [. . .] it is a concept that unifies physical space such as an office space, virtual space such as e-mail, and mental space such as shared ideals. [. . .] ba is a time-space nexus, or as Heidegger expressed it, a locationality that simultaneously includes space and time. [. . .] knowledge is created through the interactions amongst individuals or between individuals and their environments. [. . .] ba is the context shared by those who participate in ba. [. . .] ba is the place where information is interpreted to become knowledge" (Choo and Drummond de Alvarenga Neto, 2010: 594-595).

Wang, Su and Yang (2011) advise that a more complete picture on how organizations, groups, teams and individuals create new knowledge is a crucial research issue, therefore, placing a spotlight on the knowledge creation capability. The generation of knowledge involves testing many opposing ideas and statements, and through dynamic interaction the new knowledge is extracted and shared within an organization or amongst people or in public. Tacit and explicit knowledge is proposed to be two polar opposite concepts, however through a spiral that is reliant on dynamic interaction the process of knowledge creation is set into motion (Rai, 2011). "Nonaka and Takeuchi (1995) identified four distinct processes – socialization, externalization, combination and internalization (SECI) – by which new knowledge is created through conversion between tacit and explicit

knowledge. Nonaka et al. (2000) further extended the SECI process and proposed a more detailed framework consisting of two more elements, which explain how organizations create knowledge dynamically. These two elements are ba, the shared context for knowledge creation; and knowledge assets – the inputs, outputs, and moderator of the knowledge-creating process" (Rai, 2011: 782). Hautala (2011: 601) explains that "interactive knowledge creation that results, for example, in novel ideas, articles and technological applications, is internationalizing along with universities, companies and knowledge-creating groups. Knowledge is being increasingly created in groups, since their capability to innovate and perform complex tasks exceeds that of lone inventors. On the other hand, the exploitation of variety in interactive knowledge creation requires constructing a common understanding and optimal cognitive distance between the group members".

Mitchell and Boyle (2010) disclosed that the generation of new ideas or objects, through processes and initiatives refer to the creation of knowledge. Depending on the context, the term knowledge creation is defined as follows:
-as a process is defined in terms of the method or means through which knowledge is created and can be differentiated from the end result, or output;
-as an output, knowledge creation refers to the development of new ideas that reflect a significant elaboration or enrichment of existing knowing;
-as an output is defined in terms of an immediate product of the knowledge creation process, such as the representation of an idea, and can be differentiated from its impact on the organizational system, or outcome; and
-knowledge creation as an outcome is defined in terms of a value-adding object.

The interplay between the four modes of the knowledge spiral, whether it be through tacit to tacit conversion or explicit to tacit conversion and so forth, results in the emergence of new knowledge, thus knowledge creation is the result of successive conversions (Pinho, Rego and e Cunha; 2012). "Knowledge creation is enabled by the processes and activities of interaction, feedback, innovation, brainstorming, and bench marking. Knowledge conversion is made possible through the processes and activities of synthesis, refinement,

integration, combination, coordination, distribution, and restructuring of knowledge. Shared contexts and common representation are required for knowledge conversion, and facilitated by group problem solving and decision-making. Information technologies like e-mail, repositories, intranet portal, teleconferencing, and the activities of mentoring, collaboration and training play a key role in transferring knowledge. Forums such as communities of practice and centers of excellence, and training provide a platform for the transfer of knowledge. Knowledge is effectively applied during the developmental processes of an organization through rules and directives, routines and self-organized teams. Knowledge is applied to formulate and refine the standards, procedures and processes developed to execute tasks within the organization" (Sandhawalia and Dalcher; 2011: 301).

Knowledge creation as a concept is recognized by academics, and a concept which requires more research. Jakubik (2011) calls for a greater awareness and better representations of knowledge creation. Knowledge creation is a core competency in an organization; therefore, knowing of this somewhat intangible non-transferable element of knowledge is essential. Jakubik (2011) believes that there are academic naysayers who believe that the knowledge conversion model is flawed. Moreover the four modes of conversion as a creation framework lack conceptual clarity. Furthermore, the creation framework of Nonaka is flawed in an organization due to the emphasis placed on a manager's belief, and that a manager's subjectivity may omit scientific forms of knowledge. Therefore the entire knowledge creation processes with tacit and explicit knowledge interplays are radically subjective.

McNichols (2010: 25) argues that Karlsen and Gottschalk (2003: 113) put forward that knowledge is transferred from teams throughout an institution, across teams, from teams to a person, from person to person, and from a person/team to explicit forms . A person(s) or a team may only generate, retain, and transfer knowledge if social contacts is the support mechanism (McNichols; 2010). "Knowledge transfer is the process where individuals mutually exchange their (tacit and explicit) knowledge and jointly create new knowledge. This implies that individuals make their knowledge collective through shar-

ing, which means that the relationship between individual and collective (community, group, team or organization) is a central aspect of knowledge sharing behavior" (Liyanage, Elhag, Ballal and Li, 2009: 121).

Zhou, Siu and Wang (2010) believe that when an individual requires knowledge he/she will rely on their personal network. Zhou, Siu and Wang (2010) emphasize connectivity/interaction is key to acquire information and to achieve one's goal. The author's take note of Burt's (1990) structural holes theory, structural holes emphasizes that individuals will be connected, or that individual and sources of knowledge will be connected, as they become connected more original information generated through the transfer amongst each other; to enhance their argument, the authors take to tie strength. "Hansen (1999) proved that although weak tie facilitates knowledge transfer in an explicit environment, strong tie is more likely to lead to tacit knowledge transfer because it loads more trustworthiness" (Zhou, Siu and Wang, 2010: 449). Each and every organization has a predefined goal(s); therefore, the combination of knowledge through the engagement in effective transfer creates new awareness and general knowledge which is used to accomplish organizational goals. Organizations tend to benefit when knowledge transferred according to need and a specific situation, attitude and people is associated to this dissemination of knowledge (Sandhawalia and Dalcher, 2011). Although individuals may have different perspective, through dynamic interaction and feedback individuals are able to understand each other thus building upon common knowledge and creating new organizational knowledge.

The path to obtaining knowledge may depend on the situation one is in, and more importantly an individual's willingness to share. Knowledge transfer requires interaction, persons may offer their knowledge to others through face-to-face discussions (direct communication) or through journals, wikis, blogs, and knowledge archives (indirect communication mechanisms). However, knowledge transfer is subject to inconsistencies as cited below. "Reagans and McEvily (2003) found that individuals were more willing to share when they perceived it would require less effort to articulate their knowledge or they could develop a negative reputation for not sharing but Kankanhalli et al. (2005)

found that level of effort only matters when there is a lack of trust and a study by So and Bolloju (2005) ascertained that a perceived social norm for knowledge sharing had no effect on intentions to share knowledge. The effect of rewards on knowledge sharing has also been mixed with some studies finding that individuals' knowledge sharing behavior is positively affected by the potential for organizational rewards (e.g., Burgess, 2005) or coworker reciprocity" (Swift, Balkin and Matusik, 2010: 379).

2.6. Knowledge Enablers

Suppiah and Sandhu (2011) advocate that knowledge creation and transfer has positive relationship with the knowlegde enablers (i.e. trust, communication, information technology/systems, culture and networks).

2.6.1. Trust

Xue, Bradley and Liang (2011) after reflecting on the studies of several authors (Pavlou et al., 2007; Te'eni, 2001; Weick and Roberts, 1993; and Hsu et al., 2007) explain that generosity, competence and integrity of group members allows an individual of the group to show vulnerability and thus trust in a group environment. Trust and dedication are common when team members communicate effectively. Teams that are aware of each individual's capabilities and competencies tend to have a greater degree of trust. The understanding of a team member's capabilities and competencies will result in a lower level of resistance whilst transferring knowledge. Cooperation, cohesion and reliability are the characteristics of a team where trust is the key player. A key benefit of trust is that transfer of knowledge is less costly when an individual's knowing is sufficiently understood and accepted by another, thus putting the knowledge into use which should result in more knowledge transfers (Zhou, Siu and Wang, 2010: 450). Zhou, Siu and Wang (2010) echoes (McAllister, 1995) and notes that cognition and affection are two parts of trust, which illustrates that trust by no means is a unitary concept. Holste and Fields (2010) identified that affect-based and cognition-based trust are distinct forms of interpersonal trust and are both related to extra-role organizational citizenship behaviors directed at other individu-

als in an organization. The aforementioned authors believe that affect-based trust and cognition-based trust may contribute to an individual's willingness to share and use tacit knowledge.

Academics are deliberating between affect-based trust and cognition-based trust.
-"Cognition-based trust is based on the trustor's rational evolution of the trustee's skills, knowledge, and competencies to solve related problems. Actually, at some extent, cognition-based trust on a knowledge source is associated with the perceived expertise on this person. Given that a trustor has a high cognition-based trust on a trustee, the trustor will certainly perceive the trustee as an expert. Thomas-Hunt et al. (2003) also found that in a team, those members who get more perceived expertise are more likely to share their unique knowledge. Thus, in knowledge transfer process, we believe that the role of cognition-based trust is pronounced
-Affect-based trust is composed by emotional bonds between trustor and trustee (McAllister, 1995). It is the trustor's faith toward a trustee that the trustee is honest, benevolent, warm-hearted and, most importantly, harmless to the trustor himself (Mayer et al., 1995). In many cases, acquiring knowledge takes risk, because it implies incompetence and dependence. Consequently, when acting knowledge seeking behavior, ego is vulnerable to the knowledge source. Affect-based trust is inversely related to the intention to lie, therefore increases the trustor's endurance of being vulnerable as well as predicts reliability of the knowledge from the trustee" (Zhou, Siu and Wang; 2010: 450-451).

Xue, Bradley and Liang (2011) believe that knowledge transfer/sharing as a group activity will sooner or later be prone to group pressure when an individual that is a part of the group is required to share their knowledge. Xue, Bradley and Liang (2011) inform that Salancik and Pfeffer (1978) suggest that individuals are able to formulate attitudes and beliefs, or develop truths from the immediate social situation/setting which is an important connection to knowledge. Xue, Bradley and Liang (2011) put forward that knowledge transfer is encouraged in appropriate group setting, and that the group setting influences one's use of technology, awareness, and normative beliefs. Trust requires an individual to make an emotional investment in other individuals within the organization.

Trust determines who will receive the knowledge in the organization; therefore individuals have to deal with other individuals with great integrity. Trust may also have some bearing on whether or not the recipient perceives they are receiving accurate, quality knowledge from the source (Bircham, 2003). The readiness to trust other individuals proposes that an individual is willing to expose themselves to other individuals' unsupervised actions (Butler, Le Grice, and Reed, 200). Trust between individuals in an organization has an effect on the overall knowledge transfer, organizational culture is duly influenced by this essential element (Al-Alawi, Al-Marzooqi, and Mohammed, 2007).

2.6.2. Networks

Monnavarian and Amini (2009: 139) point out that in the knowledge driven economy, "knowledge assets are grounded in the experience and expertise of those individuals working in a company and the firm has to therefore provide the right structures to shape knowledge into competencies. In addition to physical and resource allocation structures, social structure is also an important driver in creating the right competencies to ensure the commercial success of a firm." Perez-Araos, Barber, Munive-Hernandez, & Eldridge (2007) emphasize that the generation and transfer of knowledge is facilitated by networks (the means), moreover this rhetoric in strategic management research is commonly accepted too. Knowledge by nature is an intricate tangible resource that makes it difficult to deal with. In order for a network to exist, collaboration is required to exchange ideas, knowledge and technologies (when sharing knowledge outside of the organization). Organizations and individuals maintain autonomy, by officially transferring knowledge they choose to share, and restricting knowledge transfer in the areas they want to protect. Carlsson (2003) explains that there has been a call for networks to be researched for over two decades. Carlsson (2003) taking cognizance of many authors, identifies that people and organizations as nodes, moreover a set of nodes (social network) is linked by social contact/interaction. Knowledge processes are facilitated and supported by the social networks. A network with less accomplished knowledge sharing capability will be outperformed and out-innovated by a network with excellent knowledge sharing capability (Carlsson, 2003).

Bettoni, Andenmatten, and Mathieu (2007) deem that social interactions and relationships are fundamental for knowledge management activities. Knowledge networks focus on communication between individuals. Knowledge processes such as knowledge transfer and creation is enabled by some kind of personal or virtual network. Without having access to networks, there may be no opportunity for individuals to access knowledge. New assignments, strategies, ventures and task are particularly dependent on networks, because they function as conduits for information, provide access to resources without incurring the costs of hierarchical coordination, and provide legitimacy (Lin et al., 2006). Nahapiet and Ghoshal (1998) suggest that "Knowledge may remain hidden from individual actors but be accessible and sustained through their interactions. It is only through interactions of various kinds that learning occurs and hence new knowledge can be produced. Hence interaction is the locus for knowledge production (Borgelt and Falk, 2007). Nature of information flows is driven by the nature of relationships and networks of employees (Merlo et al., 2006). Karkoulian et al. (2008) note that successful knowledge management involves neither computers nor documents but rather interactions between people. People generate new knowledge through the outcomes of research, putting knowledge into storage systems and trying to consume knowledge (Karkoulian et al., 2008)."

Members and systems of a knowledge network may consist of different language, communities and beliefs, therefore common understanding of symbols and language is required (Schonstrom, 2005). "A knowledge network can be defined as a group of persons and activities that cooperates and exchanges information. Seufert et al. (1999) use the term knowledge networking to signify a number of people, resources, and relationships among them, who are assembled in order to accumulate and use knowledge primarily by means of knowledge creation and transfer processes, for the purpose of creating value" (Khandelwal, and Gottschalk; 2003: 15). The introduction and monitoring of formal knowledge repositories, databases, groupware, intranets and electronic knowledge networks provide powerful opportunities to create and transfer knowledge. These tools when used meaningfully for knowledge processes may convert to value creation (Michailova and Nielsen, 2006). Monnavarian and Amini (2009) believe that when interactions and

cooperation amongst individuals occur more frequently, trust is produced within the networks. Repeated social interaction plays a significant role in solving free rider problems and reducing opportunism.

2.6.3. Information Systems and Information Management

Knowledge is stored in databases and manuals, that is, once knowledge moves from tacit to explicit. Information technology is a natural solution to assist with the transfer and storage of knowledge, and more importantly support communication. Handzic (2011) supports the view that information technology provides a platform for communication and knowledge sharing. Individuals must feel comfortable to share their beliefs, know-how, and notions amongst their peers, therefore a structured framework is the platform required to enable effective communication. A knowledge-hoarding organization in the presence of a particular technology does not turn into knowledge-sharing organization. To be useful technology has to work together with cultural change, that is the technology has to be introduced in a structured and cautious manner to gradually change attitude and behavior. As a solution, technology alone cannot address the issue of know-how (Mohamed, Stankosky, and Murray; 2006:107). Information technology may have a significant impact on flourishing knowledge generation and transfer initiatives. Knowledge has always been compiled, transferred and arranged in some way or form within an organization, therefore it is not an entirely new notion. What makes the concept different is the introduction of modernized information systems and technology to the existing organizational reporting, routines, policies and procedures. Thereby, institutionalizing and accelerating knowledge management activities (Khandelwal and Gottschalk, 2003). Information systems strength to support communication, collaboration play a pivotal role in connecting those searching for knowledge, and its ability to enable collaborative learning. Information is difficult to spread across an organization, and many individuals will acknowledge this. When technology is made available, information appears to flow readily. Financial resources must be made available for technology such as intranets, communication support systems, and collaboration support systems (Little, Quintas, and Ray, 2002).

Franco and Mariano (2007: 441) draw attention to Alavi and Tiwana (2003) who described information technologies as "knowledge systems", classifying them in four "knowledge processes" (Alavi and Tiwana, 2003, p. 106):

(1) *Creation, for the development of new know-how and capabilities.*

(2) *Storage/retrieval, for the development of organizational memory, classified in internal (individual's skills and organizational culture) and external (formal policies, procedures, manual and computer files).*

(3) *Transfer, for the transmission of knowledge from one location to another.*

(4) *Application, for the use of knowledge in decision-making and problem solving processes.*

Franco and Mariano (2007: 441) go on to explain that Alavi and Tiwana (2003) express that numerous information technology tools are used to support those processes:

-E-learning and collaboration support systems for the creation process.

-Data warehousing, data meaning, and repositories for the storage and retrieval processes.

-Communication support systems and enterprise information portals for the transfer process.

-Experts systems and decision support systems for the application process.

Choo and Drummond de Alvarenga Neto (2010) believe it is risky to overstate the position of information technology; after all information technology is a tool, a means to an end (namely, knowledge), not an end in itself. Knowledge management and information technology are not one and the same. Knowledge management requires a shared space (ba), information technology provides this shared space and mechanisms for interaction. Interaction results in knowledge creation, transfer and storage. Information technology and systems are structured as a core capability of knowledge management, to facilitate teamwork through collaboration and coordination processes, and encourage an individual's contact with other individuals through communication mechanisms. Technical infrastructure technologies assist individuals to gain access to possible solutions or information they require for problems experienced. For example a user may find a solution to

a problem on a database, that is, one may search for an explicit knowledge source which may contain similarities to the current problem, thus learning through experiencing the experiences of others. Bukowitz and Williams (2000) believe that there are usually specific individuals or groups who are best equipped to respond to particular information requests.

2.6.4. Culture

Individuals' or employees' behaviour is forged in an organization though behavioural patterns, beliefs and a core set of values (culture) – the primary identity of an organization. "Greetz (1973) is the first who has done research about the subject of organizational culture. He defines culture as *a system of symbols and signs that members of the organization apply in order to perceive their feeling from their experiences*. De Long and Fahey (2000) have shown that culture judges which knowledge belongs to the organization. Barlow and Battean (2000) have proved that culture is disseminated across the organization and is regulated and reformed through daily decisions of each individual in business. Feldman (1999) has stated that culture is in hierarchical order, since it creates a system of meaning in which values have the principal importance and other dimensions will have secondary or marginal importance" (Allame, Nouri, Tavakoli, and Shokrani, 2011: 323). Culture defines how an individual is recognized within the organization (Sarabia, 2007). Knowledge in the organization is understood in the light of culture, where culture is combined with individual interests and know-how. There is no detailed outline for the implementation of knowledge management activities due to the fact that each organization's set of beliefs, values and behavior patterns are inherently unique; therefore what may work in one organizational culture may not necessarily work in another (Du Plessis, 2007).

The generation of knowledge in an organization or team is centred on active participation and interaction. Interaction and communication between team members or employees is necessary for the organisation to create a culture which encourages communication. An exposure to multiple information sources and different ideas plays a significant role when one knowledge shares (Omerzel, Biloslavo, and Trnavcevic; 2011). King (2008: 36) cites

that a knowledge culture "is one particular variety of organizational culture representing way of organizational life that enables and motivates people to create, share and utilize knowledge for the benefit and enduring success of the organization''. Organizational units, individuals, teams and the overall organization are influenced by culture. Culture as with the other aforementioned enablers determines with whom and when appropriate knowledge is shared (King, 2008).

2.6.5. Communication

Learned academics and practitioners postulate that several organizations are unaware of the techniques for taking advantage of knowledge. "They may not know what they know and may also have weak systems to recognise where the 'right' knowledge is. Even if they did recognise the 'right' knowledge, they may not know the most appropriate way(s) of retrieving it" (Liyanage, Elhag, Ballal and Li; 2009:125). The lack of an appropriate technical infrastructure for knowledge transfer and transformation limits the ability to spread knowledge to others when the number of individuals allowed to communicate with is limited (Sanchez, 2001). Bukowitz and Williams (2000) argue that the shortcoming of the lack of communication in an organization is that individuals in different parts of the organization, who might conceivably profit from sharing ideas, experience, and expertise, tend to be unaware of one another's efforts. For example, individuals within an organization may possibly go outside their own organizations to seek experience and know-how, whilst unknown to them, the skills and knowledge exist in some other part of the organization (Bukowitz and Williams, 2000). In various organizations individuals may be unwilling to share their knowledge openly; self-protection is possibly the only idea they have. This self-protective type of communication with other individuals, shows that individuals believe that knowledge is power and they would not want lose their power through open communication. The culture of an organization may not encourage open communication (Kermally, 2002).

Liyanage, Elhag, Ballal and Li (2009) discuss that communication comprises of a source and receiver. The aforementioned author extracted this from Deutsch (1952), who introduced a simple communication theory. Knowledge transfer at any given time may use

formal or informal modes to communicate and interact within the knowledge conversion model.

‘‘*Socialisation* is a great example for informal modes where individuals or teams have unscheduled meetings, friendly discussions, etc. However, such mechanisms may involve certain amounts of knowledge waste due to an absence of a formal recording of knowledge. Formal transfer mechanisms appear to be more effective than informal mechanisms although, according to Alavi and Leidner (2001), it may inhibit creativity and innovation” (Liyanage, Elhag, Ballal and Li; 2009: 125). Communities of practice facilitate knowledge transfer between individuals within an organization. O’Sullivan (2007) that those whose come together either virtually or face to face to share knowledge or learn with a group are a part of a community of practice. The community of practice allows for time saving and accuracy, as a group setting gives individuals exposure to communicate or a larger-scale than on an individual basis (O’Sullivan, 2007). For example, an individual’s doubts about a created concept can be brought forward where it can dealt with timelessly by using the community of practice, instead of going to a single individual at a time to get insight and knowledge.

2.7. Conclusion

Knowledge in nearly every field of study is in a state of evolution or has the potential to evolve. As niches are exploited, knowledge evolves, and so do ones beliefs and perceptions. The study of knowledge management and its associated processes is prevalent in every field of study; knowledge is developed from the notions, hunches, thoughts, and ideas of human beings. Knowledge generation is not centered on artificial intelligence but interaction. The pioneers of knowledge management literature Polanyi (1966) and Nonaka and Takeuchi (1995) have catapulted knowledge management into the limelight over the past decades; their discourse is prevalent in the majority of academic journals used within this literature review. These pioneers are cited in more or less every academic journal that is focused on any characteristic of knowledge. Emphasizing that in today’s

knowledge driven economy - collaboration, socialization, and information on demand, are the hallmarks of knowledge creation and transfer.

The more information we collect, the more we learn, as a result we have access to more knowledge which enables us to create new knowledge or improve the existing knowledge-base. "Unlike material assets . . . knowledge assets increase with use: ideas breed new ideas, and shared knowledge stays with the giver while it enriches the receiver only new knowledge resources – ideas – have unlimited potential for growth" (Davenport and Prusak, 1998; 16-17). Knowledge networks and a knowledge-based culture can almost guarantee that knowledge is converted according to the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995). However, in today's technologically driven atmosphere, post-graduate students require the suitable technical infrastructure is to support their knowledge creation and transfer activities. Technical infrastructure requires adequate financial investments to be made by the University of KwaZulu-Natal. As post-graduates progressively contribute more knowledge through the knowledge spiral, the more valuable the individual will be considered amongst his/her peers and others in different fields of study. The transfer of tacit knowledge is by no means a voluntary action, post graduate students have to build their network and trust the individuals in the network they build. The post-graduate students should have a willingness to impart at least a fraction of their knowledge or to seek information through direct or indirect mechanisms via a knowledge network.

In the next chapter the researcher will examine the basic aspects of research design. The purpose of the study, type of investigation, the extent of researcher interference, the unit of analysis, the study setting, and the time horizon of the study is explained. In essence, the research design involves a series of rational decision-making choices to arrive at a solution.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter highlights the research design and methodology of the study, by delving into the research practices used to obtain and analyses the data. The researcher discusses qualitative and quantitative research methodology, the time horizon, sampling design, type of investigation, study setting, extent of researcher interference, data collection method, research instrument and the ethical concerns of the study.

3.2. Type of Research Design

An exploratory research design was employed in this study. Saunders, Lewis and Thornhill (2007: 133) affirm that "an exploratory study is a valuable means of finding out 'what is happening; to seek new insights; to ask questions and to assess phenomena in a new light". "Mouton (1996) enlightens one by putting forward that the contention that exploratory studies are to ascertain facts, moreover, exploratory studies are made use of, to gather new data and determine whether there are interesting patterns. Saunders, Lewis, and Thornhill (2007: 134) emphasize that "its great advantage is that it is flexible and adaptable to change." Such investigations are implicitly flexible but by no means lack any direction in exploratory research. The investigation moves to a more clear-cut focus than the initial wide ranging focus, as a researcher progresses the study (Adams and Schvaneveldt, 1991). Sekaran (2003: 119) declares that "exploratory studies are undertaken to better comprehend the nature of the problem since very few studies might have been conducted in that area."

An exploratory study was conducted to enhance the author/researcher's understanding of the nature of the problem, which is the examination of how post-graduate students in the School of Management, IT and Governance are creating and transferring knowledge, since limited studies have been conducted in this area. The researcher used a series of closed questions to seek new insights, obtain direction and to gather context specific facts.

3.3. Qualitative and Quantitative Research

This study was quantitative in nature. "Quantitative methods require the use of standardized measures so that varying perspectives and experiences of people can be fitted into a limited number of predetermined response categories to which numbers are assigned" (Patton, 2002: 14).

A questionnaire was used, which comprised a five-point Likert scale that ranging from one to five; with 5= Strongly Agree and 1=Strongly Disagree. "The advantage of a quantitative approach is that it's possible to measure the reactions of many people to a limited set of questions, thus facilitating comparison and statistical aggregation of the data. This gives a broad, generalizable set of findings presented succinctly and parsimoniously" (Patton, 2002: 14). As soon as questions lend themselves to numerical answers and interpretation the questions become quantitative.

The response was converted to frequencies, and the results (response to each statement) were statistically related to the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995), in particular the statements are based on knowledge conversion, which consist of four modes. The questionnaire comprised of closed questions.

3.4. Time Horizon

Sekaran (2003: 135) advises to answer a research question, cross-sectional or one-shot studies are carried out to gather data once or over a specific period in time. The period in time may range from days to months. For this study, the researcher gathered data just once which was over a period of weeks, through the month of October 2013.

3.5. Sampling Design

The sampling design for the study consisted of the target population, sampling frame, sampling unit or element, sample size, and sampling approaches.

The *target population* is the sum total of all possible units or elements. Therefore all post-graduate (Honours, Masters and Doctoral) students at the University of KwaZulu-Natal in the School of Management, IT and Governance constituted the target population. The actual number in the total was not known by the researcher. According to McBurney and White (2007) the sampling frame is a population as it defined for the purposes of selecting subjects for a study. In the context of this study, the *sampling frame* is all accessible post-graduate students in the School of Management, IT and Governance who are registered at the University of KwaZulu-Natal.

The *unit of analysis* for the study is a single member of the target population. Data has to be collected from each post-graduate student within the School of Management, IT and Governance at the University of KwaZulu-Natal. The *sample size* involves making some judgment about the number of participants needed for the study (Devlin, 2006). The sample size of this study was determined using a non-probability sampling technique. The sample size of the study is 70. These 70 post-graduate students from the School of Management, IT and Governance were conveniently available to gather the information for the study. These post-graduate students, who were easiest to obtain for the sample and the lecturers, also referred other students' email addresses. The researcher continued this process until a sample size was reached; these were all the students that were conveniently available or were referred at the time that met the criteria and that could provide in-

formation for the study. With these two non-probability sampling techniques they may not represent the population well.

The *sampling approach* used for the study was based on a non-probability sampling approach. Convenience and snowball sampling are the non-probability sampling approaches. A convenience sample is a desirable group of people but differs in that it may not come close to sampling all of the population (McBurney & White, 2007). In other words convenience sampling requires individuals within a population to conveniently to gather information or data for a specific context (Sekaran, 2003). "Convenience sampling (or haphazard sampling) involves selecting 'haphazardly' those cases that are easiest to obtain for your sample, such as the person interviewed at random in a shopping centre for a television programme. The sample selection process is continued until your required sample size has been reached" (Saunders, Lewis, and Thornhill; 2007: 228). The post graduate students who were chosen for the study does not represent the entire population, they were chosen based on that they could conveniently provide information to the author/researcher. The email questionnaire technique is not representative of the population too, as those post-students who were identified using the convenience sample technique that were included in the study also recommended other post-graduate students' email addresses that met the criteria for the research. Lecturers at the School of Management, IT, and Governance also recommended other post-graduate students email addresses who they that would meet the criteria. This process of referrals or recommendations is known as snowball sampling. The sample selections continued until a sample size of post-graduate students were reached, which was hardly representative of the total population.

3.6. Type of Investigation

A correlational study is used to extract the important variables that play a role in answering the research problem (Sekaran, 2003). Correlation studies enable a number of causal relationships. The intention here would be to see if a relationship does exist among the study variables (socialization, externalization, combination, internalization, and knowledge creation and transfer amongst post-graduate students) or not. Correlation stud-

ies more often than not use interval scales. The interval scale used was a five-point Likert scale where the numerical distance from four to five is the same as the distance between one and two (Devlin, 2006) .

3.7. Study Setting

The researcher used a field study because the researcher merely wanted to assess how post-graduate students in the School of Management, IT and Governance are creating and transferring knowledge, and what are the specific factors that lead to post-graduate students creating and transferring their knowledge. The setting for this type of research was non-contrived with minimal interference with the normal work routine of the post-graduate students.

3.8. Extent of Researcher Interference

The researcher's interference was minimal as possible to generate a clear understanding of how knowledge is created and transferred amongst post-graduate students with the School of Management, IT and Governance. The researcher sent emails and personally administered questionnaires to the respondents; therefore there was minimum interference by researcher which caused very little disruption to the respondents' flow of work.

3.9. Data Collection

A survey coupled with an e-mail questionnaire and personally administered questionnaires were used to gather data for analysis for this study. The survey research method was chosen because it is retrospective in nature, and because it enabled one to record the effects of the independent variables (socialization, externalization, combination, and internalization) on dependent variables (knowledge creation and transfer amongst post-graduate student). The survey research method enables researchers to reconstruct influences and consequences by means of verbal reports. Cause and effect is difficult to establish as there is a lack of supervision, and as a result there is no manipulation of variables. The advantage of a survey is that it is not confined to a laboratory setting in which an in-

dependent variable can be manipulated. As a consequence, the survey research can investigate a larger number of important independent variables in relation to any dependent variable (Levin and Fox, 2006). With changing technology the e-mail questionnaire has become a popular choice for researchers, especially as it covers a wide ranging area which provides a significant advantage for the survey. Sekaran (2003: 236) explains that for personally administered questionnaires "when a survey is confined to a local area, and the organization is willing and able to assemble groups of employees to respond to the questionnaires at the workplace, a good way to collect data is to personally administer the questionnaires. The main advantage of this is that the researcher or a member of the research team can collect all the completed responses within a short period of time. Any doubts that the respondents might have or any question could be clarified on the spot."

Questionnaires were e-mailed and personally administered to accessible post-graduate students (whom have been identified using convenience sampling), who could conveniently complete them at their own pace at university, their place of work or at their homes. In addition the e-mail questionnaire was chosen because it is inexpensive, almost instantaneous, and has the added advantage of guaranteed delivery subject only to the correctness of the respondents e-mail addresses. The e-mail questionnaire is also a simple and effective way of obtaining data. However, the e-mail questionnaires just like a mail questionnaire have response rates which are frequently low. (Sekaran, 2003). The direction of the questions for the questionnaire was derived through the examination of preliminary literature with significant focus on Huang and Wang's (2002) research paper. All questionnaires were e-mailed to the referred respondents once the ethical clearance and gatekeeper's permission was granted. Questionnaires were also personally administered as the survey was confined to the School of Management, IT, and Governance at UKZN, and the school was enthusiastic and adept at gathering post-graduate students to provide answers to the questionnaires. Those post-students who were conveniently available were given an introduction to the research topic by the researcher; this was possible through the support of the school. A large number of individuals were administered questions the same time, thereby making study less expensive for the researcher.

3.10. Rating Scales

A five-point rating scale was designed and used to examine how strongly respondents agree or disagree with the statements, such a rating scale is known as Likert scale. 1=Strongly Agree, 2=Agree, 3=Neutral, 4=Disagree and 5=Strongly Disagree. A nominal scale was used for the biographical questions. A nominal scale allowed the researcher to classify respondents' in certain groupings or categories. With respect to the variable post-graduate student type – respondents may be bracketed into three categories, namely, hon-ors, masters, and PHD (Sekaran, 2003).

3.11. Measuring Instrument

For a measure to be of any use, it must have both reliability and validity. "The reliability of a measure indicates the extent to which it is without bias (error free) and hence ensures consistent measurement across the various items in the instrument" (Sekaran, 2003; 203). A model, concept or theory's stability and consistency determines the reliability of a measure. The internal consistency of the measure was maintained as all the sections of the research section of the questionnaire focused on measuring if the adaptation of the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995) has an influ-ence on the way knowledge is created and transferred by post-graduate students in the School of Management, IT and Governance at the University of KwaZulu-Natal. The va-lidity of a measure is dependent on internal and external validity. Sekaran (2003) propos-es that internal validity which is concerned with cause and effect relationships and the authenticity of the relationships, external validity is concerned with drawing conclusions to the external environment. There are several ways of testing validity; however the study focused on content validity which is the best test for the questionnaire. Concepts, theo-ries, and models are tapped into by representative and adequate agreed upon items as a content validity measure. The questions based on Huang and Wang's (2002) adaptation of Nonaka and Takeuchi's (1995) knowledge spiral is tapped into by a representative and adequate set of items to measure the way knowledge is created and transferred by post-graduate students in the School of Management, IT, and Governance at the University of

KwaZulu-Natal. The questions are dimensions and elements of the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995). A panel of experts in the field could confirm the content validity of the questionnaire if the researcher was asked to do so.

3.12. Ethical Concerns

Respondents were assured of anonymity in the study. The researcher stated in the e-mail and personally administered questionnaire that the respondents' answers as well as their participation would be strictly anonymous. Anonymity had to be given at the outset as the participating post graduate students would be concerned about organizations, academics and students getting a hold of their information. Informed consent drove the collection data, that is, if a post-graduate student did not avail the opportunity to participate the researcher respected the individual's decision. The study was not misrepresented and the researcher treated the respondents with self-respect. Thus, respondents provided truthful and honest responses.

3.13. Study Questions/Statements

All questions/statements were developed according to the focus of the study. The questions/statements were allocated tags or codified for use in analysis. The researcher intended on the onset to obtain a minimum of 70 responses; the researcher obtained 70 responses from students that were conveniently accessible to respond to the questionnaire via email and personal administration.

3.14. Descriptive Statistics

Descriptive statistics are a way of summarizing the variables in a study. "Descriptive statistics involve transformation of raw data into a form that would provide information to describe a set of factors in a situation…Descriptive statistics are provided by frequencies, measures of central tendency, and dispersion" (Sekaran, 2003; 394-395).

3.14.1. Frequencies

"Frequencies simply refer to the number of times various subcategories of a certain phenomenon occurs, from which the percentage and the cumulative percentage of their occurrence can be easily calculated" (Sekaran, 2003; 395). Respondents had to choose an answer that best suited them from a five-point Likert scale, therefore there were five subcategories for each statement. The frequency of each point on the scale, based on the respondents' selection, converted to percentages and cumulated percentage was calculated using the IBM SPSS Statistics 20 program.

3.14.2. Measures of Central Tendency

There are three measures of central tendency, namely, the mean, the median, and the mode. The *mean* is the average value for the variable. The mean for closed questions in section two of the questionnaire ranged from 1.59 to 2.43, thus indicating that the majority of post-graduate student in the School of Management, IT, and Governance at UKZN agreed. The *median* represented as the middle value. The mid-point in the distribution is found by ranking all the values in ascending order. "The median has the advantage that it is not affected by extreme values in the distribution" (Saunders, Lewis and Hill; 2007:437). The mid-point was 2, indicating that most post graduate students agreed with the closed questions within section two of the questionnaire, which used a five-point Likert scale. The *mode* is the most frequent value. The most frequent value was 2, indicating that most post graduate students agreed with the closed questions within section two of the questionnaire, which used a five-point Likert scale. The mean, median and mode all indicated that post-graduate students are creating and transferring knowledge with the School of Management, IT, and Governance at UKZN. The measures of central tendency are illustrated in Table A of Appendix 3, page 95 of the study.

3.14.3. Measures of Dispersion

Measures of dispersion include the standard deviation, variance, and the range. The *standard deviation* indicates how closely values are clustered around the mean. The square root of the variance equals to the standard deviation. The r*ange* is the difference between the highest and lowest values. The standard indicated that the values are very closely clustered around the mean (within the aforementioned paragraph). The measures of dispersion are illustrated in Table A of Appendix 3, page number 95 of the study, as the researcher has concentrated on the frequencies of data for this chapter of the study.

3.15. Conclusion

Research design and methodology was the core of this chapter. The chapter explained the type of design, the qualitative and quantitative research methodology, time horizon, sampling design, type of investigation, study setting, extent of researcher interference, data collection, rating scales, measuring instrument, ethical concerns, and the study questions that were used for the study. The research instrument was also explained in this this chapter. As data was collected from a sample of the population, the next chapter focuses on the steps to analyze them, to test the research study, and the interpretation of the results based on the responses from the questionnaire. Data analysis is routinely done through the use of software programs.

CHAPTER 4

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1. Introduction

Data analysis and the discussion of results of the study form the essence of this chapter. The data was obtained via e-mail survey and personally administered questionnaires. The questionnaire consisted of the biographical details of the respondents (section one of the questionnaire); whilst a five-point Likert scale was used to provide data for the descriptive statistics of the study (section two of the questionnaire). The statements for this section were explained in the previous chapter. The data was captured into a statistics program (IBM SPSS Statistics 20 program) which calculated the frequencies, mean, median, mode, range and standard deviations of each statement.

The discussion of results will indicate which of the four modes of the knowledge (SECI) spiral model developed by Nonaka and Takeuchi (1995) are predominantly used by post-graduate students in the School Management, IT and Governance at the University of KwaZulu-Natal. If the model is used, it shows that post-graduates in the School of Management, IT and Governance actually integrate and interact with tacit and explicit knowledge through the knowledge conversion modes, even if they are unaware of it. If knowledge is created through the interactions between tacit and explicit knowledge, then knowledge has to be created and transferred to aid the knowledge conversion process embedded in the knowledge spiral. It will be difficult to gauge if the conditions for the knowledge spiral have any bearing on the study, as the conditions look at specific ways of creating knowledge through the knowledge spiral. Knowledge conversion can determine if the five-phase model of the organizational knowledge-creation process is in use,

through the data generated from the second section of questionnaire to an extent. The factors affecting knowledge creation and transfer activities such as trust, communication and culture has a direct bearing on the way knowledge is converted using the four modes. Technical infrastructure, organizational knowledge networks and diverse factors cannot be verified through the questionnaire. The discussion of results as is the majority of the study is based on Nonaka and Takeuchi's (1995) book, *The Knowledge-Creating Company*.

A total of 70 post-graduate positions participated in the study.

4.2. Biographical Information

The results of the biographical data for the study which consisted of five questions from the e-mail survey and personally administered questionnaires are as follows.

4.2.1. Post-Graduate Student Type

Figure 4.1 indicates that the majority (93%) of respondents are
Honours students. The remaining (7%) comprised of Masters and Doctoral students.

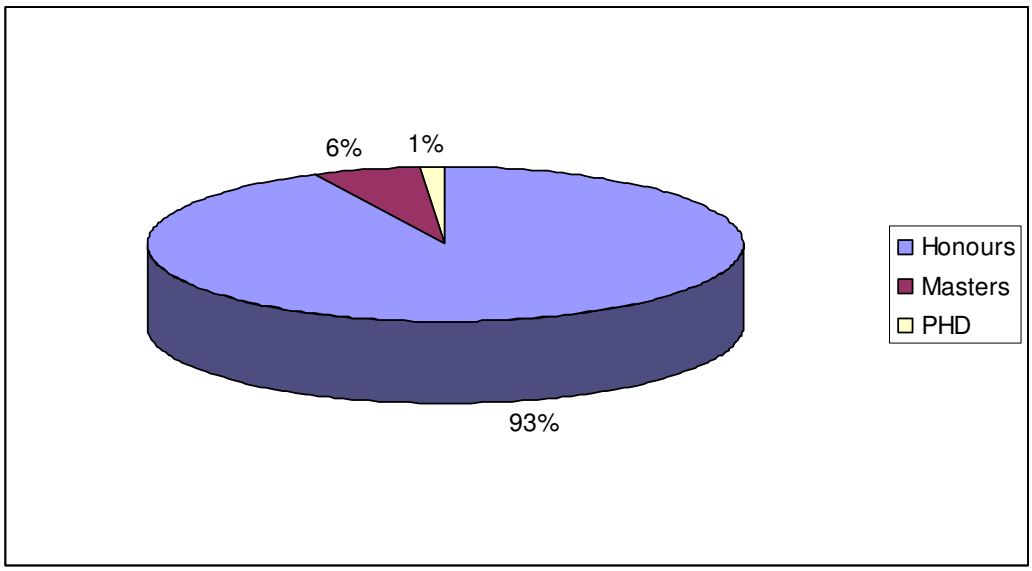


Figure 4-1: Post-Graduate Student Type

4.2.2. Age Group

Figure 4.2 indicates that the majority (70%) of the respondents' at School of Management, IT, and Governance at the University of KwaZulu-Natal were in the 21-23 to >30 age group.

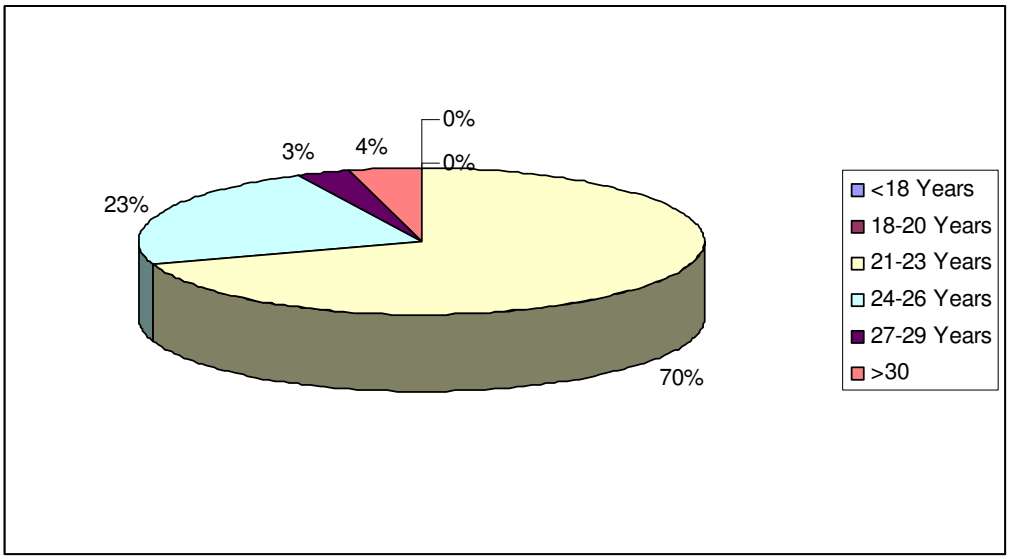


Figure 4-2: Distribution of Respondents According to Age

4.2.3. Student Type

Figure 4.3 illustrates that ninety seven percent of the respondents are full-time students, and only three percent of respondents are part-time students.

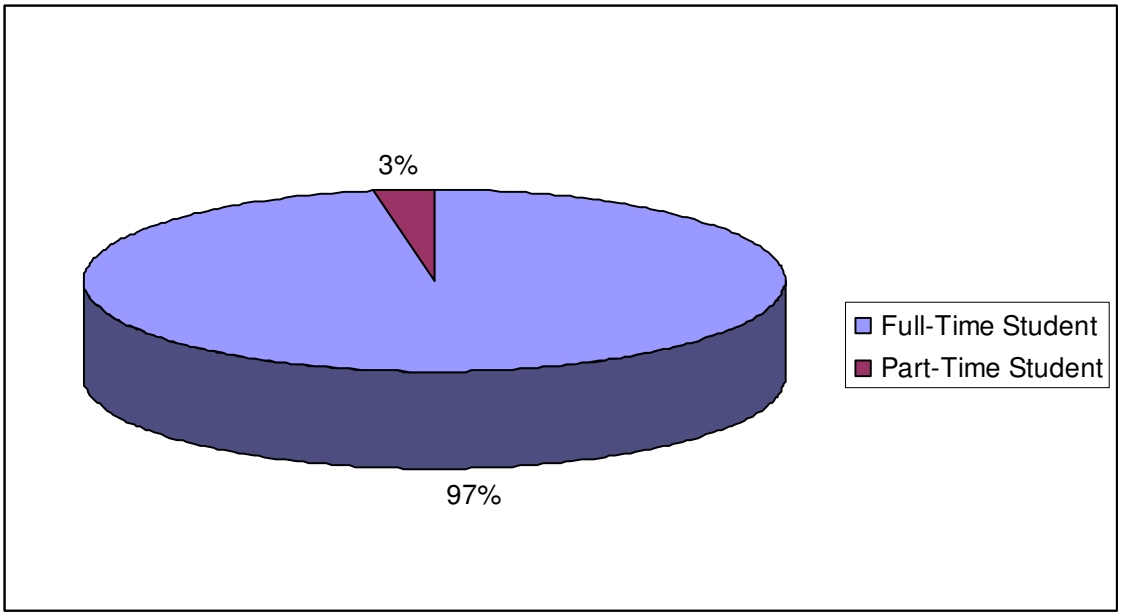


Figure 4-3: Student Type

4.2.4. Employment Status

Respondents who are permanently employed represent only nine percent, whereas, those who are not permanently employed represent the majority (91%).

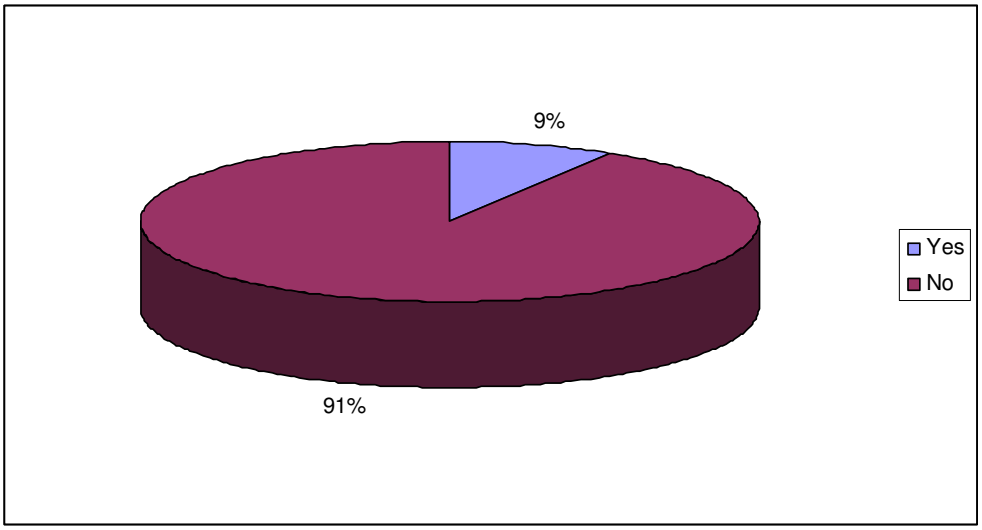


Figure 4-4: Employment Status

4.2.5. Gender

The majority (53%) of respondents were males. 47% of respondents were female.

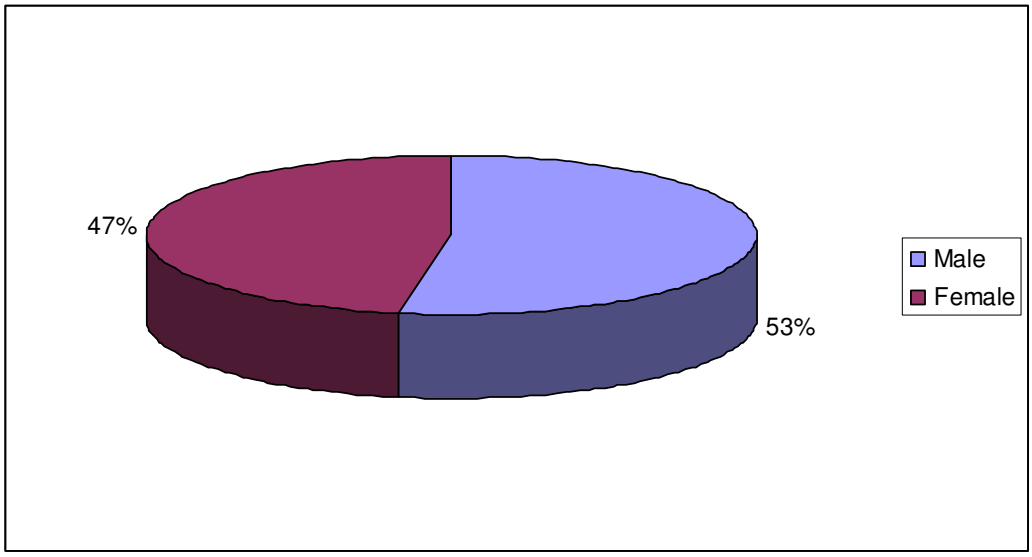


Figure 4-5: Gender of Respondents

4.3. Nonaka and Takeuchi's Knowledge (SECI) Spiral Model

4.3.1. Determining the use of Internalization

Internalization (from explicit knowledge to tacit knowledge) is described by Nonaka and Takeuchi (1995) as *process of embodying explicit knowledge into tacit knowledge.* The fourth mode of the knowledge conversion process, *internalization*, is determined by five statements in the questionnaire.

The response to the first statement, *after hearing a new idea or concept, I tend to compare it with my experience to help me comprehend the meaning* (labeled as **Internalization 1**) is reflected in Table 4.1.

Table 4-1 shows that 21.4% of the sample size strongly agrees, 72.9% of the sample size agrees, 4.3% of the sample size is neutral, and 1.4% of the sample size disagrees. Therefore by observation 78.6% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	15	21.4	21.4	21.4
	Agree	51	72.9	72.9	94.3
	Neutral	3	4.3	4.3	98.6
	Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-1: Frequency Table for Internalization 1

The second statement, *I understand others' thoughts better by repeating what they said and asking them "Is this what you mean?"* (labeled as **Internalization 2**) is reflected in Table 4-2.

Table 4-2 for Internalization 2 shows that 25.7% of the sample size strongly agrees, 52.9% of the sample size neither agrees, 10 % of the sample size is neutral, 8.6% of the sample size disagrees, and 2.9% of the sample size strongly disagrees with the statement above. Therefore by observation 78.6% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	18	25.7	25.7	25.7
	Agree	37	52.9	52.9	78.6
	Neutral	7	10.0	10.0	88.6
	Disagree	6	8.6	8.6	97.1
	Strongly Disagree	2	2.9	2.9	100.0
	Total	70	100.0	100.0	

Table 4-2: Frequency Table for Internalization 2

The third statement, *I will tell others what I think to make sure my understanding is the same as theirs* (labeled as **Internalization 3**) is reflected in Table 4-3.

Table 4-3 for Internalization 3 shows that 34.3% of the sample size strongly agrees, 50% of the sample size agrees, 14.3% of the sample size is neutral, and 1.4% of the sample size strongly disagrees with the statement. Therefore by observation 84.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	24	34.3	34.3	34.3
	Agree	35	50.0	50.0	84.3
	Neutral	10	14.3	14.3	98.6
	Strongly Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-3: Frequency Table for Internalization 3

The fourth statement, *when I have finished saying something, I will ask the other person if it is necessary to repeat to make sure he/she understands exactly what I mean* (labeled as **Internalization 4**) is reflected in Table 4-4.

Table 4-4 for Internalization 4 shows that 14.3% of the sample size strongly agrees, 44.3% of the sample size agrees, 25.7% of the sample size is neutral, 12.9% of the sample size disagrees, and 2.9% of the sample size strongly disagrees with the statement. Therefore by observation 58.7% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	10	14.3	14.3	14.3
	Agree	31	44.3	44.3	58.6
	Neutral	18	25.7	25.7	84.3
	Disagree	9	12.9	12.9	97.1
	Strongly Disagree	2	2.9	2.9	100.0
	Total	70	100.0	100.0	

Table 4-4: Frequency Table for Internalization 4

The fifth statement, *when communicating with others, I will give other time to think about we discussed* (labeled as **Internalization 5**) is reflected in Table 4-5.

Table 4-5 for Internalization 5 shows that 17.1% of the sample size strongly agrees, 60% of the sample size agrees, 18.6% of the sample size is neutral, and 4.3% of the sample size disagrees with the statement. Therefore by observation 77.1% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	12	17.1	17.1	17.1
	Agree	42	60.0	60.0	77.1
	Neutral	13	18.6	18.6	95.7
	Disagree	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

Table 4-5: Frequency Table for Internalization 5

In order for the mode of internalization to be predominantly used by the post-graduate students in the School of Management, IT, and Governance at the University of KwaZulu-Natal there needs to be agreement by at least a two thirds majority. The frequency response for each individual statement showed that four out five statements were agreed upon; however Internalization 4 was indecisive especially as 25.7% of respondents were neutral and only 15.8% disagreed. Therefore, the internalization mode is effective and

frequently use as a two thirds majority was reached with four out of the five aforementioned statements, but this may not be the predominantly used mode

4.3.2. Determining the use of Externalization

Externalization (from tacit knowledge to explicit knowledge) is described by Nonaka and Takeuchi (1995) as *the process of articulating tacit knowledge into explicit knowledge.* The second mode of the knowledge conversion process, *externalization*, was determined by seven statements in the questionnaire.

The response to the first statement, *when others can't understand me, I am usually able to give him/her examples to help explaining* (labeled as **Externalization 1**) is reflected in Table 4-6.

Table 4-6 for Externalization 1 shows that 50% of the sample size strongly agrees, 45.7% of the sample size agrees, and 4.3 % of the sample size disagrees. Therefore by observation 95.7% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	35	50.0	50.0	50.0
	Agree	32	45.7	45.7	95.7
	Disagree	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

Table 4-6: Frequency Table for Externalization 1

The second statement, *most of the time, I can transcribe some of the unorganized thoughts into concrete ideas* (labeled as **Externalization 2**) is reflected in Table 4-7.

Table 4-7 for Externalization 2 shows that 20% of the sample size strongly agrees, 48.6% of the sample size agrees, 27.1% of the sample size is neutral, and 4.3% of the sample

size strongly agrees. Therefore by observation 68.6% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	14	20.0	20.0	20.0
	Agree	34	48.6	48.6	68.6
	Neutral	19	27.1	27.1	95.7
	Disagree	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

Table 4-7: Frequency Table for Externalization 2

The third statement, *I can describe academic or technical terms with conversational language to help communicate in a group* (labeled as **Externalization 3**) is reflected in Table 4-8.

Table 4-8 for Externalization 3 shows that 24.3% of the sample size strongly agrees, 58.6% of the sample size agrees, 12.9% of the sample size is neutral, and 4.3% of the sample size strongly agrees. Therefore by observation 82.9% of respondents tend to agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	17	24.3	24.3	24.3
	Agree	41	58.6	58.6	82.9
	Neutral	9	12.9	12.9	95.7
	Disagree	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

Table 4-8: Frequency Table for Externalization 3

The fourth statement, *I tend to use analogy when expressing abstract concepts* (labeled as **Externalization 4**) is reflected in Table 4-9.

Table 4-9 for Externalization 4 shows that 24.3 % of the sample size strongly agrees, 60% of the sample size neither agrees nor disagrees, 12.9% of the sample size agrees, and 2.9% of the sample size strongly agrees. Therefore by observation 84.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	17	24.3	24.3	24.3
	Agree	42	60.0	60.0	84.3
	Neutral	9	12.9	12.9	97.1
	Disagree	2	2.9	2.9	100.0
	Total	70	100.0	100.0	

Table 4-9: Frequency Table for Externalization 4

The fifth statement, *when I try to express abstract concepts, I tend to explain with examples* (labeled as **Externalization 5**) is reflected in Table 4-10.

Table 4-10 for Externalization 5 shows that 30 % of the sample size strongly agrees, 64.3% of the sample size agrees, 4.3% of the sample size is neutral, and 1.4% of the sample size disagrees. Therefore by observation 94.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	21	30.0	30.0	30.0
	Agree	45	64.3	64.3	94.3
	Neutral	3	4.3	4.3	98.6
	Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-10: Frequency Table for Externalization 5

The sixth statement, *I will help others to clearly express what he/she has in mind by encouraging them to continue what they are saying* (labeled as **Externalization 6**) is reflected in Table 4-11.

Table 4-11 for Externalization 6 shows that 32.9% of the sample size strongly agrees with statement above, 54.3% of the sample size agrees, 8.6% of the sample size is neutral, and 4.3% of the sample size disagree. Therefore by observation 87.1% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	23	32.9	32.9	32.9
	Agree	38	54.3	54.3	87.1
	Neutral	6	8.6	8.6	95.7
	Disagree	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

Table 4-11: Frequency Table for Externalization 6

The seventh statement, when others cannot express themselves clearly, I usually help them clarify their points (labeled as **Externalization 7**) is reflected in Table 4-12.

Table 4-12 for Externalization 7 shows that 14.3% of the sample size strongly agrees with statement above, 61.4% of the sample size agrees, 22.9% of the sample size is neutral, and 1.4% of the sample size disagrees. Therefore by observation 75.7% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	10	14.3	14.3	14.3
	Agree	43	61.4	61.4	75.7
	Neutral	16	22.9	22.9	98.6
	Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-12: Frequency Table for Externalization 7

In order for the mode of Externalization to be predominantly used by the post-graduate students in the School of Management, IT, and Governance at the University of KwaZulu-Natal there needs to be at least a two thirds majority agreement with the statement for the externalization mode to be deemed effective. The study revealed that for each individual statement, all seven statements were agreed upon. Therefore, the Externalization mode is effective and frequently used. Following analysis by the research, it is clear that there is positive reaction with regard to the mode of Externalization. It is clear that the aspects of the Externalization mode are practiced enough by post-graduate students in the School of Management, IT and Governance at the University of KwaZulu-Natal. This shows that post-graduate students are able to articulate there tacit knowledge to explicit knowledge effectively, or that there are academic mechanisms in place to help post-graduate students transform their tacit knowledge into explicit knowledge.

4.3.3. Determining the use of Socialization

Socialization (from tacit knowledge to tacit knowledge) is described by Nonaka and Takeuchi (1995) as *the process of converting new tacit knowledge through shared experience.* The first mode of the knowledge conversion process, *socialization*, is determined by seven statements in the questionnaire. .

The first statement, *academic group discussion, I will actively share my experience with others* (labeled as **Socialization 1**) is reflected in Table 4-13.

Table 4-13 for Socialization 1 shows that 34.3% of the sample size strongly agrees, 48.6% of the sample size agrees, 10% of the sample size is neutral, and 7.1% of the sample size disagrees. Therefore by observation 82.9% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	24	34.3	34.3	34.3
	Agree	34	48.6	48.6	82.9
	Neutral	7	10.0	10.0	92.9
	Disagree	5	7.1	7.1	100.0
	Total	70	100.0	100.0	

Table 4-13: Frequency Table for Socialization 1

The second statement, *in my academic team, my teammates and I will share life or work experience with each other* (labeled as **Socialization 2**) is reflected in Table 4-14.

Table 4-14 Socialization 2 shows that 32.9% of the sample size strongly agrees, and 51.4% of the sample size agrees, and 15.7% of the sample size is neutral. Therefore by observation 84.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	23	32.9	32.9	32.9
	Agree	36	51.4	51.4	84.3
	Neutral	11	15.7	15.7	100.0
	Total	70	100.0	100.0	

Table 4-14: Frequency Table for Socialization 2

The third statement, *during group discussion, I try to find out others' opinions, thoughts and other information* (labeled as **Socialization 3**) is reflected in Table 4-15.

Table 4-15 for Socialization 3 shows that 47.1% of the sample size strongly agrees, 47.1% of the sample size agrees, 2.9% of the sample size is neutral, and 2.9% of the sample size disagrees. Therefore by observation 94.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	33	47.1	47.1	47.1
	Agree	33	47.1	47.1	94.3
	Neutral	2	2.9	2.9	97.1
	Disagree	2	2.9	2.9	100.0
	Total	70	100.0	100.0	

Table 4-15: Frequency Table for Socialization 3

The fourth statement, *during discussion, I will bring out some concepts, thoughts, or ideas,* (labeled as **Socialization 4**) are reflected in Table 4-16.

Table 4-16 for Socialization 4 shows that 44.3% of the sample size strongly agrees, 48.6% of the sample size agrees, and 7.1% of the sample size is neutral. Therefore by observation 92.9 % of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	31	44.3	44.3	44.3
	Agree	34	48.6	48.6	92.9
	Disagree	5	7.1	7.1	100.0
	Total	70	100.0	100.0	

Table 4-16: Frequency Table for Socialization 4

The fifth statement *I often encourage others to express their thoughts* (labeled as **Socialization 5**) is reflected in Table 4-17.

Table 4-17 for Socialization 5 shows that 34.3% of the sample size strongly agrees, 52.9% of the sample size agrees, 8.6% of the sample size is neutral, and 4.3% of the sample size disagrees. Therefore by observation 87.1% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	24	34.3	34.3	34.3
	Agree	37	52.9	52.9	87.1
	Neutral	6	8.6	8.6	95.7
	Disagree	3	4.3	4.3	100.0
	Total	70	100.0	100.0	

Table 4-17: Frequency Table for Socialization 5

The sixth statement, *before group discussion, I will collect necessary information and show it to the group* (labeled as **Socialization 6**) is reflected in Table 4-18.

Table 4-18 for Socialization 6 shows that 20% of the sample size strongly agrees, 48.6% of the sample size agrees, 25.7% of the sample size is neutral, and 5.7% of the sample size disagrees. Therefore by observation 68.6% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	14	20.0	20.0	20.0
	Agree	34	48.6	48.6	68.6
	Neutral	18	25.7	25.7	94.3
	Disagree	4	5.7	5.7	100.0
	Total	70	100.0	100.0	

Table 4-18: Frequency Table for Socialization 6

The seventh statement, *I like to get to know the people whom I will work with before going into a project together* (labeled as **Socialization 7**) is reflected in Table 4-19.

Table 4-19 for Socialization 7 shows that 31.4% of the sample size strongly agrees, 44.3% of the sample size agrees, 15.7% of the sample size is neutral, and 8.6% of the sample size disagrees. Therefore by observation 75.7% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	22	31.4	31.4	31.4
	Agree	31	44.3	44.3	75.7
	Neutral	11	15.7	15.7	91.4
	Disagree	6	8.6	8.6	100.0
	Total	70	100.0	100.0	

Table 4-19: Frequency Table for Socialization 7

Individuals agreed unanimously with all seven statements, implying that the socialization mode was effective. The results in relation to the data are further discussed within the conclusion of this chapter.

4.3.4. Determining the use of Combination

Combination (from explicit knowledge to explicit knowledge) is described by Nonaka and Takeuchi (1995) as *the process of converting explicit knowledge into more complex and systematic sets of explicit knowledge.* The third mode of the knowledge conversion process, *combination*, is determined by six statements in the questionnaire.

The first statement, *during the discussion, I tend to organize ideas and make conclusions to facilitate the discussion* (labeled as **Combination 1**) is reflected in Table 4-20.

Table 4-20 for Combination 1 shows that 12.9% of the sample size 12.9%, and 61.4% of the sample size agrees, 20% of the sample size is neutral, and 5.7% of the sample size disagree. Therefore by observation 74.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	9	12.9	12.9	12.9
	Agree	43	61.4	61.4	74.3
	Neutral	14	20.0	20.0	94.3
	Disagree	4	5.7	5.7	100.0
	Total	70	100.0	100.0	

Table 4-20: Frequency Table for Combination 1

The second statement, *when coming across problems, I tend to use my experience to help solving problems* (labeled as **Combination 2**) is reflected in Table 4-21.

Table 4-21 for Combination 2 shows that 32.9% of the sample size strongly agrees, 51.4% of the sample size agrees, and 15.7% of the sample size is neutral. Therefore by observation 84.3% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	23	32.9	32.9	32.9
	Agree	36	51.4	51.4	84.3
	Neutral	11	15.7	15.7	100.0
	Total	70	100.0	100.0	

Table 4-21: Frequency Table for Combination 2

The third statement, *after every event, I have the habit of organizing and making a summary of what happened* (labeled as **Combination 3**) is reflected in Table 4-22.

Table 4-22 for Combination 3 shows that 15.7% of the sample size strongly agrees, 42.9% of the sample size agrees, 28.6% of the sample size is neutral, 11.4% of the sample size disagrees, and 1.4% of the sample size strongly disagree. Therefore by observation 58.6% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	11	15.7	15.7	15.7
	Agree	30	42.9	42.9	58.6
	Neutral	20	28.6	28.6	87.1
	Disagree	8	11.4	11.4	98.6
	Strongly Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-22: Frequency Table for Combination 3

The fourth statement, *during discussion, I will organize everyone's thoughts in my mind* (labeled as **Combination 4**) is reflected in Table 4-23.

Table 4-23 for Combination 4 shows that 10% of the sample size strongly agrees, 51.4% of the sample size agrees, 27.1% of the sample size is neutral, and 8.6% of the sample size disagrees, and 2.9% of the sample size strongly disagrees. Therefore by observation 61.4% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	7	10.0	10.0	10.0
	Agree	36	51.4	51.4	61.4
	Neutral	19	27.1	27.1	88.6
	Disagree	6	8.6	8.6	97.1
	Strongly Disagree	2	2.9	2.9	100.0
	Total	70	100.0	100.0	

Table 4-23: Frequency Table for Combination 4

The fifth statement, *I like to collect new information, and making a connection of new and old knowledge to work up new concepts* (labeled as **Combination 5**) is reflected in Table 4-24.

Table 4-24 for Combination 5 shows that 21.4% of the sample size strongly agrees, 55.7% of the sample size agrees, 18.6% of the sample size is neutral, 2.9% of the sample size disagrees, and 1.4% of the sample size strongly disagrees. Therefore by observation 77.1% of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	15	21.4	21.4	21.4
	Agree	39	55.7	55.7	77.1
	Neutral	13	18.6	18.6	95.7
	Disagree	2	2.9	2.9	98.6
	Strongly Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-24: Frequency Table for Combination 5

The sixth statement, *I like to organize ambiguous concepts into structure* (labeled as **Combination 6**) is reflected in Table 4-25.

Table 4-25 for Combination 6 shows that 20% strongly agrees, 40% of the sample size agrees, 28.6% of the sample size is neutral, 10% of the sample size disagrees, and 1.4% of the sample size strongly disagrees. Therefore by observation 63.33 % of respondents agree with the statement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	14	20.0	20.0	20.0
	Agree	28	40.0	40.0	60.0
	Neutral	20	28.6	28.6	88.6
	Disagree	7	10.0	10.0	98.6
	Strongly Disagree	1	1.4	1.4	100.0
	Total	70	100.0	100.0	

Table 4-25: Frequency Table for Combination 6

The two thirds majority was not achieved for Combination 3, Combination 4, and Combination 6. Therefore it became evident that the combination mode is not predominantly used by the post-graduate students. This confirms that transforming explicit knowledge to explicit knowledge is not a significant activity in the knowledge creation and transfer process.

4.4. Conclusion

From the findings, it can be concluded that Nonaka and Takeuchi's (1995) knowledge (SECI) spiral model is undoubtedly utilized by post-graduate students in the School of Management, IT and Governance at the University of KwaZulu-Natal. Isolating each mode, it is apparent that Socialization and Externalization are the most utilized modes to generate and transfer knowledge, especially as the results shows that over 70% off student agreed to these modes specific questions. The researcher believes that as per Rai (2011) post-graduate students are using the socialization mode to share experiences with each other, which also includes creation and sharing of mental models, world views, and mutual trust. The researcher's belief for post-graduate students is in line with Handzic and Chaimungkalanont (2004) belief that the socialization mode is used to enable tacit knowledge to be transferred between individuals through shared experience, space, and time. Moreover from the overwhelming positive response to socialization it is evident that post-graduate students in the School of Management, IT, and Governance are using

brainstorming, informal meetings, discussions, dialogues, observation, mentoring, and learning groups to access highly personal and difficult to formalize knowledge (Kermally, 2002). The author believes it is safe to say that Michael Polyani's well-known statement, "we know more than we can tell", is appropriate for post-graduate students in the School of Management, IT and Governance at UKZN. As all seven of the externalization statements were very positive this reaffirms the use of socialization use of by the respondents. Collective reflection, experience and a purposeful dialogue (socialization) triggers the mode of externalization, in which using a context specific example, theory, diagram or analogy to express hidden tacit knowledge that is otherwise hard to communicate (Morey, Maybury and Thuraisingham, 2002). The results prove Kermally's (2002) belief that externalization occurs through meetings, building hypotheses and models, pictures to communicate, after action reviews, workshops, master classes, assignment databases, best practice exchange, diagrams, illustrations, sketches, metaphors and analogies all of which play an important role in articulating tacit knowledge, that is normally difficult to express in a verbal or written language.

As many of the respondents showed uncertainty for three of the six statements for combination, the author feels that more literature needs to be reviewed to develop and aid these statements. Overall, the results of the section's statements showed that post-graduate students to bringing together of multiple sources of explicit knowledge. The results from the frequency tables showed that the School of Management, IT and Governance in the University of KwaZulu-Natal have mechanisms in place to facilitate the process of transferring and sharing experiences and thereby creating tacit knowledge, and articulating tacit knowledge into explicit knowledge. Moreover the internalization statements which tested quite highly (except for Internalization 4 which did not achieve a two third majority), shows that the School of Management, IT and Governance has a system in place to enable post-graduate students to embody explicit knowledge into tacit knowledge, that is converting explicit knowledge into more complex and systematic sets of explicit knowledge, and have mechanisms in place for the process of embodying explicit knowledge into tacit knowledge. The School of Management, IT and Governance has created an ecosystem that encourages their post-graduate students to create and transfer

knowledge. Further conclusions for the research questions and recommendations for future studies at the school, faculty, university and other academic institutions are found within the next chapter.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

In light of the previous four chapters the researcher looked at a multitude of literature addressing various authors' views pertaining to data, information, knowledge, knowledge conversion, Nonaka and Takeuchi's (1995) knowledge (SECI) spiral model, the concept of Ba, and knowledge enablers. Moreover the study predominantly focused on Nonaka and Takeuchi's (1995) knowledge (SECI) spiral model. The literature review provided the perspective for the conclusion and recommendations, as well as the direction for the questionnaire. The findings were reported and discussed extensively. Knowledge is created and transferred amongst the post-graduates students; however the ambition of this chapter is to address which of the four modes of knowledge conversion, that is, socialization, externalization, combination, and internalization is utilized predominantly in the knowledge creation and transfer process; and finally, are post-graduate students in the School of Management, IT and Governance transcending from the old self to the new self when engaging in the knowledge creating and transfer activities.

5.2 Conclusion

The aim of this study was to assess how knowledge is created and transferred among post-graduate Students in the School of Management, IT and Governance, using Nonaka and Takeuchi's (1995) knowledge (SECI) spiral model. The literatures provide reasons why and when post-graduate students in UKZN would create and transfer their knowledge, as well as the difficulties that they may face in gaining access to knowledge.

The study confirmed that post-graduate students utilize the socialization and externalization modes of knowledge conversion comprehensively; internalization plays a significant role in their knowledge creation and transfer activities too, whilst combination was lesser utilized but still plays a role in their knowledge creation and transfer activities. Post-graduate students have a space that allows them to bring hunches, thoughts, notions, intuition, or tacit knowledge into reality. Trust and dedication are common amongst post-graduate students. With the socialization and externalization so high, post-graduate students are aware of each other's' capabilities and competencies, and trust each other enough to share the knowledge. The author was dissatisfied with the low turn response rate for the Masters Students, however, the author left no stone unturned in the pursuit to understand and make others aware of knowledge creation and transfer activities, and the sub-objectives/research questions.

This brings the author to answering the sub-objectives/research questions.

- How is knowledge created and transferred amongst the post-graduates students? Post-graduate students transfer and share experiences (existing knowledge) and information, thus creating tacit knowledge. They then articulate the tacit knowledge into explicit knowledge; connect/systemize concepts into knowledge systems; and finally embody explicit knowledge into tacit knowledge.
- Which of the four modes of knowledge conversion are utilized predominantly in the knowledge creation and transfer process? The socialization and externalization are utilized predominantly; this is as per the findings in chapter four of the study.
- Are post-graduate students transcending from the old self to the new self when engaging in knowledge creating and transfer activities? Yes, the author recognizes that post-graduate students are transcending, as all of the knowledge conversion modes received a positive response. The author acknowledges that knowledge creation is a continuous, self-transcending process through which one transcends the boundary of the old self into a new self by acquiring a new context, a new view of the world, and new knowledge. As knowledge creation is referred to as a continuous, self-transcending process in the presence of the knowledge spiral –

knowledge through this process has an origin however it does not have a conclusion, as it builds on the foundational knowledge that has been created, transferred and stored in the knowledge conversion process (Kaiser and Fordinal; 2010).

- Which is the most trusted source of information and knowledge used by post-graduate students? As socialization and externalization received the majority of the positive responses, the activities associated with these modes illustrated that these are the most trusted source of information and knowledge. Therefore brainstorming, informal meetings, discussions, dialogues, observation, mentoring, learning groups, as well as meetings, building hypotheses and models, pictures to communicate, after action reviews, workshops, master classes, assignment databases, best practice exchange, diagrams, illustrations, sketches, metaphors and analogies are the trusted sources of information and knowledge for post-graduate students at the School of Management, IT and Governance at UKZN.

5.2. Recommendations

The author believes that more research should be carried out on the modes of combination and internalization in the School of Management, IT, and Governance, which should be studied in greater detail at the school. Closed question Internalization 4, "when I have finished saying something, I will ask the other person if it is necessary to repeat to make sure he/she understands exactly what I mean" had an agreement of below 59%, therefore, students imparting their tacit knowledge but not clarifying if others' understand the context of their knowledge. The closed questions "after every event, I have the habit of organizing and making a summary of what happened during the discussion; I will organize everyone's thoughts in my mind; I like to organize ambiguous concepts into structure" was agreed to by lower percentages (58-62%) of post-graduate students in comparison to the other questions within this mode. Therefore, the researcher recommends that these questions are structured in a more simplistic manner and the mode of combination is tested as a stand-alone topic within the school. The researcher also recommends that how knowledge creation and transfer by post-graduate and undergraduate students are tested

on a larger scale. The reason for proposing post-graduate and undergraduate students for future research is that they are the individuals that directly deal with the generation, transfer, and storage of knowledge in academic institutes. Furthermore, future research on the topic should be faculty or university specific, as this will provide a generalization of results for each faculty or university. A qualitative and quantitative analysis should be carried out on this area of research. A sample size of at most 1000 students per university should be used, depending on the population of the university. In addition, future research should concentrate on the conditions that drive the knowledge spiral process, the five-phase model of the organizational knowledge-creation process (in an academic context), and the factors that affect the knowledge spiral process and the individual modes of knowledge. Moreover, the researcher strongly believes that a study should be done to compare new joiners in corporate university graduate programs, post-graduate students, and undergraduate students. A study of the influence of trust, communication, culture, organizational networks, technical infrastructure and other influences such as investment should be carried out, to determine its effects on knowledge creation and transfer in academic institutes. Future studies should also compare knowledge creation, transfer, and storage in South African academic institutions with that of other American, European, and Asian academic institutions. This will help gauge if there are any similarities or differences between academic institutes other than political, social, and economic differences. This would also enable future researchers to observe the cultural differences between students or academic institutions.

Future studies on knowledge conversion activities in academic institutes should focus on the years of existence, number of students, faculty, schools and the academic year of the student. Furthermore future research should determine if students in specific years of study and who hold certain access to academic knowledge mechanisms are more adept at creating, transferring, and storing knowledge. Finally, as the culture of the university could not be established with a single school or a few disciplines, the author strongly believes that multiple colleges should be surveyed to determine if a knowledge creating and transfer culture exists.

REFERENCES

Abrams, L., Cross, R., Lesser, E., and Levin, D., (2003). “Nurturing interpersonal trust in knowledge-sharing networks.” Academy of Management Executive, Vol. 17, No. 4, pp. 64-77.

Al-Alawi, A., I., Al-Marzooqi, N., Y., and Mohammed, Y. F., (2007). “Organizational Culture and Knowledge Sharing: Critical Success Factors.” Journal of Knowledge Management, Vol. 11, Iss. 2, pp. 22-42.

Allame, S.M., Nouri, B.A., Tavakoli, S.Y., and Shokrani, S.A.R., (2011). "Effect of Organizational culture on Success of Knowledge Management system's implementation (Case Study: Saderat bank in Isfahan province)," Interdisciplinary Journal of Contemporary Research in Business, Vol. 2, Iss. 9, pp. 321-246.

Alavi, M., and Leidner, D.E., (2001). “Review: knowledge management and knowledge management systems: conceptual foundations and research issues,” MIS Quarterly, Vol. 25, No. 1, pp. 107-36.

Arling, P.A., and Chun, M.W.S., (2011). "Facilitating new knowledge creation and obtaining KM maturity," Journal of Knowledge Management, Vol. 15, Iss. 2, pp. 231 – 250. Permanent link to this document:
http://dx.doi.org/10.1108/13673271111119673

Boisot, M., and Canals, A., (2004). "Data, information, and knowledge: have we got it right?" Journal of Evolutionary Economics, Vol.14, pp. 43–67.

Bukowitz, W.R., and Williams, R.L., (2000). The Knowledge Management Fieldbook. Harlow: Pearson Education Limited.

Burt, R.S., (1992). Structural Holes: The Social Structure of Competition, Harvard University Press, Cambridge, MA.

Butler, A., Le Grice, P., and Reed, M., (2006). “Delimiting Knowledge Transfer from Training,” Education + Training, Vol. 48, No. 8/9, pp. 627-641.

Carlsson, S.A., (2003). "Knowledge managing and knowledge management systems in inter-organizational networks," Knowledge and Process Management, Vol. 10, No. 3, pp. 194-206.

Choo, C.W., and Drummond de Alvarenga Neto, R.C., (2010). "Beyond the ba: managing enabling contexts in knowledge organizations," Journal of Knowledge Management, Vol. 14, Iss. 4, pp. 592 – 610.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011059545

Dadziea, A., Lanfranchi, V. and Petrelli, D., (2009). "Seeing is believing: Linking data with knowledge," Information Visualization. Vol. 8, Iss. 3, pp. 197–211.

Davenport, T. H., and Prusak, L., (1998). “Working Knowledge: How Organizations Manage What They Know,” Boston: Harvard Business School Press.

Dayan, R., and Evans, S., (2006). “KM Your Way to CMMI,” Journal of Knowledge Management, Vol. 10, Iss. 1, pp. 69-80.

Desouza, K. C., and Awazu, Y., (2006). “Knowledge Management at SMEs: Five Peculiarities,” Journal of Knowledge Management, Vol.10, Iss.1, pp. 32-43.

Despres, C. and Chauvel, D., (2000). Knowledge Horizons, Massachusetts: Butterworth-Heinemann.

Devlin, A. S., (2006). “Research Methods: Planning, Conducting and Presenting Research,” (California: Thomson Wadsworth).

Donate, M.J. and Canales, J.I., (2012). "A new approach to the concept of knowledge strategy," Journal of Knowledge Management, Vol. 16, Iss. 1, pp. 22 – 44.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271211198927

Du Plessis, M., (2007). "Knowledge Management: What makes Complex Implementations Successful?" Journal of Knowledge Management, 11(2), pp. 91-101.

Franco, M., and Mariano, S., (2007). "Information technology repositories and knowledge management processes," The Journal of Information and Knowledge Management Systems, Vol. 37, No. 4, pp. 440-451.

Gilmour, A., (2003). Services Marketing and Management. (London: SAGE Publications Ltd.).

Girard, J. P., (2006). "Where is the knowledge we have lost in managers?" Journal of Knowledge Management, Vol.10, Iss. 6, pp. 22-38.

Handzic, M., (2011). "Integrated socio-technical knowledge management model: an empirical evaluation," Journal of Knowledge Management, Vol. 15, Iss. 2, pp. 198 – 211.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111119655

Handzic, M., and Chaimungkalanont, M., (2004). "Enhancing Organisational Creativity through Socialisation," Journal of Knowledge Management, Vol. 2, Iss. 1, pp. 57-64.

Hansen, M.T., (1999). "The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits," Administrative Science Quarterly, Vol. 44, pp. 82-111.

Hautala, J., (2011). "Cognitive proximity in international research groups," Journal of Knowledge Management, Vol. 15, Iss. 4, pp. 601 – 624.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111151983

Hayashi, T., (2004). “Gijutsukaihatsuryoku no Kokusaiteki Bunsanka To Shuhchuhka”, Rikkyo Keizaigaku Kenkyu, Vol. 57, Iss. 3, pp. 63-88.

Hermans, J., and Castiaux, A., (2007). “Knowledge Creation through University-Industry Collaborative Research Projects,” Journal of Knowledge Management, Vol. 5, Iss. 1, pp. 43-54.

Holste, J.S., and Fields, D., (2010). "Trust and tacit knowledge sharing and use", Journal of Knowledge Management, Vol. 14, Iss. 1, pp.128 – 140.

Huang, J.C. & Wang, S.F. (2002), "Knowledge conversion abilities and knowledge creation and innovation: A new perspective on team composition", *The Third European Conference on Organizational Knowledge, Learning and Capabilities* (OLKC), Athens Laboratory of Business Administration (ALBA), Athens, Greece, 5-6 April.

Jacobs, E.J., and Roodt, G., (2011). “The mediating effect of knowledge sharing between organisational culture and turnover intentions of professional nurses,” SA Journal of Information Management, Vol. 13, No. 1, Art. #425, 6 pages, DOI: 10.4102/sajim. v13i1.425.

Jakubik, M., (2011). "Becoming to know. Shifting the knowledge creation paradigm," Journal of Knowledge Management, Vol. 15, Iss. 3, pp. 374 – 402.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111137394

Joia, L.A., and Lemos, B., (2010). "Relevant factors for tacit knowledge transfer within organisations," Journal of Knowledge Management, Vol. 14, Iss. 3, pp. 410 – 427.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011050139

Kaiser, A., and Fordinal, B., (2010). "Creating a ba for generating self-transcending knowledge", Journal of Knowledge Management, Vol. 14, Iss. 6, pp. 928 – 942.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011084943

Kermally, S. (2002). Effective Knowledge Management. (West Sussex: John Wiley & Sons, Ltd).

Khandelwal, V.K., and Gottschalk, P., (2003). "Information technology support for inter-organizational knowledge transfer: An empirical study of law firms in Norway and Australia," Information Resources Management Journal, Vol. 16, Issue. 1, pp. 14-23.

Kim, S., and Trimi, S., (2007). "IT for KM in the Management Consulting Industry," Journal of Knowledge Management, Vol. 11, Iss. 3, pp. 145-155.

King, W.R., (2008). "Questioning the conventional wisdom: culture-knowledge management relationships" Journal of Knowledge Management, Vol. 12, Iss. 3, pp. 35-47.

Levin, J., and Fox, J., A., (2006). Elementary Statistics in Social Research, (Massachusetts: Pearson Education, Inc.).

Little, S. Quintas, P., & Ray, T., (2002). Managing Knowledge: An Essential Reader, (London: Sage Publications Ltd).

Liyanage, C., Elhag, T., Ballal, T., and Li, Q., (2009). "Knowledge communication and translation – a knowledge transfer model" Journal of Knowledge Management, Vol. 13, Iss. 3, pp. 118-131.

Mayer, R.C., Davis, J.H., and Schoorman, F.D., (1995). “An integration model of organizational trust,’’ Academy of Management Review, Vol. 20, pp. 709-34.

McAllister, D., (1995). ‘‘Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations,’’ Academy of Management Journal, Vol. 38, No. 1, pp. 24-59.

McBurney, D. H., and White, T. L., (2007). Research Methods, (California: Thomson Wadsworth).

McKenzie, J., and van Winkelen, C., (2006). ”Journal of General “Creating Successful Partnerships: The Importance of Sharing KnowledgeManagement, Henley-on-Thames: Summer, Vol. 31, No. 4, pp. 45-61.

McNichols, D., (2010). "Optimal knowledge transfer methods: a Generation X perspective," Journal of Knowledge Management, Vol. 14, Iss, 1, pp. 24 – 37.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011015543

McKenzie, J., van Winkelen, C. & Grewal, S., (2011), "Developing organisational decision-making capability: a knowledge manager's guide", Journal of Knowledge Management, Vol. 15 Iss: 3 pp. 403 - 421
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111137402

Michailova, S., and Nielsen, B., B., (2006). “MNCs and Knowledge Management: A Typology and Key Features,” Journal of Knowledge Management, Vol. 10, Iss. 1, pp. 44-54.

Mitchell, R., and Boyle, B., (2010). "Knowledge creation measurement methods," Journal of Knowledge Management, Vol. 14, Iss. 1, pp. 67 – 82.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011015570

Mohamed, M., Stankosky, M., and Murray, A., (2006). "Knowledge management and information technology: can they work in perfect harmony?" Journal of Knowledge Management, Vol. 10, Iss. 3, pp. 103-116.

Morey, D., Maybury, M., and Thuraisingham, B., (2002). Knowledge Management: Classic and Contemporary Works, (Massachusetts: MIT Press).

Monnavarian. A. and Amini, A., (2009). "Do interactions within networks lead to knowledge management?" Business Strategy Series, Vol. 10, No. 3, pp. 139-155.

Mooradian, N., (2005). "Tacit Knowledge: Philosophic Roots and Role in KM," Journal of Knowledge Management, Vol. 9, Iss. 6, pp. 104 -113.

Nelson, B. and Economy, P., (2005). The Management Bible. (New Jersey: John Wiley & Sons, Inc.).

Nonaka, I., (1991). ''The knowledge-creating company,'' Harvard Business Review, Vol. 69, pp. 96-104.

Nonaka, I., (1994). ''A dynamic theory of organizational knowledge creation,'' Organization Science, Vol. 5, No. 1, pp. 14-37.

Nonaka, I., and Konno, N., (1998). ''The concept of 'ba': building a foundation for knowledge creation,'' California Management Review, Vol. 40, pp. 40-54.

Nonaka, I., and Takeuchi, H., (1995). The Knowledge Creating Company, Oxford University Press, New York, NY.

Nonaka, I., Toyama, R., and Konno, N., (2000). ‘‘SECI, ba and leadership: a unified model of dynamic knowledge creation,’’ Long Range Planning, Vol. 33, No. 1, pp. 5-34.

Oguz, F., and Sengün, A.E., (2011). "Mystery of the unknown: revisiting tacit knowledge in the organizational literature", Journal of Knowledge Management, Vol. 15, Iss. 3, pp. 445 – 461.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111137420

Oliver, S., and Kandadi, K., R., (2006). “How to Develop Knowledge Culture in Organizations? A Multiple Case Study of Large Distributed Organizations,” Journal of Knowledge Management, Vol. 10, Iss. 4, pp. 6-24**.**

Omerzel, D.G., Biloslavo, R. & Trnavcevic, A., (2011). “Knowledge management and organisational culture in higher education institutions," Journal for East European Management Studies, Vol. 16, Iss. 2, pp. 111-139.

O’Sullivan, K. J., (2007), “Creating and Executing an Internal Communications Plan for Knowledge Management Systems Deployments,” Journal of Knowledge Management, Vol. 11, Iss. 2, pp. 102-108.

Patton, M., Q. (2002). Qualitative Research and Evaluation Methods, (California: Sage Publications, Inc.).

Perez-Araos, A., Barber, K.D., Munive-Hernandez, J.E, & Eldridge, S., (2007). "Designing a knowledge management tool to support knowledge sharing networks" Journal of Manufacturing Technology Management, Vol. 18, No. 2, pp. 153-168.

Pinho, I., Rego, A., and e Cunha, M.P., (2012), "Improving knowledge management processes: a hybrid positive approach," Journal of Knowledge Management, Vol. 16, Iss. 2, pp. 215 – 242.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271211218834

Qureshi, S., Briggs, R., and O., Hlupic, V., (2006). "Value Creation from Intellectual Capital: Convergence of Knowledge Management and Collaboration in the Intellectual Bandwidth Model," Group Decision and Negotiation, Vol. 15, No. 3, pp. 197-220.

Rai, R.K., (2011). "Knowledge management and organizational culture: a theoretical integrative framework," Journal of Knowledge Management, Vol. 15, Iss. 5, pp. 779 – 801.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111174320

Sanchez, R., (2001). Knowledge Management and Organizational Competence, (Oxford: Oxford University Press).

Sandhawalia, B.S. and Dalcher, D., (2011), "Developing knowledge management capabilities: a structured approach," Journal of Knowledge Management, Vol. 15, Iss. 2, pp. 313 – 328.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111119718

Sarabia, M., (2007), "Knowledge Leadership Cycles: An Approach from Nonaka's Viewpoint," Journal of Knowledge Management, Vol. 11, Iss. 3, pp. 6-15.

Schonstrom, M., (2005). "Creating Knowledge Networks: Lessons from Practice," Journal of Knowledge Management, Vol. 9, Iss. 6, pp. 17-29.

Sekaran, U., (2003). Research Methods for Business: A Skill Building Approach. (New Jersey: John Wiley & Sons, Inc.).

Serenko, A., Bontis, N., Booker, L., Sadeddin, K., and Hardie, T., (2010), "A scientometric analysis of knowledge management and intellectual capital academic literature (1994-2008)", Journal of Knowledge Management, Vol. 14, Iss. 1, pp. 3 – 23.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011015534

Stair, R., M., and Reynolds, G. W., (2001). Principles of Information Systems: A Managerial Approach. (Boston: Course Technology).

Suppiah, V., and Sandhu, M.S., (2011). "Organisational culture's influence on tacit knowledge-sharing behaviour," Journal of Knowledge Management, Vol. 15, Iss. 3, pp. 462 – 477.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111137439

Swift, M., Balkin, D.B., and Matusik, S.F., (2010). "Goal orientations and the motivation to share knowledge," Journal of Knowledge Management, Vol. 14, Iss. 3, pp. 378 – 393.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011050111

Thomas-Hunt, M.C., Ogden, T.Y. and Neale, M., (2003), ‘‘Who’s really sharing? Effects of social and expert status on knowledge exchange within groups,’’ Management Science, Vol. 49, No. 4, pp. 464-77.

Van den Hooff, B., Schouten, A.P., and Simonovski, S., (2012). "What one feels and what one knows: the influence of emotions on attitudes and intentions towards knowledge sharing," Journal of Knowledge Management, Vol. 16, Iss. 1, pp.148 – 158.

Voelpel, S., C., von Pierer, H., & Streb, C., K., (2006). “Mobilizing Organizations for Innovation and Value Creation: An Integrated Model of the Mobile Company,” Journal of Knowledge Management, Vol. 10, Iss. 6, pp. 5-21.

Wang, C., and Han, Y., (2011). "Linking properties of knowledge with innovation performance: the moderate role of absorptive capacity," Journal of Knowledge Management, Vol. 15, Iss. 5, pp. 802 – 819.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111174339

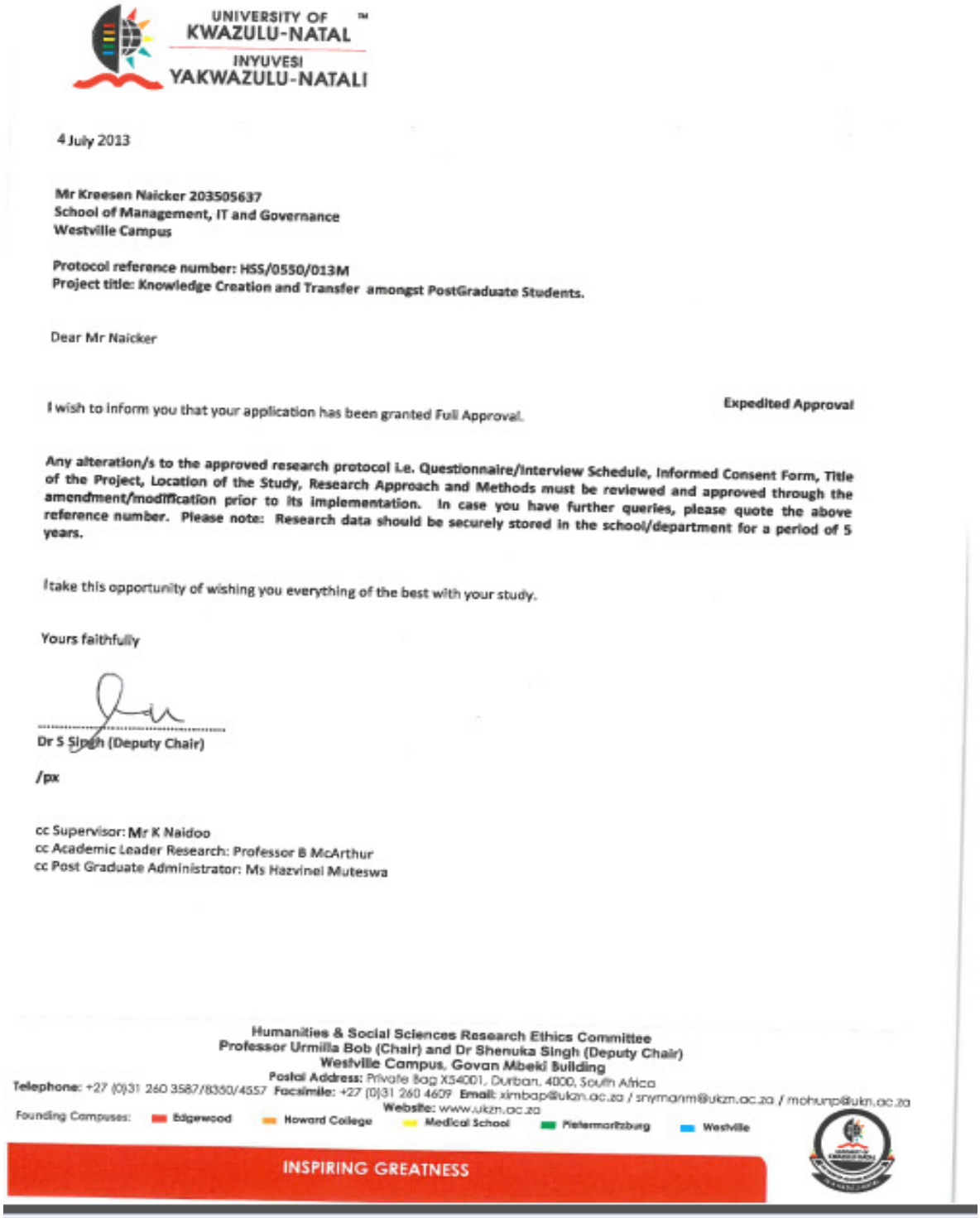
Wang, D., Su, Z., and Yang, D., (2011)."Organizational culture and knowledge creation capability," Journal of Knowledge Management, Vol. 15, Iss. 3, pp. 363 – 373.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111137385

Xue, Y., Bradley, J., and Liang, H., (2011). "Team climate, empowering leadership, and knowledge sharing," Journal of Knowledge Management, Vol. 15, Iss. 2, pp. 299 – 312.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271111119709

Zhou, S., Siu, F., and Wang, M., (2010). "Effects of social tie content on knowledge transfer," Journal of Knowledge Management, Vol. 14, Iss. 3, pp. 449 – 463.
Permanent link to this document:
http://dx.doi.org/10.1108/13673271011050157

APPENDIX 1

ETHICAL CLEARANCE FORM



UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

4 July 2013

Mr Kreesen Naicker 203505637
School of Management, IT and Governance
Westville Campus

Protocol reference number: HSS/0550/013M
Project title: Knowledge Creation and Transfer amongst PostGraduate Students.

Dear Mr Naicker

I wish to inform you that your application has been granted Full Approval. **Expedited Approval**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr S Singh (Deputy Chair)

/px

cc Supervisor: Mr K Naidoo
cc Academic Leader Research: Professor B McArthur
cc Post Graduate Administrator: Ms Hazvinei Muteswa

Humanities & Social Sciences Research Ethics Committee
Professor Urmilla Bob (Chair) and Dr Shenuka Singh (Deputy Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban, 4000, South Africa
Telephone: +27 (0)31 260 3587/8350/4557 Facsimile: +27 (0)31 260 4609 Email: ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za
Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

INSPIRING GREATNESS

APPENDIX 2

QUESTIONNAIRE

UNIVERSITY OF KWAZULU-NATAL
School of Management, IT, and Governance

Dear Respondent,

MCom (Management Studies) Research Project
Researcher: Kreesen Naicker (knaicker@za.ibm.com)
Supervisor: Prof. K.K. Govender
Co-Supervisor: Mr. K. Naidoo (Naidook82@ukzn.ac.za)

The Researcher, **Kreesen Naicker** an **MCom (Management Studies)** student, at the School of Management, IT and Governance, of the University of KwaZulu-Natal, invites you to participate in a research project entitled Knowledge Creation and Transfer amongst Post-Graduate Students. The aim of this study is to gain an understanding of how Post-Graduate students in the School of Management, IT and Governance are creating and transferring knowledge. The study is based on Nonaka and Takeuchi's (1995) knowledge (SECI) spiral theory.

Through your participation I hope to understand how knowledge is created and transferred amongst the post-graduate students; which of the four modes of knowledge conversion are predominantly utilized in the knowledge creation and transfer process; are post-graduate students transcending from the old self to the new self when engaging in knowledge creation and transfer activities; and which is the most trusted of source of information and knowledge used by post-graduate students. The results of the survey are intended to contribute to the Knowledge Management discipline.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey. Confidentiality and anonymity of records identifying you as a participant will be maintained by the School of Management, IT and Governance, UKZN.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact my co-supervisor or myself.

The survey should take you about 20 minutes to complete. I hope you will take the time to complete this survey.

Sincerely

Investigator's signature : *K.Naicker* Date : 12/08/2013

CONSENT

I…… (full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT:_____

DATE:_____

……

QUESTIONNAIRE

SECTION A

1. Biographical Questions

1.1. Are you a?

Honours Student ☐ Masters Student ☐ PHD Student ☐

1.2. Are you?

<18 years ☐ 18-20 years old ☐ 21-23 years old ☐ 24-26 years old ☐ 27-29 years old ☐ >30 years ☐

1.3. Are you a?

Full-Time Student ☐ Part-Time Student ☐

1.4. Are you permanently employed?

Yes ☐ No? ☐

1.5. Are you?

Male ☐ Female ☐

SECTION B

2. Internalization

2.1 After hearing a new idea or concept, I tend to compare it with my experience to help me comprehend the meaning.

Strongly Agree ☐ **Agree** ☐ **Neutral** ☐ **Disagree** ☐ **Strongly Disagree** ☐

2.2 I understand better by repeating what was said and by asking "Is that what you mean?"

Strongly Agree ☐ **Agree** ☐ **Neutral** ☐ **Disagree** ☐ **Strongly Disagree** ☐

2.3 I will tell others what I think to make sure my understanding is the same as theirs.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

2.4. When I have finished saying something, I will ask the other person if it is necessary to repeat what I said, to make sure he/she understands exactly what I mean.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

2.5 When communicating with others, I will give them time to think about we discussed.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

3. Externalization

3.1 When others can't understand me, I am usually able to give examples to help them understand.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

3.2 Most of the time, I can transcribe some of the unorganized thoughts into concrete ideas.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

3.3 I can describe academic or technical terms with conversational language to help communication in a group.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

3.4 I tend to use comparisons when expressing abstract concepts.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

3.5 When I try to express abstract concepts, I tend to explain using examples.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

3.6 I will help others to clearly express what they have in mind, by encouraging them to continue what they are saying.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

3.7 When others cannot express themselves clearly, I usually help them clarify their points.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4. Socialization

4.1 In academic group discussions, I will actively share my experience with others.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4.2 In my academic team, my teammates and I will share life or work experiences with each other.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4.3 During group discussion, I try to find out others' opinions, thoughts and other information.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4.4 During discussions, I will bring out some concepts, thoughts, or ideas.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4.5 I often encourage others to express their thoughts.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4.6 Before group discussions, I will collect necessary information and show it to the group.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

4.7 I like to get to know the people whom I will work with before going into a project together.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

5. Combination

5.1 During a discussion, I tend to organize ideas and make conclusions to facilitate the discussion.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

5.2 When I come across problems, I tend to use my experience to help solve them.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

5.3 After every event, I have the habit of organizing and summarizing what happened.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

5.4 During discussions, I will organize everyone's thoughts in my mind.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

5.5 I like to collect new information, and making a connection between the new and old knowledge to develop new concepts.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

☐ ☐ ☐ ☐ ☐

5.6 I like to organize ambiguous concepts into a structure.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
☐	☐	☐	☐	☐

Thank you for your participation.

APPENDIX 3

TABLE A – MEASURES OF CENTRAL TENDENCY

VARIABLE	N	MEAN	MEDIAN	MODE	STANDARD DEVIATION	RANGE
INTERNALIZATION 1	70	1.86	2.00	2.00	0.54	3.00
INTERNALIZATION 2	70	2.10	2.00	2.00	0.97	4.00
INTERNALIZATION 3	70	1.84	2.00	2.00	0.77	4.00
INTERNALIZATION 4	70	2.46	2.00	2.00	0.98	4.00
INTERNALIZATION 5	70	2.10	2.00	2.00	0.72	3.00
EXTERNALIZATION 1	70	1.59	1.50	1.00	0.71	3.00
EXTERNALIZATION 2	70	2.16	2.00	2.00	0.79	3.00
EXTERNALIZATION 3	70	1.97	2.00	2.00	0.74	3.00
EXTERNALIZATION 4	70	1.94	2.00	2.00	0.69	3.00
EXTERNALIZATION 5	70	1.77	2.00	2.00	0.59	3.00
EXTERNALIZATION 6	70	1.84	2.00	2.00	0.75	3.00
EXTERNALIZATION 7	70	2.11	2.00	2.00	0.64	3.00
SOCIALIZATION 1	70	1.90	2.00	2.00	0.85	3.00
SOCIALIZATION 2	70	1.83	2.00	2.00	0.68	2.00
SOCIALIZATION 3	70	1.61	2.00	1.00; 2.00	0.68	3.00
SOCIALIZATION 4	70	1.63	2.00	2.00	0.61	3.00
SOCIALIZATION 5	70	1.83	2.00	2.00	0.76	3.00
SOCIALIZATION 6	70	2.17	2.00	2.00	0.81	3.00
SOCIALIZATION 7	70	2.01	2.00	2.00	0.90	3.00
COMBINATION 1	70	2.19	2.00	2.00	0.72	3.00
COMBINATION 2	70	1.83	2.00	2.00	0.68	2.00
COMBINATION 3	70	2.40	2.00	2.00	0.93	4.00
COMBINATION 4	70	2.43	2.00	2.00	0.89	4.00
COMBINATION 5	70	2.07	2.00	2.00	0.80	4.00
COMBINATION 6	70	2.33	2.00	2.00	0.95	4.00

N – Number of cases for each variable