Cape Peninsula
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INFORMATION & KNOWLEDGE SHARING WITHIN VIRTUAL COMMUNITIES OF PRACTICE (VCoPs)

by

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DECLARATION

I, Hermon Berhane Ogbamichael, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed   **Date**

ABSTRACT

The concept of virtual community of practice (VCoP) emanates from the need to create a new mode of learning and knowledge creation. It is found that highly structured forums are not necessarily the best way to assist people to learn and improve their knowledge. This then, requires organisations to seek alternative informal ways to share knowledge. The significance of optimising knowledge sharing results in VCoPs receiving considerable attention while searching for new ways to draw on expertise dispersed across global operations. This impacts organisations, thereby enabling them to respond more speedily to the demands of their stakeholders. The fast pace of change in their business environments is also a factor to contend with. Within this context, the use of VCoPs to optimise both, tacit and explicit knowledge sharing within stakeholders, is the central theme of this research.

The findings from literature enables the researcher to explore scientific based models that may have the potential to enhance knowledge sharing in an enterprise. The Life Cycle knowledge flow model is found to be the most comprehensive compared to two other models – namely, a Spiral knowledge flow model and Dynamic knowledge flow model. The outflow from the findings in literature is that the Life Cycle knowledge flow model is selected as the basis to conduct two surveys to determine if the model could be adapted to improve knowledge sharing within VCoPs in particular, and in an enterprise in general.

The result of the two surveys conducted (in 2011/2012 and 2016), leads to establishing an extended Life Cycle knowledge flow model. The established model enhances knowledge sharing within VCoPs, and in turn, assists when optimising knowledge sharing in an enterprise. This extended model covers six phases of knowledge development to improve knowledge sharing within VCoPs. The first phase enhances the creation of both, tacit and explicit knowledge. The second phase enables to optimise the organisation of knowledge. The third phase enables the formalisation of tacit knowledge, that is, conversion of tacit to explicit knowledge. The fourth phase improves the distribution of knowledge. The fifth phase enables to optimise the application of knowledge and the final phase enables the evolution or continuous development of knowledge.

The contribution of this research proposes that a comprehensive knowledge flow model, namely the Life Cycle knowledge flow model found in literature, served as the basis for this research. However, this model was never tested or verified if it indeed optimises knowledge sharing within VCoPs. The two surveys (Survey One 2011/12 and Survey Two 2016) were developed and distributed to respondents to verify the model's suitability to VcoPs. As a result of responses received from the two surveys, the researcher was then able to develop an

extended Life Cycle knowledge flow model that particularly, optimises knowledge sharing within VCoPs. This research further contributes in formulating a scientific based knowledge flow model that can be adapted to social networks. Therefore, this research also creates the foundation to further study to investigate the optimisation of knowledge sharing in social networks. In recent literature, social networks are established as one of the informal mechanisms to share and enhance knowledge sharing in an enterprise.

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DEDICATION

For the genuine peace lovers in Eritrea and Ethiopia

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GLOSSARY

Terms/Abbreviations	Definition/Explanation
CoP	Communities of Practice are "defined as groups of people held together by a common interest in a body of knowledge and driven by a desire and need to share problems, experiences, insights, and best practices in an informal way" (Correia, Paulos, & Mesquita, 2010:11; Agrifoglio, 2015:26).
VCoPs	Virtual Communities of Practice are defined as "groups of individuals who share knowledge and expertise, and function as an interdependent network over an extended period of time, using various technological means to communicate with one another, with the shared goal of furthering their practice or doing their work better" (Hu & Kuo, 2013:1049).
Knowledge	Knowledge could be defined as a "fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information" (Arntzen-Bechina & Leguy, 2007:154).
Enterprises	Enterprise is another word for a for-profit business or company, but it is most often associated with entrepreneurial ventures (Business encyclopedia, 2018). According to the encyclopedia, there are many forms of legal enterprises, with the most common being Sole proprietorship – a company run by a single individual, Partnership – a business run by two or more individuals or entities who share ownership, Corporation – a for-profit entity created to shield the owner(s) from liability should the enterprise become subject to a lawsuit, Limited Liability Company (LLC) – that offers the legal protection of a corporation and the tax treatment of a partnership, and Professional Company/Professional Limited Liability Company (PC/PLLC) – that are licensed professional firms, such as accountants, architects, engineers, doctors, and lawyers, and provide liability protection similar to a corporation. Ultimately, the word enterprise is a synonym for business.
Knowledge flow or alternatively known as knowledge sharing	Knowledge flow / knowledge sharing is explained as a process whereby knowledge is passed between people or knowledge processing mechanisms (Zhuge, 2007:572). This knowledge processing mechanisms are manifested in the form of knowledge flows between nodes (such as team members, software agents, or knowledge portals that provide services), according to certain

rules and principles (Zhuge, 2007:572). Knowledge flow starts and ends at a node; a node can generate, process, understand, synthesise, and deliver knowledge.

CHAPTER ONE

INFORMATION AND KNOWELDGE SHARING WITHIN VIRTUAL COMMUNITIES OF PRACTICE

1.1 Background

Web technologies have evolved the last three decades. One of the most interactive technologies that we currently use is Web 2.0. The second generation of World Wide Web technologies, known as Web 2.0 provides possibilities to enable collaboration and creation of new knowledge (Iandoli, Quinto, Liddo, & Shum, 2012:67). Other technologies that are collectively dubbed as Web 2.0 are blogs, wikis and other social media technologies (Paroutis & Al Saleh, 2009:52). Web 2.0 has emerged where the users play major roles in documents being published. Social networking websites such as Facebook, Twitter, Flickr and other websites like Wikipedia are classic examples of Web 2.0 websites (Kenekayoro, 2011:113).

Kenekayoro (2011:113) further suggests that the semantic web, or known as Web 3.0, has ample potential and is generally believed to be the future of the web. The same author suggests that Web 3.0 is not a system of interlinked documents as the early web, but a system of interlinked data. Kenekayoro (2011:114) suggested that the timeline for Web 2.0 would last between 2000 - 2010, whereas the timeline for Web 3.0 was predicted to be 2010 - 2020. Then, the same author also suggests that the Web 4.0 is predicted to be functioning between 2020 - 2030. Yet, the Web 2.0 technologies are currently applicable and functional.

Nath and Iswary (2015) explain that Web 2.0 is the read and write networking platform where the users communicate to each other; Web 3.0 is defined as semantic web such as My Yahoo and iGoogle, whereby the technology enables to change the web into a language that can be read and categorised by the system rather than human. Web 4.0 is known as "symbiotic" web or intelligent personal agents that communicates with human, like we communicate with each other (Kenekayoro, 2011:113). While the Web 3.0 is an emerging trend and Web 4.0 considered as the future trend, the focus in this research is on Web 2.0 technologies such as VCoPs and social networks as individuals and organisations are currently using these technologies to optimise knowledge sharing.

In particular, Web 2.0 collaborative technologies in the workplace enable people in geographically dispersed teams to share knowledge in an easier, cheaper and more pervasive way, compared to traditional knowledge management systems (Iandoli *et al*., 2012:67-68). Traditional or existing departments and operational teams within typical organisations may lack

the expertise and ability to create, disseminate and utilise knowledge (Pavlin, 2006:136). Pavlin (2006:136-137) further recommends that the support of informal communities such as virtual communities of practice (VCoPs) are vehicles or practices to enhance knowledge sharing in organisations. Boh (2014:9) suggests that the use of ICT takes on a crucial role in supporting knowledge sharing in CoPs especially for organisations that their individuals are located in disparate geographical areas. Web 2.0 applications include the virtual communities of practice (VCoPs) and social networks such as twitter and LinkedIn which are still current mechanisms to enhance knowledge in an enterprise. Social networks are briefly introduced in Section 1.2.4.

The concept of VCoPs originates from the need to create a new mode of learning and is presented as a specific form of a knowledge development platform (Tremblay, 2004). It is also found that highly structured formal training programmes are not always the best way to assist people to learn and solve problems (Allen, Ure, & Evans, 2003:6). This then, requires organisations to seek alternative informal ways to share knowledge (Tang & Yang, 2005:499; Tremblay, 2004). The sharing of knowledge results in VCoPs receiving considerable attention while searching for new ways to draw on expertise dispersed across global operations. This development impacts organisations, thereby enabling them to respond more speedily to the demands of their stakeholders. According to Van Winkelen (2003), the fast pace of change in business environments is also a factor to contend with. Within this context, the use of VCoPs to enhance both tacit[1] and explicit[2] knowledge sharing within stakeholders is the central theme of this research.

This chapter introduces literature identifying the research problem, which also includes definitions of knowledge sharing, CoPs, VCoPs, and social networks, barriers in knowledge sharing, recent research on knowledge sharing within VCoPs, research problem, research questions, research design, research methods, selecting VCoPs, selecting individual participants, data collection process, data analysis, the actual survey, access to the online survey, anticipated problems, access, ethics, and informed consent, aims of this research, assumptions, scope of research, expected outcomes and contribution of the study, and layout of thesis in Sections 1.2 through 1.21.

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1 Tacit knowledge is what people carry in their minds and is, therefore, difficult to access (Panahi, Watson, & Partridge, 2012:1095; Hara & Hew, 2007:236).

2 Explicit knowledge can be articulated, codified and stored (Panahi, Watson, & Partridge, 2012:1095; Hara & Hew, 2007:236-238).

1.2   Literature identifying the research problem

The objective of this section is to review current literature and investigate knowledge gaps that exist in knowledge sharing, utilised by VCoPs. The purpose of this literature review is to identify the research gaps that hinder the optimisation of knowledge sharing within VCoPs. Although extensive literature is presented in Chapter 2, this section introduces Knowledge sharing, CoPs, VCoPs and Social networks in Sections 1.2.1 through 1.2.4.

1.2.1   Knowledge sharing

Knowledge sharing is the process of transferring knowledge from one entity to another (Noor & Salim, 2011:107). This transfer of knowledge can take place within individuals, groups, and departments in accomplishing a particular task (Noor & Salim, 2011:107). According to Noor and Salim (2011:107), the fundamental objective of sharing knowledge is to generate new ideas and develop new business opportunities in an enterprise. Similarly, Kim and Park (2017:2) define knowledge sharing as the process of exchanging task information, expert knowledge, and feedback regarding a procedure or product in order to create new knowledge, deal with issues, and achieve common objectives. Kim and Park (2017:4) further state that knowledge sharing is considered to be an indispensable means through which employees make constructive contributions to knowledge application and innovation among individual employees and teams (e.g., by increasing firm innovation capabilities and reducing production costs), ultimately leading to the sustainable development of the organisation. Furthermore, Zheng (2017:52-53) explain that knowledge sharing is an individual's conscious behaviour and decision to voluntarily externalise or transmit knowledge (codify, show, describe etc.) and the capability of knowledge receivers to internalise or absorb knowledge (learn by doing, read, interpret etc.). The results of such knowledge sharing is that knowledge is to be jointly owned by two or more parties.

Knowledge has not been separated from humans because it has only been through the human act of knowing and human cognitive processes that have existed (Schutte & Snyman, 2007). Knowledge sharing cannot be separated from humans, which means, the flow connects and binds individuals, and provides the means through which knowledge is transferred from those who have it, to those who need it (Zhuge, 2007: 572; Schutte & Snyman, 2007).

In summary, knowledge sharing, alternatively referred to as knowledge flow in this research, refers to the process of knowledge transmission from knowledge owners (such as an individual or a business unit in an organisation) to knowledge receivers. The shared knowledge eventually resides in both the knowledge owners and knowledge receivers. The shared knowledge eventually contributes to the innovativeness and sustainability of an organisation.

Knowledge sharing or alternatively referred as knowledge flow is discussed in detail in Section 4.2

1.2.2 CoPs

A popular way to share common interests and practices is by using communities of practice (CoPs). Iaquinto, Ison, and Faggian (2011:5) describe three characteristics central to the existence of CoPs. These characteristics are: mutual engagement in a shared practice, the creation of a common repertoire and negotiation of a joint enterprise. Furthermore, CoPs are summarised as groups of people who share knowledge due to their common interest and practice (Correia, Paulos, & Mesquita, 2010:11; Agrifoglio, 2015:26). These common interests are driven by the desire and need to share problems, experiences, insights, and best practices that affect all the relevant participants (Boateng, 2011:29). CoPs also refer to a group of people having shared visions and compassion through continuous activities (Ho & Kuo, 2013:1049). Boh (2014:8) quotes Lave and Wenger (1991:115) who describe CoPs as a group whose members regularly engage in sharing and learning from one another, based on their common interests. In summary, the above-mentioned definitions suggest that the similarity of the members in CoPs is determined by their common interest and shared identity that results in mutual objectives and practice. CoPs are discussed in detail in Section 2.1.1.2.

1.2.3 VCoPs

A contrasting entity arises with VCoPs in relation to CoPs, when supported by information and communication technologies (ICTs), known as VCoPs. VCoPs are those members that use ICT as their primary mode of interaction (Correia, Paulos, & Mesquita, 2010:11). VCoPs are conceptualised as similar to CoPs, but their communication usually takes place via electronic means (Correia, Paulos, & Mesquita, 2010:12). Hu and Kuo (2013:1049) further indicate that VCoPs are similar to CoPs, but information sharing in VCoPs takes place through the use of ICTs (Hu & Kuo, 2013:1049). This concept is also supported by Boh (2014:8) who explains that ICTs take on a crucial role in supporting CoPs. It is then evident that VCoPs are the same concept as CoPs, but the difference lies in the use of the ICT component in VCoPs, versus face-to-face interaction used in CoPs.

Furthermore, VCoPs are required, especially in organisations facing the challenge of disseminating organisational knowledge, to reside in some individual experts (Ho & Kuo, 2013:1049-1050; Ardichvili, Maurer, Wentling, & Stuedemann, 2006:96). VCoPs are found to

perform a central role in promoting collaboration between members who are dispersed by both, time and space (Correia, Paulos, & Mesquita, 2010:11). Further, Tang and Yang (2005:500) suggest that VCoPs are viewed as informal means to enhance knowledge sharing across time and distance. It is evident that in traditional CoPs, individuals often interact on a face-to-face basis, while VCoPs operate in multiple modes including both, face-to-face meetings [when necessary] as well as using ICT (Kimball & Ladd, 2004:203-204). VCoPs can be a face-to-face, a virtual group or a combination of both (Ford, Korjonen, Keswani, & Hughes, 2015:2). This suggests that VCoPs may provide added value as they are ubiquitous, thus allowing participants to share their knowledge at any point in time given that Internet technology and its connectivity exists.

An advantage of VCoPs is the ability to allow innovative ways of creating and sharing organisational knowledge (Allan & Lewis, 2006:369-370). Groups of experts in VCoPs function as an interdependent network over an extended period of time, with the shared goal of advancing their practice and doing their work better (Lavoue, 2011:310). Ford *et al.*, (2015:3) also suggest that VCoPs contribute to continuing professional development, improvement and innovation, and communication over geographical distances.

Knowledge managers mainly focus on formal processes of establishing explicit knowledge sharing approaches (Vuori & Okkonen, 2012a:121-122). This calls for recognising VCoPs to share tacit knowledge (footnote on page 2), which is knowledge typically embedded in a specific context. According to Ardichvili *et al.* (2006:98), tacit knowledge is long recognised as the most important element in sustaining competitive advantage of organisations. This points to assumptions that virtual knowledge transfer enhances sharing of the tacit part of knowledge, while also capitalising on already existing explicit knowledge (Panahi, Watson, and Partridge, 2012:1095).

In summary, CoPs' and VCoPs' members experience different environments because of the media through which they primarily interact and therefore, face dissimilar realities. For instance, the different time zones and geographic separation between members in CoPs urge them to resort to technologies although they are not, in real terms, real substitutes for face-to-face interactions (Wenger, McDermott, & Snyder, 2002:116). Boh (2014:9) also mentions that often much modern work collaboration occurs virtually between individuals located in different geographical areas who may never meet face-to-face, and subsequently, ICT takes on a crucial role in supporting knowledge sharing in CoPs. This development suggests the need for VCoPs as methods to support and enhance knowledge sharing among experts dispersed in various geographical areas. VCoPs are further explained in Section 2.1.1.3 and their benefits are also discussed in detail in Section 2.1.5.

1.2.4 Social networks

Social networks have become an alternative way to share tacit and explicit knowledge across geographically dispersed individuals (Panahi, Watson, & Partridge, 2012:1095-1096). Social network applications enable people to participate and make contributions in intra-organisational information flows, usually in an informal approach (Vuori & Okkonen, 2012a:118). For example, organisations are using applications such as, Twitter, Facebook and others to share product knowledge with both, internal and external stakeholders (Panahi, Watson, & Partridge, 2012:1095). Some firms also accumulate informative experiences through social networks, which eventually contributes to new product developments (Hajli & Hajli, 2013:286).

According to Panahi, Watson, and Partridge (2012:1095), social networks have the following advantages within the context of knowledge sharing:

- Enables users to generate contents;
- Links users to users rather than users with contents;
- Enables networking, that is, it enables people with common interests to meet online, locate each other, develop relationships and ultimately share their knowledge; and
- Enables users to store and share multiple content forms such as image, video, text, , audio, and other formats in an interactive way.

In summary, social networks have the potential to enhance both, tacit and explicit knowledge. The tacit knowledge may take place in the form of exchanging stories, ideas, and best practices. Explicit knowledge sharing may take place in the form of exchanging text, video, image, audio, and other codified formats. Therefore, social networks may have the potential to optimise knowledge sharing; however, they are not included as part of the theme in this research. It is emphasised, that the main focus of this research is the investigation into the optimisation of knowledge sharing within VCoPs. Social networks are further discussed in Section 2.1.3.

1.3 Barriers to knowledge sharing

From literature, it is evident that accessing and disseminating knowledge that resides within individuals and teams remains a challenge (Ho & Kuo, 2013:1049-1050). These barriers arise as the result of forced participation, restrictions in organisational environments, and lack of measurable benefits that result from knowledge sharing within VCoPs.

If individuals are forced to participate in VCoPs, then the VCoP is usually exposed to organisational politics that may hinder knowledge sharing (Dube, Bourhis, & Jacob, 2006). This usually leads to unfamiliar roles and ways of sharing knowledge when compared to VCoPs that are built on voluntary bases (Dube, Bourhis, & Jacob, 2006).

Barriers in VCoPs appear as a result of changes in the organisational environment. For example, VCoP members may view admitting 'outsiders' either as enriching the community's dialog or as diluting the community's focus (Wenger, McDermott, & Snyder, 2002:104). Further, Stuckey and Smith (2004) suggest that VCoP leaders usually choose to create sub-communities based on different topics and perspectives in reaction to changes. This however, may result in temporary misunderstanding between members. In addition, another barrier is the determination of measurable benefits that result from interaction in VCoPs. The barriers are the inability to measure the benefits of VCoPs in terms of cost savings or profits made as the result of knowledge sharing (Fontaine & Millen, 2004:3). Stuckey and Smith (2004) and Fontaine and Millen (2004:3) further suggest that participants are unable to establish the benefits in tangible terms.

The following barriers are pertinent to sharing knowledge within VCoPs proposed by Lesser and Fontaine (2004:16):

- Making knowledge seekers and knowledge sources *aware* of their respective knowledge. Knowledge experts are often unaware of individuals who might benefit from their knowledge (Lesser & Fontaine, 2004:16);

- A barrier may be related to access, that is, providing the time and space for knowledge seekers and knowledge sources to connect with one another could be another challenge. Lesser and Fontaine (2004:17-18) explain that the knowledge sources are usually confronted with little incentive to share in addition to lack of enough time to spend on sharing;

- Knowledge shared is easier said than applied (Lesser & Fontaine, 2004:16); and

- Absence of expert recognition within VCoPs creates the perception of not sharing one's knowledge (Lesser & Fontaine, 2004:19; Vuori & Okkonen, 2012b:593).

Some barriers in knowledge sharing suggested by Azudin, Ismail and Taherali (2009:142) include:

- Lack of trust among participants;
- Lack of confidence in sharing one's expertise;
- The fear of being penalized, as some people think that they may lose out in some way if they share their knowledge; and
- Knowledge hoarding, that is, keeping what you know to yourself.

In the context of social networks, similar barriers exist. For example, Vuori and Okkonen (2012b:593) indicate that people might not recognise how valuable their knowledge can be to their companies, which may subsequently result in not sharing at all. These barriers may prevent people from tapping into the know-how of experts that may result in hindering knowledge sharing and a firm's performance.

In summary, knowledge sharing in VCoPs can be hindered due to forced participation in VCoPs, restrictions in organisational environments, and lack of measureable benefits that results from the shared knowledge. Furthermore, lack of awareness of the value of participant's knowledge, lack of trust, insufficiency of time to share knowledge, lack of application of the knowledge shared, lack of expert recognition, knowledge hoarding, and lack of confidence to share one's knowledge, all present barriers to knowledge sharing in VCoPs. In view of the above-mentioned barriers, Ardichvili *et al.* (2006:96) suggest that one of the alternatives to overcome knowledge sharing barriers is by utilising VCoPs. The uniqueness of VCoPs is that they can perform, and take on, a central role in promoting collaboration and knowledge sharing between members who are dispersed in various geographical areas (Correia, Paulos, & Mesquita, 2010:11; Allan & Lewis, 2006:369-370). The outflow of this role is that knowledge sharing may be enhanced by utilising VCoPs. This realisation has compelled the researcher to conduct extensive review of literature in order to establish the extent of utilising VCoPs to improve knowledge sharing. It is essential to know how to optimise the use of VCoPs in knowledge sharing. Barriers of knowledge sharing are further discussed in Section 2.1.6.

1.4   Recent research on knowledge sharing within VCoPs

The researcher could find no literature indicating the existence of research focusing on how to *enhance* knowledge sharing within VCoPs. The researcher further could not locate literature indicating on approaches or models, to optimise knowledge sharing within VCoPs. However, relevant literature obtained is summarised in the following five paragraphs:

- Research conducted on Cooperative Learning Environments: Virtual Communities of Practice in the Healthcare Sector (Saigi-Rubio & Gonzalez-Gonzalez, 2014:15-26). The research focusses on the role of knowledge sharing and benefits provided by VCoP in healthcare sector. The research thus aims at examining the benefits of VCoP to professionals in the healthcare field. The discussion in the research indicates how the members of a community perform their professional activities at both management and performance levels. The set of benefits from the use of VCoP – at personal, community, and organisational level was also revealed.

- Research conducted on the Role of VCoPs in Knowledge Management Using Web 2.0 (Al-ghamdi & Al-ghamdi, 2015:406-411). This research is a discussion on the critical importance of Knowledge Management (KM) in helping organisations to increase performance and achieve the desired goals. The focus of the research is on the hindrances of the application of knowledge management (KM) which most prominent of which are the difficulty of tacit KM, the poor cooperation and sharing in KM, and the difficulty of dealing with KM procedures. This research aims to determine how to take advantage of the VCoP that employ Web 2.0 technologies to overcome these obstacles. A discussion on how Web 2.0 based CoP is presented and plays major roles in capturing tacit knowledge, facilitating innovation, as well as knowledge sharing and collaboration. However, no model or approach is mentioned to enable the optimisation of knowledge sharing within VCoPs.

- Research on Knowledge Sharing in Communities of Practice in International Development (Cummings, 2015) focusses on the role of CoP in its ability to link actors from many different organisations and different constituencies. Online communities are able to link people and organisations across continents. The research discusses the experience of CoPs in the development sector. These experiences will be relevant to other non-development activities which may be less organisation bound, such as the health sector and academia. There is no mention of any model surrounding the optimisation of knowledge sharing within VCoPs.

- Research on Knowledge Sharing in Virtual Distributed Environments: Main Motivators, Discrepancies of Findings and Suggestions for Future Research (Chen & Hew, 2015:466-471). This research reviews some previous empirical research that identify the main theories and factors used to explain online knowledge sharing. The findings suggest that the incentive items of knowledge sharing could be grouped into three main categories: personal, social factors and organisational factors. Of these factors, trust is the most widely discussed. Further, this research focusses on several main discrepancies among past research studies such as the notion of perceived compatibility, norm of reciprocity, and trust to provide possible directions for future studies. Discrepancies that exist in the behavior and intention of knowledge sharing is discussed. For example, a number of studies indicate trust as a positive factor that motivates knowledge sharing intention, which results in the contribution to the actual knowledge sharing behavior. At the same time, the research discusses other studies suggesting that the influence of trust in knowledge sharing behavior is not significant. There is no mention of any model or approach to knowledge optimisation in VCoPs.

- Research on Knowledge Sharing in CoP: Examining Usefulness of Knowledge from Discussion Forums versus Repositories (Boh, 2014:8-31). This research takes on the role that ICTs play in supporting knowledge sharing in Virtual CoPs. It examines the use of two key types of ICTs –online discussion forums and knowledge repositories. Two event-driven surveys are conducted with members of a CoP in a consulting firm to test a hypothesis. The hypothesis is about how various factors would differ in their influence on knowledge sourcing from online discussion forums and knowledge repositories. There is little empirical research comparing how different types of ICTs are effectively utilised for knowledge sharing. Much of the KM literature has focused on supply-side arguments for both discussion forums and knowledge repositories. There is, however, increasing recognition that it is also important to examine the demand-side – examining what facilitates knowledge seeking. This research adds to the demand-side knowledge seeking. It focusses on the demand of knowledge in CoPs by examining how CoP members source for and reuse knowledge from others through online discussion forums and knowledge repositories. This particularly examines the purposeful use of both online discussion forums and knowledge repositories in CoPs as alternative knowledge sources when individuals conducting knowledge work are looking for specific types of knowledge to solve a problem on-hand.

In summary, literature conducted between 2012 and 2016 indicates there is no research results available that has a focus on scientific models or approaches that may enable the optimisation of knowledge sharing within VCoPs. This has compelled this researcher to explore and find the relevance of conducting research to investigate the existence of a scientific model or approach that enables the optimisation of knowledge sharing within VCoPs.

1.5   Research problem

Available literature indicates that VCoPs can be utilised to share both tacit and explicit knowledge in an enterprise. However, there are a number of factors such as advantages, challenges and barriers pertaining to knowledge sharing as well as the uncertainty of how to measure them and to apply these factors in an organisation.

The research problem formulated by this researcher, therefore, reads: **VCoPs do not have a formalised approach to successfully utilise knowledge sharing.** A research question and investigative questions to govern this research are posed to solve this research problem, presented in Section 1.6.

1.6 Research questions

Considering the stated research problem, it is essential to establish a research question to address the research gaps. The following main research question is presented, followed by relevant investigative questions.

What *scientific approach or model can be used to particularly optimise knowledge sharing in a VCoP?*

The researcher is cognisant of the rational inference problem – the difficulty inherent in supporting any claim about the existence of the universal truth. This means there may not only be one approach or theory that can be used to optimise knowledge sharing. The intention of this research is not to predict and validate if it fits to the facts in the empirical research, rather to propose various competing theories and test these to the facts on ground. Thus, current theories are explored to find a relatively appropriate scientifically based approach or model to investigate its potential usability to enhance knowledge sharing within VCoPs. This is to say that the theoretical approach or model that was explored from literature may not mean a better theory than other theories, but it has been considered the best theory until other theories emerge in further research. Therefore, in this research, the absence of an absolute truth or claim of one or more theories is envisaged.

In ascertaining the appropriateness of approaches or models, investigative questions are presented in Table 1.1. These questions are answered in two ways. Firstly, a literature review and analysis is conducted to explore scientifically based approaches or models that are available to utilise knowledge sharing. The second is to ascertain the facts by testing these in various selected VCoPs. Furthermore, an additional data collection process is conducted to validate the appropriateness and relevance of the new theoretical model of knowledge sharing that has emerged from the first data collection. The data obtained from the selected VCoPs provides a new theory on knowledge sharing. This is conducted through empirical research and is discussed in the research design and methodology Chapter 3.

Table 1. 1: Investigative questions, research methods and specific objectives

Investigative questions	Research methods	Research objectives
1. How have virtual communities of practice (VCoPs) evolved contributing to knowledge sharing?	Literature analysis is conducted to define and conceptualise VCoPs and their contribution to knowledge sharing.	To analyse and compare various definitions and concepts of virtual communities and their contribution to knowledge sharing.
2. How are current processes or models applied to knowledge sharing in enterprises?	Literature analysis is done to identify current scientific processes or models applied to knowledge sharing in enterprises.	To identify current scientific processes or models applied to knowledge sharing in enterprises.
3. How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?	Survey (2011/12) and Survey (2016) are conducted to generate theories or concepts in how to optimise knowledge sharing within VCoPs.	To investigate if a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs.

1.7   Research design

The existence of the research design is to ensure that the evidence obtained enables us to answer the initial question as clearly as possible. The design deployed in this research consists of the review of literature identifying the research problem, defining main concepts, identifying methods to address the problem statement, establishing and analysing findings, drawing conclusions, and recommending further research. The review of literature identifying the problem statement is presented in Section 1.2.

The outflow of the research design recommended by Babbie and Mouton (2001:72), Warden (2010:6), and Babbie (2004:109-112) results in the following research design adopted in this study (also discussed in detail in Section 3.4).

- Review of literature identifying the research problem clearly and the ensuing research questions and investigative sub-questions;

- Use current literature to define the main concepts in this research for example, the definition and concepts of virtual communities, virtual communities of practice, social networks, and knowledge sharing;

- Identify relevant research methods to address the research problem;

- Establish the findings through a review of literature and empirical research. A current scientifically based approach or model in utilising knowledge sharing in an enterprise is identified through the review of literature and then empirical testing of the theoretical approaches or models was conducted on the relevant VCoPs. The generation of some concepts from the empirical research also occurred;

- Analyse findings based on the data collected from empirical research, by triangulating the data found through empirical research compared to the proposed theoretical models explored in literature. Thus, concluding remarks can be drawn after the analysis; and

- Any further research may be recommended, if gaps exist after the outcome of this research is established.

1.8   Research methods and methodologies

There is not a single research method deemed best with regard to knowledge sharing. This results in adopting a method obtaining evidence and answers to the research question. Therefore, a combination of research methods is utilised in this research. Firstly, a review of literature is conducted to define concepts (Chapter 2) to establish current scientific based models that may have the potential to enhance knowledge sharing in an enterprise (Chapter 4). This is followed by conducting Survey One (2011/12) for the empirical research in Chapter 5. The purpose of the survey is to test if the proposed model can enhance knowledge sharing within VCoPs. Further, data triangulation is used to ensure data collected from the literature review to compare the findings of the survey. The reliability of the data collected from both, literature and Survey One (2011/12) is validated. Finally, an additional survey is conducted in 2016 to confirm the validity of the proposed model of knowledge sharing that emerged from the initial findings. In brief, all investigative questions are dealt with relevant methods applicable to solve them.

The first investigative question is formulated in Section 1.6 and reads, *how have virtual communities of practice (VCoPs) evolved contributing to knowledge sharing?* The researcher has limited background knowledge and professional practice in the area of VCoPs. In this case, a review of literature is applicable to explore and explain the evolution of VCoPs and their contribution in knowledge sharing (discussed in Chapter 2).

The assumption in this research is that there may be scientifically based theoretical models that are available but not necessarily utilised in enterprises. The researcher is of the opinion based on extensive literature reviews that scientifically based models can be established from the review of literature. However, literature reviews may or may not necessarily influence how

the topic is looked at, thereby preventing the development of some new way, as suggested by Punch (2005:42). This suggests that literature in this research enables the researcher to identify scientifically based models that may potentially enhance knowledge sharing in an enterprise. As Babbie and Mouton (2001:565) suggest, every research report should be placed in the context of the general body of scientific knowledge and brings the reader up-to-date with previous research in the area. Therefore, models that can particularly enhance knowledge sharing in VCoPs were explored and explained based on current literature.

The second investigative question reads - *how are current models applied to knowledge sharing in an enterprise?* The researcher has limited prior knowledge of professional practice of VCoPs to define the current models applied to knowledge sharing in an enterprise. The researcher is, therefore, compelled to investigate contemporary scientifically based models and subsequently investigate how they would be applied to particularly optimise knowledge sharing within VCoPs. A literature review is suitable in exploring and explaining such scientifically based theoretical models. This is discussed in detail in Chapter 4.

A qualitative research methodology is utilised to deal with the third investigative question stated in Section 1.6 and reads, *how would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?* The indispensable condition for a qualitative methodology is a commitment to perceiving the world from the point of view of the participants (Brynard, Hanekom, & Brynard, 2014:39). Bryman (1988:46) also concurs that a qualitative approach enables a researcher to describe and analyse the experiences of humans and their groups from the point of view of those being studied. The emphasis on qualitative research is, according to Bryman (1988:53; 61), on the phenomenological approach in which the researcher grasps the meanings of a person's activities from that person's point of view. Therefore, two surveys are utilised to obtain the participants' point of view with regard to optimisation of knowledge sharing in VCoPs. This is discussed in detail in Section 3.5.

The epistemological orientation of this research is interpretivist. The intention in this research is to describe, explain and interpret the findings in the context of knowledge sharing in VCoPs. The idea of exploratory and explanatory approach is supported by Duane, Thomas, Cornell and Hilton (2014:427) who suggest that scientific knowledge is found not only in abstracting and generalizing, but also can derive from a deep and full explanation and interpretation of a context. Thus, the discussion and analysis in this research represents the responses given by the participants within their context in their respective VCoPs and not selected and distorted by the researcher. The epistemological orientation in this research is discussed in Section 3.6.

The ontological assumption in this research is that the emphasis is placed on the participants' involvement in the development of knowledge within VCoPs and based on their subjective interpretation of the reality of knowledge sharing in their respective VCoPs. The concepts of

knowledge optimisation within VCoPs is revealed in the data the respondents provided in the survey. Their responses were then interpreted by the researcher to make final analysis and conclusion. This is discussed in detail in Section 3.7.

In brief, qualitative methods of research is employed in this research. Qualitative research enables the researcher to perceive the world from the point of view of the participants this entails discovering novel or unanticipated findings, and allows the participants to have a more candid views (Brynard, Hanekom, & Brynard, 2014:39). In addition, it enables to extract concepts and abstract ideas that emerge from the data rather than using the data to provide evidence for pre-existing concepts and theories (Brynard, Hanekom, & Brynard, 2014:39).

In summary, a qualitative method of research is utilised to address investigative Question 3. Two surveys are utilised to obtain qualitative responses from the research participants. Further, an explanatory research method is applied to analyse data and concepts obtained from both literature and the surveys, mainly through inductive reasoning approaches. In explaining the data obtained from the respondents, a phenomenological approach is followed broadly through qualitative interpretivist methods of analysis. Thus, the interpretation, discussion and analysis in this research represents the responses given by the participants so that biases that might emanate from literature as well as the researcher might be avoided. The researcher also follows up new emerging literature as the actual data is being collected and analysed to include an up-to-date content to the existing findings.

1.9   Selecting VCoPs

VCoPs selected for this research are The Gurteen Knowledge Community, KM4dev, KM Practitioners Group, AIIM Network for Intelligent Information Management, Knowledge Management Education (KMedu) Hub, and actKM. These VCoPs are drawn from a Global VCoPs directory. The selection of VCoPs is discussed in detail in Section 3.8.1.

1.10   Selecting individual participants

The moderators of the prospective VCoPs and the relevant VCoP groups on LinkedIn and Twitter were approached. The researcher emailed a brief explaining the purpose of the research and received a sizeable buy-in from the moderators for their individual members to participate in this research. Neuman (2011:222) for example, supports the use of key members to reach individual members as it is difficult to reach all members in online communities.

Individual members were approached to recommend other members to participate. This was done in two ways. Firstly, an electronic request was posted on the VCoPs' website. The same request was also posted on the relevant VCoP groups on LinkedIn and Twitter as they extend their discussions on these two social networks. Secondly, the e-mail addresses of all individual participants were acquired from their respective moderators and VCoPs' personal profiles. This enabled the researcher to make direct contact with the individual members to request their participation in this research.

In addition, a snowball sampling technique is utilised to obtain individual participants. Snowball sampling is used where selected participants refer to other directly or indirectly related participants (Neuman, 2011:223). In brief, the research participants were asked to refer to other VCoP members to partake in the survey. In the first survey, 60 respondents submitted their responses across five VCoPs. In the second survey, a maximum of 60 responses were expected. However, the researcher ceased receiving responses after 41 participants completed the survey. The decision to stop receiving responses was made after a saturation level was reached, when similar and redundant responses were being received. The selection of individual participants is discussed in detail in Section 3.8.2.

1.11   Data collection process

There were two basic approaches utilised in this research - review of literature and online surveys. The data for the first two investigative questions stated in Table 1.1 are acquired from the review of literature. The data for the third investigative question was collected through online survey or alternatively called in this research, a Web-based survey. Data was collected in two phases and over two periods – the first phase was in 2011/2012 and the second phase was in 2016. The intention in the first phase was to test the applicability of the proposed knowledge flow model in optimising knowledge sharing within VCoPs. In the second phase, a survey was deployed to confirm the applicability of the model in optimising knowledge sharing in the contemporary VCoPs. A detailed discussion on data collection process is in Section 3.9.

1.12   Data analysis

Various data analysis methods were deployed in this research. One was using an analytic induction method of analysis. The responses received in both surveys were analysed to establish some premises that are derived from the data. The premises aided in reaching final conclusions and recommendations. The other is to use Miles and Huberman Framework for

qualitative analysis (Punch, 2005:198). This framework for analysis include data reduction, data display, and drawing and verifying conclusions. The survey responses are reduced to manageable data summaries. Simultaneously, the data responses are displayed in terms of diagrams, tables, and figures to make them more manageable and visible. Data reduction and display rest mainly on the operations of coding and memoing. In terms of coding, descriptive and inferential coding analysis methods are utilised in this research. That is, the responses are initially described as they appear in the surveys and a piece of data (label) is assigned to them. Then, each of the similar data attached to a certain concept or label has been interpreted and summarised, which is typical of inferential coding analysis. Further, memoing enables this researcher to make a profound interpretation of the summarised data, by questioning the new patterns that are achieved through the coding methods of analysis. Then, a final conclusion and recommendation is made. Analysis of research findings is discussed in detail in Section 3.15.

1.13   The actual surveys

Survey One (2011/2012) (APPENDIX C)

A hyperlink of the survey comprising of 28 questions was posted on the selected VCoPs' websites and the same VCoP groups who extend their discussions on LinkedIn and Twitter. The link of the survey was e-mailed to individual participants. This is in line with previous studies that online surveys can be sent via e-mail or an e-mail attachment, or are made available at a website (Duane *et al.*, 2014:186). Both, open and closed-ended questions were included in the survey.

In addition, this researcher signed in for membership in the prospective VCoPs. This may assist to gain sufficient knowledge of the VCoPs and is an opportunity to have a direct access to individual members of the potential VCoPs to obtain more responses for the survey. More detailed discussions on the first survey is found in Section 3.10.

Survey Two (2016) (APPENDIX D)

The objective with Survey Two (2016) is to validate if the survey results of 2011/12 is still applicable in current VCoPs. The reason is that the first data was collected during 2011 and 2012 and could be obsolete. Therefore, the second survey enabled to triangulate the findings with that of the findings established in the first survey. Then, the final analysis could be made by triangulating the data from both surveys in conjunction with current literature. More detailed discussion on the second survey can be found in Section 3.10.

1.14   Access to the online survey

An online survey was utilised to collect data. Online surveys are beneficial due to their speed, low cost, and the ability to reach respondents anywhere in the world. They are also returned much more quickly compared to mailed or telephone surveys. More benefits are also acquired from online surveys due to the anonymity and impersonal nature of online interaction. The respondents have the autonomy to answer questions without much restriction. For the aforementioned reasons, an online survey was deemed as appropriate for this research. The participants were required to click and open the survey. After completing the survey, a "Finish Survey" button is included at the bottom of the questionnaire [in the 2011/2012 survey] to enable the respondent to just click and submit. A freeonlinesurveys.com website was used to create the survey. It is to be noted that it is a free online survey only for the trial period of about 10 days and for questions that are not more than 20 but a payment is applicable after that period. Thus, the researcher used a paid version of the tool (that is, $9.99 is paid per month to keep the survey open). The survey automatically resides in the website and collates all responses after being submitted from each respondent. The researcher kept the link of the survey to be open for the duration of 2011/12 to reside on freeonlinesurveys website.

In the second survey, a google form website was used to create the survey. The survey was free of charge and the responses were collated automatically in the website. After completing the survey, a "Submit" button is included at the bottom of the questionnaire to enable the respondent to just click and submit. Access to online surveys is further discussed in Section 3.11

1.15   Anticipated problems

There were two anticipated problems during the data collection process. Firstly, it was difficult to locate members of the selected VCoPs. Secondly, the number of responses from online communities were too low, compared to typical face-to-face data collecting process.

In order to overcome the first problem, snowball sampling was used. This procedure was implemented by collecting data on the few members of the target population and then asking those individuals to provide the information needed to locate other members of that population whom they happen to know. In order to overcome the second problem associated with low responses, a follow up was made with the respondents. Babbie and Mouton (2001:260) advise that monitoring returns of the completed questionnaire is advisable to avoid lower rate of responses. This is discussed in detail in Section 3.12.

1.16   Access, ethics and informed consent

In this research, the moderators of each of the potential VCoPs were approached to obtain their consent to participate, explain the purpose of the research, and gain access to key contact information. As literature indicates, it is worthwhile to establish rapport directly in relation to the purpose of the study through a brief explanation of the research, clarity of purpose, and procedures so as to get consent for participation (Simons, 2009:47). In addition, it is ethical to clarify the purpose of the research to all the participants.

1.17   Aims of this research

- The first aim of this research is to propose a scientifically based knowledge flow model that may be adapted to enhance information and knowledge sharing within VCoPs.
- The second aim is to test and validate the proposed knowledge flow model if it has the potential to optimise information and knowledge sharing within VCoPs.

1.18   Assumptions

The assumption in this research is that a workable scientifically based knowledge flow model may be identified and adapted to enhance knowledge sharing within VCoPs.

1.19   Scope of research

The intention in this research is to enhance knowledge sharing within VCoPs. The VCoPs covered in this research are those that their objective is knowledge sharing and development. Any other knowledge sharing platforms other than VCoPs are not covered in this research. This research is restricted in finding a model to enhance knowledge sharing within VCoPs, in which it might in turn optimise knowledge sharing in an enterprise.

1.20 Expected outcomes and contribution of the research

The expected outcome of this research is to provide a scientifically based model that could be adapted to optimise knowledge sharing within VCoPs. From an extensive literature review, a comprehensive knowledge flow model namely, the Life Cycle knowledge flow model from literature was found. However, this model was never tested or verified if it indeed optimises knowledge sharing within VCoPs. Therefore, Survey One (2011/12) was used to solicit feedback from respondents for the optimisation of knowledge sharing within current VCoPs. Thereafter, a second survey, Survey Two (2016) was developed and used to validate the applicability of the proposed extended knowledge flow model. This enabled this researcher to propose an Extended Life Cycle knowledge flow model that particularly optimises knowledge sharing within VCoPs.

1.21 Layout of thesis

This section sets the structure of the thesis.

In Chapter 1, an introduction identifying the research problem is discussed. The review of literature indicates that formal organisational structures are not always the best way to support knowledge sharing. This is particularly a concern in organisations in which their operations are dispersed across time and distance. Therefore, in Chapter 1, VCoPs are noticed as vital in optimising knowledge sharing. Then, the need to develop a model to enhance knowledge sharing within VCoPs were envisaged. Furthermore, the research problem and investigative questions are identified. The challenges of knowledge sharing within VCoPs were discussed.

Thus, in this chapter, the following items are introduced: the research design, methodology, sampling techniques, data collection process, the online surveys used, access to the survey, anticipated problems, access, ethics, and informed consent, aims of this research, expected outcomes of the research, assumptions and scope of the research.

In Chapter 2, a review of literature is conducted to establish the historical developments of virtual communities of practice. The essential features of communities and virtual communities are also discussed. An extensive literature review is conducted to determine the definitions and concepts of Communities of Practice (CoPs) and Virtual Communities of Practice (VCoPs). The four main functions of CoPs are also elaborated on. Further, the main features of VCoPs are explained. The objectives of VCoPs, with reference to knowledge sharing are explained. Social networks are also discussed with reference to their potential contribution in

enhancing knowledge sharing. The chapter concludes with the researcher posing barriers of knowledge sharing within VCoPs.

In Chapter 3, the research design and methodology is presented. The significance and scope of this research is explained. This is followed by the research design, research methods, epistemological and ontological considerations. Sampling techniques, data collection processes, preparing survey questions and access to the survey are discussed. Furthermore, anticipated problems in this research, ethical considerations, as well as validity and reliability are explained.

In Chapter 4, a literature study is conducted to identify the current scientifically based knowledge flow models and their application to optimise knowledge sharing in an enterprise. The possibility of adapting and utilising such models in optimising knowledge sharing within VCoPs is established. The aim is to identify a workable model that may potentially be utilised to optimise knowledge sharing within VCoPs.

In Chapter 5, the findings of Survey One (2011/12) are analysed by making a reference to the research investigative questions. The intention in this chapter is to describe the findings and analyse the data acquired from the respondents. There were two crucial questions answered in the Survey One (2011/12). First, the definition and concepts of the main terms – virtual community, VCoPs, knowledge, and knowledge sharing were verified by the respondents. The second and most significant contribution discussed in this chapter is the discovery of an extended Life Cycle knowledge flow model with a potential to adapt and utilise in enhancing knowledge sharing within VCoPs. The respondents provided more insight into the creation, organisation, formalisation, distribution, application, and evolution of knowledge within VCoPs.

In Chapter 6, the findings of Survey Two (2016) responses are described and analysed. The focus of Survey Two (2016) was mainly on the practicality and adaptability of the Life Cycle knowledge flow model within the current VCoP environment. The creation, organisation, formalisation, distribution, application, and evolution of knowledge in VCoPs were the basis to structure the 2016 survey. What takes place under each phase within the VCoP environment has been clarified by most of the respondents. Therefore, the aim of Chapter 6 is to discuss and analyse the findings of Survey Two (2016) to validate the applicability of the extended Life Cycle knowledge flow model that resulted from the Survey One (2011/12).

In Chapter 7, reference is made to the research question to establish if the research findings have clearly solved the research problem. In the concluding remarks, the adaptation of the proposed knowledge flow model and its application in optimising knowledge sharing within VCoPs are established. Recommendations are made based on the discussion and analysis made that results from literature review and feedback from both surveys.

CHAPTER TWO

THE EVOLUTION AND DEFINITION OF VIRTUAL COMMUNITIES OF PRACTICE (VCoPs) AND THEIR CONTRIBUTION TO KNOWLEDGE SHARING

2.1   Introduction

In this chapter, the historical developments of virtual communities of practice (VCoPs) are discussed in Section (2.2), features of communities and virtual communities in Section (2.3) and networks in the context of virtual communities discussed in Section (2.4). In addition, the rationale of the participation of members in virtual communities are explored in Section (2.5), motivation to share knowledge in Section (2.6), objectives of VCoPs in Section (2.7), benefits of VCoPs provided in Section (2.8) and challenges of sharing knowledge within VCoPs discussed in Section (2.9). Barriers of knowledge sharing within VCoPs are then explored in Section (2.10) and the chapter closes with a summary and conclusion in Section (2.11).

2.2 The historical developments of virtual communities of Practice (VCoPs)

Although this section covers the historical developments of virtual communities of practice (VCoPs), the concepts of virtual communities and communities of practice (CoPs) are first explored in Sections 2.2.1 and 2.2.2.

2.2.1   Virtual Communities

Virtual communities are defined as groups of people whom communicate with each other via electronic media (Cheon & Ahn, 2009:135; Nagy, Kahun, Boonn, Siddiqui, Meenan, Knight & Safdar, 2006:716; Fiol & O'Connor, 2005). Talukder and Yeow (2006:186) and Yoo, Suh, and Lee (2002:553) suggest that virtual communities are social gatherings that take place through the Internet where people carry out public discussions to form personal relationships and networks. These personal relationships and networks may eventually result in developing common identities and purpose.

Similarly, Rheingold (1993) explains that virtual communities were initially an indication that real communities that were defined on the basis of geographic location, were in decline at the time when virtual communication started to take place (Schuler & Day, 2004:264-268; Yoo, Suh, & Lee, 2002:553). In other words, Rheingold (1993) views virtual communities as compensation for the loss of traditional communities. This indicates the emergence and development of virtual communities resulting in geographically-bounded communities to find new ways to interact on a virtual basis. Therefore, virtual communities that took place using ICT, created a platform for people to interact in new ways. In view of this, information and communication technologies have a strengthening effect to social interaction rather than, an

isolating effect. The Internet therefore, provides an immense opportunity according to Castells (2000:122-132) for social interaction laying the ground for the emergence of new forms of social organisation. In brief, traditional communities have found new ways to build relationships by utilising the Internet. This is not based on their local roots, but on the basis of their affinities and interests (Castells, 2000:126).

According to Holmes (1997:131), virtual communities have evolved over four epochs:

- Virtual communities were initially made up of like-minded people whose research results, were carefully recorded and circulated for discussion among fellow scientists at that time (Holmes, 1997:131). The author explains further, that these types of communities were present in academia aiming to publish academic articles in Journals;

- Virtual communities then continued to exist in media whereby newspapers, radio and television connected people together through perceived experiences and the illusion of participation (Holmes, 1997:131). The same perceived experiences is explained by Featherstone and Burrows (1995:88-89) who mention that media enables people to perceive similar experiences and virtually develop a common interest;

- Holmes (1997:131) explicitly states that virtual communities commenced operating online in about 1978. (Holmes, 1997:131). At the time, communities used to participate in bulletin board services to conduct discussions from their computer terminals (Schuler & Day, 2004:263-267); and

- Virtual communities were later centred on Gibson's[3] visions of the Cyberspace, in which there exists a "complete spatial visualisation of all information in global information processing systems, enabled by present and future communication networks" (Holmes, 1997:131). There is full co-presence and interaction of multiple users allowing input and output of data. This epoch was later to become the projection of the future of virtual space into Internet communities, in which communities interact in the space that existed within the connections and networks of communication technologies (Holmes, 1997:148; Jones, 1997:36-40). Generally, it was the American Defence Department that sponsored the first

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3 The term 'Cyberspace' was invented by William Gibson in his Cyberbunk novel, Neuromancer. It refers to when we use the Internet from a personal computer or increasingly, a handheld device or television sets. It integrates with older Communication Technologies, such as the telephone, and draws on theoretical conceptions of information and space that have enabled communication and representation to be digitised and networked (Whittaker, 2004:5).

computer network, ARPANET, which was created in the 1970s to connect researchers, who could operate at a distance (Schuler & Day, 2004:62; Rosenberg, 2004:105). This provided an opportunity for ordinary people to connect and interact based on their common interests and objectives.

In summary, the four epochs imply that virtual communities have been utilised by people to network and share their ideas with each other. The networking opportunities may have resulted in sharing both, tacit and explicit knowledge. A brief description of the four epochs is presented in Table 2.1.

Table 2 1: Epochs of virtual communities

Epochs of virtual communities	Descriptions
First epoch: like-minded people	Scientists and researchers with similar interests
Second epoch: grown in the media	Newspapers, radio, television connecting people through perceived experiences
Third epoch: communities went online	Bulletin boards
Fourth epoch: the cyberspace	Complete multi-dimensional visualisation of all information in global information systems

2.2.2 Communities of Practice (CoPs)

Communities of Practice (CoPs), as a phenomenon, have existed for many years being a natural part of human behaviour to socialise and work with others (van Winkelen, 2003). CoPs are largely formed in a voluntary manner and operate informally without formal controls or system supports (Jeon, Kim, & Koh, 2011:252). For example, Dube, Bourhis, & Jacob. (2006) and Wenger, McDermott, and Snyder (2002:2) state that CoPs have existed since the corporations of craftsmen in classical Greece and the guilds of the middle Ages, whereby knowledge was transmitted to apprentices in old workshops. Further, Wenger, McDermott, and Snyder (2002:5) explain that CoPs are the first knowledge-based social forums when human beings lived in caves and gathered to discuss how they would shape their tools and hunt animals.

Lave and Wenger (1991) describe CoP as a learning style that incorporates components of active participation, identity, and situation (Iaquinto, Ison, & Faggian, 2011:5). The same

authors also refer to the definition of Wenger (1998) which describes three characteristics central to the existence of CoPs – these are; mutual engagement in a shared practice, creation of a common repertoire, and the negotiation of a joint enterprise (Iaquinto, Ison, & Faggian, 2011:5). In a similar way Correia, Paulos, and Mesquita (2010:11) and Boateng (2011:29) define CoPs being groups of people held together by a common interest in a body of knowledge and driven by a desire and need to share problems, experiences, insights and conduct best practices. Similarly, a recent definition of CoPs refers to a group of people, who have shared visions and compassion through continual activities (Ho & Kuo, 2013:1049).

CoPs, in the modern sense, have gained prominence and significant management attention since the beginning of the 1990s according to van Winkelen (2003). The term was originally coined in 1991 when Jean Lave and Etienne Wenger[4] used it in their exploration of *situated learning* (Hislop, 2004:38; Archdivili *et al.,* 2006:95; Lima, Carvalho, & Ambrosio, 2010:98; Jeon, Kim, & Koh, 2011:252). Situated learning is also mentioned within the same context by Pilerot and Limberg (2011:315). Situated learning is defined as learning that takes place through working practices such as an apprenticeship where an employee learns skills on site (Hildreth & Kimble, 2004; Pilerot & Limberg, 2011:315). Working practice refers to a set of actions organised in terms of rules, beliefs, hopes, and expectations which all have a bearing on what is being performed (Pilerot & Limberg, 2011:315).

Organisations have shown an increased interest in CoPs due to the possibility of taking the existing concept of CoPs, into current knowledge sharing practices (Dube, Bourhis, & Jacob: 2006; Wenger, McDermott, and Snyder*,* 2002:14-15). ICTs have a crucial role in enabling CoPs to virtually share knowledge (Dube, Bourhis, & Jacob, 2006; Wenger, McDermott, & Snyder, 2002:116). Thus, ICTs have facilitated the introduction of Virtual Communities of Practice (VCoPs).

Central to the notion of CoPs is the means to acquire knowledge by which a newcomer learns from senior members, who have expertise (Hildreth & Kimble, 2004; Archdivili, 2006:95). The concept of CoP thus refers to the assumption that less experienced members of a community, learn from their social interactions, with more experienced members of a specific knowledge domain (Archdivili, 2006:95; Lueg, 2002). Ho and Kuo (2013:1049) explain that people may acquire expert knowledge and obtain higher professional practices through CoPs. The same authors explain that newcomers initially perform peripheral activities in the completion of a specific task, and over time, take on more central tasks and roles to ultimately become experts.

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4 Lave, Jean and Wenger, Etienne (1991). Situated learning: legitimate peripheral participation. Cambridge University Press.

This process of acquiring knowledge is termed Legitimate Peripheral Participation (LPP) (Lave and Wenger, 1991; Su *et al.*, 2011; & Archdivili, 2006:95). The concept of LPP is also referred to in the same context by Hildreth and Kimble (2004), Lundkvist (2004:98), and Lueg (2002). A brief discussion on legitimation, peripheral and participation follows:

- Legitimation refers to the power and authority relations in the community, that is, the willingness of a community to accept new comers once they meet a certain criteria set by the communities concerned (Archdivili, 2006:95; Lueg, 2002). Legitimation is also referred to in the same context, by Hildreth and Kimble (2004) and Lundkvist (2004:98), who explain that a minimum criteria should be met in order to accept new members into a community.

- Peripheral refers to the individual's social, rather than physical peripherality in relation to a community, that is, the phases that a member goes through until becoming a full member (Archdivili, 2006:95; Lueg, 2002). This is a stage where new members start engagement in a CoP until they reach an expertise level. Peripheral is also referred to within the same context by Hildreth and Kimble (2004), Lundkvist (2004:98), and Wenger, McDermott, and Snyder (2002:143).

- Participation refers to the involvement of a member in a community (Archdivili, 2006:95; Lueg, 2002). The objectives of members in participating in a community differ from one participant to another. Some members participate because they have an interest in the domain such as, issues and topics of a particular interest; while others may be more interested in belonging to a community; and others may get involved to enhance their profession and practice such as standards, tools and other lessons (Wenger, McDermott, & Snyder, 2002:44-45).

Further, learning in CoPs is described as a process in which the competence regime of the knowledge domain, pulls the experience of a newcomer until the person becomes a fully competent member of the community (Justesen, 2004:82; Wenger, McDermott, & Snyder, 2002:45). A newcomer can be knowledgeable in a particular field but may not have experience in interacting with the old and experienced members of the community. It should also be noted that it does not necessarily mean that the most experienced core members of a community are more competent (Justesen, 2004:82-83). Rather, the competence regime refers to the ability to interact, understand and have knowledge of the social domain of the CoPs (Justesen, 2004:82-83; Wenger, McDermott, & Snyder, 2002:44-46).

In summary, it is the mutual interest and passion in resolving a particular problem through knowledge sharing activities that best defines CoPs. In their quest to resolve problems, members of CoPs develop common work standards and practice.

2.2.3 Virtual Communities of Practice (VCoPs)

VCoPs are groups of people who get together to discuss and share their knowledge on a given domain using a virtual environment (Lima, Carvalho, & Ambrosio, 2010:93). They are some of the mechanisms to share knowledge especially in multinational organisations (Ho & Kuo, 2013:1049-1050). This view is also shared by Archdivili (2006:96), Allen, Ure, and Evans (2003:7), van Winkelen (2003), Kimball and Ladd (2004:203) and Wenger, McDermott, and Snyder (2002:116). VCoPs perform a central role in promoting collaboration between members who are dispersed in both, time and space (Correia, Paulos, & Mesquita, 2010:11).

VCoPs have interactive environments that provide their members the chance to engage with other members through a sequence of tools such as chats, document postings and community discussions (Kimball & Ladd, 2004:203). On the other hand, these authors also state that in traditional CoPs, individuals often interact between meetings in one-on-one conversations usually taking place on a face-to-face basis, while VCoPs operate in multiple ways beyond face-to-face meetings (Kimball & Ladd, 2004:203-204). For example, Lavoue (2011:310) define VCoPs as groups of individuals who share knowledge and expertise by using various technological means with the shared goal, of furthering their practice or doing their work better. Other literature also confirms VCoPs as popular forms of communities of practice and a web application that focuses on building and operation of an online community that facilitates knowledge sharing across time and distance (Tang & Yang, 2005:500).

The development of CoPs coincides with the development of learning technologies and tools to support group discussions and collaboration for example, through the Internet (Allan & Lewis, 2006:369). This development has led to the emergence of VCoPs. Furthermore, Correia, Paulos, and Mesquita (2010:12) explain that VCoPs are those whose members use ICT as their primary mode of interaction. This means VCoPs have similarities to CoP, but communication is usually by electronic means within VCoP members. Other authors also confirm VCoPs as a form of CoP which allows online information sharing according to Hu and Kuo (2013:1049).

Conceptually, VCoPs differ from CoPs due to a technological component only present in VCoPs; CoP and VCoP members also experience different environments due to the use of media they primarily use to interact, although facing dissimilar realities (Dube, Bourhis, & Jacob, 2006). For instance, the different time zones and geographic separation between members in CoPs urge them to resort to technologies that are not, in real terms, real substitutes for face-to-face interactions (Wenger, McDermott, & Snyder, 2002:116).

In summary, VCoPs can be conceptualised as knowledge sharing platforms enabled by ICT tools and methods, but may also extend their interaction on a face-to-face basis. On the other hand, the concept of CoP refers to the sharing of knowledge usually based on face-to-face interaction. The common denominator in both VCoPs and CoPs is the presence of common identity and passion that assists to lead them towards sharing expertise to solve problems, refine ideas, perspectives and practices.

2.3   Features of communities and virtual communities

In this section, the various features of communities and virtual communities are discussed in Sections 2.3.1 and 2.3.2 respectively.

2.3.1   Communities

The following four features are attributed to a community:

- Geographically-bounded group of people sharing common identities (Lee, Vogel & Limayem, 2003);
- Relatively stronger interpersonal ties and networkability (Castells, 2000:126-127);
- A sense of common identity and interests (Jones, 1997:39);
- Solidarity and sociability (Marouf, 2007:111).

Communities refer to closed systems, which presupposes a fixed or stable identity of its members with a relatively clear boundary, stable membership, and its limited linkage to other communities (Lee, Vogel & Limayem, 2003). This is an indication that a community is a group of people who reside in the same geographic location and share common values and attributes for a relatively stable and long-term existence.

Further, Castells (2000:126-127) defines a community as networks of interpersonal ties that provide sociability, information, a sense of belonging, and identity. The author further has the perspective that the proximity of a geographical boundary cannot merely define community; rather, it is the interpersonal ties and networkability of households in a community that is based on similar interests and affinities that creates more sociability and meaning to the term community.

In addition, Jones (1997:39) refers to community as encompassing both, material and symbolic dimensions, but it can also refer to a sense of common identity and interests. For example, the European Community was initially created to foster the economic interests of its constituent nations, while some other communities exist around a core of symbolic values such as quasi-religious interests (Jones, 1997:39).

A community has two aspects of human relationships; solidarity and sociability according to Marouf (2007:111). The author further suggests that solidarity is based on common tasks, mutual interests, and shared goals, whereas sociability refers to emotional relationships, in which people do not see others as a means to satisfy their own ends but to regard one another as friends. Rheingold (1994:24) also suggests that virtual communities would be serving as an aid, a comfort, and inspiration to some individuals. Komito (2001:17) explains that the overriding notion in virtual community is to promote solidarity in which new technologies, which are perceived as fragmenting and undermining traditional forms of communities, have countered this fragmentation by supporting a new form of community.

In summary, a community develops its own rules and norms concerning levels of participation, and individuals not conforming to these norms may be marginalised. Furthermore, communities may have stricter laws, customs and variations of language and presentation for all members to abide by. Thus, stronger interpersonal ties and networkability in a community reinforces common interests and identities. Thus, there is a presence of sociability and solidarity in a community. The notion of a community is thus associated with consensus and pressures to conform.

2.3.2 Virtual communities

Virtualness is the relative absence of face-to-face contact (Fiol & O'Connor, 2005:19). Virtual interactions reduce emphasis on discernible and tangible dimensions such as offices and other physical entities; the focus in virtual interactions is placed on intimacy based on members' perceptions of belonging or identity (Fiol & O'Connor, 2005:19; Holmes, 1997:149). Thus, the common interests are encased in virtual communities.

Virtual community participants often feel the need to strengthen or complement their disembodied relations by simulating more embodied contacts (Holmes, 1997:149). Holmes states that such participants develop a more comprehensive understanding of each other at such gatherings. This is due to the fact that Internet technology essentially prevents the interpersonal identification and judgment by which people normally evaluate each other in face-to-face interaction (Jones, 1997:107).

According to Kim and Jin (2006:41), virtual communities are meant to recover the values and ideals of traditional communities. Further, Talukder and Yeow (2006:186:42) indicate virtual communities being an impetus to construct new sorts of communities, linked by commonality of interest, value systems, and a sense of identity and association. Rheingold (1994:24-25) further suggests, individuals would be happier to associate with their online communities because the people with whom they interact most, would be selected more by commonality of interests and objectives, rather than by accidents of vicinity or geographical location.

Virtual communities can sustain themselves if the participants are kept engaged in what is discussed within their particular communities. In virtual communities, there is more autonomy and flexibility for an individual member to make choices that makes them relatively temporary and unsustainable. In traditional communities, members usually focus on a stricter conformity to rules and regulations to promote stability and long-term existence.

Virtual communities are enablers in complementing, revitalising and reinforcing the commonality of values and interests of already existing traditional communities. Simultaneously, virtual communities also encourage individuals to find new ways of interacting with other members of communities who have similar interests and objectives.

The intricacies of rules in traditional communities are stricter than the ones in virtual communities. The reason is that the traditional communities are usually defined by physical contacts or proximity, which urges members to observe rules more closely and strictly, whereas, the absence of physical proximity of members in virtual communities may tend to encourage individuals to either comply or withdraw easily.

In summary, communities and virtual communities are characterised by their common interest and identity. One of their main differences is that a community is traditionally viewed as a geographically-bounded entity, whereas, virtual communities on the other hand, refer to communities that interact on virtual basis enabled by Internet technology. The differences between communities and virtual communities are summarised in Table 2.2.

Table 2 2: Differences between communities and virtual communities

Communities	Virtual communities
Geographically-bounded group of people sharing common identities	Group of people sharing common identities but in a virtual environment
Relatively long-term existence and stability	Fluid and rapidly changing implying short-term existence and instability
Relatively stronger interpersonal ties and networkability	Relatively weaker interpersonal ties and networkability
Stricter conformity to rules and regulations by individual members	More autonomy and flexibility for individual members

Source: (Adapted from Lee, Vogel & Limayem, 2003; Castells, 2000:126-127; Komito, 2001:120; Marouf, 2007:111 and Allan & Lewis, 2006:369).

2.4   Networks in the context of virtual communities

With reference to virtual communities, three types of networks are identified in literature. They are as follows:

- **Computer networks** (White, 2004:3; Robertazzi, 2017:1);
- **Knowledge networks** (Seufert, Krogh, & Bach, 1999:184; Warkentin, Sugumaran, & Bapna, 2001:149);
- **Social networks** (Downes, 2005:411; Talukder & Yeow, 2006:180; Kim & Jin, 2006:42).

2.4.1   Computer networks

There are many definitions describing computer networks, but in general, they are the interconnection of computers using wires and radio waves over small and large geographic areas (White, 2004:3). It therefore, refers to a collection of computers (nodes), and transmission channels (links) that allow people to communicate over distances (Robertazzi, 2017:1). For example, Robertazzi (2017:1-2) states that a Bluetooth personal area network may, for example, simply connect a PC with its peripherals; an undersea fibre optic cable may cross an ocean, and the Internet and telephone networks span the globe.   At the present state of Information and Communication Technology, computer networks use high-speed networks which connects various individuals as well as businesses. Therefore, computer networks form the infrastructural basis to enable virtual communities to communicate with each other.

However, the issue of digital divide remains noticeable. The proliferation of the Internet in developed countries, the digital divide between North American and developed countries elsewhere is thus narrowing, but remains substantial (Chen & Wellman, 2004:18). The same authors explain that the divide also remains substantial within almost all countries, and is widening even as the number and percentage of Internet users increases, as newcomers to the Internet are demographically similar to those already online. The same authors further predicted that people, social groups and nations on the wrong side of the digital divide may be increasingly excluded from knowledge-based societies and economies.

2.4.2   Knowledge networks

Knowledge networks refer mainly to a number of people, resources, and relationships, who are assembled to store and share knowledge (Seufert, Krogh, & Bach, 1999:184). Knowledge networks allow participants of virtual communities to create, share, and utilise strategic knowledge so as to improve organisational business operations (Warkentin, Sugumaran, & Bapna, 2001:149).

According to Marouf (2007:111), knowledge networks are classified as intentional and emergent. Intentional networks are deliberately created by an organisation to accomplish a defined task (Marouf, 2007:111). Such networks, according to Pilerot and Limberg (2011:318), enable people to achieve common work and develop a shared understanding. On the other hand, emergent networks require some interventional support to enable them to perform better (Marouf, 2007:111). Emergent networks are usually created on informal basis, which Schonstrom (2005:18) suggests that they involve discretionary patterns of interaction where the contents of the relationship may have a social message or work related aspects. In emergent networks, people may share various types of information regardless of rank, function, job title and other organisational formal prescriptions.

2.4.3 Social networks

A social network is a collection of individuals linked together by a set of relations to share a common language, set of values and objectives in order to achieve desired outcomes (Downes, 2005:411). Further, Seufert, Krogh, and Bach (1999:182) explain that social networks are specific sets of relationships among defined sets of participants, where the characteristics of these relationships as a whole, defines the social behaviour of relevant participants. Social networks thus results in achieving common objectives and stimulates further relationships among people.

In social networks, communities may form relationships to share particular life experiences (Talukder & Yeow, 2006:180; Kim & Jin, 2006:42). For example, "WebMD" is a forum where people form relationships based on discussions on health concerns. Another example is "Facebook", which is a social network that was initially launched for Harvard students in 2004 (Facebook.com). When Facebook was established, the idea was for students to get to know their classmates for their following year. Other benefits of social networks are described in Table 2.3.

Table 2 3: Benefits of social networks

Benefits	Description
Information integration	Social networks can help users to handle information and sensitive real-time data more speedily than the traditional face-to-face social network.
Flexibility	Social networks are flexible and allow the users to participate in the communities' aspiration to create their ideal environment.
Dissemination activities	Knowledge, experience, and best practices can spread through multiple communication media such as virtual working groups and discussion forum.

Source: (Adapted from Lea, Yu, & Maguluru, 2006:124-125).

Social networks enable people to explore the informal application of knowledge transfer (Lea, Yu, & Maguluru, 2006:121). This results in promoting informal knowledge sharing, thereby aiming to enhance work quality (Hajli & Hajli, 2013:284; Ou, Davison, Zhong, & Liang, 2010:194). For example, in an ethnographic study of photocopier technicians working for Xerox, informal sharing in social networks is believed to enhance work quality and collaboration between peer-to-peer and superior-to-subordinate relationships (Ou *et al.*, 2010:194).

Panahi, Watson, and Partridge (2012:1095) suggest that social networks enable communities of specialised practitioners to share, critique, and validate their collective tacit knowledge. In brief, social interaction in the form of online discussion forums, chat rooms, and other real-time online conversations using social networks are positively associated with tacit knowledge sharing.

In summary, social networks are some of the virtual environments that promote the optimisation of personal as well as work related knowledge. According to Burrus (2010:50-53), some of the main social networks that are utilised in knowledge sharing are briefly summarised in Table 2.4.

Table 2 4: Social network sites and their functions in business 2.0

Name of social network sites	Functions in business 2.0
Facebook	Help organisations to increase internal and external networking and collaboration.
Twitter	Fast way to solve problems.
Wikipedia	Foster education and training as well as enhance information sharing.
YouTube	Post entertaining commercial videos to generate interest in products and educate or train people.
LinkedIn	Exchange information, ideas, and opportunities; share best practices.

Source: (Adapted from Burrus, 2010:50-53).

2.5   Rationale to participate in virtual communities

Internal motivational factors urge individuals to participate in virtual communities where internal factors refer to personal interest and enjoyment (Rovai, 2006:5; Kwok & Gao, 2004:98). Furthermore, internal motivation also alludes to the desire for achieving competence, self-esteem, and self-determination. For example, a person may participate in virtual communities to promote a certain positive image of oneself or the recognition of a specific contribution to the community (Kwok & Gao, 2004:98). This arises from the view that knowledge sharing is motivated by moral duty and community interest and not by narrow self-centeredness (Ardichvili, Page, & Wentling, 2003: 69). Further, Ho & Kuo (2013:1054) agree that individuals actively participate in knowledge sharing within their virtual communities in order to be recognised by their social groups. On the other hand, external motivation is also an essential factor for individual members to participate in virtual communities (Ho & Kuo, 2013:1052; Kwok & Gao, 2004:98). For example, an individual may participate in knowledge sharing if there are monetary incentives. Nevertheless, Correia, Paulos, & Mesquita (2010:11) contend that no direct financial reward is seen as a motivational factor for participation in virtual communities.

From literature it is found that internal factors are more rewarding than external factors (Vuori & Okkonen, 2012b:592-603). The rewards in internal motivational factors manifest in various ways such as contributing to organisation success, obtaining incentives and knowledge in return, boosting own reputation and feeling empowered (Vuori & Okkonen, 2012b:594). Information sharing is similarly viewed as an activity that creates a positive sense of community spirit which implies the intrinsic need of people to be recognised and be reputable in the community (Pilerot & Limberg, 2011:322). Other studies indicate that non-financial rewards

are more imperative than financial rewards in relation to knowledge sharing (Hu & Kuo, 2013:1052).

2.6   Motivation to share knowledge

The expectation to subsequently receive useful help from other members of a VCoP, determines the level of enthusiasm of individual members of a VCoP to share their knowledge. This means a member does not engage in self-received futile endeavours unless the resultant positive outcomes or returns from the participation in the virtual communities exist (Kwok & Gao, 2004:98-99; Rovai, 2006:5-6). This assumption reinforces the return on investment as the main reason to take part in virtual communities.

Kwok and Gao (2004:98-99) explain that organisational culture and policies as well as personal factors may influence people's information sharing behaviour. In other words, the more people believe that information sharing is a social norm, which is the usual, correct and socially acceptable behaviour, the more they would be willing to share. In a similar opinion, Vuori and Okkonen (2012:595b; 600) agree that knowledge sharing can be influenced by the company's organisational culture such as assumptions, values, and beliefs. Further, Kwok and Gao (2004:98-99) are of the opinion that the easiness of interfaces motivate the active participation of members. This can be construed that difficult-to-use systems negatively affect user's motivation to participate in virtual communities. As Preece (2001:139) indicates, the state-of-the-art of software and systems are crucial in developing virtual systems. The same idea is also shared in recent studies by Hu and Kuo (2013:1048-1052) indicating that ease of use is one of the factors that determine the participation in virtual communities.

Another motivational factor is the provision for discussions related to social cohesion or the feeling of belonging to a group in VCoP for individual members of a VCoP to share their knowledge (Rovai, 2006:7-8; Kwok & Gao, 2004:98-99). The development of social presence among members of a virtual community increases discourse, strengthens sense of community, promotes collaborative learning, and contributes directly to the success of the learning experience in the community. Therefore, online acquaintances, sensing community acceptance, and achieving companionship promote common interests, trust, and goodwill. For example, social networking sites such as "Facebook" and "Twitter" allow members to be friends and become fans of other online members (Hansen, 2011:43). These so called social ties, can be aggregated into a social network that enables identification of who is connected to whom and who is interested in whom.

In summary, these social ties suggest that intrinsic motivational factors are more significant than extrinsic ones. Extrinsic rewards only work temporarily as long as they are provided but do not permanently change the attitudes towards knowledge sharing. This implies people will

expect higher utilities as there seems to be no utility except rewards, resulting in people shifting to other activities with higher expectations of rewards.

2.7   Objectives of VCoPs

The main objective of VCoPs appears to supply content to users, encourages members to participate through their contribution, and facilitates interaction between community members (Kondratova & Goldfarb, 2004). Members have to be encouraged to generate content, which is known as pushing content (Kondratova & Goldfarb, 2004). Some pushing functionality features include: news, knowledge repository, classifieds, and job offerings. On the other hand, VCoPs are implied to have a means of pulling contents from participants such as member directories, member reviews, and surveys among others (Kondratova & Goldfarb, 2004). For example, VCoPs in multi-national firms are noticed to be increasing customer responses and creating new business opportunities (Manville, 2004:108-109).

2.8   Benefits of VCoPs

The benefits of VCoPs include sharing of tacit knowledge, utilisation of current knowledge, improving competitive advantage of organisations and perform daily tasks more efficiently (Correia, Paulos, & Mesquita, 2010:12-16). In addition, these authors state that VCoPs promote professional development, provide access to up-to-date knowledge, assist for faster decision making, upgrade individual skills, and enable to predict future happenings. Benefits of VCoPs are presented in Table 2.5.

Table 2 5: Benefits of VCoPs

Benefits of VCoPs		Description
Sharing tacit knowledge		Create and preserve tacit knowledge.
Knowledge utilisation		Increase the efficiency of knowledge utilisation.
Improve competitive advantage		Increase the quality of knowledge leading to improved competitive advantage.
Perform daily tasks		Access to the necessary knowledge to perform daily tasks.
Promote professional development		Disseminate own knowledge: both tacit and explicit; thereby promoting professional development.
Access to knowledge		Access to huge amount of knowledge which might be denied in other circumstances.
Decision making		Support towards decision-making.
Upgrade skills		Upgrade the skills of VCoP members.
Ability to predict		Predict future happenings and prepare for such occurrence.

Source: (Adapted from Correia, Paulos, & Mesquita, 2010:12-16).

Fontaine and Millen (2004:4-7) indicate that VCoPs present three benefits: individual, community, and organisational benefits. Individual benefits include acquiring knowledge objects such as documents, templates, ideas, and solutions (Fontaine & Millen, 2004:4-6). Participants usually develop their individual skills and know-how as well as maintain their sense of belonging to their organisation (Fontaine & Millen, 2004:6). Community benefits usually occur when the interaction increases access to the collective expertise and experience in the community (Fontaine & Millen: 2004:7). There appears to be wider access to knowledge and resources of the community, while the community also benefits from an individual expertise (Fontaine & Millen: 2004:7). The same view is shared by Hislop (2004:38). Organisational benefits include the increase in operational efficiency that leads to cost savings, maximising sales and profits as the result of the flow and sharing of knowledge within VCoPs (Hislop, 2004: 38; Fontaine & Millen, 2004:7). While personal and community benefits remain intangible they

both, have the potential to influence tangible business outcomes (Fontaine & Millen, 2004:7). Table 2.6 provides a summary of the benefits of VCoPs.

Table 2 6: Benefits of VCoPs

Objectives	Description
Individual benefits	Gain knowledge for individual development and recognition.
Community benefits	Access to knowledge and expertise of the collective community.
Organisational benefits	Increase operational efficiency that leads to maximizing productivity, sales, and profits.

Source: (Adapted from Fontaine and Millen, 2004:4-7).

2.9   Challenges in sharing knowledge within VCoPs

Knowledge sharing issues in VCoPs emanates from three sets of challenges. These challenges include Forced participation of members (Section 2.9.1), Changes in an organisational environment (Section 2.9.2) and the inability to measure the outcome of knowledge sharing (Section 2.9.3).

2.9.1   Forced participation of members

If individuals are forced to participate in VCoPs, then the VCoP is usually exposed to organisational politics that impede knowledge sharing (Dube, Bourhis, & Jacob, 2006). This usually leads to unfamiliar roles and ways of sharing knowledge when compared to VCoPs that are built on voluntary basis (Dube, Bourhis, & Jacob, 2006).

2.9.2   Changes in an organisational environment

Challenges in VCoPs appear as the result of changes in an organisational environment. For example, members view admitting "outsiders" either as enriching the community's dialog or diluting the community's focus (Stuckey & Smith, 2004; Wenger, McDermott, & Snyder, 2002:104). In reaction to changes, VCoP leaders usually choose to create sub-communities based on different topics and perspectives (Stuckey & Smith, 2004; Wenger, McDermott, & Snyder, 2002:24). This action often creates temporary misunderstanding among VCoP members.

2.9.3   Inability to measure the outcome of knowledge sharing

The determination of measurable benefits as the result of interaction in VcoPs could lead to challenges. These challenges are the inability to measure benefits of VCoPs in terms of cost

savings or profits made, as a result of knowledge sharing (Fontaine & Millen, 2004:3). In addition, the inability to establish some measure of assurance by participants in order to describe the benefits resulting from the action of VCoPs (Stuckey & Smith, 2004; Fontaine & Millen, 2004:3).

2.10   Barriers of knowledge sharing in VCoPs

Lesser and Fontaine (2004:16) posit four common barriers of knowledge sharing in VCoPs discussed in this section. These are: Lack of awareness of one's knowledge (Section 2.10.1), Lack of time and space (Section 2.10.2), Lack of application of knowledge (Section 2.10.3), and Lack of expert recognition (Section 2.10.4).

2.10.1 Lack of awareness of personal knowledge

The primary barrier is making knowledge seekers and knowledge sources aware of their respective knowledge. Not only are knowledge seekers, but also knowledge experts are often unaware of individuals who might benefit from their knowledge (Lesser & Fontaine, 2004:16). In order to address the non-awareness from both sides, Lesser and Fontaine (2004:16) suggest that the creation of a knowledge sharing platform increases the interaction of experts in order to be exposed to the knowledge of a critical mass of like-minded practitioners.

2.10.2 Lack of time and space

The second barrier is related to access, that is, providing the time and space for knowledge seekers and knowledge sources to connect with one another. Lesser and Fontaine (2004:17-18) explain that the knowledge sources are usually confronted with little incentive to spend some time in sharing their knowledge. This happens despite the fact that VCoPs are still among the few viable alternatives to instant conversations and knowledge sharing as the face-to-face interaction can be more costly and time consuming (Hara & Hew, 2007:236). This is known as convenience utility, whereby people use information on the web at their suitability of time and space (Whiting & Williams, 2013:365).

2.10.3 Lack of application of knowledge

The third barrier is that the knowledge shared is easier said than applied (Lesser & Fontaine, 2004:16). The knowledge provided by the source must be properly understood and related to the specific need and context of the knowledge seeker (Lesser & Fontaine, 2004:19; Hislop, 2004:39). In other words, the absence of a significant common knowledge base within a VCoPs' members creates problems with application of the knowledge shared (Hislop, 2004:39). Similarly, it usually takes extra time and effort for people to adapt to new knowledge (Correia, Paulos, & Mesquita, 2010:18). In order to address such barrier, the availability and

access to rich media, such as video clips, may reduce misunderstanding within VCoPs' members (Schenkel, 2004:54).

2.10.4 Lack of expert recognition

The fourth barrier is the absence of expert recognition within the VCoPs' communities create the perception of not sharing one's knowledge (Lesser & Fontaine, 2004:19). A similar view is also shared in Vuori and Okkonen (2012b:593). It should be realised that members make their knowledge visible to others so as to enhance their professional reputation and capability (Hislop, 2004:42; Wenger, McDermott, & Snyder, 2002:16). As a summary, the four barriers in knowledge sharing are summarised in Table 2.7.

Table 2 7: Barriers of knowledge sharing in VCoPs

Barriers	Description
Lack of awareness of one's knowledge	Knowledge experts are often unaware of individuals who might benefit from their knowledge, making it difficult to proactively spread their knowledge.
Lack of time and space	Little incentive to share and not having enough time to spend on sharing.
Lack of application of knowledge	Knowledge shared is easier said than applied.
Lack of expert recognition	Lack of expertise recognition, which in turn creates the *perception* of not sharing knowledge and low morale to knowledge dissemination.

Source: (Adapted from Lesser and Fontaine, 2004:16).

2.11 Summary and Conclusion

The emergence and development of contemporary virtual communities is enabled by the emergence and development of ICTs. ICTs enabled traditional communities to find new ways to interact on a virtual basis. Geographically-bound communities have found their ways to develop relationships using the Internet not based on their indigenous roots but on the basis of their affinities and interests.

One of the main advantages of virtual communities is their ability to promote informal knowledge sharing. Informal knowledge sharing help to overcome knowledge flow barriers and stimulate the sharing of tacit knowledge. Within the context of knowledge sharing in VCoPs, intrinsic motivation is viewed as a more determinant factor for participants to be willing to share than the extrinsic motivation.

VCoPs provide three main benefits: individual, community, and organisational benefits. Individual benefits refer to enhancing personal development and expertise as the result of participating in the knowledge sharing with fellow members. Community benefits refer to upgrading awareness and access to the collective community members' expertise. Organisational benefits refer to the increase in operational efficiency that leads to improved cost savings, sales, and profits as the result of the knowledge shared within VCoPs.

Barriers in knowledge sharing can significantly hamper a firm's performance, as organisations may be unable to tap into the know-how and expertise of their employees. For example, some companies such as IBM, The World Bank, UNDP, EXXON and Siemens deliberately support their CoPs in order to enhance the sharing of tacit and explicit knowledge. The concept of CoPs stems from the need to create a new mode of learning and is viewed as a specific form of knowledge development (Smith, 2001:311). In this context, ICT infrastructures are critical in enabling the flow of knowledge. This prompts for the development of VCoPs.

Further, some of the challenges encountered in VCoPs are explained in this chapter. These include forcing members to participate in VCoPs, which results in hindering knowledge sharing. The second challenge emerges as the result of resistance to change such as disallowing outside membership and/or resistance by existing members. The third challenge is due to the lack of measurable outcomes that could have resulted from knowledge sharing in VCoPs.

In view of the benefits, challenges and barriers, the identification and development of scientifically based models that can potentially enhance knowledge sharing in a VCoP are crucial. The result of the scientifically based model would be to adapt and use them in optimising VCoP's knowledge sharing, in order to overcome the challenges and barriers of knowledge flow among knowledge providers and receivers. Therefore, the objective of the next chapter is to discuss a research design and methodology in order to investigate how a scientifically based model can be applied to particularly enhance knowledge sharing within VCoPs.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1   Introduction

The objective of this chapter is to discuss and present the design and methodology needed to conduct this research. As mentioned in Section 1.4, the objective of this research is to ascertain if the adoption of a proposed knowledge flow model is applicable in the optimisation of knowledge sharing within VCoPs. A brief recap of the research problem and research questions are also presented. Furthermore, this chapter contains the following: Significance of this research (Section 3.2), Scope of this research (Section 3.3), Research design (Section 3.4), Research methodology and methods (Section 3.5), Epistemological considerations (Section 3.6), Ontological considerations (Section 3.7), Sampling techniques (Section 3.8), Data collection methods (Sections 3.9), The Survey (Section 3.10), Access to the survey (Section 3.11), Anticipated problems (Section 3.12), Access, ethics, and informed consent (Sections 3.13), Ensuring validity and reliability (Section 3.14) and Analysis of the result findings (Sections 3.15). A Summary and Conclusion is presented in Section 3.15.

The research problem presented in Section 1.4 reads: **enterprises do not have a formalised approach to successfully utilise knowledge sharing.** In particular, this research deals with a specific research question that reads: - *what scientific approach or model can be used to particularly optimise knowledge sharing in an enterprise?* This question needs to be answered as VCoPs are already established as one of the mechanisms to share knowledge in an enterprise. In order to answer this question, three investigative questions with their relevant objectives are also proposed in Section 1.6, Table 1.1.

3.2   Significance of this research

This research has the following significance:

- To find a suitable model amongst all the previous research conducted on knowledge sharing (management) or to create a new model, that could be used to optimise knowledge sharing within VCoPs;

- To determine if such a model could enhance work and research on knowledge sharing in various enterprises.

3.3   Scope of the research

This research proposes to enhance knowledge sharing within VCoPs. However, VCoPs covered in this research are limited to those that have their objective as knowledge sharing and development. Therefore, any other knowledge sharing platforms other than VCoPs fall outside the scope of this research and are not included in this research. More specifically, this research is restricted to finding a model to enhance knowledge sharing within VCoPs that it might in turn, optimise knowledge sharing in various enterprises (refer to Significance 3.2).

3.4.   Epistemological consideration

The epistemological position in this research is an interpretivist approach as opposed to a positivist approach. An epistemological position described as interpretivist, places the emphasis on the understanding of the social world through an examination of the interpretation of that world by its participants (Bryman, 2004:266). Interpretive approaches posit that social reality has a subjective component that arises out of the creation and exchange of social meanings during the process of social interaction (Duane *et al.,* 2014:40). Thus, in an interpretative stance, a researcher interprets social actions from the participants' point of view (Bryman, 2004:14). On the other hand, positivism argues that the world exists independently of people's perceptions of it, and that science uses objective techniques to discover what exists in the world (Duane *et al.*, 2014:39). The subjective and personal meanings that people attach to what they do in VCoPs' knowledge sharing activities is vital in terms of interpretative approaches. In this research, therefore, all data collected from both Survey One (2011/12) and Survey Two (2016) are interpreted based on the data provided by the respondents. Duane *et al.* (2014:438) emphasise that the description and interpretation of data in qualitative research should be closer to the meaning of the original data provided by the respondents. This results in the discussion and analysis in this research representing the responses given by the participants and not selected and distorted by the researcher. Then, the researcher's interpretations are further interpreted in terms of concepts, theories, and literature related to knowledge sharing in VCoPs. The triangulation with that obtained from literature is executed in order to provide a scientific-based explanation to the data given by the respondents.

3.5   Ontological consideration

In achieving accurate interpretation or representation of the "participants' voice", the ontological position in this research is broadly that of a constructivist approach as opposed to objectivism. Constructivism is the assertion that social phenomena and their meanings are continually being accomplished by social actors (Bryman, 2004:17). This author further explains that the researcher always presents a specific version of social reality, rather than

one that can be regarded as definitive. Therefore, in this research, the participants' responses are viewed as socially constructed and interpreted from the participants' subjective reality points of view. Therefore, the ontological assumption in this research is that the emphasis is placed on participant involvement in the development of knowledge within VCoPs and based on their subjective interpretation of the reality of knowledge sharing in their respective VCoPs. The concepts with regard to the optimisation of knowledge sharing within VCoPs is revealed in the data the respondents provide in the two surveys. Their responses are then interpreted by the researcher to conduct final analysis and draw conclusions.

More specifically to this research, a mere description of the findings on knowledge sharing within VCoPs would not be sufficient. Thus, an explanation as to how knowledge sharing is enhanced in VCoPs provides more detail and insight is required. This requires further interpretation and explanation of the findings through iterative inductive and deductive reasoning to finally arrive with an in-depth understanding of the topic. To a large extent, the limiting effect of a deductive approach is overcome by following inductive reasoning. In other words, the realisation that deductive hypothesis construction that limits researchers to observe the key phenomena, needs to be foreseen in this research. This, in turn, would result in an interpretivist approach – that is, the social reality has a subjective component that arises out of the creation and exchange of social meanings during the process of social interaction (Bryman, 2004:13-14). Therefore, the knowledge, ideas, and opinions of the research participants are interpreted and explained based on the data they provide. These responses in the surveys are the basis to establish premises which aids the researcher to determine conclusive concepts.

It is a given to explore new literature in knowledge sharing within VCoPs and taking into consideration during the survey data collection process. This results having up-to-date knowledge that may also have been revealed during the data collection process. For example, Duane *et al.* (2014:428) explain that qualitative research maintains a close, interactive link between data collection, analysis, and drawing conclusions. The authors suggest that there are always theoretical issues arising during data collection and analysis processes which begs for interaction between theory and data collection. In the words of Bryman (2004:15), "...the researcher's interpretations have to be further interpreted in terms of the concepts, theories, and literature of a discipline…", as there are emerging new findings that demands the interaction between theory and data collection. Thus, restrictions that stem from pre-existing theory are to be overcome by explaining what happens as data emerges from both literature and the survey responses.

3.6   Research design

A combination of research design approaches recommended by Babbie and Mouton (2001:72), Warden (2010:6), and Babbie (2004:109–112) are adopted for this research. According to Babbie and Mouton (2001:72), two main aspects of research design are to firstly, specify clearly what the researcher wants to find out; and secondly, to determine the best way to do it. In research design, the emphasis is placed on the research problem or question, the plan to conduct the research and the kind of results aimed at finding. Furthermore, the evidence required to address the research question adequately is paramount. The function of having a research design is to ensure that the evidence obtained enables the researcher to answer the questions as clearly as possible. Similarly, but a more detailed explanation of a research design is tabled by Warden (2010:6) who presents six phases of research design. These phases are as follows:

-   Scanning the environment and identifying the problem through literature;
-   Identifying the hypothesis or proposition accompanied by research question and sub-questions;
-   Identify the research methods to solve the research problem: this could be through literature and/or empirical research;
-   Establish findings: this could be through literature and empirical research;
-   Analysing findings by triangulating the data collected: this could also be both through empirical research and literature; and
-   Concluding based on the data collected from both literature and empirical research.

Further, a research design recommended by Babbie (2004, 109-112) is explained:

-   Have a well-defined purpose and a clear description of the kinds of outcomes you want to achieve (Babbie, 2004:109). This is similar to the first aspect of research design suggested above by Babbie and Mouton (2001:72);
-   The next step is to define concepts of what you are studying about. An important part of the research may involve the discovery of different scopes, features, or nuances of concepts (Babbie, 2004:109). Duane *et al.* (2014:31) similarly suggest operational definitions of concepts – definitions that indicate the precise operations to be followed in measuring a concept as opposed to nominal definitions of concepts – verbal definitions that are similar to dictionary definitions of ordinary words;
-   The choice of research methods must be clearly spelt out according to Babbie (2004: 110), that is, to decide how the desired data will be collected; for example, whether to use direct observation, a questionnaire, or some other techniques. Further, population and sampling needs to be considered, that is, groups of people whom to draw

conclusions from, is also required. The same is suggested in Babbie and Mouton (2001:72) and Warden (2010:6);

- The next phase is to collect empirical data and establish findings. The same is recommended by Warden (2010:6);

- Analysis then follows, that is, interpretation of data for the purpose of drawing conclusions that reflect the benefits, ideas, and theories that prompted the inquiry. The same is recommended by Mouton (2004:110) and Warden (2010:6); and

- Finally, the researcher to suggest further research on the topic. What avenues opened up by the research should be pursued further (Babbie, 2004:111-112). This is noteworthy as testing theory is not always seeking evidence that is consistent with the proposed theory; it also means to seek evidence that could disprove the theory which would result in further testing and investigation.

The outflow of the research design recommendations by Babbie and Mouton (2001:72), Warden (2010:6), and Babbie (2004:109-112), results in the following research design that is adopted for this research:

- Review of literature identifying the research problem conducted and the ensuing research questions and sub-questions identified;

- The current literature is referred to define the main concepts in this research; for example, the definition and concepts of virtual communities, virtual communities of practice, knowledge, and knowledge sharing are clarified in Chapter 2;

- Relevant research methods to address the research problem identified;

- Establishing the findings through a review of literature and a survey. A current scientifically based approach or model in utilising knowledge sharing in an enterprise is identified through the review of literature in Chapter 4, and then empirical testing of the theoretical approaches or models is conducted on the relevant VCoPs by using a survey discussed in Chapters 5 and 6.

- Analyse findings based on the data collected from the survey, by triangulating the data from the survey compared to the proposed theoretical knowledge flow model, explored in literature and discussed in Chapters 5 and 6. Concluding remarks is presented after data analysis in Chapter 7; and

- Further research recommended, if gaps exist after the outcome of this research is established in Chapter 7.

In summary, the research design deployed to conduct this research consists of reviewing literature to identify the research problem, defining main concepts, identifying research design

and methods to address the problem statement. Following establishing findings, analysing and discussing findings and drawing conclusions, and recommending further research.

3.7   Research methodology and research methods

In this section, various research methodologies are discussed in Section (3.5.1) and the research method employed in this research is presented in Section (3.5.2).

3.7.1   Various Research methodologies

There are three main research methodologies available – quantitative, qualitative, and mixed methods research. Quantitative research involves measurement of phenomena using numbers and counts (Duane *et al.*, 2014:39). Qualitative research involves data in the form of words, pictures, description, or narratives rather than numbers and counts (Duane *et al.*, 2014:39). A mixed method research methodology refers to combining both, quantitative and qualitative methodologies to capitalise on the strengths of the two approaches. In effect, it could compensate for the weaknesses of each. (Punch, 2005:240).   Punch (2005:241) further postulates mixed methodologies may be combining methods, data, and findings. For example, the author states that combining findings means that the qualitative and quantitative data and methods are not combined; only the results from the two kinds of inquiries can be combined. Punch (2005:241) is of the opinion that more complex studies which combine methods, data and findings, can be described as full multi-method studies. A deductive approach is used in quantitative research, while using an inductive approach in qualitative research, suggested by Duane *et al.*, (2014:39). The authors also indicate that a positivist approach is used in quantitative research, while an interpretive approach is used in qualitative research (Duane *et al.*, 2014:39-40). In a positivist approach, the authors explain that the world exists independently of people's perceptions of it and that science uses objective techniques to discover what exists in the world (Duane *et al.*, 2014:39). Whereas, in an interpretive approach, the authors explain that social reality has a subjective component that arises out of the creation and exchange of social meanings during the process of social interaction (Duane *et al.*, 2014:40). The decision in this research as to which methodology is most appropriate to use in the optimisation of knowledge sharing in VcoPs is paramount. Previous research study findings are obtained from literature to ascertain which methodology is most suitable and applicable for this research.

Different research methodologies have been utilised in research studies related to knowledge sharing. For example, in a study titled Knowledge Sharing Mechanisms in Industrial Research (Berends, Bij, Debackere, & Weggeman, 2006:85-95), an exploratory research methodology is employed. Berends *et al.* (2006:87) undertook an in-depth field study of knowledge sharing in two industrial research groups. Field studies are conducted in the form of passive participant

observation and partly, knowledge sharing interactions are tape-recorded by the researchers. Transcriptions of the interactions and interviews are then analysed in line with the grounded theory approach – which is a systematic way of theory building.

In the research titled the Exploration of Knowledge Sharing Challenges in Value Networks: A Case Study in the Finnish Grocery Industry (Timonen & Yitalo, 2007:505-514), a case study approach is used. The case study is based on a research project in which the collaboration between a Finnish retailer and its major suppliers are explored (Timonen & Yitalo, 2007:508). The aim of the research is to describe the current state of collaboration from a strategic point of view, and to explore anticipated future directions. A purposely interview is conducted with the top and upper management of the companies selected as the aim of that research project is to investigate a strategic view to the collaboration. An inductive analysis process is embarked upon based on the interview data (Timonen & Yitalo, 2007:509).

In a review study on knowledge sharing (Wang & Noe, 2010:115-131), most of the studies report on the theme of knowledge sharing, indicates qualitative studies in which interviews, observation, and analysis of archival documents are utilised. Wang & Noe (2010:126) further indicate that a small number of the qualitative studies collected quantitative data for analysis. The same authors suggest that many of the quantitative studies of knowledge sharing suffer from several significant limitations such as lack of measurability and objectivity. It is found that the majority of the qualitative studies reported in the review of their respective research, indicates that it is conducted in field settings. Wang and Noe (2010:127) find empirical studies involving field experiments using longitudinal research designs are recommended because such designs could assist to establish the causal relationships between individual, team, and organisational factors and their contribution to knowledge sharing. For example, two comparable units of an organisation may be cautiously chosen with one unit first serving as the control condition and then implementing the same intervention in the other one unit. This design allows researchers to relate overall differences in knowledge sharing between the two units as well as changes that occur across time (Wang & Noe, 2010:127).

In another research project conducted on developing an intranet towards knowledge sharing (Averweg, 2008), a theoretical approach is used to guide the study. An e-mail survey is also used to conduct the empirical part of the research to possibly verify the theoretical approach. The only problem experienced is the lower number of responses than initially expected. Out of a 150 expected responses, 39 are received, which means a 26% of the total number of employees who originally expressed interest in participating in the survey (Averweg, 2008).

3.7.2 Research method employed in this research

In view of the above different types of research conducted and applied to knowledge sharing, there appears to be no single type of research method deemed as the best to fit all applications.

This has led this researcher to adopt a method that enables him best to obtain evidence to answer the investigative questions (mentioned in Section1.6) posed for this research. This process commences by a review of literature conducted to define main concepts such as, knowledge sharing (Section 1.2.1) and VCoPs (Section 1.2.3), the historical developments of VCoPs (Section 2.2) and identifying the proposed scientific based knowledge flow model that may have the potential to enhance knowledge sharing in an enterprise (Section 4.3). Two surveys are needed to conduct the empirical research – the first survey conducted in April 2011 to January 2012 (Survey One) and the second survey in September 2016 to October 2016 (Survey Two), presented in Chapters 5 and 6, respectively. A triangulation method is employed to compare and contrast data captured from the review of literature with that of the findings from the two mentioned surveys. The use of this method enables and assists this researcher to answer the research investigative questions (Table1.1). How this researcher dealt with investigative questions 1, 2, and 3 follows.

Investigative question 1 - *How have virtual communities of practice (VCoPs) evolved contributing to knowledge sharing?* The researcher has to ensure that he has sufficient knowledge and understanding of the professional practice in the area of VCoPs. A review of literature is deemed applicable to explore the development of VCoPs and their contribution in knowledge sharing. In Chapter 2, the review of literature is conducted by exploring the development of VCoPs, theoretical concepts of VCoPs, and their contribution in enhancing knowledge sharing. In addition, the characteristics, benefits, challenges and barriers of knowledge sharing in VCoPs are also explored and reviewed. Investigative question 1 contributes to this research by providing a comprehensive definition and concept of VCoPs. It also allows the researcher to explain the contribution of VCoPs in enhancing knowledge sharing.

Investigative question 2 - *How are current models applied to knowledge sharing in an enterprise?* This researcher needs to ensure that he has sufficient prior knowledge to enable him to determine the use of current models applied to knowledge sharing in an enterprise. The researcher investigates contemporary scientifically based knowledge flow models in an enterprise and subsequently, investigates how they would be applied to particularly enhance knowledge sharing within VCoPs. A literature review is deemed suitable by exploring scientifically based knowledge flow models. Babbie & Mouton (2001:565) suggest, every research report should be placed in the context of the general body of scientific knowledge and brings the reader up-to-date with previous research in the area. Therefore, the contribution of Investigative question 2 is to establish current models that can particularly be adapted to knowledge sharing in VCoPs.

Investigative question 3 - *How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?* A qualitative research methodology is utilised to obtain evidence to solve Investigative question 3. According to Brynard, Hanekom, and Brynard, (2014:39), qualitative research entails discovering novel or unanticipated findings. The findings for this investigative question are derived from the data obtained from the respondents in both, Survey One (2011/12) and Survey Two (2016). An interpretive approach is used to analyse the data obtained from both surveys. The findings are objectively interpreted though the constructivist overtones are present due to the nature of the social interactive approach of VCoPs. This is in agreement with the definition of objectivity in science presented by Babbie and Mouton (2001:11) – scientific claims are always a socially constructed phenomenon and the claims are accepted based on objective evidence. Objective evidence, according to these authors, is a set of procedures and methods used to enable us to produce high quality results. In this research, the survey responses are objectively described, interpreted, and analysed based on the responses provided by the research participants and insights gained by this researcher. The contribution of Investigative question 3 to this research is to establish a model that has the potential to optimise knowledge sharing in VCoPs, in particular.

As Babbie and Mouton (2001:272) explain, in qualitative research, the researcher aims to define and interpret events within their concrete context in which they occur. Duane *et al.,* (2014:427) agree that the qualitative research methodology, facilitates to focus with more emphasis to contextualise and understand people, groups, and organisations within the full context or situation in which they act. A similar opinion is presented by Bazeley (2013:193), proposing that the intention of a researcher in qualitative research is to interpret the original intentions and meanings held by people in relation to a phenomenon. Therefore, in this research, the responses are described, interpreted and explained in the context of knowledge sharing led by the respondents from both Survey One (2011/12) and Survey Two (2016).

An Exploratory research method is also applied in this research. Exploratory research is applicable when a study is undertaken with the objective of either, exploring an area where little is known, or examining the possibilities of undertaking studies that are not explored in previous research (Kumar, 2014:13). Babbie & Mouton (2001:79) concur that an exploratory approach is relevant when a researcher examines a new interest or when the subject of study itself is relatively new. Thus, in this research, an exploratory research is conducted in anticipation of new findings from both literature as well as Survey One (2011/12) and Survey Two (2016).

Furthermore, an inductive approach is utilised in this research where the survey responses are analysed to generate meaningful concepts from the given survey data. For example, similar

responses are analysed and grouped to establish the concept of VCoPs; then the subsequent patterns that follow from such data responses leads to final concepts. The assertion in qualitative research is to predominantly emphasise on an inductive approach which places emphasis on the generation of concepts from given data (Bryman, 2004:20). The same is implied by Babbie and Mouton (2001:273) that most analytical strategies of the qualitative researcher are inductive in nature.

In summary, a qualitative research methodology is utilised to address investigative question 3. An exploratory research is conducted in anticipation of new findings from both, literature and two surveys. The two surveys are deployed to obtain responses from selected VCoPs. The questions posed in Survey One (2011/12) and Survey Two (2016) are developed based on the features of the proposed knowledge flow model discussed in Section 4.3. The findings and analysis is the reflection of the data provided by the respondents of the surveys. The responses are objectively described, interpreted, and analysed based on the insight of the researcher. An inductive approach is then used to conduct the analysis of the data.

3.8   Sampling techniques

In this section, the selection of VCoPs and individual participants for this research are discussed in Sections 3.8.1 and 3.8.2, respectively.

3.8.1   Selecting VCoPs

VCoPs selected for this research include The Gurteen Knowledge Community, KM4dev, KM Practitioners Group, AIIM Network for Intelligent Information Management, Knowledge Management Education (KMedu) Hub and actKM, all listed in Tables 3.1 and 3.2). These VCoPs are drawn from a VCoPs directory obtained from Google search, now discussed:

Google is utilised to search for VCoPs that cover a wide variety of themes. The phrase "VCoP Directory" is entered into the Google search area. From such search, about 27,000 google results came out which include articles written about VCoPs, VCoPs with various themes, reviews written about VCoPs and other several links. Subsequently, a purposive sampling technique is used to select VCoPs that have relevance to knowledge sharing. The search covers all VCoPs that are engaged in information and knowledge sharing. For example, by entering a specific search such as "current VCoPs engaging in knowledge management and sharing". This search resulted in much less number of VCoPs that have a specific theme that aim at knowledge sharing activities. Eventually, a discretionary judgement has been applied to select a certain number of VCoPs based on their membership criteria, geographical coverage, thematic choice, length of their stay as VCoPs and their members' accessibility to participate in an online survey. Certainly, it was practically impossible to cover wide ranging numbers of VCoPs in one research. This view of selecting VCoP is justified to control some

unseen variables that might arise from differences in themes and objectives of various VCoPs. According to Neuman (2011:40), the purposive selection of relevant entities is justified if a researcher is to intensively investigate such few selected entities to analyse them in detail and establish their generalisability to similar cases. The justification in selecting only VCoPs that are involved in knowledge sharing is due to their professional relevance in the field of information and knowledge management. This researcher asserts that knowledge management professionals may provide more insight and relevant information in how knowledge is shared and enhanced within VCoPs.

The purposive selection of such VCoPs is based on the knowledge of the subject matter of this researcher and the relevant VCoPs. This researcher joined some VCoPs that are engaged in knowledge sharing and knowledge management and made an informed decision by selecting them for this research. This researcher is an online member of some of the VCoPs, namely KM4dev and The Gurteen Knowledge Community. At the time of joining, the researcher has revealed that a research on knowledge sharing within VCoPs was being conducted, and their consent to participate was required. Thus, the moderators of the VCoPs were aware of the fact that one of the aims of this researcher to join the VCoPs, was to gain an insight and conduct a research knowledge sharing activities of individual members of such VCoPs. The membership in the VCoPs assists this researcher to obtain participants that are deemed best placed and knowledgeable to provide reliable and richer data. In other words, being a member makes it easier to find more respondents. For example, Babbie and Mouton (2011:166) explain that it is appropriate to pick a sample based on a researchers' knowledge of the discipline, the objectives of the study and a good knowledge of the available population. Purposive selection of relevant VCoPs deters from obtaining unrelated information that has nothing to do with this research's aims and objectives.

The geographical location of the potential VCoPs is also considered. The assumption is broad-based communities that are present in various geographical areas can provide a range of expertise and insight into the findings of a research (Duncan-Howell, 2007:81). A similar view is shared by Simons (2009:30), who suggests that broad-based communities can allow a researcher to draw experiences, perceptions, and knowledge of individual members. This may result in obtaining various insights and perspectives from the participants of the selected VCoPs.

The VCoPs are assigned with codes and the respondents are assigned with code names. The respondents are indicated as '11/12' for those whom responses are collected from Survey One (2011/12), and '16' for those whom responses are collected from Survey Two (2016). The codes of the VCoPs and respective respondents are depicted in Table 3.1 and Table 3.2.

Table 3 1: Codes of the VCoPs and respondents-Survey one (2011/2012)

Name of VCoP	VCoP codes	VCoP code names
The Gurteen Knowledge Community	Gurteen Knowledge[11/12]	Gurteen Knowledge respondent[11/12] 1 to 10
KM Practitioners Group	KM Practitioners[11/12]	KM Practitioners respondent[11/12] 1 to 1
AIIM Network for Intelligent Information Management	AIIM Network[11/12]	AIIM Network respondent[11/12] 1 to 5
Knowledge Management Education (KMedu) Hub	KM Education[11/12]	KM Education respondent[11/12] 1 to 3
KM4dev	KM Development[11/12]	KM Development respondent[11/12] 1 to 21
KM non-classified	KM Non-classified[11/12]	KM Non-classified respondent[11/12] 1 to 20

Table 3 2: Codes of the VCoPs and respondents - Survey two (2016)

Name of VCoP	VCoP codes	VCoP code names
The Gurteen Knowledge Community	Gurteen Knowledge[16]	Gurteen Knowledge respondent[16] 1 to 6
KM Practitioners Group	KM Practitioners[16]	KM Practitioners respondent[16] 1 to 4
AIIM Network for Intelligent Information Management	AIIM Network[16]	AIIM Network respondent[16] – 0 response
Knowledge Management Education (KMedu) Hub	KM Education[16]	KM Education respondent[16] – 0 response
KM4dev	KM Development[16]	KM Development respondent[16] 1 to 16
KM non-classified	KM Non-classified[16]	KM Non-classified respondent[16] 1 to 15

3.8.2 Selecting individual participants

The moderators of the prospective VCoPs are approached. This researcher provides a brief explanation describing the purpose of this research in order to establish a good rapport and to get an initial "buy-in" from the moderators. This is to encourage their individual members to participate in this research. This practice of using key members to suggest other members to participate is an acceptable method (snowball), as it is often difficult to reach all members in online communities (Neuman, 2011:222).

Furthermore, individual members are also approached to recommend other members to participate. This is done in two ways. Firstly, an electronic request is posted on the VCoPs' website. The same request is also posted on the relevant VCoP groups on Linkedin and Twitter as they are found extending their discussions on those social networks. Secondly, the electronic mails of individual participants is obtained from their respective moderators and VCoPs' personal profiles. This assists the researcher to get a direct contact with the individual members so as to increase the number of responses.

In addition, a snowball sampling technique is utilised to solicit more individual participants. Snowball sampling is used whereby already selected participants refer researchers to obtain more directly or indirectly related participants (Neuman, 2011:223). This concept of snowball sampling is also supported by Babbie and Mouton (2001:166) and Babbie (2004:184), who all agree that this procedure is appropriate when members of a particular population is difficult to locate. This researcher then collects data from a few members of the target population that can be located, then asking those individuals to provide the information to locate other members of the same population whom they happen to know (Babbie, 2004:184). Sixty respondents participated in Survey One (2011/12). In Survey Two (2016), the expectation was to receive another sixty responses. However, this researcher ceased after 41 responses had been received, as the responses were similar and reached a saturation point. Details of the two surveys used is provided in Section 3.10.

In summary, there are three approaches to select individual participants. The first is to approach the moderators of the VCoPs; the second is to approach individual participants via electronic mail; and the third to use a snowball sampling technique, whereby the current participants suggest other members to participate.

3.9   Data collection methods

As part of the research design, a description of what kind of data will be collected and how this will be done is essential (Duane *et al.*, 2014:9). The basic two approaches utilised to collect data for this research are using the review of literature and administering online surveys. The data obtained for the first two investigative questions (Table 1.1), is acquired from the review of literature. The data for the third investigative question is obtained by using online surveys, alternatively called in this research, a web-based survey.

Online surveys are beneficial due to their flexible design, fast response, low cost, and the ability to reach respondents anywhere in the world (Neuman, 2006:302; Duane *et al.*, 2014:186). The flexibility and versatility of online surveys using technology are strongly supported. Furthermore, online surveys assist in reducing paper, postage, outgoing mail and data entry

costs, while overcoming international boundaries as significant barriers reducing the reach-time from weeks to hours (Neuman, 2006:302).

Researchers find that responses from online surveys are returned much more quickly compared to posted or telephonic surveys (Duane *et al.*, 2014:186). Babbie (2004:271) also mentions that online surveys can be used to conduct meaningful survey research especially, if the population targeted are online-based. For example, a similar research conducted about knowledge sharing in eThekwini Municipality in South Africa, suggests web-based surveys save time and money while presenting opportunities of virtual research settings (Averweg, 2008). As this research is targeting online communities [that is, VCoPs], online surveys are appropriate.

An additional benefit of online surveys is the anonymity and impersonal nature of online interaction. This hides the characteristics of the researcher such as, race or gender as well as behaviour that may not influence respondents' answers. However, answering questions online raises the impact of social desirability, that is, respondents concern is reduced of how their responses appear to other people (Duane *et al.*, 2014:187). In this research, VCoPs respondents are afforded the opportunity to autonomously provide open responses, without feeling much pressure about their responses.

Although one disadvantage of online surveys is that, not all respondents have online access, or actually use the Internet (Duane *et al.*, 2014:187), participants from VCoPs use the Internet extensively to interact, which makes online survey relevant in conducting this research.

In summary, an online survey is utilised to collect data for the empirical part of this research. Online surveys are beneficial due to their speed, low cost, and the ability to reach respondents anywhere in the world. They are also returned much more quickly compared to posted (mailed) or telephonic surveys. More benefits are also acquired from online surveys due to the anonymity and impersonal nature of online interaction. The respondents have the autonomy to answer questions without much restriction. For the aforementioned reasons, an online survey is deemed most appropriate for this research.

3.10   The surveys

Two surveys were conducted one, in 2011/2012 and a second in 2016. Survey One (2011/2012) originates from Investigative questions 1 and 3,respectively (Table 1.1) where respondents are asked to verify the concepts of VCoPs and knowledge sharing, pertinent to investigative question 1. Furthermore, respondents are asked to provide their views on the applicability of the Life cycle knowledge flow model presented in Section 4.3.3. The objective of the second survey in 2016 is to establish if the proposed extended Life Cycle knowledge

flow model that resulted from Survey One (2011/12), is applicable as the data was collected during 2011 and 2012. These surveys are now discussed in more detail.

Survey One (2011/2012) (APPENDIX C)

This survey is aimed at soliciting respondents about the proposed Life Cycle knowledge flow model of its potential to optimise knowledge sharing within VCoPs, it found to be more comprehensive compared to the Spiral and Dynamic knowledge flow models, discussed in Sections 4.3.1 and 4.3.2, respectively. A hyperlink to Survey One (2011/2012) comprising of 28 questions was posted on the selected VCoP Websites and the same VCoP groups whom participate and extend their discussions on Linkedin and Twitter. The link of the survey was also e-mailed to individual participants. This is in line with previous studies of online surveys sent via e-mail, an e-mail attachment or made available on a website (Duane *et al.*, 2014:186).

In addition, this researcher signed up for membership to the prospective VCoPs. This is deemed necessary to gain sufficient knowledge of the VCoPs and also to provide an opportunity to have direct access to individual members of the potential VCoPs, thereby to obtain more respondents for the survey.

Both, open and closed-ended questions, are included in Survey One (2011/2012). For example, Bernard (2013:229) suggests that there are no rules that prevents a researcher from mixing question types. The choice for open and closed-ended questions is made in light of the fact that respondents generally provide their own answers to open-ended questions. Thereafter, the researcher can interpret the meaning of the responses to eliminate the possibility of misunderstanding or introducing researcher bias, as discussed by Babbie and Mouton (2001:233) and Babbie (2004:245). These authors also suggest that, using open-ended questions, there is a risk that some respondents provide answers that are essentially irrelevant to the stated research objectives (Babbie & Mouton, 2001:233). On the other hand, closed-ended questions eliminate the occurrence of such irrelevant answers and most often provides a greater uniformity of responses (Babbie, 2004:245). In order to balance such occurrences, closed-ended questions are included in the survey to mitigate obtaining irrelevant responses. This is done by adding a category labelled "Other (please specify: _____)" type questions. The closed-ended questions in the survey does not necessarily provide a "yes" or "no" answers. The questions rather propose some selective answers that elucidate the intended interpretation of the questions for appropriate responses. For example, Questions No. 18 and 28 in Survey One provide some key words that the respondents can select. The questions are as follows:

- What is the content of the messages that others have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

- If a discussion has been closed and archived, what are the requirements if a member wants to read, use or edit such discussion in case new ideas and/or developments came to the fore since it was archived? (for example acquiring permission from the moderator; requesting an unlock key; etc.)?

Prior to the distribution of Survey One (2011/2012), a pre-test was conducted on about 20 people (in the field of information and knowledge management) to determine whether the survey questions were clearly stated, and that the planned timeline would be feasible. From literature it is learnt, that pre-testing of a questionnaire is done to avoid ambiguous questions (Babbie & Mouton, 2001:244). The same is suggested by Duane *et al.* (2014:9) that a pre-test is required in case modifications to a questionnaire are required. Based on the results of pre-testing, the researcher made minor adjustment to the survey.

Survey One (2011/2012) questions (Appendix C)

The first part of this survey solicits personal details of respondents such as, area of expertise, names (optional), current employer / profession, name of their VCoPs to which they belong, and how long they have been members. These questions are meant to establish a working rapport with respondents with the hope of encouraging them to answer the subsequent questions that are more relevant and focussed on the issues posed in the research problem.

In the second part of Survey One (2011/2012), the focus is on respondents answering Investigative question 1 - **"How have virtual communities of practice (VCoPs) evolved contributing to knowledge sharing?"** (Section 1.6, Table 1.1). Respondent definitions and concepts of virtual communities of practice are asked to be provided. The concepts of other important terms pertaining to this research such as, virtual communities, knowledge, and knowledge sharing were also asked to be provided. This resulted in obtaining what knowledge and insight the respondents have about virtual communities of practice and their contribution to knowledge sharing. This assisted the researcher to validate the reliability of the data provided by the respondents' compared to the findings from literature (Section 2.2.3). The assumption by this researcher is that the more insightful and knowledgeable the respondents are about the crucial terms in this research, the more valuable and reliable data might be for this research. The contribution of reliable data has the potential to further develop knowledge sharing within VCoPs.

Extract of some of the questions (Appendix C):

- What is your opinion of what a virtual community entails (that is, what is your understanding of the definition and concept of 'virtual community')? (Question 4)

- What is your understanding of the term 'virtual communities of practice' (that is, what changes when a community of practice goes online)? (Question 5)

- Why do you belong or subscribe to a VCoP (that is, what do you personally expect to achieve by belonging to this VCoP?) (Question 6)

- According to your opinion, why do people in general subscribe to a VCoP? List as many reasons as you can think of? (Question 7)

- How would you describe 'knowledge' (that is, how would you interpret the concept 'knowledge'?) (Question 8)

- How would you describe 'knowledge sharing' (that is, how would you interpret the concept 'knowledge sharing')? (Question 9)

In the third part of Survey One (2011/2012), questions are asked to obtain responses to Investigative question 3 - **"How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?"** (Section 1.6, Table 1.1). The purpose of these survey questions are to ascertain the insights and opinions of respondents how to enhance knowledge sharing by utilising VCoPs.

Extract of some of these questions (Appendix C):

- What types of knowledge do you share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)? (Question 12)

- How do you determine whether your knowledge is worth sharing in the VCoP (that is, who or what makes you to decide that it is worth sharing your knowledge)? (Question 14)

- What do you do to ensure the knowledge that you share is simple to understand by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)? (Question 15)

- What is the content of the messages that *you* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)? (Question 17)

- How are the messages organised in the VCoP (that is, by date of receipt, author name, topic, subject area)? (Question 19)

- If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)? (Question 20)

- Who do you mostly share your knowledge within the VCoP (for example, only selected groups, all members, core groups, etc.)? (Question 21)

- How will you share your knowledge in the VCoP (for example, knowledge on how to manufacture a product; how to solve a problem at work; how to fix a flat tyre; how to prepare a meal; etc.)? (Question 24)

- What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible? (Question 26)

Survey Two (2016) (APPENDIX D)

In Survey Two (2016), 10 questions are developed. The intention in the first part of this survey is to obtain personal details of the respondents, (similar to Survey One (2011/2012), identifying to which VCoPs they belong. The questions in the second part of this survey relates to the applicability of the Life Cycle knowledge flow model which mainly focuses on obtaining data to solve the main investigative question – " How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?" (Section 1.6, Table 1.1). The questions in the second part are based on the six phases of the extended Life Cycle knowledge flow model that comprises - *creation, organisation, formalisation, distribution, application, and evolution*. These phases are also initially used as the basis to prepare Survey One (2011/12) that aimed to establish the model that potentially optimises knowledge sharing in VCoPs. Therefore, Survey Two (2016) enables to compare the findings using triangulation, established in Survey One (2011/2012). The final analysis could be made by triangulating the data from both surveys in conjunction with current literature. This results in validating the initial findings obtained from Survey One (2011/2012).

Extract of some Survey Two (2016) questions: (Appendix D)

- What types of knowledge do you create or share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)? (Question 3)

- How are the messages organised in the VCoP (that is, by date of receipt, author name, topic, subject area)? (Question 5)

- What do you do to ensure the knowledge that you share is simple *to understand* by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)? (Question 7)

- Who do you mostly share your knowledge within the VCoP (for example, only selected groups, all members, core groups, etc.)? (Question 8)

- What is the content of the messages that *you or others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)? (Question 10)

- What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)? (Question 11)

- What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible? (Question 12)

In summary, the web-based surveys are directly linked to the research investigative questions. In Survey One (2011/2012), a hyperlink of the survey comprising 28 questions was posted on the selected VCoP websites and on the selected VCoP groups extending their discussion on Linkedin and Twitter. The researcher also signed up for membership to some of the VoPs to gain sufficient knowledge of the VCoPs and an opportunity to have a direct access to individual respondents. In Survey Two (2016), eight main questions (plus an additional two questions related to personal details) were used to ask respondents to validate the current usability of the extended Life Cycle knowledge flow model.

3.11 Access to the survey

A freeonlinesurveys.com website was used to create the survey. The survey automatically resides on the website with a $9.99 monthly fee and collates all responses after being submitted from each respondent. The hyperlink could expire after all the responses were collated or alternatively, it could be kept open for as long as online payments are made to maintain the freeonlinesurveys website. More specifically, this is a free online survey but only for a trial period of about 10 days and not for more than 20 questions. A payment would then be applicable. In Survey Two (2016), a Google form website was used to create the survey. The survey was free of charge and the responses were collated automatically on the website.

After participants received notice of the online surveys, they were required to open the respective surveys by executing simple mouse clicks. After completing Survey One (2011/2012), a "Finish Survey" button is included at the bottom of the questionnaire to enable the respondent to click a submit button. After completing Survey Two (2016) on the Google website, a "Submit" button is included at the bottom of the survey to enable the respondent to click and submit.

3.12   Anticipated problems

There were two potential problems that this researcher had to anticipate for the data collection process. The first problem was to get members of the selected VCoPs on board and to participate in the surveys. Secondly, the number of responses from online communities are low compared to face-to-face data collection interactions. In order to overcome the first problem, a snowball sampling technique was utilised. This procedure is implemented by collecting data on the initial members of the target population that the researcher located, and then asking those individuals to provide other member names of that population whom they happen to know and work with (Babbie & Mouton, 2001:166). In other words, some of the VCoP members were instrumental in providing contact information of relevant members so that the researcher could send the survey directly to those contact members.

To counter the anticipated problems, the researcher managed to overcome the problem associated with low responses, by a follow up request to the chosen respondents to participate. From literature, Babbie and Mouton (2001:260) advise that monitoring returns of completed questionnaires is advisable to avoid a low rate of responses. This is done by sending a new copy of the survey questionnaire with a follow up letter, properly timed follow-up mailings, and to provide additional stimuli to respond (Babbie & Mouton, 2001:160-161). Thus, a two-week interval would be deemed as a reasonable time period to follow up with respondents both, via e-mail and by posting a message on the prospective VCoPs' websites. This includes the two social networks they were using to extend their discussions – Linkedin and Twitter.

3.13   Access, ethics and informed consent

In this research, the participants of each of the potential VCoPs were approached to gain their consent to participate, explain the purpose of the research, and gain access to key contact information. It is advisable to establish contact directly in relation to the purpose of the study by providing a brief explanation of the research, clarity of purpose and procedures to get consent for participation (Simons, 2009:47). For ethical reasons, a clarity of purpose for the research was sent to all the participants.

3.14   Ensuring validity and reliability

Multiple sources of evidence are used to validate the various information collected from literature. The concept of using multiple sources of evidence to increase validity is recommended by Yin (2003:34) and suggests that various literature is used to authenticate the validity of theoretical findings. In addition, Survey Two (2016) is utilised to confirm the applicability of the extended Life Cycle knowledge flow model (that was tested in Survey One (2011/12) to existing knowledge sharing within VCoPs.

3.15   Analysis of the research findings

In qualitative research, different techniques for analysis can be applied to the same set of qualitative data, as there are different questions to be addressed (Punch, 2005:194). The author further suggests that there is no single way to conduct qualitative data analysis. The purpose of a study usually dictates the method of analysis to be used.

For this research, various analysis methods are employed. One of them is to use an analytic induction method of analysis. Analytic induction involves concepts are developed inductively from the data in which the premises are viewed as supplying strong evidence for the truth of the conclusion (Punch, 2005:196). The premises are developed from the survey responses in which the conclusion would be the reflection of those premises. An inductive analysis is done to test and verify the applicability of the Life Cycle knowledge flow model which was tested in Survey One (2011/12), and subsequently also tested in Survey Two (2016).

The Miles and Huberman Framework reported by (Punch, 2005:198) for qualitative analysis, is also used. This analysis include data reduction, data display, and drawing and verifying conclusions (Punch, 2005:198). Punch explains that the objective of data reduction is to reduce the data without significant loss of information and without stripping the data from their context. Babbie and Mouton (2001:460) explain that data reduction involves the reduction of data from unmanageable details to manageable summaries. The objective of data displays are to organise, compress and assemble information as the nature of qualitative data are typically so voluminous and dispersed (Punch, 2005:198). Thus, the data reduction and data display method assisted the researcher with this research to summarise and sort the responses from the survey in a more organised and meaningful way.

Data reduction and display rests mainly on the operations of coding and memoing (Punch, 2005:199). Coding refers to the assigning of labels to attach meaning to pieces of data, where these labels serve a number of functions such as indexing the data, providing the basis for storage and retrieval (Punch:199). Further, coding permits a researcher to summarise data and identify their patterns. It also enables to conduct the first part of analysis and subsequent analysis.

According to Punch (2005:200), descriptive codes are first-level codes that enable a researcher to just merely describe and get the analysis started; whereas inferential or pattern codes are more interpretative, requiring some degree of inference beyond the data. In this research, both descriptive and inferential coding were utilised. The concept of coding according to Punch (2005:200), is also explained in Babbie and Mouton (2001:499). For example in this research, a descriptive analysis is initiated based on what the respondents

reported on knowledge creation in their respective VCoPs; then, a more interpretative approach is utilised to determine the type of knowledge that has been created and further explanation made based on the patterns that emerge out of the initial interpretation and discussion. In this research, both types of codes are used to first start describing the data as it is specified by the respondents and assign them to certain labels and concepts; then a further logical interpretation of the data is done without losing the message and meaning given by the respondents.

In this research, the data drawn from the surveys dictates what descriptive and inferential codes to use. Simultaneously, the proposed Life Cycle knowledge flow model that is discussed in Section 4.3.3, is on the basis to assign codes to certain pieces of data received from Survey Two (2016). In other words, the various phases that make up the model has assisted the researcher in assigning specific thematic codes to certain pieces of data responses. This enables the researcher to conduct a more manageable analysis. For this, all the data related to knowledge application are assigned to the "application of knowledge"; all the data related to knowledge formalisation are assigned to "'formalising knowledge" in the VCoPs. The same applies to organising, distribution, application and evolution of knowledge.

Subsequent to coding, memoing is also utilised in this research when summarising and analysing the responses received for each question. According to Punch (2005:201), memoing provides deeper meanings and point towards new patterns than what coding has so far produced and results in further interpretation. In this research, memoing has permitted the researcher to embark on a conceptual level of analysis. Punch (2005:202) finds this type of analysis requires more creativity rather than a mere disciplined part of the analysis. Babbie and Mouton (2001:501) and Babbie (2004:379) similarly explain that the memoing process involves more than simply categorising chunks of text. This could result into a more profound interpretative approach by providing more reasonable and logical explanations of the responses received in surveys. Memoing has enabled this researcher to make a profound interpretation of the summarised data, by interrogating the new patterns that are achieved through the coding methods of analysis. This researcher has used his own insight as well as references from literature reviews, to explore a more creative interpretation and analysis of data. This interpretative approach results a more scientific-based analysis. From this, conclusions are drawn and recommendations are made based on the final analysis.

In summary, various analysis methods are employed. One of them is to use an analytic induction method of analysis in which the responses received in both surveys (2011/12 and 2016) are analysed inductively to establish some premises. The premises led this researcher to make final conclusions and recommendations. A second method used is a framework proposed by Miles and Huberman (Punch, 2005:198) for qualitative analysis. This framework

for analysis include data reduction, data display, and drawing and verifying conclusions. The responses from both surveys (2011/12 and 2016) are reduced to manageable data summaries. Simultaneously, the data responses are displayed in terms of diagrams, tables, and figures to make them more manageable and visible. Data reduction and display rest mainly on the operations of coding and memoing. In terms of coding, descriptive and inferential coding analysis methods were utilised in this research. That is, the responses are initially described as they appear in the survey and a piece of data (label) is assigned to that. For example, all responses related to knowledge creation, are assigned the label 'knowledge creation'. Then, each piece of the similar data is attached to a certain concept or label that has been interpreted and summarised, which is typical of inferential coding analysis. Furthermore, memoing enables this researcher to interpret the summarised data, by questioning the new patterns that are achieved using the coding method of analysis. Finally, conclusions and recommendations are made.

3.16   Summary and conclusion

VCoPs are considered being a means to optimise knowledge sharing. VCoPs take on a central role in promoting knowledge sharing between members who are dispersed in various geographical areas. The outflow of this role is that it is essential to conduct research to establish a scientifically based model to particularly utilise VCoPs to enhance knowledge sharing.

The main research question in this research reads - *"What scientific approach or model can be used to particularly optimise knowledge sharing in an enterprise?"* The subsequent research investigative questions that emerge from the main question are - *"How have virtual communities of practice (VCoPs) evolved contributing to knowledge sharing? How are current models applied to knowledge sharing in an enterprise? How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?"* presented in Section 1.6, Table 1.1. In order to answer these three investigative questions, an appropriate research tool and techniques, relevant research participants, an appropriate research design, methodology, and methods are identified.

An online survey is utilised to obtain qualitative responses from the selected VCoPs. Online surveys are chosen as they are beneficial due to their speed, low cost, and the ability to reach respondents anywhere in the world. An overriding benefit using online surveys are that respondents have the autonomy to answer questions without much restriction.
Some relevant VCoPs selected for this research include - The Gurteen Knowledge Community, KM4dev, KM Practitioners Group, AIIM Network for Intelligent Information Management, Knowledge Management Education (KMedu) Hub, and actKM. These VCoPs comprise of international experts with broad range of experiences in the field of knowledge

management. In addition, the same members take on their knowledge sharing on both Linkedin and Twitter.

Each of the VCoPs have been assigned with codes and the respondents have also been assigned with code names. The respondents are referred to '11/12' for those responses collected in Survey One (2011/2012) and as '16', for those responses collected in Survey Two (2016). Three approaches are used in selecting individual participants. The first is an approach to the moderators of the VCoPs; the second is to approach the individual participants via e-mail; and the third is to use a snowball sampling technique, whereby the current respondents suggests other members to participate in this research.

The web-based survey was prepared based on the direct reference made to the research investigative questions. In Survey One (2011/2012), a hyperlink of the survey comprising of 28 questions was posted in the selected VCoPs' websites and in the selected VCoP groups extending their discussion on Linkedin and Twitter. In addition, the researcher also signed up for membership to the VCoPs. This assisted the researcher to gain a sufficient knowledge of the VCoPs and enabled him for direct access to individual respondents. Prior to the distribution of Survey One (2011/2012), a pre-test was conducted on about 20 people to determine whether the survey questions were appropriate and clear and whether the planned timeline is feasible. In Survey Two (2016), eight main questions (with additional two questions that were related to personal details) were asked to validate the current usability of the extended Life Cycle knowledge flow model. This enabled the researcher to confirm the current utilisation of the extended Life Cycle knowledge flow model.

Various analysis methods were employed. One of them was to use an analytic induction method of analysis in which the responses received in the survey were analysed inductively to establish the resultant premises. Miles and Huberman Framework (Punch, 2005:198) for qualitative analysis was also used in this research. This framework for analysis include data reduction, data display, and drawing and verifying conclusions. In the next chapter, the various knowledge flow models are discussed.

CHAPTER FOUR

CURRENT KNOWLEDGE FLOW MODELS

4.1. Introduction

This chapter explores literature focussing on knowledge flow models to find a potential or suitable model to ascertain if a workable and scientifically based knowledge flow model exists that may be able to be used to be adapted to enable practitioners to optimise knowledge sharing within VcoPs. This is as a result of Chapter 1, providing introductory literature on knowledge sharing within VCoPs. This is followed by further exploring literature of the evolution, definition, and concepts of VCoPs and their roles in enhancing knowledge sharing in Chapter 2. In Chapter 3, the research design and methodology to research knowledge sharing within VCoPs is provided and discussed. The specific topics covered in this chapter include: the definition and concepts of knowledge and knowledge flow (Section 4.2), current knowledge flow models in literature (Section 4.3), and the three types of models – Spiral knowledge flow model (Section 4.3.1), Dynamic knowledge flow model (Section 4.3.2), and Life Cycle knowledge flow model (Section 4.3.3). A summary and conclusion is provided in Section (4.4).

4.2. Definition and concepts: knowledge and knowledge flow

4.2.1   Knowledge

Knowledge is the "fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information" (Arntzen-Bechina & Leguy, 2007:154). Knowledge is an internal and personal abstraction of something that was experienced by someone (Lima, Carvalho, & Ambrosio, 2010:95). This results in enabling people to informed decision-making and action (Nissen, 2002:253). In addition, knowledge consists of two elements – tacit and explicit knowledge. In addition, knowledge consists of two elements – tacit and explicit knowledge. The difference between tacit and explicit knowledge can be referred to the ease with which knowledge can be expressed and communicated to others. Lima, Carvalho, and Ambrosion (2010:96) also refer explicit knowledge as the knowledge that can be easily collected, organised, and transferred through digital means while tacit knowledge is knowledge that is personal, in a specific context and hard to formalize and communicate. Tacit and explicit knowledge are explained in Section 1.1.

4.2.2 Knowledge flow

The concept of knowledge logistics is vital in understanding the concept of knowledge flow. In the context of VCoPs, Knowledge logistics, alternatively known as knowledge stocks, are the methods and processes for providing the right knowledge to the right person at the right time (Zhuge, 2007:572). Knowledge logistics implies the accumulated knowledge assets that are available to flow in a particular organisation. Within this context, knowledge flow constitutes the production and transmission of knowledge that may be assimilated and developed into knowledge logistics of an organisation (Zhuge, 2007:572).

Knowledge flow is also explained as a process whereby knowledge is passed between people or knowledge processing mechanisms (Zhuge, 2007:572). This knowledge processing mechanisms are manifested in the form of knowledge flows between nodes (such as team members, software agents, or knowledge portals that provide services), according to certain rules and principles (Zhuge, 2007:572). Knowledge flow starts and ends at a node; a node can generate, process, understand, synthesise, and deliver knowledge (Zhuge, 2007:572).

In addition, the concept of knowledge flow rotates around two-dimensional region in a knowledge space (knowledge space being the overall knowledge sharing context) (Zhuge, 2007:572). These two dimensions include knowledge field and knowledge level. A certain field of knowledge flows from one node to another. Simultaneously, the level of knowledge of a node can range from a lower level (simple) to a higher level (complex).

The strength of knowledge flow is also determined by the knowledge energy, that is, the power to drive knowledge flow in terms of the nodes' cognitive and creative ability (Zhuge, 2007:573). For example, members which act as the only node between two networks have the highest potential within a network to drive the knowledge flow because they may have full control within the knowledge flow networks (Anderson, Holm, & Johnson, 2006:33; Zhuge, 2007:573).

A similar opinion to the preceding paragraph is also explained in Alashwal, Rahman, and Beksin (2011:1534). According to Alashwal, Rahman, and Beksin (2011:1534), power is viewed as an important aspect in facilitating collaboration and knowledge sharing between individuals as well as firms. It can be inferred that an active interaction of a node [or an individual entity] and more knowledge sharing with other nodes or [individuals] may result in accumulating more knowledge and gaining more power within a particular knowledge flow context.

To elaborate more, network analysts view the world as a collection of two comparable primary building blocks: nodes and edges (Hansen, 2011:45). Nodes are represented by circles, while edges represent lines that connect those nodes (Hansen, 2011:45). Nodes refer to people, organisations, and websites; whereas edges refer to friendship ties, hyperlinks, or e-mail

exchanges (Hansen, 2011:45). In addition, nodes may also refer to contents of a particular interest such as videos and images while edges may refer to tags, comments, ratings that can be used to link related contents (Hansen, 2011:45). For example, video clips on YouTube can be referred as nodes while the comments and ratings on a particular video clip may be considered as edges.

Social network theorists also view social relationships in terms of nodes such as individual users and ties, that is, relationships between the individuals (Ou *et al.*, 2010:195). A Chinese social network known as 'guanxi' can be taken as an example. 'Guanxi' refers to the presence of direct personalised ties between two or more individuals (Ou *et al.*, 2010:195). The same authors explain that the concept of 'guanxi' implies the reciprocity and long-term benefits. This concept is highly valued in knowledge sharing as reliable knowledge is considered intangible and scarce in China (Ou *et al.*, 2010:196).

In summary, knowledge flow is the process of knowledge dissemination from one node to another. These nodes can be individuals, units, departments, firms and other entities that have the potential to share knowledge. The entities can either be knowledge sources or knowledge recipients. Therefore, in essence, knowledge flow and knowledge sharing are seamless in terms of their meaning and concepts. In this research, knowledge sharing and knowledge flow are interchangeably used. Knowledge sharing is discussed in Section 1.2.1.

Figure 4.1 depicts knowledge flow between various nodes, that is, between a knowledge source and a knowledge recipient. Knowledge flow from N1 (subject 1 – knowledge source) to N2 (Object 1 – knowledge receiver) at various levels and fields of knowledge. A different knowledge field flows from N2 (subject 2) to N3 (Object 2); then from N4 (subject 4 – knowledge source) to N3 (Object 2 – knowledge receiver). The flow may take place in various directions, and the nodes can either be knowledge sources or knowledge receivers at any particular time and various contexts of knowledge sharing. The more knowledge is shared, the more knowledge energy or power a particular node will have. In other words, more knowledge is gained as nodes share more knowledge. The knowledge shared eventually culminates as knowledge stocks or logistics of a particular VCoP.

Figure 4. 1: Knowledge flow between nodes
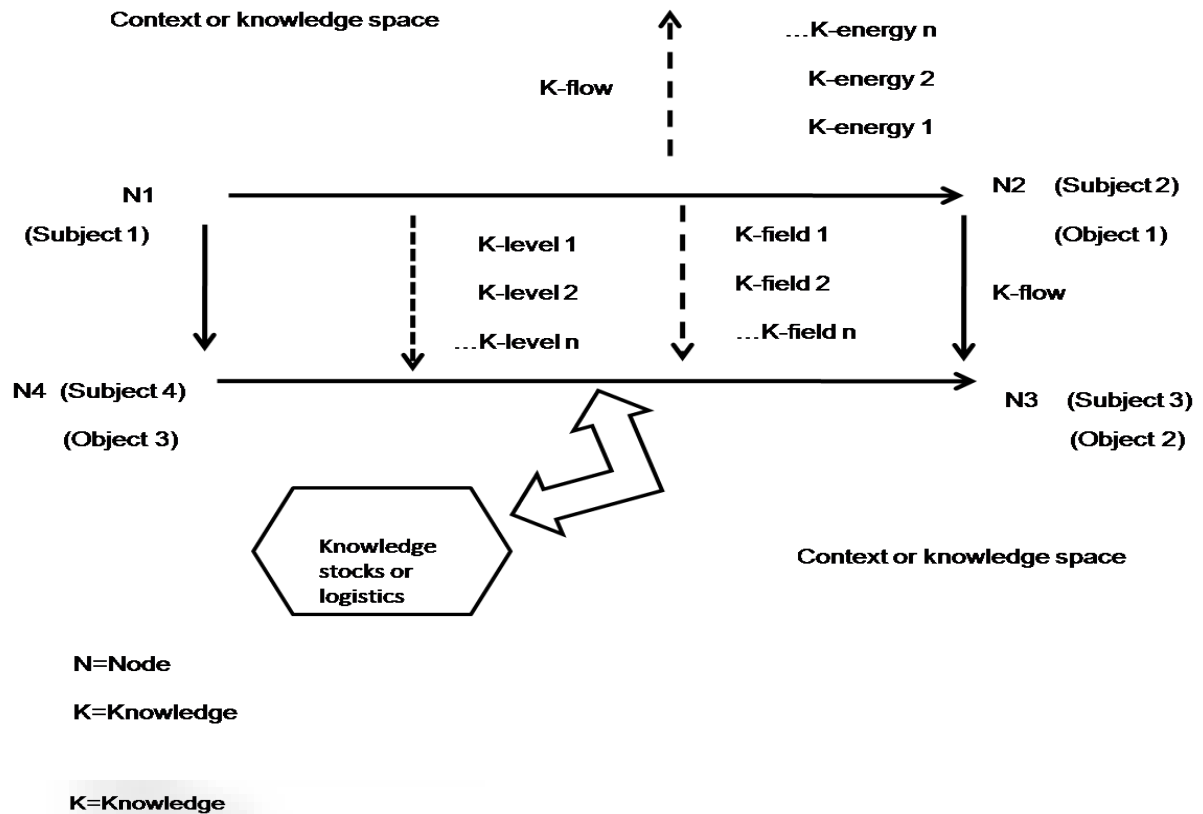
Source: (Adapted from Hansen, 2011:45).

4.3. Current knowledge flow models

Three potential knowledge flow models from literature that may be used as a basis to optimising knowledge sharing within VCoPs are presented. These are:

- Spiral knowledge flow model;

- Dynamic knowledge flow model; and

- Life cycle knowledge flow model.

4.3.1. Spiral knowledge flow model

According to Bratianu (2010:193) and Lima, Carvalho, and Ambrosio (2010:97), the spiral knowledge flow model was initially developed by Nonaka in 1994. This model is created based on four basic knowledge conversion processes: socialisation, externalisation, combination and internalisation, and two knowledge dimensions (discussed later in this section). These four basic knowledge conversion processes are also mentioned in Nissen and Levitt (2002) and Nissen (2002:257-258). Bratianu (2010:193) states that, the knowledge creation model (Nonaka, 1994), has been one of the paradigms for organisational knowledge dynamics. Bratianu (2010:193-194) refers to Nonaka (1994:14) who views that any organisation that

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deals with a changing environment ought not only to process information capably, but also create information and knowledge. Thinking of the Japanese companies interested in innovation, Bratianu (2010:193-194) further refers to Nonaka (1994), who considers that a paradigm based solely on information processing is not able to explain the innovation phenomenon. Having this shortcoming in mind, Bratianu (2010:193-194) refers again to the Nonaka (1994) development of these four basic conversion processes of knowledge. This knowledge flow model is also referred to, in more detail, by Lima, Carvalho, and Ambrosio (2010:97), Bontis, Fearon and Hishon (2003:8-9), and Hafeez and Alghatas (2007:30). These four conversion processes are now explained:

- **Socialisation -** refers to members of a team engaging in sharing experiences and perspectives through tight closely related workgroups and CoPs (Nissen, 2002:257-258; Hafeez & Alghatas, 2007:30). Socialisation is gaining tacit knowledge in social ties and networks (Mu, Peng, & Love, 2008:88). In addition, the sharing of personal experiences through various methods such as story-telling, discussion, and observation are recognised as powerful ways of transferring tacit knowledge (Panahi, Watson, & Partridge, 2012:1098). Other authors also mention that socialisation stimulates the capability to share tacit knowledge, most notably Noor and Salim (2011:106).

  In the context of online sharing, Web 2.0 tools such as blogs, social media sites, and video sites are mentioned as modern tools for exchanging ideas and experiences (Panahi, Watson, & Partridge, 2012:1098). It is generally perceived that sharing experiences over social networks is "positively associated with tacit knowledge sharing" (Panahi, Watson, & Partridge, 2012:1098). Thus, socialisation can take place through workgroups, VCoPs, and social networks. Other tools such as Web 3.0 and Web 4.0 are discussed in Section 1.1., but the focus of this research is Web 2.0, still being applicable and functional.

- **Externalisation** - involves a dialogue that leads to the articulation of tacit knowledge and its subsequent conversion to explicit knowledge (Nissen & Levitt, 2002; Nissen, 2002:257-258; Hafeez & Alghatas, 2007:30). Externalisation usually takes place by having strong ties and ensuring frequent interactions between members to have a clear expression of tacit knowledge (Mu *et al.,* 2008:95; Halal, 2005:300-301). This implies that the knowledge is orally expressed or written to create noticeable knowledge objects.

- **Combination** - refers to merging of new concepts with the explicit knowledge already available in an enterprise (Nissen & Levitt, 2002; Nissen, 2002:257-258; Hafeez & Alghatas, 2007:30).This implies that firms' growth depends on their successful incorporation of external knowledge to that of internal knowledge (Mu *et al.*, 2008:88).

This results in the development of knowledge.

- **Internalisation** - occurs when individuals develop a core competency in a particular task and becomes part of their tacit knowledge (Nissen & Levitt, 2002; Nissen, 2002:257-258). This concept is also mentioned by Bontis, Fearon and Hishon (2003:8-9) and Hafeez and Alghatas (2007:30). Internalisation happens as interactive learning promotes tacit knowledge through observation, imitation, and interaction with other firms or individuals (Mu *et al.*, 2008:89).

Furthermore, as mentioned, the spiral knowledge flow model is also based on two knowledge dimensions – namely, epistemological and ontological dimensions (Nissen, 2002:257). The author describes the epistemological dimension as the dualistic contrast between tacit and explicit knowledge - the knowledge that resides within people's minds compared to knowledge formalised through books, manuals, and other tangible documents. The ontological dimension refers to sharing of tacit knowledge between various communities allowing them to compare their own information structures with that of other communities that share a common jargon and semantics (Nissen, 2002:257). Figure 4.2 depicts the four phases of spiral knowledge flow model.

Figure 4. 2: Spiral knowledge flow model
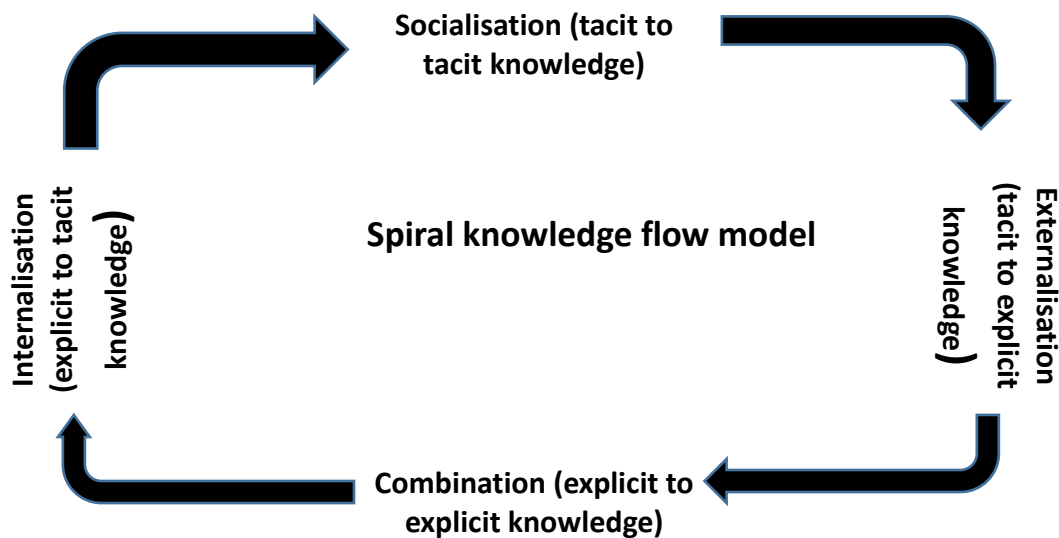
Source: (Adapted from Bratianu, 2010:193).

Figure 4.1 depicts members of a group sharing their tacit knowledge (socialisation). Then, the tacit knowledge is converted to explicit knowledge (externalisation). The new explicit knowledge is incorporated into the existing explicit knowledge resulting in a new knowledge stock or logistics (combination). The new knowledge stock then forms part of the tacit knowledge of the individuals concerned (internalisation). In summary, in the spiral knowledge flow model, there is a cyclical flow of tacit and explicit knowledge.

4.3.2. Dynamic knowledge flow model

The dynamic knowledge flow model proposed by Nissen (2002) is built based on the theory of Nonaka (1994) spiral knowledge flow model, with the emphasis on workflow process (Ibrahim & Nissen, 2004; Nissen, 2002). Workflow process is a technique that is used to complete a task or series of tasks through co-operation between team members (Zhuge, 2007:572). The dynamic knowledge flow model, according to Ibrahim and Nissen (2004) and Nissen (2002), combines the Vertical and Horizontal Processes Model (VHPM) emphasising the interactive processes between the flow of work and the flow of knowledge in an enterprise.

The Vertical and Horizontal Workflow Process is depicted in Figure 4.3 by the arrangement of several series of tasks such as T1, T2…Tn [T represents tasks]; and each task has a certain goal to achieve represented as G1, G2…Gn [G represents goals]. The flow of knowledge from one node to another must take place in order to complete a particular task (Ibrahim & Nissen, 2004; Nissen, 2002). The dynamic knowledge flow model is illustrated as follows:

Figure 4. 3: Dynamic knowledge flow model
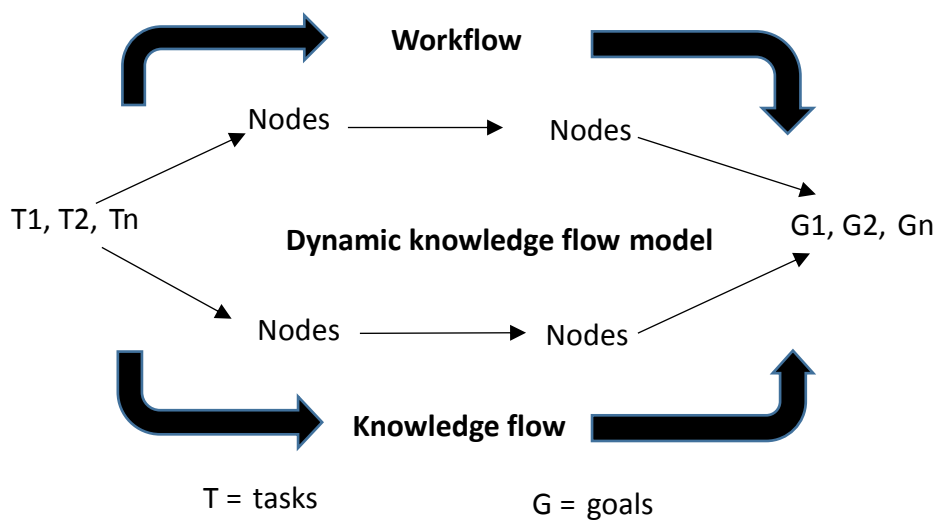
Source: (Adapted from Ibrahim & Nissen, 2004; Nissen, 2002).

The speed of knowledge flow within the workflow process relies on the degree of existing relationship and trust between the predecessor node and the successor node (Guo, Shi, Cao, & Yang, 2003; Mu *et a*l., 2008:88-91). These authors demonstrate two scenarios of knowledge flows within the workflow process. These include either, tightly coupled or loosely coupled knowledge flow networks. In tightly coupled knowledge flow networks, the workflow process is closely coordinated with the knowledge flow process. In loosely coupled knowledge flow networks, the workflow process is hardly coordinated with the knowledge flow process.

In a situation where the knowledge flow network is tightly coupled or simultaneously linked and coordinated with the workflow, the initial activity is accomplished by a node that is randomly selected from its candidate set. On the other hand, the successor node is selected based on the previous degree of trust and experience.

On the other hand, in a situation where the knowledge flow network is loosely coupled or hardly coordinated with the workflow, the most trustworthy node or member is selected, during the launch of the knowledge sharing, to solve a particular problem. The reason is that there are still experiences to be gained so as to create a higher rate of knowledge flow to facilitate a faster workflow process.

The dynamic knowledge flow model in a situation where knowledge flow is tightly coupled or closely linked with workflow process is depicted in Figure 4.4.

Figure 4. 4: Dynamic knowledge flow model in a tightly coupled knowledge flow networks
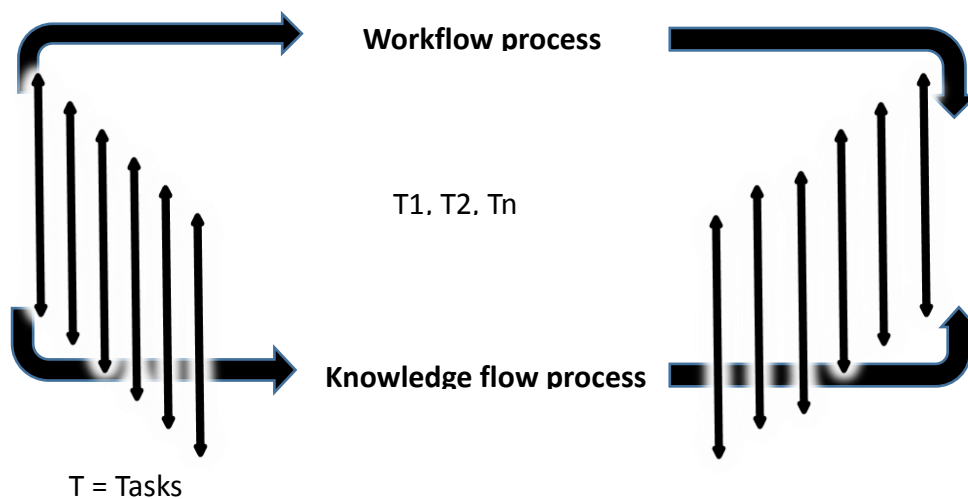
Source: (Adapted from Guo *et al.* 2003; Mu et al., 2008:88-91).

The dynamic knowledge flow model in a situation where knowledge flow is loosely coupled or hardly linked with workflow process is depicted in Figure 4.5.

Figure 4. 5: Dynamic knowledge flow model in a loosely coupled knowledge flow networks
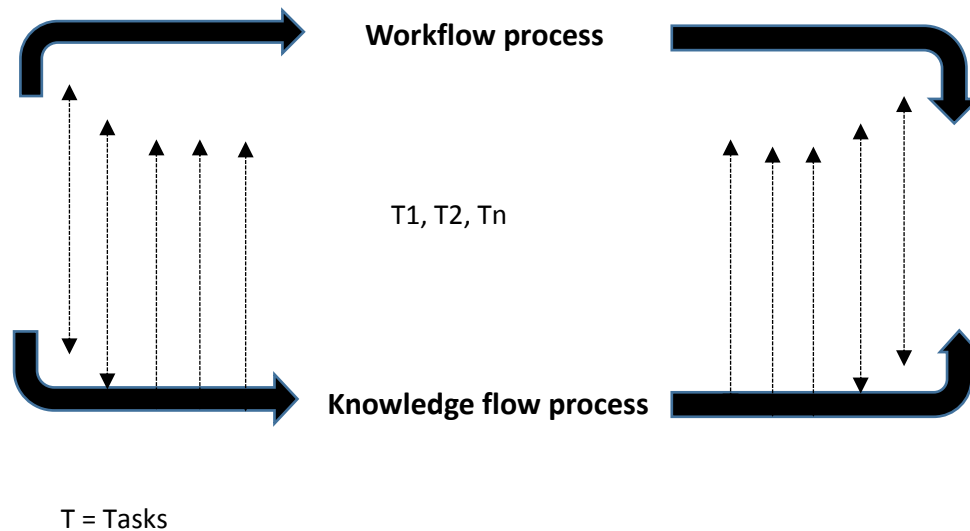
Source: (Adapted from Guo *et al.*, 2003; Mu et al., 2008:88-91).

Figure 4.4 depicts the workflow and knowledge flow in a tightly coupled knowledge flow network and are connected by bold thick arrows to emphasise that there is more knowledge flow between nodes to achieve a certain task at a given time and space. However, Figure 4.5 presents a loosely coupled knowledge flow network that are connected by broken thin arrows to emphasise that there is less knowledge flow between nodes to achieve a certain task at a given time and space. This results in a tightly coupled knowledge flow networks to have a high volume of knowledge flow compared to loosely coupled knowledge flow networks.

In summary, the workflow must be closely interwoven with the knowledge flow in order to enhance knowledge sharing within members. This implies that if knowledge flow is linked to workflow, then there is strong relationship and trust among participants to enhance knowledge sharing.

4.3.3. Life Cycle knowledge flow model

The Life Cycle knowledge flow model depicted in Figure 4.6, has six phases, namely: creation, organisation, formalisation, distribution, application, and evolution (Nissen & Levitt, 2002:7-8). These phases are now discussed:

- **Creation** - refers to producing new knowledge within an enterprise (Nissen & Levitt, 2002:7-8). The creation phase begins the Life Cycle, as new knowledge is generated within an enterprise (Nissen, 2014:43). Similar terms include capture or acquire

(Nissen, 2014:43). During this phase, new ideas are articulated and made explicit to members of a group. It is believed that successful organisations are those that create new knowledge, distribute it widely throughout the organisation, and represent it into new technologies and products (Boateng, 2011:30). This implies that people can come up with new ideas and knowledge during this initial phase.

Knowledge can be potentially created by any member of an organisation (Mu *et al.*, 2008:88).This means the source of a particular knowledge can hypothetically contribute to enhancing or impeding knowledge creation and flow. The source's personal belief, willingness or inhibitions to share expertise are some of the key determinants in knowledge creation and flow (Schutte & Snyman, 2007; Lin & Chang, 2006:332).

- **Organisation** - refers to mapping of knowledge by employing systems such as taxonomies and repositories (Nissen & Levitt, 2002:7-8; Nissen, 2014:43). Generally, knowledge taxonomies can be affected by the knowledge sharing contexts. The knowledge context is a situation where participants can come together and share experiences, for example in the form of physical contacts (office), virtual (e-mails and teleconferences), and mental (shared ideas and experiences) (Lin & Chang, 2008:338). Knowledge context is crucial in forming both tacit (for example, in the form of ideas and experiences) and explicit knowledge (for example, in the form of documents) (Lin & Chang, 2008:332). Eventually, the use of knowledge taxonomies is to benefit an individual or a community to easily retrieve such knowledge when required.

- **Formalisation** - defined as the process of making knowledge explicit and documented for further use (Nissen & Levitt, 2002:7-8). Formalisation addresses mechanisms for making knowledge formal or explicit; similar terms from other models include store and codify (Nissen, 2014:43). During this phase, individuals recognise and articulate their intuitive competencies, interests, beliefs and norms and make them common and available to others (Arntzen-Bechina & Leguy, 2007:159). During this phase, tacit knowledge is converted to explicit such as in the form of manuals, memos, videos and other tangible forms.

- **Distribution** - refers to the propagation of knowledge from the knowledge sources to the knowledge receivers (Nissen & Levitt, 2002:7-8). This fourth phase concerns the ability to share or distribute knowledge in the enterprise; similar terms include transfer and access (Nissen, 2014:43). Generally, people may not be willing to share their knowledge if they are supervised or forced to participate (Mu *et al.*, 2008:88). According to Arntzen-Bechina and Leguy (2007:156), some of the best ways in enhancing knowledge distribution is to motivate and reward people to propagate their knowledge.

There is a general consensus that knowledge flows easily but only with the cooperation and willingness of the experts and the recipients as well (Mu *et al.*, 2008:88; Noor & Salim, 2011:106).

Social contexts such as values, norms, and principles also affect the distribution of knowledge (Schutte & Snyman, 2007; Mu *et al.*, 2008:88-91). For example, an open culture founded on honesty and trust may enable knowledge distribution and flow simpler. Conversely, distrust may create fear in the senders that their knowledge might be exploited or the receiver may have reservations about the quality and reliability of the source's knowledge (Alashwal, Rahman, & Beksin, 2011:1530). A similar view is shared by Azudin, Ismail and Taherali (2009:143), Lin and Chang (2008:332), and Mu *et al.* (2008:88-91).

A recipient's absorptive capacity such as the desire to share, learn, and experience are critical factors in knowledge distribution (Lin and Chang, 2008:332; Arntzen-Bechina & Leguy, 2007:156). In other words, the recipient's pride, ego, and resistance to change can affect the flow of knowledge negatively (Arntzen-Bechina & Leguy, 2007:156). For example, in research conducted on knowledge flow in the context of Biomedical Engineering Science, some scientists have shown a latent, as well as open hostility to exploit fully the high tech tools that help to transfer knowledge (Arntzen-Bechina & Leguy, 2007:156). Furthermore, research conducted in healthcare organisations reveals that the knowledge receivers do resist using materials from outside, which is known as the non-invented-here (NIH) syndrome (Lin and Chang, 2008:332). In brief, the willingness of the source and the receiver is crucial in encouraging knowledge distribution.

- **Application** - refers to the utilisation of the knowledge shared in an organisation (Nissen & Levitt, 2002:7-8). This phase constitutes knowledge use and application for problem solving or decision making in an organisation (Nissen, 2014:43). The application of knowledge is usually influenced by the receiver's needs (Hu & Kuo, 2013:1049). This means the knowledge stock must be appropriate and relevant for the recipient's requirements, as well as recognised and understood as such (Lin and Chang, 2008:332). In addition, knowledge needs to be in appropriate language forms and tools to be easily used by the recipients or end users. Knowledge without a record of past usefulness is also usually questioned by recipients and presents a barrier to knowledge flow and utilisation (Lin and Chang, 2008:332). In summary, ease of use of a knowledge entity and its past usefulness determines the applicability of such knowledge in an enterprise.

- **Evolution** - is a period of reflection during organisational learning, that is, when users evaluate the usefulness of the available knowledge (Nissen & Levitt, 2002:7-8). This

last phase is included to cover knowledge refinement and evolution, which reflects organisational learning and thus a return to knowledge creation through time (Nissen, 2014:43). This is crucial due to the fact that knowledge, unlike capital, generates more as one dispenses more (Halal, 2005:297). Evolution is the potential innovative ideas that arise from emerging internal and external needs of an organisation. For example, new knowledge may be required to deal with emerging issues in an organisation. In social networks, for example, evolution takes place in the form of simultaneous content producing and using, which is known as "produsage" (Vuori & Okkonen, 2012a:119). The logic behind evolution is that there are many different truths which lead to swift testing of emerging ideas and simultaneous development of knowledge (Vuori & Okkonen, 2012a:119). In brief, evolution implies a new knowledge output as the result of new ideas and trends in a particular environment.

According to Nissen (2014:43), the development through the various phases of this Life Cycle knowledge flow model is generally iterative and involves feedback loops between stages. Thus, the flow through this model is not necessarily unidirectional. For example, the three knowledge activities (organise, formalise, and share), according to Nissen (2014:43), are well supported by existing information technologies. The author further explains that these three knowledge activities in an enterprise support people, who perform knowledge flow process activities, which in turn, the people apply, refine, and create knowledge in an organisation.

The Life Cycle knowledge flow model is also referred to as the amalgamated model (Nissen, 2002:255). The Amalgamated model is more complete as it already incorporates the various features of the four models mentioned below. The following models are included in the work of Nissen (2002:255):

- Despres' and Chauvel's (1999:5-6) model has six phases - create, map/bundle, store, share/transfer, reuse, evolve;

- Gartner Group model (Malhotra, 2000:224) has five phases - create, organize, capture, access, and use;

- Davenport and Prusak model (Malhotra, 2000:224) with three phases - generate, codify, and transfer; and

- The initial model of Nissen (2002:255), has five phases - capture, organise, formalise, distribute, and apply.

Nissen (2002:258-263) refers to and explains the two significant aspects in knowledge flow. These two aspects are the *refine* process and the *time* factor. While the refine process is similar to the evolution phase, the time factor (dimension) helps to determine the duration or period of

completion of the flow of both, tacit and explicit knowledge at a particular case in point. For example, knowledge that is highly explicit may complete its flow in a few hours, while knowledge that is highly tacit requires several months or years for the participants to conceptualise, absorb, and convert to being explicit (Nissen, 2002:261). In other words, explicit knowledge is readily available for consumption while tacit knowledge requires articulation, absorption, and conversion to eventually become explicit knowledge.

Schutte and Snyman (2007) mention *time* as one of the important factors in determining knowledge flow. The authors explain that some people are so busy that they do not have time available to share and collaborate. As knowledge is time-sensitive and might lose significance quickly, shortage of time to share knowledge creates a heavy burden on knowledge flow processes.

From the discussion on the three main knowledge flow models; **Spiral knowledge flow model**, **Dynamic knowledge flow model** and **Life Cycle knowledge flow mode**l, the latter flow model is recognised as more inclusive and complete than the former two. The Life Cycle knowledge flow model already incorporates the four phases of the Spiral knowledge flow model (Nonaka, 1994) that emphasises the sharing of tacit-to-tacit, tacit-to-explicit, explicit-to-explicit, and back from explicit-to-tacit knowledge sharing and conversion. In a similar view, the Dynamic knowledge flow model portrayed by (Nissen, 2002), is also structured and based on the Spiral knowledge flow model theory according to Nonaka (1994), Ibrahim and Nissen (2004 and Nissen (2002). This posits that the Life Cycle knowledge flow model also incorporates all the phases in Spiral knowledge flow model. The only contribution to the knowledge flow process of the Dynamic knowledge flow model, is its integration of workflow, which is also taken into consideration in the application element of the Life Cycle knowledge flow model. Figure 4.6 depicts the Life Cycle knowledge flow model.

Figure 4. 6: Life cycle knowledge flow model
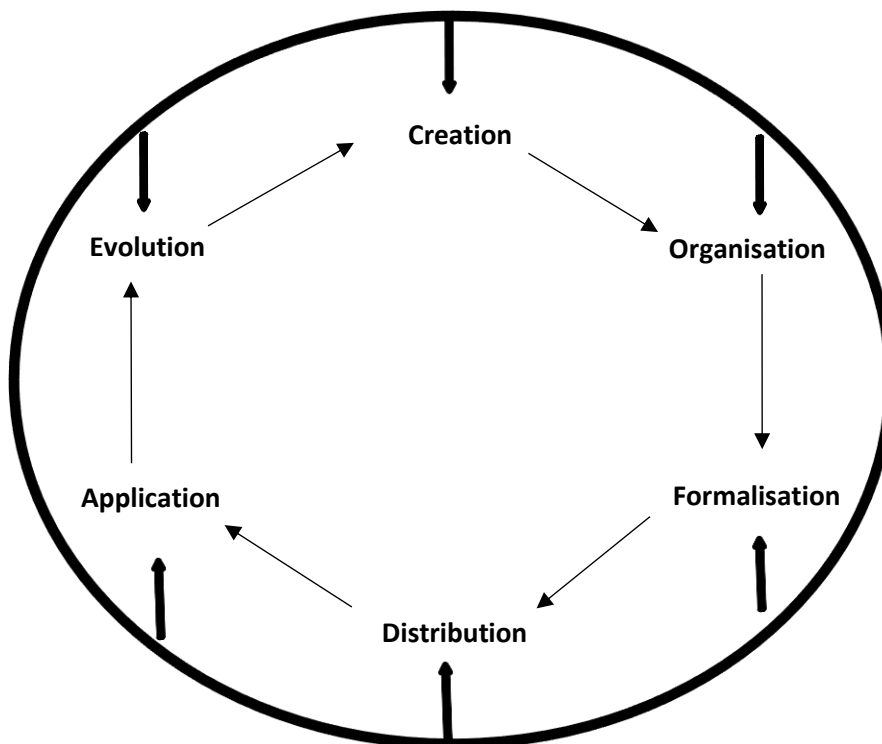
Source: (Adapted from Nissen & Levitt, 2002:7-8; Nissen, 2014:43).

From these discussions, the Life Cycle knowledge flow model is deemed to be the ideal model to serve as a basis to further conduct empirical research in finding the optimum knowledge sharing within VCoPs. This model is thus selected as it incorporates elements of the two other models in terms of the scope of this research – enhancing tacit and explicit knowledge sharing within VCoPs. Figure 4.6 depicts the Life Cycle knowledge flow model.

4.4.   Summary and Conclusion

VCoPs are recognised as essential to enhance information and knowledge sharing in an enterprise. Appropriate knowledge flow models are explored to ascertain their potential to be adapted and applied, to knowledge sharing within VCoPs. The outcome of the literature review indicates that the Life Cycle knowledge flow model is an all-inclusive model and able to best serve as the basis to conduct empirical research to enhance knowledge sharing within VCoPs. The phases in the Life Cycle knowledge flow model include creation, organisation, formalisation, distribution, application, and evolution.

Creation refers to how the tacit knowledge is initially articulated; organisation refers to the development of taxonomies; formalisation is the conversion of tacit knowledge to explicit; distribution refers to diffusion of the tacit and explicit knowledge; application represents the

utilisation of both tacit and explicit knowledge, and evolution is the final stage where the existing tacit and explicit knowledge are evaluated to determine their further use and applicability.

In conclusion, the six phases of the Life Cycle knowledge flow model are taken as the basis to conduct Survey One (2011/2012) and Survey Two (2016) to investigate the adaptability and applicability to knowledge sharing within VCoPs. The outcome of the investigation from the surveys is used to generate a scientifically based model in an endeavour to optimise knowledge sharing within VCoPs. The next step is to conduct online surveys, to establish the findings, and conduct analysis in Chapters 5 and 6.

CHAPTER FIVE

FINDINGS AND DISCUSSION
Survey One (2011/12)

5.1   Introduction

In this chapter, the findings of Survey One (2011/2012) are discussed after analysis of the survey data. In the first part of the discussion, the definitions specifically pertaining to virtual community, virtual community of practice (VCoP), knowledge and knowledge sharing are presented- in Sections 5.2 through 5.5. Confirmation of the results is to establish the understanding of the respondents in relation to the findings established in literature in Sections (2.2.1 and 2.2.3) for virtual community and VCoPs respectively, as well as in Sections (1.1 and 1.2.1) for knowledge and knowledge sharing, respectively. In the second part, the responses to ascertain the applicability of the proposed model, namely – the Life Cycle knowledge flow model and the potential use thereof to optimise knowledge sharing within VCoPs is explored in Section 5.6.

Furthermore, this chapter consists of the following sections: Verification of definitions of virtual community (Section 5.2); Verification of definitions of Virtual Community of Practice (VCoP) (Section 5.3), Verification of definitions of knowledge (Section 5.4), and Verification of definitions of knowledge sharing (Section 5.5). In addition, the findings from Survey One (2011/2012) verifying the applicability of the proposed knowledge flow model (Section 5.6), namely the Life Cycle knowledge flow model is discussed. This model is discussed in six phases: Knowledge creation (Section 5.6.1), Knowledge organisation (Section 5.6.2), Knowledge formalisation (Section 5.6.3), Knowledge distribution (Section 5.6.4), Knowledge application (Section 5.6.5), and Knowledge evolution (Section 5.6.6).   A summary and conclusion is provided in Section (5.7).

5.2   Verification of definitions of virtual community

The researcher discusses the relevant questions from Survey One (2011/2012) and provides a summary of the analysed data obtained from respondents in Appendix F.

Eleven respondents are used for the analysis and are named: Gurteen Knowledge respondent[11/12] 2, Gurteen Knowledge respondent[11/12] 3, Gurteen Knowledge respondent[11/12] 7, Gurteen Knowledge respondents[11/12] 5 and 6; KM Practitioners respondent[11/12] 4; KM Development respondent[11/12] 2, KM Development respondent[11/12] 3, KM Practitioners respondent[11/12] 1, KM Development respondent[11/12] 8, KM Development respondent[11/12] 10.

In Question 4 of Survey One (2011/2012), the following is asked: **What is your opinion of what a virtual community entails (that is, what is your understanding of the definition and concept of 'virtual community')?** A data reduction method is used to summarise the responses to this question and tabulated in Question 4, Appendix F. A summary of the various responses are provided by the researcher. Three features (themes) emanating from the data reduction analysis obtained from most of the respondents to describe virtual communities are:

- Common purpose and interest;
- Knowledge sharing communities; and
- Online communities.

These features are highlighted in the summary of Question 4, Appendix F and further discussed in Sections 5.2.1 through 5.2.3.

5.2.1 Common purpose and interest

Some respondents describe virtual communities as groups of people who share a common interest, concern, language, and topic of discussion online. Other respondents agree that people who have similar culture, values, norms, and other social affiliations can be described as a virtual community. For example, Gurteen Knowledge respondent[11/12] 2, explains that VCoPs are groups of individuals who "...share a common interest … or mining or technology...". Gurteen Knowledge respondent[11/12] 3 describes virtual communities as online communities with common interest (could be religion, politics, and any field of interest). Gurteen Knowledge respondent[11/12] 7 points out that a virtual community is formed online, based on common background and interests agreed upon. In literature, it is found that virtual communities are made up of like-minded people whose objectives are to reach a common interest and objective (Holmes, 1997:131). Further discussion on virtual communities is found in Section 2.2.1.

5.2.2 Knowledge sharing communities

Some respondents describe virtual communities based on Wenger's definition (Section 2.2.2). Four respondents simply reply: "Wenger's definition" (Gurteen Knowledge respondents[11/12] 5 and 6; KM Practitioners respondent[11/12] 4; KM Development respondent[11/12] 2). According to Wenger, virtual communities refer to "people with common interests in a body of knowledge, and sharing is driven by a desire and need to share problems, experiences, insights, templates, tools and best practices to extend their knowledge by interacting on continuous basis" (Wenger, McDermott, & Snyder, 2002:4). Other respondents describe virtual communities as a platform for knowledge sharing and collaboration that takes place among professionals. Yet another respondent explains, an online site or forum that enables collaboration, support and project outsourcing for professionals working on or with simply shared interest in a particular area or subject can best describe a virtual community (KM Development respondent[11/12] 3).

5.2.3   Online communities

One respondent states that virtual communities refer to an online-based community that shares common ideas on the Internet (KM Practitioners respondent[11/12] 1). Another respondent describes virtual communities as communities with common interests or topics of discussion conducted online (KM Development respondent[11/12] 8). Another respondent describes virtual communities as online communities that promote sharing values and interests to resolve common problems on the internet (KM Development respondent[11/12] 10).

The findings above are aligned with findings obtained from literature in Chapter 2. In literature, it is found for example, that virtual communities are defined as groups of people who communicate with each other through electronic medium (Nagy, Kahun, Boonn, Siddiqui, Meenan, Knight & Safdar, 2006: 716; Fiol & O'Connor, 2005). Further, Talukder and Yeow (2006:186) and Yoo, Suh, and Lee (2002:553) suggest that virtual communities are social meetings that take place through the Internet where people carry out public discussions to form personal relationships and networks. These online personal relationships and networks may eventually result in developing common identities, purposes, and practices.

In summary, it appears from respondents, that virtual communities are made up of like-minded people, their collaboration takes place online and they share knowledge, develop common interests and practices.

5.3   Verification of definitions of Virtual Community of Practice (VCoP)

The participants are asked to explain their understanding of a VCoP, that is, what changes when a community of practice goes online (Question 5, Appendix F). As a follow up question, the respondents are asked to provide the reasons why they and others, subscribe to a VCoP that is, what they personally and others expect to achieve by belonging to VCoPs (Questions 6 and 7, Appendix F).

Ten groups of respondents are used for the analysis of both, Question 6 and 7, and are named: KM Development respondent[11/12] 5, KM Development respondent[11/12] 18, KM Practitioners respondent[11/12] 1, KM Development respondent[11/12] 8, Gurteen Knowledge respondent[11/12] 5, Gurteen Knowledge respondent[11/12] 2, Gurteen Knowledge respondent[11/12] 8, Gurteen Knowledge respondent[11/12] 9, KM Development respondent[11/12] 19, KM Development respondent[11/12] 3.

Some respondents explain VCoP as online-based communities, in which their intention is to share knowledge and develop common practice across geographical locations. For instance, a respondent explains that VCoPs enable to benchmark best practices between organisations. In the respondent's words: "…people get the opportunity to learn from each other, get the

scope to adopt better practices and compare with their one" (KM Development respondent[11/12] 5). For example, KM Development respondent[11/12] 18 explains that by using digital technology, people advocate and campaign for a similar practice to be implemented across regions and continents, usually shared online. Similar explanations are also given by other respondents. For example, a respondent replies that VCoPs are online communities with common practice or field of knowledge (Gurteen Knowledge respondent[11/12] 3). Another respondent explains that a VCoP is an online platform that enables to share common ideas most notably amongst individuals with similar expertise (KM Practitioners respondent[11/12] 1). The same is reported by another respondent who specifies that communities with common practice to solve a common problem constitutes VCoPs (KM Development respondent[11/12] 8).

Another respondent refers to Wenger's description of VCoPs. For example, Gurteen Knowledge respondent[11/12] 5 refers to Wenger's definition of VCoPs as more appropriate. Wenger's definition is explained in Section 5.2.2. Most of the respondents place emphasis on the Internet or online utilisation as vital in the development of VCoPs. Gurteen Knowledge respondent[11/12] 2 mentions that VCoPs are designed to collaborate online. A similar response is received from another respondent who explains that individuals who are practising similar tasks online constitute VCoPs. For example, Gurteen Knowledge respondent[11/12] 8 points out that web developers can have a common discussion on how to increase the efficiency in web development over the Internet.

In current literature, similar findings are found to those of Survey One (2011/2012) responses. For example, VCoPs are those members that use ICT as their primary mode of interaction (Correia, Paulos, & Mesquita, 2010:11). VCoPs are conceptualised as similar to CoPs, but their communication usually takes place via online (Correia, Paulos, & Mesquita, 2010:12). Hu and Kuo (2013:1049) also indicate that VCoPs are similar to CoPs, but information sharing in VCoPs takes place through the use of ICTs (Hu & Kuo, 2013:1049). It is then evident that VCoPs have the same concept as CoPs, but the difference lies in the use of the ICT component in VCoPs versus face-to-face interaction in CoPs. The respondents in the survey have similar understanding to what is found in literature.

Further, some respondents view VCoPs as an online collaboration platform of knowledge sharing extended across various geographical boundaries. VCoPs remove geographical barriers and enable people with common interests and practices to share their knowledge across geographical borders. As one respondent responds: "instead of onsite sharing of the practice (such as when doctors operate on site together with their nurses), they go online, share ideas and expertise to operate a person from wherever they are; thus, CoPs become virtual when they share their practice online…to seek how learning becomes efficiently available to learners online" (Gurteen Knowledge respondent[11/12] 9). Similarly, another respondent explains that a community of knowledgeable people promote the same practice

embracing the Internet to share their knowledge to reach millions of people in the world (KM Development respondent[11/12] 19).

Some respondents indicate that VCoPs provide a richer pool of skills and expertise over an extended territory. As one respondent points out, the main impact of the online presence provides access to a wider group of practitioners to participate and provides a richer pool of skills and expertise available to many who need them (KM Development respondent[11/12] 3).

Similar to these findings, it is indicated in current literature that VCoPs are required, especially in organisations facing the challenge of disseminating organisational knowledge (Ho & Kuo, 2013:1049-1050; Ardichvili *et al.*, 2006:96). VCoPs are found to perform a central role in encouraging collaboration between skilled members who are dispersed in both, time and space (Correia, Paulos, & Mesquita, 2010:11). They are endowed with interactive environments that give their members the opportunity to engage with other members through a sequence of tools such as chats, document postings and community discussions (Kimball & Ladd, 2004:203). It is evident that in traditional CoPs, individuals often interact on a face-to-face basis, while VCoPs operate in multiple modes including both face-to-face meetings as well as using Internet technologies (Kimball & Ladd, 2004:203-204). This implies that VCoPs provide an added value as they are pervasive, thus allowing participants to share their knowledge regardless of geographical locations.

Literature indicates that the development of CoPs coincides with the development of learning technologies and tools to support group discussions and collaboration, for example, through the Internet (Allan & Lewis, 2006:369). This development leads to the emergence of VCoPs. Correia, Paulos, and Mesquita (2010:12) explain that VCoPs are those whose members use ICT as their primary mode of interaction. This means VCoPs have similarities to CoP, but communication is usually by electronic means within VCoP members. Other authors also confirm VCoPs as a form of CoP which allows online information sharing (Hu & Kuo, 2013:1049).

Conceptually, VCoPs differ from CoPs by their technological components; CoPs' and VCoPs' members experience different situations because of the media through which they mainly interact, facing dissimilar realities (Dube, Bourhis, & Jacob, 2006). For instance, the different time zones and geographic separation between members in CoPs urge them to resort to technologies that are not, in real terms, real substitutes for face-to-face interactions (Wenger, McDermott, & Snyder, 2002:116). The technological component in VCoP conceptually separates them from CoP.

These concepts of VCoPs are further discussed in literature. For example, Lavoue (2011:310) define VCoPs as groups of individuals who share knowledge and expertise by using various

technological means with the shared goal of furthering their practice (Section 2.2.3). Literature also confirms VCoPs being popular forms of communities of practice and a web application that focuses on building and operation of an online community that facilitates knowledge sharing across time and distance (Tang & Yang, 2005:500) (Section 2.2.3).

In summary, the definitions of VCoPs have been verified by the respondents in Survey One (2011/12). Many respondents indicate that a VCoP involves online knowledge sharing communities. Similarly, literature indicates that VCoPs can be conceptualised as knowledge sharing online platforms enabled by ICT tools and methods, but may also extend their interaction on a face-to-face basis. The findings in both, Survey One (2011/2012) and literature indicate that VCoPs enable members to develop common identity, purpose, and practice regardless of their geographical location.

5.4   Verification of definition of knowledge

The participants are asked to describe 'knowledge', that is, how they interpret the concept of 'knowledge' (Question 8, Appendix F). Most of the respondents describe knowledge with six attributes discussed in Sections 5.4.1 through 5.4.6. These are:

- Subjective construction of reality
- Enables to make decisions
- Profound understanding of concepts
- Core competency
- Tacit and explicit knowledge
- A meaning assigned to information.

These are highlighted in the summary of Question 8, Appendix F.

5.4.1   Subjective construction of reality

Some respondents explain that knowledge refers to each individual's construction of reality, which is negotiated through the interaction among professionals. This implies that knowledge is described as an individual's subjective interpretation of facts and explanations that emerge as the result of dialog among individuals. Thus, it depends on how individuals view ideas and concepts presented to them. As one respondent states, knowledge is a subjective interpretation of information (Gurteen Knowledge respondent[11/12] 3).

Similar to these responses, from literature, knowledge can be asserted as "a fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition that provides a framework for evaluating and incorporating new experiences and information" (Arntzen-Bechina & Leguy, 2007:154). This definition of knowledge implies that the tacit part

of knowledge such as processes, practices, and norms are incorporated by an individual. In this case, interpretation of particular knowledge can be viewed as subjective, depending on the beliefs, values, experiences and perception of an individual.

Literature further contains aspects of knowledge that has not been separated from humans. As Schutte and Snyman (2007) explain, knowledge forms part of a human interaction and interpretations of knowledge can differ from one individual to another. Knowledge being created and assimilated from within humans, is highly subjective and context-related (Schutte & Snyman, 2007; Arntzen-Bechina & Leguy, 2007:154). Therefore, knowledge is subjectively interpreted and constructed through negotiation among individuals.

5.4.2 Knowledge enables to make decisions

Some respondents indicate that knowledge becomes meaningful if it aids in decision making. For example, a respondent states that knowledge enables to make decisions in resolving problems (KM Development respondent[11/12] 11). Another respondent mentions that knowledge can be utilised in daily activities at work to make decisions (KM Development respondent[11/12] 12). In literature, Nissen (2002:253) concurs that knowledge enables making a quick decision; information provides direction to decision making; and data refers to a stage where decision-making is too early or immature.

5.4.3 Profound understanding of concepts

A respondent explains that knowledge is not superficial but a profound understanding of concepts (KM Development respondent[11/12] 13). The accumulation of experience through education and involvement in many tasks that is embodied in what we do, and how we do, can be associated with the concept of knowledge. As one respondent indicates, knowledge refers to those who have an insight about a task, or series of tasks, and executes such tasks as perfect as possible (KM Practitioners respondent[11/12] 5). Therefore, knowledge refers to an extensive understanding of a particular task, an object, or a situation.

5.4.4 Core competency

Some respondents indicate that knowledge refers to the competence of a person in doing a particular task. It can be inferred that to be knowledgeable is to become an expert in a specific task or field. For example, KM Non-classified respondent[11/12] 17 states that knowledge refers to a core competency and experience of a person in a particular field. In literature, the benefits of knowledge can be found as to acquire expertise of a particular template, an idea or a solution (Fontaine & Millen, 2004:4-6; Hislop, 2004:38) (discussed in Section 2.8). VCoP participants usually develop their individual skills and know-how that enables them to perform better and maintain their sense of belonging to their organisations (Fontaine & Millen, 2004:6).

5.4.5 Tacit and explicit knowledge

Some respondents explain that knowledge consists of having both, tacit and explicit formats. These respondents describe knowledge as both, a written and unwritten body of information that can be accessed as people share, analyse, process, store in their minds and synthesise to form solid expertise. For example, respondent KM Practitioners respondent[11/12] 6 mentions that knowledge is a tacit and explicit body of information that needs to be internalised by the knowledge receiver, and shared with others to form a common understanding of concepts.

Similar to these findings, accessing literature indicates that knowledge is reflected in both, tacit and explicit formats (Panahi, Watson, & Partridge, 2012:1095-1096; Schutte & Snyman, 2007; Seufert, Krogh, and Bach, 1999:183; Marouf, 2007:110) (Section 1.2.3 and 1.2.4). The two groupings of knowledge dimensions include individuals' knowledge that reside in the mind of an individual (known as tacit knowledge), and explicit knowledge. Another respondent, for example, explains that knowledge is the "tacit cognitive schema used by workers in order to do their job more efficient and better and better" (KM Non-classified respondent[11/12] 4). Another respondent adds that knowledge is information that might be revealed in any format, which includes tacit knowledge (KM Non-classified respondent[11/12] 7).

Referring to literature, tacit knowledge is reported as what people carry in their minds and is, therefore, difficult to access (Panahi, Watson, & Partridge, 2012:1095; Hara & Hew, 2007:236) (Section 1.1). Explicit knowledge can be articulated, codified and stored (Panahi, Watson, & Partridge, 2012:1095; Hara & Hew, 2007:236-238). The difference between tacit and explicit knowledge can be explained in terms of the ease in which knowledge can be expressed and communicated to others. Therefore, from both, the respondents and current literature, knowledge is revealed in both, tacit and explicit formats.

5.4.6 A meaning assigned to information

Some respondents are of the opinion that knowledge is a meaning assigned to information. For example, a respondent explains knowledge as information that has been "...assigned meaning and context..." (KM Education respondent[11/12] 1). Knowledge may have various meanings attached to it, depending on the interpretation given by the receivers of a particular knowledge and the context which it exists. Similarly, another respondent explains that as opposed to information, which is usually superficial, knowledge incorporates concepts that become part of a particular individual's core competency. Another respondent clarifies that knowledge is more meaningful to be able to assist people to apply and solve problems in various tasks (KM Development respondent[11/12] 14).

In summary, the definition of knowledge have been verified from the responses in Survey One (2011/12). Knowledge entails a subjective construction of reality which varies upon the interpretation by different individuals. Knowledge enables individuals and organisations to make an informed decision. Knowledge also refers to a profound understanding of concepts, core competency of an individual or an organisation, tacit and explicit knowledge, as well as a meaning assigned to information.

5.5   Verification of definition of knowledge sharing

The participants are asked to provide their own description of knowledge sharing that is, how they interpret the concept of sharing knowledge (Question 9, Appendix F). Many respondents agree to the seven concepts of knowledge sharing discussed in Sections 5.5.1 through 5.5.7. These are:

- Purposeful construction of realities
- Sharing experience and expertise
- An inherent nature of human interaction
- Formal and informal knowledge exchange
- Sharing of tacit and explicit knowledge
- Sharing of an individual and organisational core competency
- Meaningful utilisation of knowledge.

These are highlighted in the summary in Question 9, Appendix F.

5.5.1   Purposeful construction of realities

A respondent indicates that knowledge sharing refers to an understanding of each other's constructions of reality and interpretations of key concepts that are common to both parties (KM Development respondent[11/12] 1).   Another respondent states knowledge sharing is conveying new ideas and developing common interpretations accordingly. In the case of KM Development respondent[11/12] 4, knowledge is about "...negotiating meanings...". As stated in Section (5.4.1), it can be found in literature that knowledge entails subjective interpretation of a particular information based on the beliefs, values, and perceptions of individuals (Arntzen-Bechina & Leguy, 2007:154). Therefore, knowledge sharing involves the subjective interpretation and creation of knowledge through interaction and negotiation among individuals.

5.5.2 Sharing experience and expertise

KM Development respondent[11/12] 2 explains that knowledge sharing refers to the sharing of experience and expertise. The method of sharing takes place by transferring knowledge from those who possess it, to those who do not. Gurteen Knowledge respondent[11/12] 2 states: "...disseminating the knowledge you have with others who do not possess that knowledge..." is known as knowledge sharing. Another respondent explains that knowledge sharing may refer to sharing one's idea, opinion, beliefs, principles and knowledge in general (KM Development respondent[11/12] 12).

It is found in literature that knowledge sharing is a process whereby knowledge is passed between people or knowledge processing apparatuses (Zhuge, 2007:572) (Section 4.4.2). This knowledge processing apparatuses referred to here, can be in the form of knowledge flows between nodes (such as members, software agents, and knowledge portals that provide services), according to certain procedures and principles (Zhuge, 2007:572) (Section 4.4.2). Knowledge flow starts and ends at a node; a node can generate, process, understand, synthesise, and deliver knowledge (Zhuge, 2007:572) (Section 4.4.2). Knowledge sharing is defined as the process of transferring knowledge from one entity to another (Noor & Salim, 2011:107) (Section 1.2.1). The transfer of knowledge can take place within individuals, groups, and departments in accomplishing a particular task (Noor & Salim, 2011:107). Therefore, the respondents' understanding of knowledge sharing concepts concurs with that found in current literature.

5.5.3 An inherent nature of human interaction

Some respondents define knowledge sharing as a mutual and voluntary process of interaction that underpins a give and take of ideas, beliefs, opinion, and information. As one respondent explains, people share their know-how in CoPs, and knowledge sharing entails the 'give and take' of information (Gurteen Knowledge respondent[11/12] 8). In addition, another respondent explains that knowledge sharing is an essential part of human interaction (KM Non-classified respondent[11/12] 3). Human interaction usually happens through a voluntary exchange of opinions, ideas, and practice (KM Development respondent[11/12] 8).

As stated in Section (5.4.1), in literature it is found that knowledge has not been separated from humans because it has only been through the human act of knowing and human cognitive processes that have existed (Schutte & Snyman, 2007) (Section 1.2.1). Knowledge sharing cannot be separated from humans, which means, the flow connects and binds individuals, and provides the means through which knowledge is transferred from those who have it, to those who need it (Zhuge, 2007:572; Schutte & Snyman, 2007) (Section 1.2.1). The respondents' understanding of knowledge sharing also concurs with that of the findings in current literature.

5.5.4 Formal and informal knowledge exchange

Knowledge sharing is described as a formal and informal exchange of knowledge. For example, KM Development respondent[11/12] 11 defines knowledge sharing as making one's insights public to others by disseminating what you know either formally or informally. In addition, another respondent says that knowledge sharing is the sharing of one's experiences, ideas, opinions, concepts, and information. It can be inferred that knowledge is a "…shared engagement during informal as well as formal conversations..." (KM Practitioners respondent[11/12] 4).

In literature it is found, central to the notion of CoPs, as a means to acquire knowledge by which a newcomers learn from senior participants who have already been members for a long time (Ardichvili *et al.*, 2006:95). In other words, the concept of CoP lies in the assumption that less skilled members of a community learn from social interactions with more knowledgeable members and experts of a specific knowledge domain (Ardichvili *et al.*, 2006:95). This results in acquiring expert knowledge and obtaining higher professional practice through CoPs (Ho & Kuo, 2013:1049).

5.5.5 Sharing of tacit and explicit knowledge

Some respondents define knowledge sharing as the flow of both, tacit and explicit knowledge. For example, one respondent simply writes that it is "...sharing such tacit and explicit knowledge..." that best describes knowledge sharing (KM Practitioners respondent[11/12] 6). Another respondent defines knowledge sharing as 'how-to' or conceptual insight either tacitly via conversation or explicitly via codified knowledge" (KM Non-classified respondent[11/12] 12). Both, tacit and explicit knowledge are similarly explained in Section (5.4.5) to describe the concept of knowledge.

5.5.6 Sharing of an individual and organisational core competency

Some respondents describe knowledge sharing as the transfer of core competency. KM Development respondent[11/12] 19 explains, knowledge sharing is the ability to express and explain to others what you are good at. Another respondent states that sharing one's good competencies is what knowledge sharing is all about (KM Non-classified respondent[11/12] 17). Thus, knowledge sharing is an individual's and organisation's sharing of particular expertise.

5.5.7 Meaningful utilisation of knowledge

According to one respondent, knowledge sharing refers to imparting of knowledge that is required and relevant, with those who can and should benefit from it. In the words of the KM Practitioners respondent[11/12] 2, knowledge sharing is explained as an open and honest conversation where common interest exists. The same respondent further describe knowledge

sharing as imparting knowledge that has a value and purpose to utilise it (KM Practitioners respondent[11/12] 2).

Another respondent defines knowledge sharing as a process whereby knowledge is received to solve problems that may in turn result in generating new knowledge (Gurteen Knowledge respondent[11/12] 1). It is found in literature that, knowledge sharing forms the production and dissemination of knowledge that may be assimilated and developed into becoming knowledge stock of a particular entity such as an individual or organisation (Zhuge, 2007:572; Halal, 2005:297) (Section 4.4.2).

In summary, the definitions of knowledge sharing have been verified with the respondents of Survey One (2011/12). Knowledge sharing is described as an inherent nature of human interaction to gain an insight and competence in a particular expertise. Knowledge sharing involves a purposeful construction of realities and sharing of skills. Knowledge sharing in VCoPs can be voluntary; but it may also be promoted through the intervention of organisational management. In the context of VCoPs, knowledge sharing entails both formal and informal knowledge exchange. It entails the promotion of an individual and organisational core competency. It also means the utilisation of knowledge to solve individual and organisational problems.

5.6   Applicability of the proposed knowledge flow model

The emphasis of this second part discussion identified in Section 5.1, is to particularly obtain a response to the main investigative question of this research - ***To what extent can the proposed knowledge flow model be applied in optimising knowledge sharing in VCoPs (Section 1.6, Table 1.1)?*** The six phases of the proposed model, namely the Life Cycle knowledge flow model, is utilised as the basis for structuring this section. However, the structuring of this section is not meant to influence the analysis and therefore, the discussion. It is rather meant to create a structure to organise the responses in relation to the phases of the proposed model. A data reduction method is utilised for discussing the six phases to create a manageable and organised data-set and discussed in Sections (5.6.1 to 5.6.6). The findings and discussion presented, are based on the respondents' points of view and triangulated with that of the findings from literature. This is aimed to establish more validity and reliability of the responses. The six phases discussed are: Knowledge creation in Section (5.6.1), Knowledge organisation in Section (5.6.2), Knowledge formalisation in Section (5.6.3), Knowledge distribution in Section (5.6.4), Knowledge application in Section (5.6.5), and Knowledge evolution in Section (5.6.6).

5.6.1 Knowledge creation

Knowledge creation refers to producing new knowledge within an enterprise (Nissen & Levitt, 2002:7-8) (Section 4.3.3). During this phase, new ideas are articulated and made explicit to members of a VCoP. Boateng (2011:30) is of the opinion that successful organisations are those that generate new knowledge, distribute it widely throughout the organisation, and represent it into new technologies and products (Section 4.3.3). This encourages people to come up with new ideas and knowledge during this initial phase. One of the advantages of VCoPs is its ability to allow innovative ways of creating and sharing organisational knowledge (Allan & Lewis, 2006:369-370).

Knowledge can be potentially created by any member of an organisation (Mu *et al.*, 2008:88).This means the source of a particular knowledge can hypothetically contribute to improving or impeding knowledge creation and flow. The source's personal belief, willingness or inhibitions to share expertise are some of the key determinants in knowledge creation and flow (Schutte & Snyman, 2007).

In Survey One (2011/12), a question is asked to obtain a response of how knowledge creation takes place in VCoPs. The question is: *"What types of knowledge do you share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)?"* (Question 12, Annexure F). A supplementary question is asked: **"***How do you determine whether your knowledge is worth sharing in the VCoP (that is, who or what makes you to decide that it is worth sharing your knowledge)?"* (Question 14, Annexure F). Some respondents indicate that both, tacit and explicit knowledge are created by their respective members in the VCoPs. A respondent explains that VCoP members share original ideas, research results, opinions, reply to other opinions, commenting on academic articles, and forwarding some other research articles to members (KM Development respondent[11/12] 6). Ideas and opinions are examples of tacit knowledge, while research results and academic articles may form explicit knowledge.

Some respondents further explain that original ideas and experiences, new expertise, and new knowledge in the form of questions and answers are created by VCoPs. In addition, new ideas forwarded from other people are relayed to members of their respective VCoPs. Gurteen Knowledge respondent[11/12] 1 explains that all types of knowledge such as original (own) ideas are shared. Another respondent agrees by explaining that VCoPs translate their tacit knowledge, especially in the area of engineering and other mechanical knowledge (KM Practitioners respondent[11/12] 6). Similar responses include "...original ideas, developments, and insights..." (Gurteen Knowledge respondent[11/12] 3) are shared in their VCoP; another respondent concurs that "original ideas, opinions on others' questions, experience, best practice studies, and contacts" are shared (KM Non-classified respondent[11/12] 11); Moreover,

another respondent writes that their own ideas as well as identified best practices, references to readings (blog, journal article, etc.), answering questions posted in discussion lists (how-to) are reported to be shared in their VCoPs (KM Non-classified respondent[11/12] 12).

Other respondents explain that explicit knowledge such as research results (KM Development respondent[11/12] 6), technical reports (Gurteen Knowledge respondent[11/12] 6), academic articles (KM Development respondent[11/12] 6), photos and videos (KM Development respondent[11/12] 6), case studies (Gurteen Knowledge respondent[11/12] 1), and news bits (Gurteen Knowledge respondent[11/12] 3) are created by their respective VCoPs. As Gurteen Knowledge respondent[11/12] 6 puts it: "...research results in knowledge management, technical reports, [and] news..." are shared in VCoPs. Another respondent writes: "...new media technologies such as web features, technical reports of knowledge management systems, research results..." are shared (KM Practitioners respondent[11/12] 4). Academic research and industry reports are shared according to KM Non-classified respondent[11/12] 9, while another respondent specifies sharing research outputs in their VCoPs (KM Development respondent[11/12] 4).

5.6.1.1 Contents of messages

The respondents are asked about the content of the messages that they and others have been sharing in their VCoPs (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)? (Question 17 and 18, Annexure F). Most of the respondents suggest that VCoP members create contents with the following features:

- Work-related information
- Life-oriented information
- Research results
- Combination of many aspects of knowledge.

Work-related information

Some respondents state that some information are related to their work such as academic articles, technical reports, and research results (Gurteen Knowledge respondent[11/12] 1). Furthermore, some respondents reply that well-positioned practice and experience (KM Non-classified respondent[11/12] 11), decisions (KM Development respondent[11/12] 11), problems and solutions, and new practice (KM Practitioners respondent[11/12] 2) are shared, that are related to their work. Another respondent mentions that work related, new practice, suggestions, new dimensions to addressing knowledge management issues and challenges are shared within VCoPs (Gurteen Knowledge respondent[11/12] 3). Another respondent further writes that work related experiences, new practice in knowledge sharing mechanisms, opinions, and work procedures are shared in VCoPs (Gurteen Knowledge respondent[11/12] 5). A similar response

includes work-related technical reports and new practice in marketing are shared in VCoPs (KM Practitioners respondent[11/12] 5).

Life-oriented information

Some respondents mention that some social aspects such as frequently asked questions and solutions, insights from thoughtful leaders (KM Non-classified respondent[11/12] 12), problem definitions and their methods to solve, results and findings, and next steps are shared (KM Non-classified respondent[11/12] 6). Furthermore, some respondents indicate that announcements, discussion starters, events that form part of a collective learning and multiple knowledge avenues are discussed in their respective VCoPs (KM Non-classified respondent[11/12] 3). In a respondent's words: "...frequently asked questions and solutions, insights from thought leaders, internal and external stories that illustrate productive new thinking and practical application of effective practices..." are shared in VCoPs (KM Non-classified respondent[11/12] 12). Another respondent specifies that events and engagement opportunities are discussed in VCoPs (KM Development respondent[11/12] 7).

Research results

Some other respondents mention that academic research results (Gurteen Knowledge respondent[11/12] 1) and research articles (KM Development respondent[11/12] 6) are shared. Further, a respondent states that book reviews and articles are covered by VCoPs (KM Non-classified respondent[11/12] 12). In a respondent's words: "...research related or academia related..." are shared (Gurteen Knowledge respondent[11/12] 1); while another respondent indicates that "...reports and findings and at times too much of academia..." are shared within VCoPs members (KM Practitioners respondent[11/12] 2).

Combination of many aspects of knowledge

Some respondents indicate that any aspect of knowledge is shared with no restrictions whatsoever (KM Non-classified respondent[11/12] 12). These set of respondents suggest different contents are shared without restriction, such as upcoming events, best practices (KM Non-classified respondent[11/12] 12), questions (KM Non-classified respondent[11/12] 11), and engagement opportunities (KM Development respondent[11/12] 7). A respondent answers that "...questions and suggestions such as work-related problems, solutions, new practice, ideas, beliefs, and procedures..." are shared (KM Practitioners respondent[11/12] 2). Another respondent explains that there is no restrictions what others share but one can only view and participate in areas that are of their interest; if they want to be part of other areas, then they have to subscribe to that (KM Development respondent[11/12] 3).

5.6.1.2 Roles of members in VCoPs

The participants are asked about their roles in their respective VCoPs. The intention is to obtain their response to ascertain to what extent they create knowledge in their respective VCoPs. The question is: **"*What is your role in the VCoP (for example, read messages, edit contributions, provide solutions, write reports, etc.)?*"** (Question 16, Annexure F). Most respondents explain that their role in creating knowledge within their respective VCoPs are summarised under the following headings:

- Contributors
- Consumers and contributors
- Facilitators and Moderators.

These are highlighted in the summary in Question 16, Appendix F.

Contributors

As contributors, some respondents explain that they provide solutions (KM Practitioners respondent[11/12] 2), consultations (KM Development respondent[11/12] 14), ideas (Gurteen Knowledge respondent[11/12] 9), and stories (Gurteen Knowledge respondent[11/12] 3) [which usually form tacit knowledge sharing]. In addition, some of the respondents explain that they provide technical and research reports (KM Practitioners respondent[11/12] 5), photos and videos (Gurteen Knowledge respondent[11/12] 6) [which form explicit knowledge sharing]. One respondent mentions that his contribution includes providing solutions to any queries raised by members of a VCoP (KM Practitioners respondent[11/12] 3).

Consumer and Contributor

Some other respondents mention that they participate as both consumers and contributors in the knowledge sharing activities (KM Practitioners respondent[11/12] 3). These set of respondents state that they read and comment on stories (Gurteen Knowledge respondent[11/12] 3), provide inputs and solutions to queries in knowledge management (Gurteen Knowledge respondent[11/12] 3), share technical reports and research results (KM Practitioners respondent[11/12] 4), and develop surveys (KM Non-classified respondent[11/12] 12). In addition, they share some information such as workshops and conferences available that might contribute to the development of their groups in their respective VCoPs (KM Development respondent[11/12] T6). One of the respondents states that the involvement is mostly in reading and writing knowledge contents distributed in Gurteen Knowledge Community (Gurteen Knowledge respondent[11/12] 1). Another respondent replies that involvements in VCoPs include reading messages, encouraging conversations, and organising and getting involved in meetings (Gurteen Knowledge respondent[11/12] 2). Further, a respondent's involvement

includes editing, reading other contributions, providing knowledge management and media-related solutions, and developing management information systems (KM Practitioners respondent[11/12] 4).

Facilitators and Moderators

Some respondents mention that they play as both facilitators and moderators in their respective VCoPs (KM Non-classified respondent[11/12] 3). KM Practitioners respondent[11/12] 5 indicates assuming 'all' roles that include reading messages, editing contributions, providing solutions, writing reports and more. KM Non-classified respondent[11/12] 5 also indicates as 'facilitator' with various roles such as contributing and reading messages, editing contributions, providing solutions, and writing reports. Similar responses are given by another respondent who explains his role as facilitator of discussions in different languages and any other web discussions. (KM Development respondent[11/12] 18). Another one mentions of being involved as a 'moderator' (KM Development respondent[11/12] 2).

In summary, the responses from the survey provide the type of tacit and explicit knowledge that are created by VCoPs, which is not clearly identified in current literature. For example, from the survey, it is revealed that the type of knowledge created by VCoPs are originally own ideas, research results, opinions, a reply to opinions, comments on academic articles, and research articles. In addition, the type of contents that are created by VCoPs are revealed in the survey. These contents include work-related information, life-oriented information, academic and research outputs, and other various aspects of knowledge. The roles that the VCoP members perform are also explained in the survey. The roles of VCoP members include – as contributors, consumers and contributors, as well as facilitators and moderators. The creation of knowledge in VCoPs is summarised in figure 5.1:

from the survey, it is revealed that the type of knowledge created by VCoPs are originally own ideas, research results, opinions, a reply to opinions, comments on academic articles, and research articles. In addition, the type of contents that are created by VCoPs are revealed in the survey. These contents include work-related information, life-oriented information, academic and research outputs, and other various aspects of knowledge. The roles that the VCoP members perform are also explained in the survey. The roles of VCoP members include – as contributors, consumers and contributors, as well as facilitators and moderators. The creation of knowledge in VCoPs is summarised in figure 5.1:

Figure 5. 1: Knowledge creation
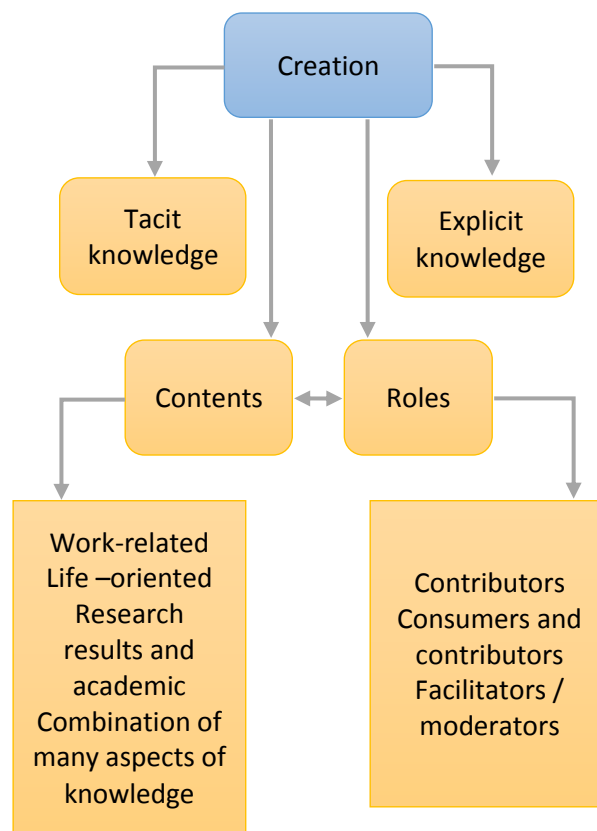
Source: (Adapted from Survey One 2011/12 findings).

5.6.2   Knowledge organisation

Organisation refers to mapping of knowledge by employing systems such as classifications and repositories (Nissen & Levitt, 2002:7-8) (Section 4.3.3). The use of knowledge taxonomies is to benefit an individual or a community to retrieve contents that exist in VCoPs. In Survey One (2011/2012), the respondents are asked: **"How are the messages organised in the VCoP (that is, by date of receipt, author name, topic, subject area)?"** (Question 19, Annexure F). The word 'message' in this research refers to the knowledge artefacts such as

documents, videos, pictures that are generated within VCoPs; thus, knowledge that are stored and organised in the VCoPs' repositories. As a follow up question, the respondents are also asked: ***"If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)?"*** (Question 20, Annexure F).

Most respondents indicate that knowledge in their respective VCoPs are organised and retrieved in various ways such as using author's name, date, both author name and topic, date, author, topic, subject area, in both chronological order and category, date and author, mind mapping, and by inserting and searching keywords (KM Education respondent[11/12] 1; KM Practitioners respondent[11/12] 4). Some of the responses include - by author name (Gurteen Knowledge respondents[11/12] 6, 7, & 8; KM Practitioners respondent[11/12] 6); by date (Gurteen Knowledge respondent[11/12] 1 & 3); by author name and topic (KM Practitioners respondent[11/12] 5); by date, author, topic, subject area (KM Education respondent[11/12] 1 and KM Practitioners respondent[11/12] 4); in chronological order and by category (Gurteen Knowledge respondent[11/12] 2); by date and author (Gurteen Knowledge respondent[11/12] 4; Gurteen Knowledge respondent[11/12] 5); by mind mapping (KM Non-classified respondent[11/12] 4); by relevant rating of search engines (KM Non-classified respondent[11/12] 15).

Other responses are, the messages can be traced by searching a file, discussion topic and date (KM Practitioners respondent[11/12] 1); entering the name of an author or topic (Gurteen Knowledge respondents[11/12] 1, 3, & 6); searching by a name of an author (Gurteen Knowledge respondent[11/12] 7 and KM Practitioners respondent[11/12] 6); author name and date (KM Practitioners respondent[11/12] 4); in accordance to themes (KM Development respondent[11/12] 1); through web archives (KM Development respondent[11/12] 2); by tracing e-mail trails and seeking moderators' assistance (KM Development respondent[11/12] 8); by saving the messages in separate e-mail folder and returning to e-mail trails sent from the core groups (KM Development respondent[11/12] 13); and by asking editorial board (KM Development respondent[11/12] 10). KM Development respondent[11/12] 14 further explains that knowledge is retrieved by searching e-mail folders or searching on a website, while KM Non-classified respondent[11/12] 12 and Gurteen Knowledge respondent[11/12] 2 mention that knowledge is retrieved by browsing through current contents and searching for a key word. Similarly, KM Development respondent[11/12] 3 indicates that messages are retrieved by searching results that match keywords; and KM Non-classified respondent[11/12] 2 mentions of searching in Google, such as using google groups that has a search facility.

In summary, current literature does not specifically reveal how messages are organised and retrieved in VCoPs. The responses in the survey provide new insights in how knowledge is classified and organised (for example, author name, date, mind mapping etc.) and retrieved (search by author, web archives, themes etc.) in VCoPs. This indicates that VCoPs can also

enhance the classification of knowledge in an organised manner for a potential user to easily retrieve saved messages. Organising knowledge in VCoPs is summarised in figure 5.2:

Figure 5. 2: Knowledge organisation
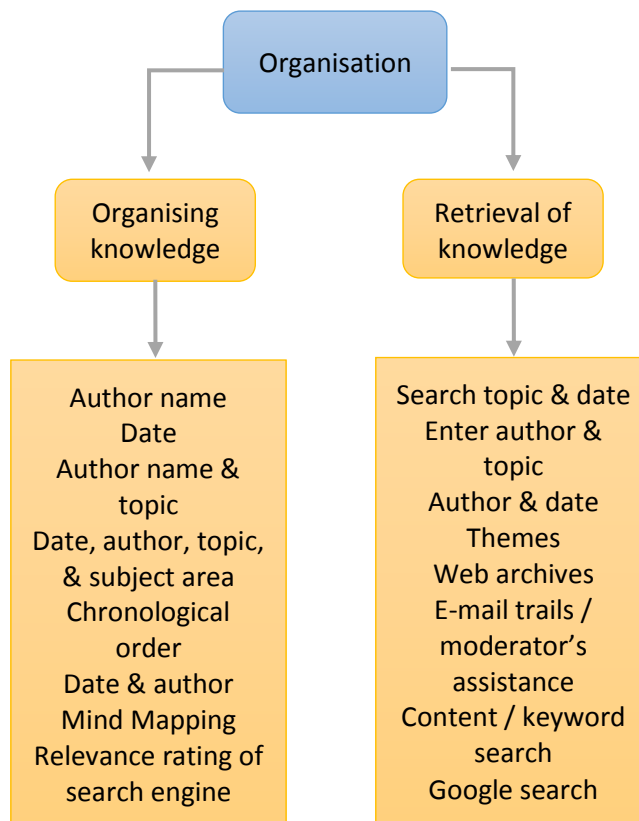
Source: (Adapted from Survey One 2011/12 findings).

5.6.3   Knowledge formalisation

Knowledge formalisation is defined as the process of making knowledge explicit and documented for further use (Nissen & Levitt, 2002:7-8). During this phase, individuals recognise and articulate their intuitive competencies, interests, beliefs and norms and make them common and available to others (Arntzen-Bechina & Leguy, 2007:159). Thus, formalisation results in having a discernible information that are available to VCoP users.

The respondents are asked: **"*What do you do to ensure the knowledge that you share is simple to understand by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc. to support what you share)?"*** (Question 15, Annexure F). Two follow up questions are asked: **"*What formats do you usually use to transfer your ideas and experiences via the VCoP (for example, use diagrams, storytelling, case studies, etc.)?"*** (Question 22, Annexure F) and the next follow up question is: **"*What formats do***

others usually use to transfer their ideas and experiences via the VCoP (for example, diagrams, storytelling, case studies, etc.)?" (Question 23, Annexure F).

For Question 15, some respondents report using case studies and storytelling (Gurteen Knowledge respondent[11/12] 1, KM Non-classified respondent[11/12] 8, Gurteen Knowledge respondent[11/12] 3, Gurteen Knowledge respondent[11/12] 4); others mention of using a mix of stories, diagrams, text, video clips, and pictures (KM Development respondent[11/12] 6). Similarly, Gurteen Knowledge respondents[11/12] 5 and 6 explain that stories, diagrams, text, video, photos and many more are used to share knowledge. Another respondent points out that personal experiences are shared through stories, text, and pictorial representations (KM Development respondent[11/12] 11). Further, KM Non-classified respondent[11/12] 14 mentions that experiences, for example, 'about the fishing trip' is shared via text, photos, and video. Further, KM Non-classified respondent[11/12] 12 states that word documents, voice over PowerPoint presentations, blog posts, reference links, and images are used to transfer knowledge.

Other set of respondents, for question 22 and 23, suggest the use of simple language that can be easily understood by receivers of a message (Gurteen Knowledge respondent[11/12] 3; KM Development respondent[11/12] 13). In addition, a multilingual approach to knowledge sharing is specified by another respondent, as one of the means to transfer knowledge (KM Development respondent[11/12] 18). In the respondent's words: "...using a simple language that people can easily capture..." is meaningful when sharing knowledge (Gurteen Knowledge respondent[11/12] 7) or using simple language that the target people can understand (KM Development respondent[11/12] 13). Another respondent reports that multilingual approaches are used to ensure that all people with different languages are allowed to use a particular knowledge in VCoP (KM Development respondent[11/12] 18). Similarly, KM Non-classified respondent[11/12] 3 is of the opinion of using a plain language when sharing knowledge with others.

In current literature, it is revealed that the sharing of personal experiences through various methods such as storytelling, discussion, and observation are recognised as powerful ways of transferring tacit knowledge (Panahi, Watson, & Partridge, 2012:1098). In the context of online sharing, blogs, social media sites, video sites, and Wikis are mentioned as modern alternative tools to support the exchange of ideas and experiences (Panahi, Watson, & Partridge, 2012:1098).

In three of the questions asked, some respondents are of the opinion that face-to-face interaction is utilised in knowledge sharing - that is usually not typical of VCoPs as they are construed to be online. One respondent specifies of organising face-to-face conversations and physical demonstration of objects in passing knowledge to others (KM Development respondent[11/12] 6). A different view is stated by two respondents who indicate that any tool can be used depending on what needs to be communicated and to who should be communicated

(KM Non-classified respondent[11/12] 5). KM Non-classified respondent[11/12] 5 explains that various ways may be used depending on what, when and to what public knowledge is communicated. Similarly, another respondent mentions that communication is a complicated business prompting for any tool to be used to communicate ideas and opinions (KM Non-classified respondent[11/12] 1).

In summary, most respondents are of the opinion that VCoPs can be utilised to share tacit knowledge. In addition, VCoPs can also be utilised to convert tacit knowledge into explicit knowledge. Tacit knowledge can be communicated through different ways such as storytelling, diagrams, video, text, pictures, and illustrations. Various other means to share knowledge in VCoPs include PowerPoint presentations, blogs, and hyperlinks. The use of different languages that are understandable to various individuals is also mentioned as effective way to share knowledge. Face-to-face conversations are also used by VCoPs when it is deemed necessary. These responses in the Survey One (2011/12) are indications of VCoPs' capability to optimise knowledge formalisation, that is, to enable knowledge to be more noticeable and explicable to users. Knowledge formalisation in VCoPs is depicted in Figure 5.3:

Figure 5. 3: Knowledge formalisation


```
          ┌─────────────────────────┐
          │      Formalisation      │
          └─────────────────────────┘
                       │
                       ▼
   ┌──────────────────────────────────────┐
   │            Case studies              │
   │            Storytelling              │
   │             Diagrams                 │
   │             Video clips              │
   │               Text                   │
   │             Pictures                 │
   │            Illustrations             │
   │        PowerPoint presentation       │
   │             Blog posts               │
   │          Reference hyperlinks        │
   │            Q & A comments            │
   │          Multilingual approaches     │
   └──────────────────────────────────────┘
```
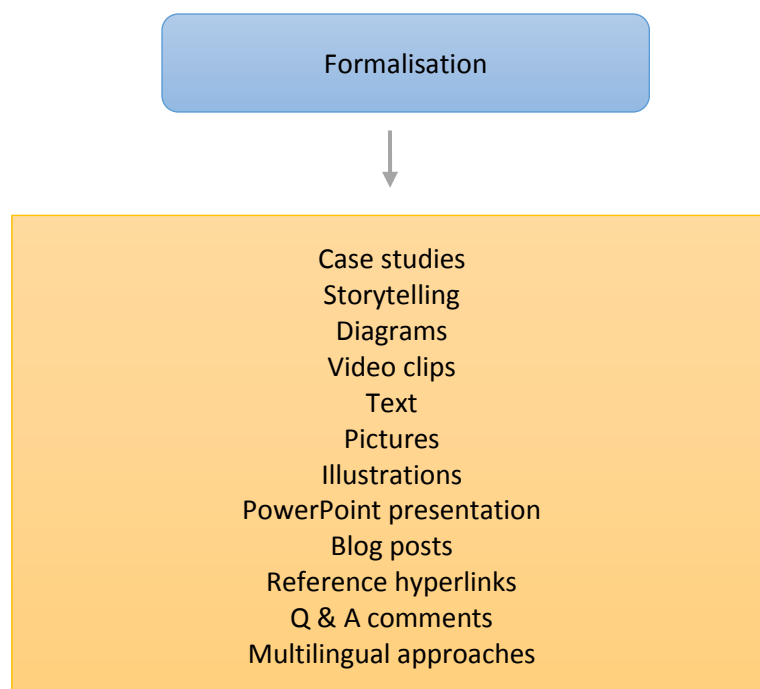
Source: (Adapted from Survey One 2011/12 findings).

5.6.4   Knowledge distribution

Knowledge distribution refers to the spread of knowledge from the knowledge sources to the knowledge receivers (Nissen & Levitt, 2002:7-8). Generally, people may not be willing to share

their knowledge if they are supervised or forced to share (Mu *et al.*, 2008:88). According to Arntzen-Bechina and Leguy (2007:156), some of the best ways in enhancing knowledge distribution is to motivate and reward people to disseminate their knowledge. According to Mu *et al.* (2008:88) and Noor and Salim (2011:106), knowledge flows easily but only with the cooperation and willingness of the source of knowledge and their recipients as well within the context of voluntary knowledge sharing, VCoPs are usually recognised as one of the best ways to share knowledge with others.

In Survey One (2011/2012), a question is asked to determine the distribution of knowledge and its optimisation in VCoPs. The question is: **"*Who do you mostly share your knowledge within the VCoP (for example, only selected groups, all members, core groups, etc.)?*"** (Question 21, Annexure F).

Most respondents agree that members of VCoPs share their knowledge with various groups depending on the type of knowledge and relevance to various groups that they share with (KM Practitioners respondent[11/12] 2). Some respondents mention that they share with their selected groups (Gurteen Knowledge respondent[11/12] 8; KM Development respondent[11/12] 3; KM Development respondent[11/12] 5); some others point out that they share with all members (KM Non-classified respondent[11/12] 11); some other group of respondents mention that they share with only core groups (KM Development respondent[11/12] 17); some others indicate that they simultaneously share with all members and selected groups (KM Non-classified respondent[11/12] 11); some others simultaneously share with all members and core groups (KM Development respondent[11/12] 6); or simultaneously to selected groups, core groups and all members (KM Development respondent[11/12] 6). A group of respondents answer that the type of groups that they share with include "all members" of their respective VCoPs (Gurteen Knowledge respondents[11/12] 1, 2, 3, 4, & 6). Other respondents mention that they share with some "selected groups" (Gurteen Knowledge respondent[11/12] 8, KM Development respondents[11/12] 3 & 5). Other respondents indicate of sharing with "core groups" (KM Development respondent[11/12] 6 & 17). It is to be noted that selected groups are usually targeted outside of the VCoP platform as some of the VCoP members use some social media such as LinkedIn and Twitter to extend their knowledge sharing activities, as stated in Section 3.12.

One respondent writes that general information is usually shared with all members while there are information that target specific or selected groups (KM Development respondent[11/12] 6). KM Non-classified respondent[11/12] 11 mentions that some responses may target all members or selected groups. KM Practitioners respondent[11/12] 2 explains, whom you share depends on the knowledge and relevance of the audience. For example, KM Practitioners respondent[11/12] 4 confirms that work-related contents are distributed to "...whoever is interested in change management, media development, and knowledge management..." (KM Practitioners respondent[11/12] 4).

A respondent also suggests that some messages are shared with all people who have a special interest in a particular topic. A respondent answers that "...some messages that are related to marketing are shared in their VCoP groups..." (KM Practitioners respondent[11/12] 5). Another respondent specifies sharing knowledge is mostly with selected groups, but also at the same time, with every member interested in the topic that their VCoP discusses (KM Development respondents[11/12] 15). A respondent mentions that individual members with similar interests in a group may contribute to discussions of a VCoP (KM Non-classified respondent[11/12] 1).

The contribution from literature is that social contexts such as values, norms, and principles do affect the distribution of knowledge (Schutte & Snyman, 2007; Mu *et al.*, 2008:88-91). For example, an open culture founded on honesty and trust may enable knowledge distribution and flow simpler. Conversely, distrust may create fear in the senders that their knowledge might be exploited or the receiver may have reservations about the quality and reliability of the source's knowledge (Alashwal, Rahman, & Beksin, 2011:1530). A similar view is shared in Azudin, Ismail and Taherali (2009:143), Lin and Chang (2008:332), and Mu *et al.* (2008:88-91) who alluded that trust is vital in enabling knowledge distribution.

In addition, the recipient's absorptive capacity such as the desire to share, learn, and experience are critical factors in knowledge distribution (Arntzen-Bechina & Leguy, 2007:156). In other words, the recipient's pride, ego, and resistance to change can affect the flow of knowledge negatively (Arntzen-Bechina & Leguy, 2007:156). For example, in a study conducted on knowledge flow in the context of Biomedical Engineering Science, some scientists have shown a latent as well as open hostility to exploit fully, the high tech tools that help to transfer knowledge (Arntzen-Bechina & Leguy, 2007:156). In brief, the willingness of both knowledge sources and receivers is vital in promoting and optimising knowledge distribution.

In summary, the outflow from the research responses and current literature is that people distribute their knowledge with whom they find it relevant to share with. This can be interpreted that to whom you distribute your knowledge is contextual depending on the nature and the significance of contents to the audience. For example, some contents may be work-related which you distribute to colleagues; others may be topics of common interest which you can share to interest groups; and some others may be common issues that may be distributed and intended to reach everyone. In addition, social context, cultural values, and the knowledge source's desire to share and the receiver's desire to learn are determinant factors in the context of knowledge distribution within VCoPs. In brief, VCoPs enhance knowledge distribution from users to either selected users, core groups, and/or all groups of VCoPs. Knowledge distribution within VCoPs is represented in Figure 5.4.

Figure 5. 4: Knowledge distribution
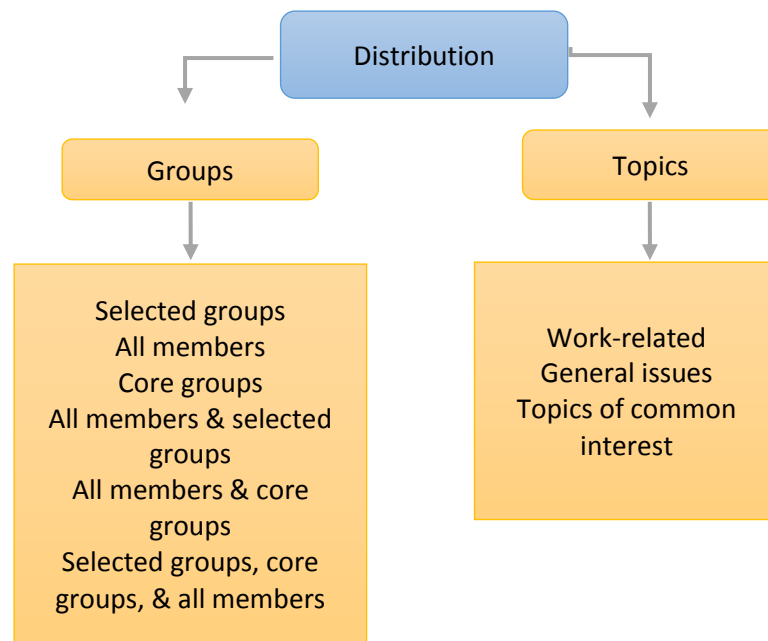
Source: (Adapted from Survey One 2011/12 findings).

5.6.5   Knowledge application

Knowledge application refers to the utilisation of knowledge that are shared in an organisation (Nissen & Levitt, 2002:7-8) (Section 4.3.3). The application of knowledge is usually influenced by the knowledge receivers need (Hu & Kuo, 2013:1049) (Section 4.3.3). In more simple terms, the knowledge must be appropriate and relevant for the recipient's requirements, as well as recognised and understood as such. In addition, knowledge needs to be in appropriate language forms and tools to be easily utilised by the recipients. Knowledge without a record of past usefulness is also usually questioned by recipients and presents an impediment to knowledge flow and application (Lin and Chang, 2008:332). Ease of use of a knowledge entity and its past usefulness also determines the applicability of such knowledge in an enterprise.

In Survey One (2011/12) a question is posed: **"*How will you share your knowledge in the VCoP (for example, knowledge on how to manufacture a product; how to solve a problem at work; how to fix a flat tyre; how to prepare a meal; etc.)?*"** (Question 24, Annexure F). A follow up question is asked: **"*What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?*"** (Question 25, Annexure F).

For question 24 and 25, most respondents explain that they use the knowledge shared in their respective VCoPs to develop new practice (KM Practitioners respondent[11/12] 5), upgrade individual knowledge (KM Education respondent[11/12] 1), promote life-long learning (Gurteen

Knowledge respondent[11/12] 6), apply in workplaces (Gurteen Knowledge respondent[11/12] 6), and enhance problem solving techniques (KM Non-classified respondent[11/12] 12).

These are highlighted in the summary in Questions 24 and 25, Appendix F.

Develop new practice

Some respondents explain that knowledge sharing in VCoPs enables the development of common practice that can be applied in workplaces (KM Practitioners respondent[11/12] 5; KM Practitioners respondent[11/12] 4; KM Development respondent[11/12] 6). For example, KM Development respondent[11/12] 6 is of the opinion that, through VCoPs, people get some solutions, learn new ways of doing things, benchmark own practices with those of other practitioners. Similarly, KM Development respondent[11/12] 12 specifies that, through VCoPs, people are able reflect about current practice and evaluate its validity. Individuals can integrate new knowledge into their tasks if they consider it useful (KM Development respondent[11/12] 13). Similarly, it is indicated in current literature that some people participate in VCoPs because it enables them to enhance their profession and practice by promoting common standards, tools and other important lessons (Wenger, McDermott, & Snyder, 2002:44-45).

Upgrade individual knowledge

Some respondents explain that knowledge sharing in VCoPs promote individual professional development and new ways of doing things. Gurteen Knowledge respondent[11/12] 2 explains that individuals can optimise their knowledge. Another respondent states that VCoPs promote professional development (KM Education respondent[11/12] 1). Similarly, KM Development respondent[11/12] 20 states that knowledge sharing in VCoPs enable an individual to further studies and upgrade knowledge. KM Non-classified respondent[11/12] 8 also is of the opinion that VCoPs help an individual to increase the level of maturity and professionalism.

In current literature, it is indicated that there are internal motivations for an individual to get involved in VCoPs such as to acquire knowledge, boost own reputation, and feel empowered (Vuori & Okkonen, 2012b:594). Information sharing in VCoPs is similarly viewed as an activity that creates a positive sense of community spirit which implies the intrinsic need to be recognised and be reliable in a community (Pilerot & Limberg, 2011:322). Other studies indicate that individuals value the non-financial rewards rather than financial rewards, in volunteering to share their knowledge with others (Hu & Kuo, 2013:1052).

Promote life-long learning

A group of respondents explain that knowledge sharing in VCoPs enable to acquire experiences and insights that can be applied in personal daily activities (Gurteen Knowledge respondent[11/12] 6). Gurteen Knowledge respondent[11/12] 3 mentions that VCoPs aid individuals to utilise the knowledge acquired in both daily personal and work activities. KM Development

respondent[11/12] 10 similarly states of using knowledge shared in their respective VCoPs in making decisions and solving problems associated to daily life activities. Another respondent writes that people can use the knowledge obtained in VCoPs, to gain some experience and insights that can be utilised in daily life and workplace activities (Gurteen Knowledge respondent[11/12] 6).

Apply at workplace

Some respondents suggest that knowledge sharing in VCoPs enable to change how businesses are conducted (KM Non-classified respondent[11/12] 17). Gurteen Knowledge respondents[11/12] 4 and 8 explain that knowledge that are shared in VCoPs may be utilised in workplaces if they are found important. KM Development respondent[11/12] 9 also mentions that knowledge of VCoPs can be utilised and adopted in workplaces. VCoPs provide an in-depth knowledge in how tasks are completed in workplaces. (KM Non-classified respondent[11/12] 17). Similarly, a respondent mentions that people can use VCoPs' knowledge in applying and integrating new practice and tools relevant to their workplaces (KM Practitioners respondent[11/12] 5).

In literature, it is revealed that organisations enhance their operational efficiency as the result of knowledge sharing in VCoPs (Hislop, 2004: 38; Fontaine & Millen, 2004:7). While personal and community benefits remain intangible, they both have the potential to influence tangible business outcomes (Fontaine & Millen, 2004:7).

Enhance individual's problem solving

Some respondents indicate that VCoPs can increase individuals' problem solving capabilities. KM Non-classified respondent[11/12] 4 is of the opinion that VCoPs can encourage different points of view that helps to solve a problem (KM Non-classified respondent[11/12] 4). Another respondent writes that VCoPs enable to optimise productivity and problem solving capability of members (KM Non-classified respondent[11/12] 12).

In literature, it is learnt that individual benefits from VCoP consist of acquiring knowledge objects such as documents, templates, ideas, and solutions (Fontaine & Millen, 2004:4-6). VCoP members usually develop their individual skills and know-how as well as maintain their sense of belonging to their organisation (Fontaine & Millen, 2004:6). The skills that they develop enables individuals to solve both individual and organisational problems. Similarly, Correia, Paulos, and Mesquita (2010:12-16) explains that VCoPs enhance skills and promote professional development of individuals.

In summary, most respondents explain that knowledge shared within VCoPs are applied to develop common standards, upgrade individual knowledge, and promote life-long learning. VCoPs also enhance problem solving capabilities. Therefore, VCoPs optimise the application

of knowledge both at an individual and organisational level. Knowledge application in VCoPs is represented in Figure 5.5:

Figure 5. 5: Knowledge application
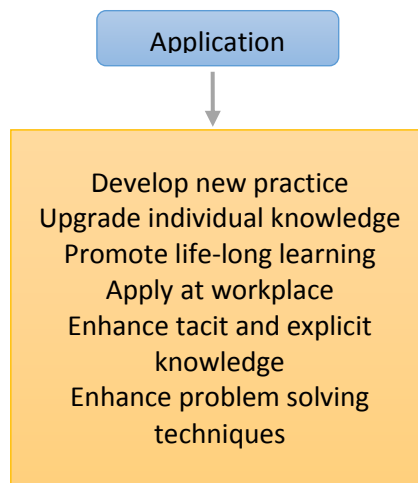
Source: (Adapted from Survey One 2011/12 findings).

5.6.6   Knowledge evolution

Evolution is a period of reflection during organisational learning, that is, when users evaluate the appropriateness of current knowledge (Nissen & Levitt, 2002:7-8) (Section 4.3.3). Evolution entails potential innovative ideas that might arise from emerging internal and external needs of an organisation. For example, new knowledge may be required to deal with emerging trends in an organisation. The logic behind evolution is that there are many different truths which lead to swift testing of emerging ideas and simultaneous development of knowledge (Vuori & Okkonen, 2012a:119). In brief, evolution implies a new knowledge output that emerge as a result of new ideas and trends in an enterprise.

Three questions are asked in Survey One (2011/12) to solicit responses about the evolution of knowledge in VCoPs. Firstly, the respondents are asked to evaluate the value of their respective VCoPs in generating new knowledge (Question 26, Annexure F). Secondly, respondents are asked to provide their opinion on how long a knowledge sharing contribution should ideally be open for discussion in the VCoP (that is, how long should the contribution stay in the VCoP so that it can be used as a future reference by members)? (Question 27, Annexure F). Thirdly, they are asked to determine when a discussion has been closed and archived, what the requirements are if a member wants to read, use or edit such a discussion in case new ideas and/or developments came to the fore since it was archived? (For example,

acquiring permission from the moderator, requesting an unlock key etc.) (Question 28, Annexure F).

Most respondents, in three of the above questions, concur that the following activities occur with regards to knowledge evolution within VCoPs:

- Generate new experiences and perspectives

- Adapt to new practice

- Fill knowledge gaps and avoid redundancy

- Contribute to current knowledge of a community

- Upgrade individual knowledge.

These are highlighted in the summary in Question 26, 27, and 28, Appendix F.

Generate new experiences and perspectives

Some respondents indicate that new information and perspectives, fresh ideas, and standard practices are shared by members of VCoPs (Gurteen Knowledge respondent[11/12] 7). Gurteen Knowledge respondent[11/12] 3 explains that knowledge sharing in VCoPs entail sharing new scopes of performing tasks, new insights and knowledge. Another respondent writes that knowledge sharing in VCoPs provide new insights and practices that enables to generate and incorporate new knowledge into current tasks (Gurteen Knowledge respondent[11/12] 4). KM Practitioners respondent[11/12] 4 also states that VCoPs have the potential to generate new ideas and developments; nevertheless, it depends on the dynamics of the members and relevance of the topic of discussion.

Another respondent writes that knowledge sharing within VCoPs enables obtaining fresh ideas from knowledge management practitioners and acquire new skills of knowledge management (KM Development respondent[11/12] 8). Yet, another respondent specifies that new ideas and insights can be generated by utilising VCoPs (KM Development respondent[11/12] 11). KM Non-classified respondent[11/12] 11 writes that VCoPs are vital in generating new knowledge in a specific area of expertise.

A different view however, exists with one respondent who states that much of new knowledge is generated in the real world, suggesting that a very small percentage of knowledge are created by VCoPs. In the respondent's words: "...about 5% of new knowledge generated within a project could be attributed to the VCoP, but most new learning is done in the real world..." (KM Development respondent[11/12] 7).

Adapt to new practice

A respondent mention that VCoPs enable people to adapt to a new practice. This results in VCoPs providing opportunities to improve on current business practices. Gurteen Knowledge respondent[11/12] 5 is of the opinion that VCoPs provide a wider perspective from various sources in UNDP. This implies that these wider perspectives can be adapted into current practice.

Fill knowledge gaps and avoid redundancy

Some respondents point out that VCoPs allow individuals and organisations to close knowledge gaps and avoid redundancy. KM Non-classified respondent[11/12] 9 explains that information sharing is important to avoid information overload. Another respondent writes that, the "unknowns" emerge in VCoP discussion forums encouraging regular members of VCoPs to address those "unknowns" or knowledge gaps (KM Non-classified respondent[11/12] 15).

Contribute to current knowledge of a community

Gurteen Knowledge respondent[11/12] 2 indicates that it is free to join with VCoPs and the only motivation to post and get involved is not for monetary benefit but for the betterment of a community. Similarly, another respondent explains that a VCoP has widespread and deep impact on overall community development to ensure that positive changes in society takes place (KM Development respondent[11/12] 5). The significance of VCoPs in community development is discussed in Section 5.7.5.

Contribute to current knowledge of a community

Gurteen Knowledge respondent[11/12] 2 indicates that it is free to join with VCoPs and the only motivation to post and get involved is not for monetary benefit but for the betterment of a community. Similarly, another respondent explains that a VCoP has widespread and deep impact on overall community development to ensure that positive changes in society takes place (KM Development respondent[11/12] 5). The significance of VCoPs in community development is discussed in Section 5.7.5.

Upgrade individual knowledge

Respondents explain that VCoPs can enhance individual knowledge. KM Practitioners respondent[11/12] 1 mentions that VCoPs contribute immensely in developing members professionally. KM Non-classified respondent[11/12] 4 is of the opinion that VCoPs empower everyone that participates in their discussion. The benefits that individuals acquire from VCoPs is discussed in Section 5.7.5.

In summary, individuals, communities and organisations can optimise their knowledge base through the use of VCoPs. VCoPs are also ways to generate new experiences and perspectives. Individuals and organisations are enabled to adapt to a new practice through VCoPs. VCoPs can also enable to fill knowledge gaps and avoid redundancy. Thus, VCoPs are vital in developing knowledge at individual, community, and organisational level. Knowledge evolution in VCoPs is depicted in Figure 5.6:

Figure 5. 6: Knowledge evolution
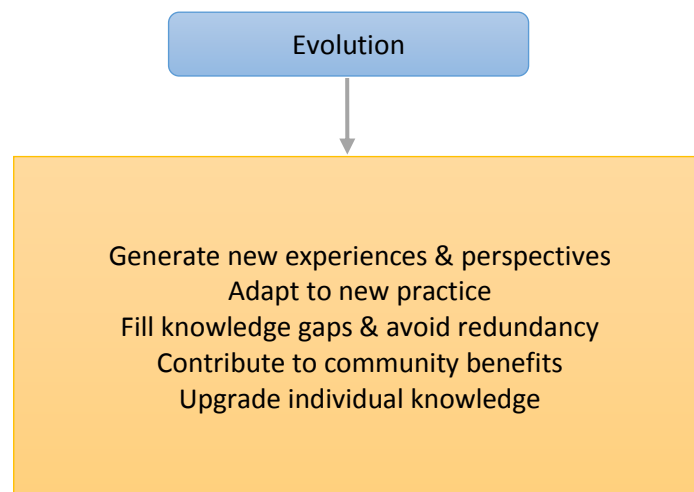
Source: (Adapted from Survey One 2011/12 findings).
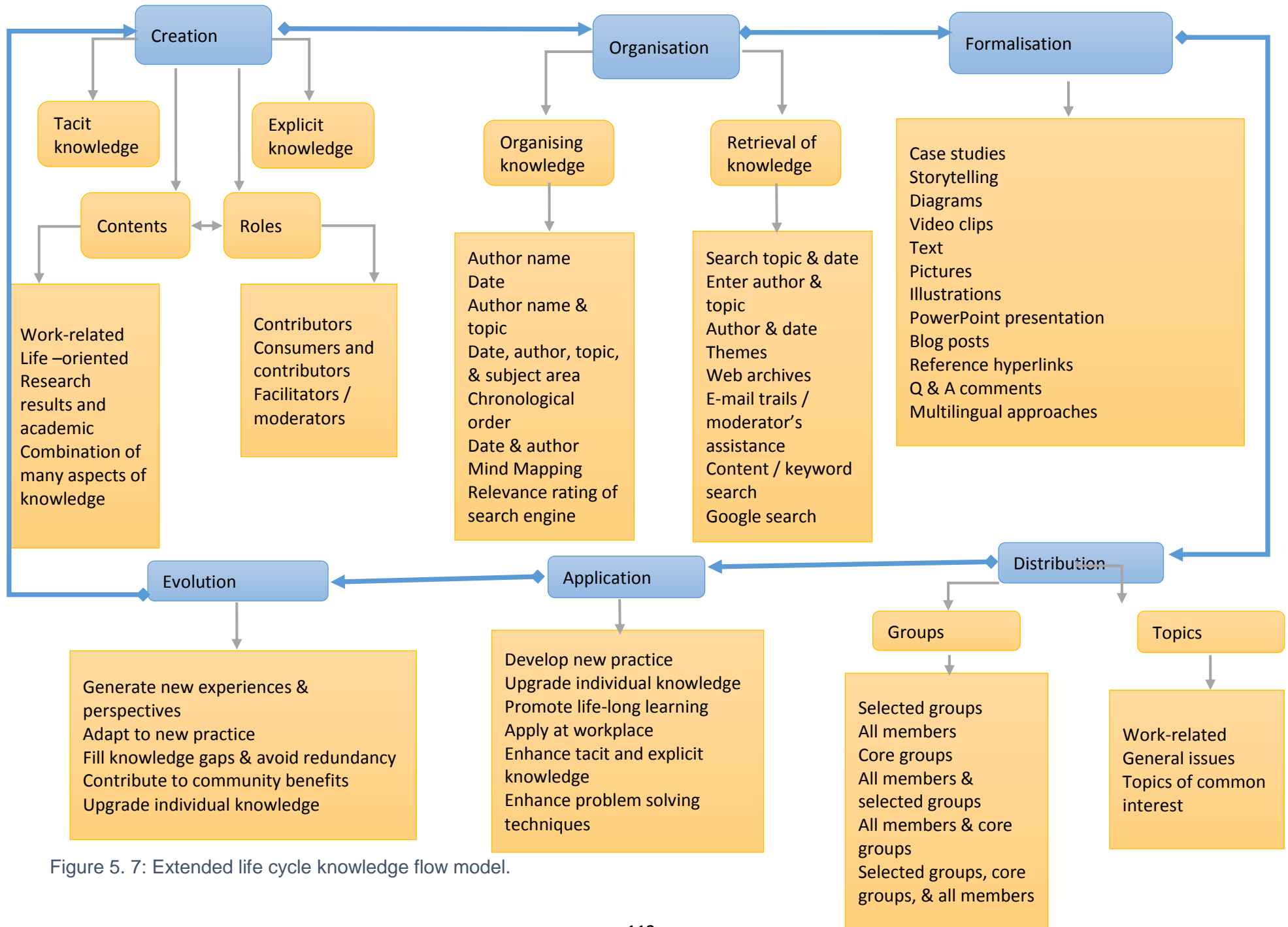
Figure 5. 7: Extended life cycle knowledge flow model.

Creation
- Tacit knowledge
- Explicit knowledge
- Contents ↔ Roles

Contents:
Work-related
Life –oriented
Research results and academic
Combination of many aspects of knowledge

Roles:
Contributors
Consumers and contributors
Facilitators / moderators

Organisation
- Organising knowledge
- Retrieval of knowledge

Organising knowledge:
Author name
Date
Author name & topic
Date, author, topic, & subject area
Chronological order
Date & author
Mind Mapping
Relevance rating of search engine

Retrieval of knowledge:
Search topic & date
Enter author & topic
Author & date
Themes
Web archives
E-mail trails / moderator's assistance
Content / keyword search
Google search

Formalisation
Case studies
Storytelling
Diagrams
Video clips
Text
Pictures
Illustrations
PowerPoint presentation
Blog posts
Reference hyperlinks
Q & A comments
Multilingual approaches

Evolution
Generate new experiences & perspectives
Adapt to new practice
Fill knowledge gaps & avoid redundancy
Contribute to community benefits
Upgrade individual knowledge

Application
Develop new practice
Upgrade individual knowledge
Promote life-long learning
Apply at workplace
Enhance tacit and explicit knowledge
Enhance problem solving techniques

Distribution
- Groups
- Topics

Groups:
Selected groups
All members
Core groups
All members & selected groups
All members & core groups
Selected groups, core groups, & all members

Topics:
Work-related
General issues
Topics of common interest

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5.7   Summary and Conclusion

Two important aspects are revealed in Survey One (2011/12). Firstly, the responses pertaining to the definitions of the main terms in this research – virtual community, VCoPs, knowledge, and knowledge sharing could be verified by the researcher. The respondents' understanding of the main terms correspond to the findings revealed in current literature. This leads to the fact that respondents have sufficient understanding of the main aspects of knowledge sharing within VCoPs. This is an assertion made possible by the contributions of the respondents in providing insight into VCoPs' knowledge sharing optimisation model, vital and justified. The second and most significant contribution of Survey One (2011/12) is the disclosure of an extended Life Cycle knowledge flow model that has the potential to be adapted and utilised in enhancing knowledge sharing within VCoPs.

Eleven respondents confirm that virtual communities are made up of like-minded people who communicate via the Internet. In addition, many respondents concur that the aims of VCoPs are to share knowledge, develop common practice, and solve common problems that affect virtual communities. In line with current literature, Survey One (2011/12) responses after analysis, reveals that VCoPs enable members to develop common identity, purpose, and practice regardless of their geographical locations.

Ten respondents define knowledge as a subjective construction of reality that individuals give different interpretations depending on their frame of reference. Another ten respondents assert that knowledge enables individuals and organisations to make an informed decision. Eight other respondents further explain that knowledge refers to a profound understanding of concepts, a core competency of an individual or an organisation, tacit and explicit knowledge, as well as a meaning assigned to information.

Fourteen respondents refer to knowledge sharing as an inherent nature of human interaction to subjectively construct realities. Other six respondents further clarify that knowledge sharing entails both formal and informal knowledge exchange in addition to sharing of an individual and organisational core competency.

The second part of Survey One (2011/12) refers to the responses given to ascertain the validity and utilisation of the Life Cycle knowledge flow model. The model consists of knowledge creation, organisation, formalisation, distribution, application, and evolution (Section 4.3.3).

Fifteen respondents explain that VCoPs share original ideas, research results, opinions, comments on academic articles, and research articles. Other respondents (twenty three respondents) also mention about the contents that are created by VCoPs, which entail work-related information, life-oriented information, research results and academic, and other various aspects of knowledge. Many respondents (twenty respondents) indicate the roles that VCoP members perform include - contributors, both consumers and contributors, as well as both facilitators and moderators. Thus, knowledge creation takes place in VCoPs.

Thirty three respondents provide new insights in how knowledge is organised (for example, author name, date, mind mapping etc.) and retrieved (search by author, web archives, themes etc.). VCoPs contribute to enhancement of knowledge classification for an easy retrieval.

Most of the respondents (twenty respondents) assert that through VCoPs, tacit knowledge is converted to explicit knowledge to make it more accessible and understandable by knowledge receivers. Ten respondents mention that tacit knowledge can be communicated through different forms such as storytelling, diagrams, video, text, pictures, and illustrations. Some respondents (eleven respondents) also mention other various forms of sharing knowledge such as using PowerPoint Presentation, blogs, hyperlinks, and different languages that are understandable by various individuals. Thus, VCoPs enable the optimisation of knowledge formalisation.

Twenty eight respondents also concur that VCoPs optimise the distribution of knowledge. Most respondents assert that to whom you distribute your knowledge is contextual depending on the nature of the content and audience. For example, twenty respondents explain that knowledge may be work-related which you share with colleagues, some may be topics of common interest in which you share with interest groups, and some others may be general issues that may be distributed and intended to reach to everyone. It is found in literature that social context, cultural values, and the knowledge sources' and the knowledge receivers' desire to share and learn are determinant factors in the context of knowledge distribution within VCoPs. The contribution of VCoPs in optimising knowledge distribution is evident in the survey responses.

Twenty three respondents also indicate that VCoPs can be utilised to develop common standards, upgrade individual knowledge, and promote life-long learning. The respondents also indicated that VCoPs optimise tacit and explicit knowledge that can be applied in solving individual and organisational problems. Therefore, VCoPs are vital in enhancing knowledge application both at an individual and organisational level.

Lastly, fourteen respondents concur that VCoPs allow individuals, communities and organisations to revive and upgrade their existing knowledge. Most respondents agree that both individuals and organisations use VCoPs to generate new experiences and perspectives, adapt to a new practice, fill knowledge gaps and avoid redundancy, contribute to community benefits, and enable individuals to upgrade their individual knowledge. Therefore, VCoPs enable to identify and formalise untapped tacit knowledge, and incorporate and adapt new knowledge to the existing body of knowledge. This confirms that VCoPs are essential in enabling knowledge to evolve and develop, and thus be the source of innovation. In the next Chapter the researcher discusses the findings of Survey Two (2016) in order to verify the applicability of the extended model established from Survey One (2011/12).

CHAPTER SIX

FINDINGS AND DISCUSSION
Survey Two (2016)

6.1   Introduction

In this chapter, the findings of Survey Two (2016) are discussed. The objective of conducting Survey Two (2016) is to verify the applicability of the extended Life Cycle knowledge flow model in current VCoPs knowledge sharing optimisation. A literature review is conducted to investigate the theoretical knowledge flow models that are currently utilised by an enterprise (Chapter 4). Subsequently, the Life Cycle knowledge flow model is ascertained as most comprehensive compared to the other two models – Dynamic and Spiral knowledge flow models (discussed in Chapter 4). Then, the Life Cycle knowledge flow model is tested if it can be adapted and applied in the optimisation of knowledge sharing through VCoPs. The findings of the testing through Survey one (2011/12) is discussed in Chapter 5. As the result of the findings and discussion in chapter 5, an extended Life Cycle knowledge flow model has been derived.

This chapter consists of the following sections: Verification of the applicability of the extended Life Cycle knowledge flow model (Section 6.2), Knowledge creation Section (6.2.1), Knowledge organisation Section (6.2.2), Knowledge formalisation Section (6.2.3), Knowledge distribution Section (6.2.4), Knowledge application Section (6.2.5), and knowledge evolution Section (6.2.6). A summary and conclusion is provided in Section (6.3).

6.2   Verification of the applicability of the extended model

This section answers the third investigative question in this research - ***How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?*** (Section 1.6). The six phases of the extended Life Cycle knowledge flow model are utilised as the basis to structure this chapter. It is to be noted that this structure is not intended to influence the findings and discussions thereof. Rather, the structure is meant to aid this researcher to reduce the voluminous qualitative data received from the respondents to a manageable and summarised data-set. Data reduction is discussed in Section 3.15. The findings and discussions are based on the respondents' point of view (summarised responses is presented in Annexure G). A reference is also made to Survey One (2011/2012) findings and current literature to compare and identify

the gaps that the Survey two (2016) might have addressed. The six phases in the extended Life Cycle knowledge flow model that aid this researcher to structure this chapter are:

- Knowledge creation
- Knowledge organisation
- Knowledge formalisation
- Knowledge distribution
- Knowledge application
- Knowledge evolution

6.2.1 Knowledge creation

Knowledge creation refers to generating of new knowledge within an enterprise (Nissen & Levitt, 2002:7-8) (Section 4.3.3). During this phase, new ideas are put forth and made explicit to members of a group. Successful organisations are those that produce new knowledge, distribute it widely throughout the organisation, and represent it into new technologies and products (Boateng, 2011:30) (Section 4.3.3). This implies that people come up with new knowledge during this initial phase.

Knowledge can be potentially created by any member of an organisation (Mu *et al.*, 2008:88) (Section 4.3.3).This means the source of a particular knowledge can hypothetically contribute to enhancing or impeding knowledge creation and flow. The source's personal belief, willingness or inhibitions to share expertise are some of the key determinants in knowledge creation and flow (Schutte & Snyman, 2007) (Section 4.3.3).

The respondents of Survey Two (2016) are asked a question pertinent to the creation of knowledge in VCoPs - **What types of knowledge do you create or share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)?** (Question 3, Annexure G).

Similar to the responses received in Survey One (2011/12) (discussed in Section 5.6.1), some respondents in Survey Two (2016), indicate that own ideas, new knowledge development, peer reviews, as well as discussions and dialogue leading to new insights are shared by members of a VCoP **(**KM Non-classified respondent[16] 4, KM Non-classified respondent[16] 12). These types of knowledge creation can either be tacit or explicit knowledge. For example, one respondent explains that "…own ideas, research results, workshop initiatives, and new developments in knowledge management…" are shared in their VCoP (KM Non-classified respondent[16] 4). Another

respondent concurs that "original ideas" are shared (KM Non-classified respondent[16] 13). Similar view is also put forth by another respondent who explains that new knowledge development, peer review, discussions and dialogue leading to new insights are shared (KM Non-classified respondent[16] 15). Another respondent writes that own ideas or any idea that can be incorporated into a workplace is discussed (KM Development respondent[16] 17). Another respondent further answers of "…sharing some new concepts and practices in education…" (Gurteen Knowledge respondent[16] 21), while another one explain that innovative ideas, business reports, and news bits are shared within their VCoP members (KM Practitioners respondent[16] 33). Other set of respondents explain that research results and academia are discussed in their VCoPs **(**KM Non-classified respondent[16] 12).

Other specific knowledge shared in the VCoPs include:

- Work-related knowledge
- Research results and academia
- Combination of many aspects of knowledge

These are highlighted in the summary in Question 9 and 10, Appendix G.

Work-related knowledge

Some respondents in Survey One (2011/12) mention that some of the information they share in their VCoPs are related to their work such as policy briefs, articles, translations, summaries, procedures, etiquette, and code of practice (Section 5.6.1.1). Similarly, some respondents in Survey Two (2016) confirm that work-related matters are shared (KM Development respondent[16] 3, 17, 30, 32, 38, 39, and KM Non-classified respondent[16] 9, 11, 15, 20 and 26).

Research results and academic

Some of the Survey One (2011/12) respondents explain that academic-related research results, new dimensions to addressing knowledge management issues and challenges, research articles, and research methodologies are shared (Section 5.6.1.1). In Survey Two (2016), similar responses are given. For example, some respondents state of sharing academic, technical, and research reports (Gurteen Knowledge respondent[16] 18, KM Development respondent[16] 30). Some other respondents mention that research results and technical reports are shared (for example, KM Development respondent[16] 36). Another respondent explain that own ideas and opinions, operational and research results, and academic articles are created in VCoPs (KM Practitioners respondent[16] 37).

Combination of many aspects of knowledge

Some other set of respondents in Survey One (2011/12) indicate that any aspect of knowledge is shared with no restrictions whatsoever. These contents include upcoming events, best practices, questions, and engagement opportunities (Section 5.6.1.1). Similar responses are received from Survey Two (2016). A respondent writes of sharing "…ideas, views, and general Information…" (for example, KM Non-classified respondent[16] 10). Another respondent explain that diverse views and what is deemed as useful at present stimulates sharing knowledge (KM Non-classified respondent[16] 14). Another respondent state that what is shared is usually related to work or own ideas, opinion, and beliefs (KM Development respondent[16] 17). Another respondent further state that various contents such as emerging practice and ideas, beliefs, procedures, and new policies are shared in their respective VCoPs (Gurteen Knowledge respondent[16] 18). Therefore, VCoPs members can create and share knowledge without being restricted to a particular content.

The respondents are also asked about their role in their respective VCoPs (for example, read messages, edit contributions, provide solutions, write reports, etc.)? (Question 4, Annexure G) Many respondents agree that their role in knowledge creation can be as either contributors, consumers and contributors, or facilitators and moderators, which also featured in Survey One (2011/12) (Section 5.6.1.1). In the same manner, respondents in Survey Two (2016) mention of role players in VCoPs as follows:

- Contributors

- Consumers and contributors

Facilitators and moderators

These are highlighted in the summary in Question 4, Appendix G.

Contributors

Some respondents of Survey One (2011/12) indicate that their role is to contribute some contents (Section 5.6.1.2). Similar responses are received from the respondents of Survey Two (2016). For example, their responses include sharing new practices in knowledge management (KM Non-classified respondent[16] 4; Gurteen Knowledge respondent[16] 21). Another respondent mention of contributing messages and share reports (KM Development respondent[16] 17). More other respondents also explain of contributing research results and providing inputs on anything that comes across their way (For example, Gurteen Knowledge respondent[16] 18). In addition, a

respondent reports of moderating, contributing, and providing business solutions (Gurteen Knowledge respondent[16] 29), while another respondent stated of contributing reports and new mechanisms of knowledge management (KM Development respondent[16] 34). Another respondent further writes that solutions are shared and advice are provided on operations of their various offices where their virtual communities reside (KM Non-classified respondent[16] 40).

Contributors and consumers

Some respondents of Survey One (2011/12) explain that they participate as both contributors and consumers in their knowledge sharing activities (discussed in Section 5.6.1.2). Similar responses are received from respondents of Survey Two (2016). One of the respondents state that they assume as "…leaders, provocateurs, scribes, supporters, facilitators, and lurkers…" - all of the roles at the same time (KM Non-classified respondent[16] 14). For example, a respondent mentions that roles often change over time (KM Non-classified respondent[16] 14). Other set of respondents mention that their roles include as a moderator (edit, review, stimulate), participant and lurker (for example, KM Non-classified respondent[16] 15). Some KM Development respondents indicate that their contribution includes editing and providing solutions to some queries from members (KM Development respondent[16] 19). Another respondent reply that their role include to observe other members' participation and assist in the ongoing maintenance of the VCoP when the skills match the need (KM Development respondent[16] 27). Another respondent writes that the contributions consist of reading and contributing, providing solutions, and seeking solutions from others (KM Development respondent[16] 30). Further, another respondent state that the contributions include reading, editing, writing reports, and sharing analysis (KM Development respondent[16] 32).

Facilitators and moderators

Some of the respondents of Survey One (2011/12) mention that their roles include as both facilitators and moderators in their respective VCoPs (Section 5.6.1.2). Similar responses are received from respondents of Survey Two (2016). A respondent mention that their roles include reading messages, facilitating discussions, managing knowledge, and moderating contents (KM Non-classified respondent[16] 12). Another respondent reports that their contribution includes moderating and providing business solutions (Gurteen Knowledge respondent[16] 29). Another respondent further writes that all roles are played – that is, to read and contribute, provide solutions, and seek solutions from others (KM Development respondent[16] 30).

In summary, the responses from Survey Two (2016) provide specific types of tacit and explicit knowledge that are created by VCoPs, which is not clearly identified in current literature. For example, Survey Two (2016) reveals that the type of knowledge created by VCoPs are originally

own ideas, research results, opinions, reply to other opinions, comment on academic articles, and forwarding some other research articles to members. Survey Two (2016) further reveal that the contents of the knowledge shared are work-related matters, research results and academic, and other various aspects of knowledge without much restriction on contents.

The roles that the VCoP members execute are verified in Survey Two (2016) responses. The three types of roles of VCoP members include - contributors, consumers and contributors, as well as facilitators and moderators. Thus, the role of VCoPs in enhancing the creation of knowledge is substantial in terms of the types of knowledge produced and the active roles that the VCoP members perform.

6.2.2 Knowledge organisation

Organisation refers to mapping of knowledge by employing systems such as taxonomies and repositories (Nissen & Levitt, 2002:7-8). Eventually, the use of knowledge taxonomies is to benefit an individual or a community to easily retrieve such knowledge organised in VCoPs, when required. In Survey two (2016), the respondents are asked: **"How are the messages organised in the VCoP (that is, by date of receipt, author name, topic, subject area)?"** (Question 5, Annexure G). As a follow up question, they are asked: **"If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)?"** (Question 6, Annexure G).

In Survey One (2011/12), some respondents indicate that knowledge in their respective VCoPs are organised and retrieved in various ways such as per author's name, date, author name and topic, date, author, topic, subject area, in chronological order and by category, date and author, mind mapping, and by searching using a keyword (Section 5.6.2).

Similar responses are received from respondents of Survey Two (2016), which include by author name (KM Development respondent[16] 4 and 17; KM Non-classified respondent[16] 9, 16, 19, & 30; Gurteen Knowledge respondent[16] 18); by topic (KM Non-classified respondent[16] 9, 13, 15, 16, 20, & 22; KM Development respondent[16] 4 & 19; KM Practitioners respondent[16] 24); by subject area (KM Development respondent[16] 4 & 28; KM Non- classified respondent[16] 12, 13 & 16; Gurteen Knowledge respondent[16] 29); by date (KM Non-classified respondent[16] 8, 10, 15, 22, & 26; Gurteen Knowledge respondent[16] 18, 21, 23, 29; KM Development respondent[16] 19, 23, 28 & 30; KM Practitioners respondent[16] 25); a combination of date, author, and topic (KM Development respondent[16] 4, 19, 28, 30, 32, 36, 38, and 41; KM Non-classified respondent[16] 20; Gurteen Knowledge respondent[16] 21 & 29); and in a chronological order (KM Non-classified respondent[16] 14; KM Development respondent[16] 38).

In terms of retrieving messages shared in VCoPs, similar responses to that of Survey One (2011/12) (Section 5.6.2) are received from respondents of Survey Two (2016). Such responses include - contents are retrieved by author, topic, or keyword (KM Non-classified respondent[16] 8 & 10; KM Development respondent[16] 31 & 39); by Subject area and date (KM Non-classified respondent[16] 12); from archives and by searching keyword (KM Non-classified respondent[16] 14 & 40, KM Development respondent[16] 36, KM Practitioners respondent[16] 37); by creating links to speed up the search (KM Non-classified respondent[16] 20); using google website (KM Non-classified respondent[16] 26); and flaging an interesting post and saving it to a folder inbox (KM Development respondent[16] 27); or searching from e-mail (KM Non-classified respondent[16] 40).

In summary, current literature does not specifically indicate on how messages are organised and retrieved, particularly in VCoPs. The responses from Survey Two (2016) provided new insights in how knowledge is organised (for example, author name, date, mind mapping, inter alia) and retrieved (search by author, web archives, and themes, among others) in VCoPs. This gives a new insight on how VCoPs enhance the classification of knowledge in VCoPs for an easier retrieval of archived knowledge.

6.2.3   Knowledge formalisation

Formalisation is defined as the process of making knowledge explicit and documented for further use (Nissen & Levitt, 2002:7-8) (Section 4.3.3). During this phase, individuals recognise and articulate their intuitive competencies, interests, beliefs and norms and make them common and available to others (Arntzen-Bechina & Leguy, 2007:159) (Section 4.3.3). In order to validate on how the VCoPs formalise their knowledge, a question is asked in the survey - **"What do you do to ensure the knowledge that you share is simple to understand by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)?"** (Question 7, Annexure G).

In Survey One (2011/12), most respondents explain that knowledge formats are shared in various ways which include case studies, storytelling, diagrams, video clips, text, pictures, and illustrations (Section 5.6.3). In addition, voice over PowerPoint presentation, blog posts, reference hyperlinks, a series of question & answer comments have been reported to be used by some respondents (Section 5.6.3). Simple languages and a multilingual approach to sharing are utilised by some other respondents (Section 5.6.3).

From the responses of Survey two (2016), most respondents similarly verify that diagrams (KM Non-classified respondent[16] 3), stories (KM Development respondent[16] 4), text (KM Non-classified respondent[16] 8), video (KM Non-classified respondent[16] 10), PowerPoint presentations

(KM Development respondent[16] 17), flow charts (KM Non-classified respondent[16] 9), and plain language usage (KM Non-classified respondent[16] 11) are used. In addition, some of the respondents further explain that live chats (Gurteen Knowledge respondent[16] 18), examples (KM Development respondent[16] 27), and guidance to new members (KM Non-classified respondent[16] 15) are utilised to ensure that the knowledge shared is simple and understandable to members of VCoPs.

Current literature reveals that the sharing of personal experiences through various methods such as story-telling, discussion, and observation are recognised as powerful ways of transferring tacit knowledge (Panahi, Watson, & Partridge, 2012:1098). In the context of online sharing, some web 2.0 tools such as blogs, social media sites, video sites, and wikis are mentioned as modern alternative tools to support the exchange of ideas and experiences (Panahi, Watson, & Partridge, 2012:1098).

In summary, most respondents indicate that VCoPs can be utilised to share tacit knowledge. In addition, VCoPs can also be utilised to formalise the tacit knowledge and make them more explicit to users. Tacit knowledge can be communicated through different forms such as storytelling, diagrams, video clips, text, pictures, and illustrations. Various forms are also used to make tacit knowledge noticeable and understandable to others such as by using PowerPoint Presentation, blogs, hyperlinks, and different languages understandable to individual members. Therefore, VCoPs can optimise the formalisation of knowledge to make it more visible and understandable to members of a particular VCoP.

6.2.4   Knowledge distribution

Knowledge distribution refers to the propagation of knowledge from the knowledge sources to the knowledge receivers (Nissen & Levitt, 2002:7-8) (Section 4.3.3). According to Arntzen-Bechina and Leguy (2007:156), some of the best ways in enhancing knowledge distribution is to motivate and reward people to propagate their knowledge (Section 4.3.3). There is a general consensus that knowledge flows easily but only with the cooperation and willingness of the experts and the recipients to share and distribute to relevant people (Mu *et al.*, 2008:88; Noor & Salim, 2011:106) (Section 4.3.3).

In Survey One (2011/12), a question is asked: **"Who do you mostly share your knowledge within the VCoP (for example, only selected groups, all members, core groups, etc.)?"** (Question 21, Annexure F). The same question is asked in Survey Two (2016) (Question 8, Appendix G). In Survey One (2011/12), respondents vary by indicating that they share with either of their selected groups; others with all members; some others with only core groups; and some

others indicate that they simultaneously share with all members and selected groups (discussed in Section 5.6.4). Thus, it varies from one respondent to the other depending on the contents and relevance of the message.

In Survey Two (2016), the responses vary from some respondents to the other. For example, some respondents explain that they share with all members (KM Development respondents[16] 3, 28, 32, 38, 39, & 41; KM Non-classified respondents[16] 7 & 12; Gurteen Knowledge respondent[16] 23); other respondents state that they share with selected groups only (KM Non-classified respondents[16] 4, 8, 9, 10, 13 & 22; KM Development respondents[16] 16, 17, 30 & 31; Gurteen Knowledge respondent[16] 21 & 35; KM Practitioners respondents[16] 24 & 25); some few respondents report of sharing with core groups (KM Development respondents[16] 31 & 34); and other respondents indicate that they share with various groups such as with "…all members and selected groups depending on the relevance of contents…" (KM Non-classified respondent[16] 11; Gurteen Knowledge respondent[16] 18; KM Development respondents[16] 19 & 27).

The contribution from literature is that social contexts such as values, norms, and principles affect the distribution of knowledge (Schutte & Snyman, 2007; Mu *et al.*, 2008:88-91) (Section 4.3.3). For example, an open culture founded on honesty and trust may enable knowledge distribution and flow simpler. Conversely, distrust may create fear in the senders that their knowledge might be exploited or the receiver may have reservations about the quality and reliability of the source's knowledge (Alashwal, Rahman, & Beksin, 2011:1530) (Section 4.3.3). A similar view is shared in Azudin, Ismail and Taherali (2009:143), Lin and Chang (2008:332), and Mu *et al.* (2008:88-91) who all indicate that trust is a vital factor in knowledge distribution (Section 4.3.3).

In addition, the recipient's absorptive capacity such as the desire to share, learn, and experience are critical factors in knowledge distribution (Arntzen-Bechina & Leguy, 2007:156) (Section 4.3.3). In other words, the recipient's pride, ego, and resistance to change can affect the flow of knowledge negatively (Arntzen-Bechina & Leguy, 2007:156) (Section 4.3.3). For example, in a study conducted on knowledge flow in the context of Biomedical Engineering Science, some scientists show a latent as well as open hostility to exploit fully the high tech tools that help to transfer knowledge (Arntzen-Bechina & Leguy, 2007:156) (Section 4.3.3). In brief, the willingness of both the sources and receivers to share their knowledge is crucial in enhancing knowledge distribution.

In summary, the outflow from the research Survey Two (2016) and current literature is that people distribute their knowledge with whom they find it relevant to share. This implies that to whom you distribute your knowledge is contextual depending on the nature of the content and the audience.

For example, some may be task-related which you distribute to colleagues, others may be topics of common interest which you can share to interest groups, and some others may be general issues that may be distributed and intended to reach to everyone. In addition, social context, cultural values, and the knowledge source's desire to share and the receiver's desire to learn are determinant factors in the context of knowledge distribution within VCoPs. The importance of VCoPs in enhancing the distribution of knowledge to relevant people is evident from what the Survey Two (2016) results reveal in terms of what contents are shared to which group of members in VCoPs.

6.2.5   Knowledge application

Application refers to the utilisation of the knowledge shared in an organisation (Nissen & Levitt, 2002:7-8) (Section 4.3.3). The application of knowledge is usually influenced by the receiver's needs (Hu & Kuo, 2013:1049) (Section 4.3.3). This means the knowledge that needs to be shared must be appropriate and relevant for the recipient's requirements, as well as recognised and understood as such. In addition, knowledge needs to be in appropriate language forms and tools to be easily used by the recipients or end users. Knowledge without a record of past usefulness is also usually questioned by recipients and presents a barrier to knowledge flow and application (Lin and Chang, 2008:332) (discussed in Section 4.3.3). In brief, ease of use of a knowledge entity and its past usefulness determines the applicability of such knowledge in an enterprise.

In Survey One (2011/12), a question to confirm the application of knowledge in VCoPs was asked: **"How will you share your knowledge in the VCoP (for example, knowledge on how to manufacture a product; how to solve a problem at work; how to fix a flat tyre; how to prepare a meal; etc.)?"** (Question 24, Annexure F). Then, a follow up question was asked: **"What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?"** (Question 25, Annexure F).

For both question 24 and 25, many respondents explain that they use knowledge to develop common standards, upgrade individual knowledge, promote life-long learning, apply at workplace, enhance tacit and explicit knowledge of an individual, and enhance problem solving techniques (discussed in Section 5.6.5).

In Survey Two (2016), a question was asked to verify if the application of knowledge is enhanced through VCoPs. The respondents were asked: **"What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?"** (Question

11, Annexure G). Similar responses to that of Survey One (2011/12) is obtained. For example, one respondent states that "…a great deal of the knowledge shared contributes towards the enhancement of individual knowledge to do work better and more efficiently…" (KM Development respondent[16] 32). Another respondent writes that new paradigms and practice emerge as the result of the discussion in their respective VCoPs enabling them to be aware of new developments in their sector (KM Practitioners respondent[16] 33). Another respondent further mentions that knowledge sharing aids in identifying the knowledge gap that currently exists in an enterprise (KM Development respondent[16] 39).

In Survey One (2011/12), some respondents further explain that knowledge sharing in VCoPs can be the cause of changes in how businesses should be run (discussion found in Section 5.6.5). In Survey Two (2016), similar response is suggested. For example, a respondent explains that VCoPs contribute to the learning and upgrading of skills of entrepreneurs in their particular business area (KM Development respondent[16] 36). Another respondent suggests that new paradigms and practice as well as new developments in a particular business sector are acquired through VCoPs' knowledge sharing activities (KM Practitioners respondent[16] 33). Another one further explain that experiences are shared and incorporated to extend the existing work ethics and practice (KM Development respondent[16] 34). Similar responses include that VCoPs enhance work and personal experiences (KM Development respondents[16] 17 & 30); optimise problem solving capabilities (KM Non-classified respondents[16] 4 & 8; KM Practitioners respondent[16] 24 & 25; KM Development respondent[16] 28); provide many possible answers to a question (KM Non-classified respondent[16] 40); improve business processes and increase profit margins (KM Non-classified respondent[16] 9; Gurteen Knowledge respondent[16] 29); and enable an individual to integrate knowledge in daily tasks (KM Development respondent[16] 19).

In current literature, organisational benefits by VCoPs include the increase in operational efficiency that lead to cost savings, maximise sales and profits as the result of the flow and sharing of knowledge within VCoPs (Hislop, 2004:38; Fontaine & Millen, 2004:7) (Section 2.8). While personal and community benefits through the use of VCoPs remain intangible, they both have the potential to influence tangible business outcomes (Fontaine & Millen, 2004:7) (Section 2.8). For example, organisations introduce VCoPs in an effort to enhance their knowledge database, facilitate the transfer of expertise and hands-on experience among their employees (Fontaine & Millen, 2004:2) (Section 2.8). Furthermore, the same authors explain that many organisations provide VCoPs with necessary resources to enable knowledge sharing. Such organisations that implement VCoPs usually strive to improve expert knowledge sharing and solve their work-related problems (Tang & Yang, 2005:499).

In summary, the responses from Survey Two (2016) confirm that knowledge shared within VCoPs are utilised to develop common standards, upgrade individual knowledge, and promote life-long learning. VCoPs also enhance tacit and explicit knowledge sharing that can be applied in solving individual as well as organisational problems. Therefore, VCoPs optimise the application of knowledge both at an individual and organisational level.

6.2.6   Knowledge evolution

Knowledge evolution is a period of reflection during organisational learning, that is, when users evaluate the usefulness of the available knowledge (Nissen & Levitt, 2002:7-8) (Section 4.3.3). Evolution implies potential innovative ideas that arise from emerging internal and external needs of an organisation. For example, new knowledge may be required to deal with emerging issues in an organisation. The logic behind evolution is that there are many different truths which lead to swift testing of emerging ideas and simultaneous development of knowledge (Vuori & Okkonen, 2012a:119) (discussed in Section 4.3.3). In brief, evolution implies a new knowledge output as the result of new ideas and trends in a particular environment.

In Survey One (2011/12), a question was asked pertinent to knowledge evolution – **"What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible?"** (Question 26, Annexure F). Most respondents in Survey One (2011/12) indicate that VCoPs generate new experiences and perspectives, enable to adapt to new practice, fill knowledge gaps, contribute to community benefits, and aid individuals in enhancing their knowledge (discussion found in Section 5.6.6). The same question was asked in Survey Two (2016) (Question 12, Appendix G). Similar responses are given in Survey Two (2016). For example, KM Development respondent[16] 3 and KM Non-classified respondent[16] 4 indicate that original ideas and new knowledge are shared within their VCoP groups. Another respondent explains that VCoPs enable to "…share new concepts, new installations or projects and in sharing evaluations of said initiatives which assist in creating knowledge and throwing up new questions…" (KM Development respondent[16] 28). Another respondent further states that "…UNDP gains new and adaptable experiences from various grassroots communities in various UNDP-targeted sectors…thus, share this as communities of practice to extend the experiences to other communities that fall within similar projects…" (KM Development respondent[16] 41).

In Survey One (2011/2012), however, one respondent indicates that much of the new knowledge is generated in the real world, implying that a very minimal percentage is only generated by VCoPs (discussion found in Section 5.6.6). Similarly, in Survey Two (2016), some of the respondents question the originality of knowledge shared within VCoPs. As one respondent explain, people

can learn something out of what is displayed in VCoPs but the problem is that "…there is no enough originality; people pick up ideas from left and right, then they share them as their own…" (KM Non-classified respondent[16] 13). Another respondent concurs that "…people just have the opportunity to articulate their knowledge that was already out there so that other people can be aware and use them when they require them…" (KM Development respondent[16] 38).

Some respondents of Survey One (2011/2012) explain that generating new knowledge affects individuals across borders (explained in Section 5.7.6). Similar response is found in Survey Two (2016). For example, one respondent explain that CoPs are still utilised in their organisation as they are more international almost reaching several countries (KM Development respondent[16] 19). The same respondent further answers that CoPs are useful to get a first-hand data from the real people in the ground.

Some respondents of Survey One (2011/12) further explain that generating new knowledge does not happen as a result of VCoPs per se; rather, it happens as the result of discussion and collaboration process among individuals (discussed in Section 5.6.6). Similar responses in Survey Two (2016) show that new knowledge emerges as people discuss and debate about a particular topic. As one respondent writes, "…generating knowledge in VCoPs certainly happen during discussions and debates with other experts; Communities of Practice is just another platform to enable people to generate knowledge on regular basis…" (Gurteen Knowledge respondent[16] 18). Another respondent explains that, "…it is not just about generating new knowledge per se or even sharing that knowledge, but it is about making meaning of, contextualising and using knowledge to forward the domain the community cares about…" (KM Non-classified respondent[16] 14).

In Survey One (2011/12), some respondents further explain that knowledge sharing within VCoPs enable to adapt a new practice (discussed in detail in Section 5.6.6). Similar response from Survey Two (2016) include: VCoPs should form part of the learning environment in businesses as they generate new solutions and knowledge (Gurteen Knowledge respondent[16] 35). Another respondent states that new experiences and paradigms are gained through discussions and contributions by professionals (Gurteen Knowledge respondent[16] 29). A respondent further explains that there are new knowledge produced by VCoPs but at the same time there are existing practice that are not clearly noticed that actually emerge in the VCoPs (KM Development respondent[16] 31).

In summary, VCoPs enable individuals, communities and organisations to revive and upgrade their knowledge. Both individuals and organisations use VCoPs to generate new experiences and perspectives as well as to adapt to a new practice. Thus, VCoPs are vital in generating new knowledge on regular basis.

6.3   Summary and Conclusion

The main objective of Survey Two (2016) is to verify the applicability of the extended Life Cycle knowledge flow model to enhance knowledge sharing within current VCoPs. Most of the findings from Survey Two (2016) are found to have similarities with that of the Survey One (2011/12) results. The phases in the extended Life Cycle knowledge flow model, namely - creation, organisation, formalisation, distribution, application and evolution of knowledge in VCoPs are used as the basis to structure Survey Two (2016). What takes place under each phase of the model within the VCoP knowledge sharing environment is verified by 41 respondents.

Seven respondents reveal the type of tacit and explicit knowledge that are created by VCoPs. For example, the type of knowledge created in VCoPs are originally own ideas, research results, opinions, reply to other opinions, comment on academic articles, and forwarding some other research articles to members.

In addition, the types of contents that are created by VCoPs include work-related knowledge (eleven respondents), life-oriented information (eleven respondents), academic and research results (four respondents), and other various aspects of knowledge (four respondents). The roles of VCoP members are also verified in Survey Two (2016). The roles include contributors (seven respondents), consumers and contributors (seven respondents), as well as facilitators or moderators (four respondents).

Current literature does not specifically indicate how messages are organised in VCoPs. The Survey Two (2016) results provide new insights in how knowledge is organised, for example, using author name (seven respondents), topic (nine respondents), date (fourteen respondents), subject area (six respondents), and a combination of other search mechanisms (11 respondents). Messages are retrieved, for example, by searching using author names, topic, and any other keyword (four respondents); using links, google, inbox and e-mails (four respondents). It is verified from Survey Two (2016) results that VCoPs optimise the classification of knowledge in an organised manner, which enables a simple retrieval of archived knowledge.

Some respondents report that VCoPs can be utilised to share tacit knowledge. In addition, VCoPs can be utilised to formalise the tacit part of knowledge to make them easily accessible and noticeable to knowledge receivers. Ten respondents in Survey Two (2016) explain that tacit knowledge can be communicated through different forms such as storytelling, diagrams, video clips, text, pictures, and illustrations. Various other forms that are used to make tacit knowledge visible and understandable to others include PowerPoint Presentation, blogs, hyperlinks, and different languages suitable to individuals. Thus, the extended Life Cycle knowledge flow model

enables VCoPs to optimise the formalisation of knowledge to make it more conspicuous and accessible to users.

Survey One (2011/12) and Survey Two (2016) as well as current literature illuminate how knowledge is distributed to members of VCoPs. Thirty respondents indicate that knowledge distribution is contextual depending on the nature of content and audience. For example, some knowledge may be work-related in which individuals distribute only to colleagues (Fifteen respondents), some may be topics of common interest in which you share to interest groups (Two respondents), and others may be general issues that may be distributed to everyone (nine respondents). In addition, social context, cultural values, and the knowledge sources' as well as the knowledge receivers' desire to share and learn respectively are determinant factors in the context of knowledge distribution within VCoPs. Thus, the extended Life Cycle knowledge flow model enables VCoPs to optimise knowledge distribution.

Furthermore, this researcher found from the responses of Survey Two (2016), that knowledge shared within VCoPs can be utilised to develop common standards, upgrade individual knowledge, and promote life-long learning (fourteen respondents). VCoPs enhance tacit and explicit knowledge that can be utilised in solving individual and organisational problems. Thus, the extended Life Cycle knowledge flow model enables VCoPs to enhance the application of knowledge both at an individual and organisational level.

VCoPs enable individuals and organisations to revive and develop their existing knowledge. Individuals and organisations use VCoPs to generate new experiences and perspectives, adapt to new practice, and enable individuals to uplift an individual knowledge (eleven respondents). The adaptation of the extended Life Cycle knowledge flow model by VCoPs is vital in reviving and upgrading new knowledge on regular basis.

CHAPTER SEVEN

SUMMARY AND CONCLUSION

7.1   Introduction

In this Chapter, the conclusion of this research and recommendations are presented. The Chapter begins with the research summary which includes research problem statement, aim of the research, and the research questions. The extended Life Cycle knowledge flow model that enables to enhance knowledge sharing within VCoPs is presented. This is followed by the conclusion, recommendations, limitations and reflection of the research.

7.2   Research Summary

In this section, the research problem statement, aim of this research, and research questions are presented.

7.2.1   Research problem statement

The concept of VCoPs originates from the need to create a new mode of learning and knowledge creation. It is also established that highly structured formal knowledge sharing activities are not always the best way to assist people to learn and solve problems. This then requires organisations to seek alternative ways to share knowledge. The sharing of knowledge using VCoPs receive considerable attention in many organisations. This development impacts organisations, thereby enabling them to respond more speedily to the demands of their stakeholders. However, there is no model that could be established in current literature that enables to enhance knowledge sharing within VCoPs. Within this context, the use of VCoPs to optimise both tacit and explicit knowledge sharing within stakeholders is the central theme of this research.

7.2.2 Aim of the research

The aim in this research is:

- To identify scientifically based model that may be adapted to enhance information and knowledge sharing within VCoPs.
- To generate theories or models as well as test these potential theories or models to establish their adaptability in optimising information and knowledge sharing within VCoPs.

7.2.3   Research question

What scientific approach can be used to optimise knowledge sharing within VCoPs?

7.3   Conclusion

To answer the first and second investigative questions, a literature review was conducted between 2007 and 2011. A further review of literature was conducted spanning years 2012 to 2016. This was to validate the relevance of the literature collected until 2011, as well as any new developments that came forth after 2012 with regard to any model that potentially optimises knowledge sharing within VCoPs. The contribution to this research is that a comprehensive knowledge flow model, namely the Life Cycle knowledge flow model is used from literature. However, the model has not been tested and verified if it optimises knowledge sharing within the context of VCoPs. Thus, this researcher is compelled to further investigate and establish if this scientifically based model enhances knowledge sharing within VCoPs.

After investigating the review of literature and finding a comprehensive scientific based knowledge flow model – namely, the Life Cycle knowledge flow model, the researcher was able to conduct Survey One (2011/12), which enabled to generate an extended knowledge flow model and Survey Two (2016), which enabled to validate the extended knowledge flow model in optimising knowledge sharing within VCoPs. The answers to the investigative questions are summarised below.

7.3.1   Answering the investigative questions

The answers to the investigative questions are summarised below:

7.3.1.1   How have virtual communities of practice (VCoPs) evolved contributing to knowledge sharing?

The objective of this investigative question is to analyse and compare various definitions and concepts of VCoPs and their contribution to knowledge sharing. A review of literature has been conducted in establishing the historical evolution of VCoPs, theoretical concepts of VCoPs and their contribution in enhancing knowledge sharing. The literature review resulted in the need to identify and develop scientifically based models that could potentially enhance knowledge sharing in an enterprise.

The central notion of VCoPs is to acquire knowledge by which a newcomer learns from the old members of a particular VCoP. The concept of VCoP is the assumption that less experienced members of a community can learn in social interactions from experienced experts of a specific

knowledge domain. Other noteworthy advantages of VCoPs are their ability to promote informal knowledge sharing. Informal knowledge networks help to overcome knowledge flow barriers and stimulate the sharing of tacit knowledge.

In addition, VCoPs provide three main benefits - individual, community, and organisational benefits. Individual benefits refer to enhancing personal development and expertise as the result of participating in the knowledge sharing activities. Community benefits refer to upgrading awareness and access to the collective community members' expertise. Organisational benefits refer to the increase in operational efficiency that leads to improved cost savings, sales, and profits as the result of the knowledge shared within VCoPs.

However, there are challenges in VCoPs in terms of knowledge sharing. These include forcing members to participate in VCoPs, which results in hindering knowledge sharing. The second challenge emerges as the result of resistance to change such as disallowing outside membership and/or resistance by existing members. The third challenge is due to the lack of measurable outcomes that could have resulted from knowledge sharing in VCoPs.

Barriers in knowledge sharing can significantly hamper firm performance, as organisations may be unable to tap into the know-how and expertise of their employees. For example, some companies such as IBM, Shell, The World Bank, UNDP, FAO and Siemens deliberately support their VCoPs in order to enhance the sharing of tacit and explicit knowledge. The concept of CoPs stems from the need to create a new mode of learning and is viewed as a specific form of knowledge development. In this context, ICT infrastructures are critical in enabling the flow of knowledge. This prompts for the development of VCoPs.

In view of these benefits, challenges and barriers, the identification and development of scientifically based models that can potentially enhance knowledge sharing in an enterprise was found crucial in this research.

7.3.1.2   How are current processes or models applied to knowledge sharing in enterprises?

The objective of this investigative question is to identify current scientific processes or models applied to knowledge sharing in enterprises. The researcher has limited prior knowledge and not closely linked to the professional practice of VCoPs. This enables him to have an unbiased view to determine the current models applied to knowledge sharing in enterprises. The researcher is compelled to investigate contemporary scientifically based knowledge flow models in an enterprise and subsequently, to investigate how they would be applied to particularly enhance

knowledge sharing within VCoPs. A literature review is deemed suitable in exploring such scientifically based theoretical models.

After a thorough investigation of literature, the Life Cycle knowledge flow model was established as being comprehensive to be able to establish a basis to conduct empirical research to enhance knowledge sharing within VCoPs. The phases in Life Cycle knowledge flow model include creation, organisation, formalisation, distribution, application and evolution (Nissen & Levitt, 2002:7-8).

Creation refers to how the tacit knowledge is initially articulated; organisation refers to the development of taxonomies; formalisation is the conversion of tacit knowledge to explicit; distribution refers to diffusion of the tacit and explicit knowledge; application represents the utilisation of both tacit and explicit knowledge, and evolution is the final stage where the existing tacit and explicit knowledge are evaluated to determine their further use and applicability.

From literature, it is established that the Life Cycle knowledge flow model has not been applied and adapted to the optimisation of knowledge sharing within VCoPs. Thus, the model is taken as the basis to conduct surveys and to investigate its adaptability and applicability to knowledge sharing within VCoPs. The outcome of the investigation from both, Survey One (2011/12) and Survey Two (2016) enabled the researcher to generate a scientifically based extended model in an endeavor to adapt to and optimise knowledge sharing within VCoPs. Thus, the researcher was compelled to answer the third investigative question, in an effort to establish the application of the model to enable the optimisation of knowledge sharing in VCoPs.

7.3.1.3 How would a scientifically based model be applied to particularly enhance knowledge sharing within VCoPs?

The objective of this investigative question is to investigate if the Life Cycle knowledge flow model can be applied to particularly enhance knowledge sharing within VCoPs. Both, Survey One (2011/12) and Survey Two (2016) was conducted to get a response from the actual participants of VCoPs.

A qualitative methodology was utilised to deal with the third investigative question. The indispensable condition for qualitative methodology is a commitment to perceiving the world from the point of view of the participants. The use of a qualitative approach enabled the researcher to describe and analyse the experiences of the participants from their point of view. The emphasis on qualitative research is on the phenomenological approach in which the researcher grasps the meanings of a person's activities from that person's point of view. The use of qualitative inquiry in

this research is also justified as it allows the participants to provide a more open-ended way of giving their views. Thus, the assertion in qualitative research enabled the researcher to emphasise on inductive approach which places emphasis on the generation of theories or models based on the responses given in both Survey One (2011/2012) and Survey Two (2016).

The responses from the survey provided the category of tacit and explicit knowledge that are created by VCoPs, which was missing in current literature. For example, the types of knowledge created in VCoPs are established as originally own ideas, research results, opinions, reply to other opinions, comment on academic articles, and forwarding some other research articles to members.

In addition, the extended model optimises the creation of knowledge in VCoPs. The types of contents that are created by VCoPs are established from the survey responses. These included work-related information, life-oriented information, research results and academic, and other various aspects of knowledge. The roles that the VCoP members play have also been clarified in the survey responses. The roles of VCoP members are as contributors, consumers and contributors, as well as facilitators or moderators. Thus, the categories and roles of VCoPs in enhancing the creation of knowledge are put forward in this research.

The extended model also enhances the organisation of knowledge in VCoPs. The responses in both surveys provided new insights in how knowledge is organised (for example, author name, date, topic, subject area etc.) and retrieved (search by author, web archives, keyword, e-mails, links etc.) in VCoPs. Thus, the extended Life Cycle knowledge flow model enhances the organisation of knowledge in VCoPs.

The extended model also optimises the formalisation of tacit knowledge sharing in VCoPs. This results in enhancing tacit knowledge sharing and make them easily accessible and understandable to users. The extended Life Cycle knowledge flow model reveals that knowledge in VCoPs can be communicated through different forms such as storytelling, diagrams, video clips, text, pictures, and illustrations. Various forms are also used to make tacit knowledge visible and understandable to others such as by using PowerPoint Presentation, blogs, hyperlinks, and by using different languages suitable to individuals. This is a clear indication that the extended Life Cycle knowledge flow model enables to enhance the formalisation of knowledge in VCoPs.

The extended Life Cycle knowledge flow model also enables to optimise knowledge distribution within VCoPs. The respondents showed that to whom you distribute your knowledge is contextual depending on the nature of the content and the audience. For example, some may be work-related which you distribute to colleagues, others may be topics of common interest which you can share

to interest groups, and others may be general issues that may be distributed and intended to reach to everyone. In addition, social context, cultural values, and the knowledge sources' as well as the knowledge receivers' desire to share and learn respectively are determinant factors in the context of knowledge distribution within VCoPs. The importance of the extended Life Cycle knowledge flow model in optimising the distribution of knowledge within VCoPs is documented in this research.

The extended Life Cycle knowledge flow model also enables to optimise the application of knowledge sharing. The response in both Survey One (2011/12) and Survey Two (2016) reveal that knowledge shared within VCoPs can be utilised to develop common standards, upgrade individual knowledge, and promote life-long learning. VCoPs also enhance tacit and explicit knowledge so that to apply in solving individual as well as organisational problems. Therefore, the extended Life Cycle knowledge flow model enables VCoPs to enhance the application of knowledge both at an individual and organisational level.

The extended Life Cycle knowledge flow model also enables to optimise the evolution of knowledge in VCoPs. This results in enabling individual members as well as organisations to revive and upgrade their existing knowledge. Both individuals and organisations use VCoPs to generate new experiences and perspectives, adapt to new practice, fill knowledge gaps and avoid redundancy, contribute to community benefits, and enable individuals to upgrade an individual knowledge. This is a clear indication of the extended Life Cycle knowledge flow model to enable the use of VCoPs in reviving and upgrading new knowledge on continual basis.

Therefore, the extended Life Cycle knowledge flow model can be utilised as the basis to develop a criteria that will enable to enhance knowledge sharing within VCoPs. VCoPs can measure their knowledge sharing expectations and effectiveness against the essentials of the extended model. The challenges to knowledge sharing within VCoPs that were identified in the literature review can now be addressed by utilising the abovementioned six phases of the proposed scientific knowledge flow model, namely creation, organisation, formalisation, distribution, application, and evolution.

7.3.2   Answering the research question

This section is to discuss the main research question: ***What scientific approach can be used to optimise knowledge sharing within VCoPs?***

An extended Life Cycle knowledge flow model is established to enhance knowledge sharing within VCoPs. This extended model covers six phases of knowledge development to particularly enable

to optimise knowledge sharing within VCoPs. While the Life Cycle knowledge flow model was already existing in literature, it was not designed and applied to knowledge sharing optimisation within VCoPs. Thus, this research is vital in revealing the extended model of knowledge flow that can be used and be adapted in VCoPs. The outflow of such model is to enhance knowledge sharing within VCoPs, and in turn, develop and optimise knowledge sharing in an enterprise. The first phase enables to enhance the creation of both tacit and explicit knowledge. The second phase enables to optimise the organisation of knowledge. The third phase enables to optimise the formalisation of tacit knowledge. The fourth phase enables to enhance the distribution of knowledge. The fifth phase enables to optimise the application of knowledge and the last phase enables to optimise the evolution of knowledge.

7.4   Recommendations

The optimisation of information and knowledge sharing in organisations is important to enhance work flow and attending to customer needs more speedily and effectively. Within this context, the use of VCoPs to optimise both tacit and explicit knowledge sharing within stakeholders is the central theme of this research. This research enabled the investigation to an extended Life Cycle knowledge flow model which will enable VCoPs to utilise the six phases of knowledge development of the model. Recommendations are also made for an enterprise to make use of the extended Life Cycle knowledge flow model to optimise knowledge sharing within stakeholders.

Utilisation of the extended Life Cycle knowledge flow model by VCoPs and an enterprise

The findings of this research indicates that the extended Life Cycle knowledge flow model optimises knowledge creation, organisation, formalisation, distribution, application, and evolution within VCoPs. Thus, the extended model can be adapted to qualitatively analyse and interpret the effective utilisation of VCoPs in knowledge sharing. The extended model can be used to analyse and establish VCoPs' knowledge sharing capability in light of the six phases of the knowledge extended Life Cycle knowledge flow model.

For example, in terms of knowledge creation, the contents of tacit and explicit knowledge sharing can be analysed and established whether they are work-related, life-oriented, research results, or a combination of other knowledge contents. The role players in knowledge creation can also be monitored whether they are contributing, or merely consuming, facilitating, and/or moderating messages.

In terms of knowledge organisations, a criteria can be developed to check both the organisation and retrieval of knowledge within VCoPs. For example, if the knowledge is organised by author name, date, topic, subject area, chronological order, mind mapping, and per keyword, the knowledge retrieval can also be checked in terms of date, author, topic, e-mail trails, through archives, keyword or a combination of two or more of the mentioned features.

The formalisation of tacit knowledge is another feature that can be analysed using the extended model. The formalisation of such knowledge can be checked if it is made explicit to others by using case studies, storytelling, diagrams, video clips, text, pictures, illustrations, PowerPoint presentation, blog posts, reference hyperlinks, question and answer comments, as well as multilingual approaches.

The optimisation of knowledge distribution within VCoPs can also be checked using the extended model. The contents distributed to individuals can be checked if they are task-related, topics of common interest, or general issues. At the same time, people who receive the contents can be checked if they are selected groups, core groups, and all members. In brief, the enhancement of content distribution can be determined with the help of the model.

The extended model also enables when optimising the application of knowledge sharing. The survey responses reveal that knowledge shared within VCoPs can be utilised to develop common standards, upgrade individual knowledge, and promote life-long learning. VCoPs also enhance tacit and explicit knowledge so that to apply in solving individual as well as organisational problems. Therefore, the application of knowledge within a particular VCoP can be established based on the model.

The extended model also enables VCoPs to optimise the evolution or continuous development of knowledge. This results in enabling individual members as well as organisations to revive and upgrade their existing knowledge on continuous basis. Both, individuals and organisations use VCoPs to generate new experiences and perspectives, adapt to new practice, fill knowledge gaps and avoid redundancy, contribute to community benefits, and enable individuals to upgrade an individual knowledge. The optimisation of generating new knowledge can be enabled by the model.

In summary, the outflow of this research is the extent of knowledge enhancement in an enterprise and VCoPs could be established through the intervention of the extended model. In turn, organisations who adopt VCoPs for the purpose of knowledge sharing can utilise the extended model to optimise their knowledge sharing.

7.4.1 Research limitations

This research is limited to Virtual Communities of Practice (VCoP) and their contribution to the optimisation of knowledge sharing. The extended model can also be adopted to establish the extent of knowledge enhancement in organisations. The participants in this research are drawn from VCoPs that have membership presence worldwide. In addition, their knowledge is extensively shared in open-ended surveys and therefore, their views and expertise can be generalised to all VCoPs that aim to share information and knowledge in various fields. This is justified as their sound knowledge of VCoPs, knowledge, and knowledge sharing as well as the diverse backgrounds of the participants are established and discussed in Chapter 6, Sections 6.3, 6.4 and 6.5.

The responses of the participants were delayed to an extent, due to their online presence and not face-to-face contact. There is usually a lower rate of response using online as the respondents are less obligated due to the barrier of the medium used (such as posting the survey on their VCoP websites or via e-mails) compared to face-to-face communication. The researcher had to constantly remind the respondents on certain time intervals, in order to overcome the reluctance to non-response. The researcher made a decision to stop at a point when the data saturation was observed from the responses, that is, when similar responses were being received. A realistic time-frame to receive responses was also a reason not to delay for too long but to resort to stop collecting more data as saturation had already been reached.

Another limitation is reconciling the responses received from Survey One (2011/12) to that of the responses received from Survey Two (2016). The same respondents may not have responded in Survey Two (2016), although the same VCoPs were chosen. Again, some of the VCoPs resorted to discussion on social networks such as LinkedIn. Both VCoP groups, KM4dev and Gurteen knowledge community were the only ones that were still active in providing responses to Survey Two (2011/12). In order to overcome this limitation, the researcher was able to reach the other VCoPs groups on LinkedIn, where they were noticed extending their discussions.

7.4.2 Further research

This research creates the foundation to further study and investigation into the optimisation of knowledge sharing in social networks. Recent trends point to Social networks being established as another mechanisms to share and enhance knowledge. Some of the benefits of social networks in both, tacit and explicit knowledge sharing are mentioned in Chapter 1, Section 1.2.4. Their contribution in optimising knowledge sharing can be tested by utilising the extended Life Cycle knowledge flow model provided by this research.

7.5   Reflection

This research enabled the researcher to establish a scientific based knowledge flow model that VCoPs can adapt to enhance their knowledge sharing capability. The practicality of the extended model was established through responses given by the actual participants of VCoPs' members. This research contributes to the optimisation of knowledge creation, organisation, formalisation, distribution, application and evolution. Most importantly, the researcher was able to find an extended knowledge flow model which could be applied to VCoPs.

A significant outflow reflecting on this research is that the extended model can also serve as the basis to further investigation and testing of other VCoPs with various themes and objectives. This would identify their contribution and possibly the effectiveness in enhancing knowledge sharing. A rubric based on the model may be formulated to enable VCoP managers and moderators to monitor the continuous development of knowledge.

VCoPs are particularly important for the enhancement of tacit knowledge sharing. The importance of VCoPs is further highlighted as the unstructured nature of tacit knowledge makes it difficult to be easily shared and managed by some traditional and formal knowledge management systems. Traditional knowledge sharing mechanisms such as, apprenticeships, face-to-face chatting or direct observation, would no longer be cost effective in the faster growing new business models. Thus, the relevance of VCoPs and the extended knowledge flow model in enhancing knowledge sharing within VCoPs becomes essential. The extended model can also be utilised by testing the contribution of social networks in optimising knowledge sharing.

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APPENDIX A: Letter of consent to key informants (2011/2012)

Cape Peninsula
University of Technology

Questionnaire to be used for online /e-mail interviews with various moderators and members of virtual communities of practice (VCoPs)

The purpose of this letter is to introduce a survey to investigate the potential use of an information and knowledge flow model in active VCoPs. If found applicable the model could be used for further research in this field, for example approaches to improve the efficiency of information and knowledge sharing within a particular VCoP. The results of this research will form part of a doctoral thesis.

The attached questionnaire should take approximately 20 to 25 minutes to complete.

Informed consent

The participation of moderators and members of VCoPs in this survey is completely voluntary. Participants are assured that their information will be kept strictly confidential and anonymous. No references will be made to specific individuals. All responses will be used for academic purposes only.

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APPENDIX B: Letter of consent to key informants (2016)

Questionnaire to be used for e-mail interviews with various moderators and members of virtual communities of practice (VCoPs)

The purpose of this letter is to introduce a survey to investigate the potential use of an information and knowledge flow model in active VCoPs. If found applicable the model could be used for further research in this field, for example approaches to enhance information and knowledge sharing within a particular VCoP. The results of this research will form part of a doctoral thesis.

The attached questionnaire should take approximately 10 to 15 minutes to complete.

Informed consent

The participation of moderators and members of VCoPs in this survey is completely voluntary. Participants are assured that their information will be kept strictly confidential and anonymous. No references will be made to specific individuals. All responses will be used for academic purposes only.

Please follow the link to complete the questionnaire:

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APPENDIX C: Research Survey (2011/2012)

Purpose of the questionnaire:

The aim of this questionnaire is to investigate how virtual communities of practice (VCoPs) can optimise information and knowledge sharing.

Terminology used in this questionnaire:

VCoPs are defined as groups of individuals who share information and knowledge using the Internet.

You have been included in my research as I have identified your name via one of the following VCoPs - km4dev.org, actKM, KM Practitioners group, Knowledge Management Education (KMedu) Hub, Gurteen Knowledge Community, and AIIM Network for Intelligent Information Management. Please note that the questionnaire below entails open-ended questions and a respondent should feel free to answer in as many words as necessary.

Part I - Personal details

Question 1

1	*Subject area / expertise	

Name of moderator/member interviewed (optional)

1

*Current employer / profession

1

*Date

4	87226761	1

*   2. Please provide the website address of the VCoP that you use most for work-related purposes (for example, kmpractitioner.co.za; efios.com, etc)?

1	47226763		2

*   3. How long have you been a member of the VCoP mentioned in Q.2?

1	47226764		3

*   Part II - Definition of terms

4. What is your opinion of what a *virtual community* entails (that is, what is your understanding of the definition and concept of 'virtual community')?

| 1 | 47226776 | | 4 |

*   5. What is your understanding of the term '*virtual communities of practice'* (that is, what changes when a community of practice goes online)?

| 1 | 47226778 | | 5 |

*   6. If you take part in what you described in Q.5., why do you belong or subscribe to a VCoP (that is, what do you personally expect to achieve by belonging to this VCoP?)

| 1 | 47226780 | | 6 |

*   7. According to your opinion, why do people in general subscribe to a VCoP? List as many reasons as you can think of?

| 1 | 47226781 | | 7 |

*   8. How would you describe 'knowledge' (that is, how would you interpret the concept 'knowledge'?)

| 1 | 47226782 | | 8 |

*   9. How would you describe 'knowledge sharing' (that is, how would you interpret the concept 'knowledge sharing')?

| 1 | 47226784 | | 9 |

*   Part III - Knowledge Sharing

10. What other media do you use to share knowledge other than the VCoP mentioned in Q.2 (that is, e-mail, face-to-face, videoconferencing, etc)?

| 1 | 47226786 | | 10 |

*   11. How frequently do you share your knowledge via the VCoP mentioned in Q.2 (for example, hourly, daily, etc)?

1	47226788		11

*   12. What types of knowledge do you share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)?

1	47226789		12

*   13. What are the requirements (criteria) to be allowed entry (subscription) to the VCoP mentioned in Q.2. (that is, qualification and expertise, experience, payment, etc.)?

1	47226790		13

*   14. How do you determine whether your knowledge is worth sharing in the VCoP (that is, who or what makes you to decide that it is worth sharing your knowledge)?

1	47226792		14

*   15. What do you do to ensure the knowledge that you share is simple to understand by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)?

1	47226793		15

*   16. What is your role in the VCoP (for example, read messages, edit contributions, provide solutions, write reports, etc.)? Please add more than one role if applicable.

1	47226796		16

*   17. What is the content of the messages that *you* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

| 1 | 47226798 | | 17 |

* 18. What is the content of the messages that *others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

| 1 | 47226800 | | 18 |

* 19. How are the messages organised in the VCoP (that is, by date of receipt, author name, topic, subject area)?

| 1 | 47226802 | | 19 |

*

20. If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)?

| 1 | 47226804 | | 20 |

* 21. Who do you mostly share your knowledge with in the VCoP (for example, only selected groups, all members, core groups, etc.)?

| 1 | 47226806 | | 21 |

* 22. What formats do *you* usually use to transfer your ideas and experiences via the VCoP (for example, use diagrams, story telling, case studies, etc.)?

| 1 | 47226807 | | 22 |

* 23. What formats do *others* usually use to transfer their ideas and experiences via the VCoP (for example, diagrams, story telling, case studies, etc.)?

| 1 | 47226808 | | 23 |

*   24. How will you share your knowledge in the VCoP (for example, knowledge on how to manufacture a product; how to solve a problem at work; how to fix a flat tyre; how to prepare a meal; etc.)?

| 1 | 47226810 | | 24 |

*   25. What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?

| 1 | 47226814 | | 25 |

*   26. What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible?

| 1 | 47226816 | | 26 |

*   27. How long should a knowledge sharing contribution be ideally open for discussion in the VCoP (that is, how long should the contribution stay in the VCoP so that it can be used as a reference by members)?

| 1 | 47226818 | | 27 |

*   28. If a discussion has been closed and archived, what are the requirements if a member wants to read, use or edit such discussion in case new ideas and/or developments came to the fore since it was archived? (for example acquiring permission from the moderator; requesting an unlock key; etc.)?

| 1 | 47226820 | | 28 |

'Your contribution to this research project is much appreciated'

END

| 57226822 | 28 |

Finish Survey

APPENDIX D: Research Survey (2016)

Purpose of the questionnaire:

The aim of this questionnaire is to investigate how virtual communities of practice (VCoPs) can optimise information and knowledge sharing in an enterprise.

Terminology used in this questionnaire:

VCoPs are defined as groups of individuals who share information and knowledge using the Internet.

You have been included in my research as I have identified your name via one of VCoPs. Please note that the questionnaire below entails open-ended questions and a respondent should feel free to answer in as many words as necessary.

Part I - Personal details

Question 1

| 1 | *Subject area / expertise | |

Name of moderator/member interviewed (optional)

| | | 1 |

*Current employer / profession

| | | 1 |

*Date

* 2. Please provide the website address of the VCoP that you use most (for example, kmpractitioner.co.za; efios.com, Km4dev.org, Gurteen Knowledge Community etc.)?

| 1 | 47226763 | | 2 |

Part II – Knowledge sharing

* 3. What types of knowledge do you create or share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)?

| 1 | 47226789 | | 12 |

*   4. What is your role in the VCoP (for example, read messages, edit contributions, provide solutions, write reports, etc.)? Please add more than one role if applicable.

1	47226796		16

*   5. How are the messages organised in the VCoP (that is, by date of receipt, author name, topic, subject area)?

1	47226802		19

*

6. If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)?

1	47226804		20

*   7. What do you do to ensure the knowledge that you share is simple *to understand* by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)?

1	47226793		15

*   8. Who do you mostly share your knowledge with in the VCoP (for example, only selected groups, all members, core groups, etc.)?

1	47226806		21

*   9. What is the content of the messages that *others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

1	47226800		18

*   10. What is the content of the messages that *you or others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

| 1 | 47226798 | | 17 |

*   11. What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?

| 1 | 47226814 | | 25 |

*   12. What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible?

| 1 | 47226816 | | 26 |

APPENDIX E: Profile of Selected VCoPs

KM4Dev

Name of the community – Knowledge Management for Development (KM4Dev).

Year established – 2000.

Objective – The aim of KM4Dev is to share various knowledge in order to create sustainable international development. It is a community of international development practitioners who are interested in knowledge management and knowledge sharing issues and approaches, and who seek to share ideas and experiences in this domain.

Membership – members are mainly in the field of knowledge management; however, individuals from various disciplines can join KM4Dev.

Source**:** http://www.km4dev.org/

Gurteen knowledge community

Name of the community -The Gurteen Knowledge Community.

Year established – 2002.

Objective -The community is for people who are committed to *making a difference*: people who wish to share and learn from each other and who strive to see the world differently, think differently and act differently.

Membership of the community is diverse but members have common traits - they:

- are committed to making a difference

- are inclined to action

- see themselves as thought-leaders and change activists

- recognize the importance of understanding through dialogue and conversation

- have a passion for learning

- are open minded and non-judgmental by nature

- value diversity and cultural differences

KM Practitioners Group

Name of the community – KM Practitioners Group aims to share knowledge and experience of how practical knowledge sharing and management can be successful in organisations

Year established - 2000.

Objective -. Their mission is to continuously improve the skills of knowledge managers, and to elevate the profile of knowledge management as a profession in South Africa, as well as the rest of Africa.

Membership – The members are mainly in the knowledge management field.

AIIM Network for Intelligent Information Management

Name of the community - AIIM Network for Intelligent Information Management.

Year established – 1982.

Objectives - provides, and to help organizations find, control, and optimise their information.

Name of the community - AIIM Network for Intelligent Information Management.

Year established – 1982.

Objectives - provides, and to help organizations find, control, and optimise their information.

AIIM provides market research and information that:

- Empower end-users to make smarter information management decisions.

- Help vendors, consultants and solution providers reduce the amount of uncertainty involved in developing, marketing and selling their products and services.

AIIM provides educational services that:

Help users, project managers, and business executives become more savvy information managers, strategists and technology buyers.

Improve the effectiveness and efficiency of sales and marketing executives from solution provider companies.

AIIM creates networking opportunities and communities that:

Allow users, vendors, consultants, and solution providers to connect with each other in a vendor-neutral and non-profit setting.

Provide a means for the industry to communicate the value of effective information management and its impact on organizational effectiveness.

Membership – The members include individuals that are engaged in information management and its optimization.

Source: **https://www.aiim.org**

Knowledge Management Education (KMedu) Hub

Name of the community – Knowledge Management Education (KMedu) Hub.

Year established – data not available

Objective - The Knowledge Management Education Hub (KMedu Hub) is the independent source and unique place where to find, discuss, and promote Knowledge Management education and training worldwide. It is created for KMedu Seekers, KMedu Providers, and the KM Community. Knowledge Management education seekers can find and discuss educational and training opportunities in Knowledge Management from universities, associations, training providers, and other organisations.

Membership - people who seek appropriate Knowledge Management education opportunities.

Source**:** https://kmeducationhub.de/

actKM

Name of the community -The actKM Forum.

Year established - 1998.

Objective - The actKM Forum is a not-for-profit learning community dedicated to building and sharing knowledge about public sector knowledge management, and contributing to improved public sector performance through effective management of knowledge and information resources. It aims to provide an environment where members can create and share knowledge about both public and private sector knowledge management issues.

Membership - The community comparises public sector, private sector and academics that have an interest in knowledge management. The actKM Forum also has a strong international

representation with members from Canada, the United Kingdom, the United States, New Zealand, India, Singapore, France and the Philippines.

Source: http://www.gurteen.com/gurteen/gurteen.nsf/id/actkm-forum

Questions	Answer	VCoP names and respondents' number codes
Question 1, 2, and 3 (personal details of the participants – such as Name, VCoP Membership, and Date etc.) Question 4. What is your opinion of what a *virtual community* entails (that is, what is your understanding of the definition and concept of 'virtual community')?		
	They share **a common interest**, for example Knowledge, or Mining or Technology	Gurteen Knowledge respondent[11/12] 2
	Communities on line with **common interest** (could be religion, politics, any field of interest)	Gurteen Knowledge respondent[11/12] 3
	Wenger's definition	Gurteen Knowledge respondent[11/12] 5; Gurteen Knowledge respondent[11/12] 6; KM Practitioners respondent[11/12] 4; KM Development respondent[11/12] 2
	A virtual community can form online if they have **common background and interests** agreed upon. Currently, this might refer to those who engage in animal rights, human rights, environmental activist, interests groups and other similar groups	Gurteen Knowledge respondent[11/12] 7
	This is a platform of **sharing common ideas** on the Internet	KM Practitioners respondent[11/12] 1
	Communities with **same interests**, targets, objectives, values, common norms aspiring to attain a goal or series of goals	KM Practitioners respondent[11/12] 5
	When people of **common interest** face one another to experience thoughts, feelings, ideas, expertise over the new ICT media	KM Practitioners respondent[11/12] 6
	Share a **common interest**	KM Education respondent[11/12] 1

	It's like a community fireplace where each participant is free to revive a fading fire or cook a meal.	KM Development respondent[11/12] 4
	To me this is an **online site or forum** that enables collaboration, support and project outsourcing for professionals working on or with simply **shared interest** in a particular area or subject	KM Development respondent[11/12] 3
	Communities with **common interest** regardless of geographic location; with common values and characteristics no matter their geographic embodiment	KM Development respondent[11/12] 6
	Communities with **common interest or topic of discussion online**	KM Development respondent[11/12] 8
	People sharing values, interests, resolve common problems on the internet	KM Development respondent[11/12] 10
	A group of people bound by **common values and beliefs** even though they can be far away from each other. For example, there are some enclaves in US such as the Hispanic, Arabs, Indian communities who are much related to the mainland	KM Development respondent[11/12] 17
	Communities located here and there but might have **common cultural practice that binds them together.** This communities have existed since ancient times by connecting themselves simply by their mere belief and common mindedness and thoughts	KM Development respondent[11/12] 20
	A group of people with something in common and in different locations	KM Non-classified respondent[11/12] 6
	People with **common interest(s),** who **communicate**	KM Non-classified respondent[11/12] 12

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	via web and telecommunications.	

Question 5. What is your understanding of the term '*virtual communities of practice'* (that is, what changes when a community of practice goes online)?

Question 6. If you take part in what you described in Q.5., why do you belong or subscribe to a VCoP (that is, what do you personally expect to achieve by belonging to this VCoP?)

Question 7. According to your opinion, why do people in general subscribe to a VCoP? List as many reasons as you can think of?

Supplementary question:

Question 13. What are the requirements (criteria) to be allowed entry (subscription) to the VCoP mentioned in Q.2. (that is, qualification and expertise, experience, payment, etc.)?

	They are designed long the same lines, have to have an active facilitator, however, unlike physical CoP's **collaboration occurs online**	Gurteen Knowledge respondent[11/12] 2
	Communities online with **common practice or field of knowledge**	Gurteen Knowledge respondent[11/12] 3
	People **sharing on internet** such as Gurteen knowledge community who share knowledge management issues	Gurteen Knowledge respondent[11/12] 4
	Wenger's definition; perhaps ICT is added to it	Gurteen Knowledge respondent[11/12] 5
	But, this term might differ from the above the fact that it implies more of a professional community practicing similar tasks rather than a social lobby group and activism	Gurteen Knowledge respondent[11/12] 7
	Individuals who are practicing some sort of the same tasks. For exam, the web developers can talk on how to increase the efficiency in web development **over the Internet**	Gurteen Knowledge respondent[11/12] 8
	Instead of onsite sharing of the practice (such as when doctors operate on site together with their nurses), they go **online, share ideas and expertise** to	Gurteen Knowledge respondent[11/12] 9

	operate a person from wherever they are; thus, CoPs become virtual when they share their practice online…to seek how learning becomes efficiently available to learners online	
	This is a platform of **sharing common ideas on the Internet** most notably amongst individuals with the same expertise	KM Practitioners respondent[11/12] 1
	Face to face interaction that is not facilitated by technology, unmanageable influx of information data etc., you cannot choose what you want, expanded network, promptness, easy access, control of time, flexibility, cautiousness cannot afford to make a mistake, not as accommodating of learning as face to face	KM Practitioners respondent[11/12] 2
	The same as mentioned above, nevertheless this could be a new phenomenon that **emerged with the Internet as it is virtual in a true sense**	KM Practitioners respondent[11/12] 5
	Sharing what is mentioned on answered in 4 but this has to go beyond theory; it implies real practice	KM Practitioners respondent[11/12] 6
	A VCoP is an informal community that is **formed online**. When a CoP goes online it requires different group/community management skills - people have to be willing to **share without really meeting the other members of the community**	KM Education respondent[11/12] 1
	There are at least 2 ways of forming a virtual community - one is for a **pre-existing community to go on-line**, and the other is for the **group to form on the internet in the first place**. I belong to both types, but am	KM Development respondent[11/12] 1

	answering here from K4D which is the second	
	As per Wenger	KM Development respondent[11/12] 2
	The main impact of the **online element** is the fact that geography is transcended and gives access to a wider group of practitioners to participate. It also provides a richer pool of skills and expertise	KM Development respondent[11/12] 3
	It provides direct positive impacts towards changes. **People get the opportunity to learn from each-other**; **can get the scope to adopt better practices and compare with their one**	KM Development respondent[11/12] 5
	Communities with common practice, trying to **solve a common problem**	KM Development respondent[11/12] 8
	Same as No 4 but more of knowledge **exchange between people of same practice**; more serious **exchange of knowledge**	KM Development respondent[11/12] 11
	A virtual space to preach about similar practice that can be implemented across regions	KM Development respondent[11/12] 12
	Knowledgeable people with the **same practice and topic of concern discussion online** to come up with new ideas and concepts to improve their practice	KM Development respondent[11/12] 14
	This is more of professional groups with affinities in their expertise **discussion online** such as on Kmfordev	KM Development respondent[11/12] 17
	By using the digital technology, people advocate and campaign for a **similar practice to be implemented across regions and continents usually shared online** such as km4dev	KM Development respondent[11/12] 18
	A community of knowledgeable people **promoting the same practice** to penetrate in many	KM Development respondent[11/12] 19

	regions of the world. These communities **embrace the Internet to share their knowledge** to reach millions of people in the world	
	This term is more recent that emerged as the result of digital technology whereby **individual experts meet online to share and review their common existing** knowledge and practice	KM Development respondent[11/12] 20
	Those are two different questions. For the first, I'd take my previous definition but I'd add that a VCoP specifically involves learning together while doing and crafting a practice together. Nothing changes in a CoP when it goes online except the meeting places, modes of communication and tools they use to interact	KM Non-classified respondent[11/12] 3
	A place on the web to share knowledge, experiences without restriction of country or jet lag... synchronous or synchronous participation....	KM Non-classified respondent[11/12] 4
	A community of online professionals **with a certain focus of expertise that exchange work-related information**	KM Non-classified respondent[11/12] 7
	Similar to a virtual community, but focused on problem solving or other social or organizational issue	KM Non-classified respondent[11/12] 9
	Fundamentally, **sharing a passion around a common discipline** should not change with a CoP goes virtual, it is the communication methods which change	KM Non-classified respondent[11/12] 12
	Members become "virtual" Identity, who have the option to change the identity and even the "appearance" relatively easier	KM Non-classified respondent[11/12] 14

	Working for a global engineering company I do not any better than working with teams all over the world. **Going online** makes communications a lot easier. We are seeing this happen over the 11 years we have our KM system now	KM Non-classified respondent[11/12] 15
	This is more into **specific practice shared e.g. doctors** sharing on how to operate in a surgical environment	KM Non-classified respondent[11/12] 17

Question 8. How would you describe 'knowledge' (that is, how would you interpret the concept 'knowledge'?)

Subjective construction of reality	**Subjective interpretation of information or data**; depends from people to people how you define knowledge; could be some information that permanently resides in one's mind	Gurteen Knowledge respondent[11/12] 3
	An individual's **subjective interpretation of concepts and explanations**; thus, depends on how an individual looks at ideas and concepts presented to them rather than knowledge being an absolutely the same for all	KM Practitioners respondent[11/12] 4
	It is subjective in a sense people interpret information they get from other people based on their frame of reference; It is something kept in the mind for **further application in daily life or to apply to various tasks where you work**	KM Development respondent[11/12] 6
	More of **subjective understanding of acquired information to make decisions and resolve issues**	KM Development respondent[11/12] 11
	Subjective interpretation of information acquired and use it for daily activities at work	KM Development respondent[11/12] 12

	Well, it is deep in terms of having **a better insight in a task or series of tasks;** know how to make a product perfectly, perform a task as much perfect as possible	KM Practitioners respondent[11/12] 5
	A **deeper understanding of concepts,** not superficial	KM Development respondent[11/12] 13
	Own **deep schema structured** over years	KM Development respondent[11/12] 17
	A **deeper insight into a concept**	KM Non-classified respondent[11/12] 16
	To be good at one core competency or area; have high level of experience in one field	KM Non-classified respondent[11/12] 17
	As the new literature in knowledge management indicates, it is **tacit and explicit body of information** that needs to be internalized and shared with others so as all can speak the same language	KM Practitioners respondent[11/12] 6
	Knowledge is the **tacit cognitive schema** used by worker in order to do their job more efficient and better and better	KM Non-classified respondent[11/12] 4
	Knowledge is information in any format, including **tacit knowledge**	KM Non-classified respondent[11/12] 7
	Knowledge is information that has been assigned meaning and context	KM Education respondent[11/12] 1
	As opposed to information, which is usually superficial, knowledge is about incorporating concept to be part of one's schema residing for a long period of time to serve for various purposes in future. Hence, knowledge **more meaningful to be able to assist people to apply in various tasks** than having mere information	KM Development respondent[11/12] 14

Question 9. How would you describe 'knowledge sharing' (that is, how would you interpret the concept 'knowledge sharing')?		
	As reaching an understanding of each other's **constructions of reality** and interpretations of key concepts and findings, common to both parties	KM Development respondent[11/12] 1
	Negotiating meaning	KM Development respondent[11/12] 4
	Sharing of experience and expertise	K KM Development respondent[11/12] 2
	Disseminating the knowledge you have with others who do not possess that knowledge	Gurteen Knowledge respondent[11/12] 2
	Sharing one's idea, opinion, beliefs, principles, idiosyncrasies, knowledge in general	KM Development respondent[11/12] 12
	When people share their know-how in CoP that is sharing but it is mutual give and take	Gurteen Knowledge respondent[11/12] 8
	A voluntary exchange of opinions, ideas, practice	KM Development respondent[11/12] 8
	An innate consequence of social interaction	KM Non-classified respondent[11/12] 3
	Making one's insights public; **disseminate what you know to others either formally or informal**	KM Development respondent[11/12] 11
	It is the sharing of one's experiences, ideas, opinions, concepts, and information. It implies an **exchange during informal as well as formal conversations**	KM Practitioners respondent[11/12] 4
	Sharing such tacit and explicit knowledge with the emerging definition in informatics	KM Practitioners respondent[11/12] 6
	Sharing 'how-to' or conceptual **insight either tacitly via conversation or explicitly via codified knowledge**	KM Non-classified respondent[11/12] 12

	Being able good to express and explain to others what you are good at	KM Development respondent[11/12] 19
	Sharing one's good competencies	KM Non-classified respondent[11/12] 17
	Open, honest conversation personal and interpersonal where the common interest exists. Imparting that which is required, with those who can and should benefit. **It's not giving information for the sake of it, there should be a value driver behind it. It is purposeful with benefit**	KM Practitioners respondent[11/12] 2
	A process where knowledge is provided and received to solve problems, this may result in new knowledge	Gurteen Knowledge respondent[11/12] 1

Question 10. What other media do you use to share knowledge other than the VCoP mentioned in Q.2 (that is, e-mail, face-to-face, videoconferencing, etc)?

Question 11. How frequently do you share your knowledge via the VCoP mentioned in Q.2 (for example, hourly, daily, etc)?

Question 12. What types of knowledge do you share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)?

Supplementary question:

Question 14. How do you determine whether your knowledge is worth sharing in the VCoP (that is, who or what makes you to decide that it is worth sharing your knowledge)?

Tacit knowledge & explicit knowledge	All types of knowledge mentioned above [referring to for example, **original (your own) ideas, research results, academic articles; technical reports, news bits, etc**.]	Gurteen Knowledge respondent[11/12] 1
	Original ideas, developments, insights; new reports, news bits in knowledge management	Gurteen Knowledge respondent[11/12] 3
	Originally my own findings, research results in knowledge management, technical reports, news	Gurteen Knowledge respondent[11/12] 6
	My own ideas, research results, news stories	Gurteen Knowledge respondent[11/12] 7

	New media technologies such as web features, **technical reports** of knowledge management systems, **research results**	KM Practitioners respondent[11/12] 4
	Mainly talking on how tacit knowledge is codified especially in the area of engineering and other mechanical knowledge intensive tasks	KM Practitioners respondent[11/12] 6
	Ideas and research outputs/outcomes	KM Development respondent[11/12] 4
	Originally my own ideas, research results, opinions, reply to other opinions, comment on academic articles, forward some other research articles to members	KM Development respondent[11/12] 6
	Blog and website updates	KM Non-classified respondent[11/12] 7
	Academic research, industry reports	KM Non-classified respondent[11/12] 9
	Original ideas, opinions on others' questions, experience, best practice studies, contacts	KM Non-classified respondent[11/12] 11
	My own ideas identified best practices references to readings (blog, journal article, etc.) Answering questions posted in discussion lists (how-to)	KM Non-classified respondent[11/12] 12
	If I find it is new idea to share, might be new dimension to the KM practice	Gurteen Knowledge respondent[11/12] 3
	I usually take ideas first and give my input if necessary	Gurteen Knowledge respondent[11/12] 4
	Text, video, real stories	Gurteen Knowledge respondent[11/12] 3
	The ambition to grow and develop knowledge management that companies can leverage to increase business performance; also to make money and be successful by having many networks that I can consult to	Gurteen Knowledge respondent[11/12] 6

	Utilize all tools - anecdote, diagram video, text, whatsoever to make it simple	Gurteen Knowledge respondent[11/12] 9
	It's an open platform where the reader chooses what's worth and what's not worth to them	KM Practitioners respondent[11/12] 1
	By comments from others you can actually judge it	KM Practitioners respondent[11/12] 3
	All that you have mentioned - anecdotes, plain text, relevant diagrams, and also stream technologies such as video	KM Practitioners respondent[11/12] 4
	When I know that I will be rewarded in future but also a matter of interest	KM Practitioners respondent[11/12] 6
	Topics regarded of interest to the group	KM Education respondent[11/12] 1
	Respect for the VCoP	KM Development respondent[11/12] 1
	Usually there is a progression. As a new member, you are usually seeking information and knowledge and from there you progress to offering your knowledge. It is a collaborative effort, i.e the more you share, the more reputation you gain.	KM Development respondent[11/12] 3
	I use storytelling and story listening.	KM Development respondent[11/12] 4
	It depends on personal understanding and own judgment. Responses from others is one of the determining criteria of usefulness of the shared knowledge.	KM Development respondent[11/12] 5
	The desire to make knowledge public	KM Development respondent[11/12] 8
	When I feel that I should make my knowledge public; don't feel containing it to myself; I also share when people ask for any information that I already have it for them; there is also a culture of sharing in UNDP.	KM Development respondent[11/12] 11

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	When it feels it has new perspectives to the agricultural practice	KM Development respondent[11/12] 19
	Plain English. hyperlinks where appropriate	KM Non-classified respondent[11/12] 3
	Depending of what, when and to what public	KM Non-classified respondent[11/12] 5
	PowerPoint presentations.	KM Non-classified respondent[11/12] 6
	I think that audio-visual and other ways of enhancing knowledge are a great way to ensure the successful transferal of that knowledge	KM Non-classified respondent[11/12] 7
	Face-to-face, phone, Skype, email	Gurteen Knowledge respondent[11/12] 1

Question 17. What is the content of the messages that *you* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

Question 18. What is the content of the messages that *others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

	Research related or academia related	Gurteen Knowledge respondent[11/12] 1
	New practices and procedures	Gurteen Knowledge respondent[11/12] 1
	Work related, new practice, suggestions, new dimensions to addressing KM issues and challenges	Gurteen Knowledge respondent[11/12] 3
	Work-related, new ideas	Gurteen Knowledge respondent[11/12] 4
	Work-related experiences, new practice in knowledge sharing mechanisms, opinions, work procedures	Gurteen Knowledge respondent[11/12] 5
	Work related and **social**	Gurteen Knowledge respondent[11/12] 7
	Work related and **life oriented** News ideas, beliefs, work related	Gurteen Knowledge respondent[11/12] 9
	All of the above including questions and suggestions. [**work-related** problems, solutions, new practice, ideas, beliefs, procedures]	KM Practitioners respondent[11/12] 2

	You can find **every kind of content**	KM Practitioners respondent[11/12] 3
	Reports and findings and at times too much of **academia,** which deters me a lot	KM Practitioners respondent[11/12] 2
	Work related technical reports, new ideas and practice in marketing esp. the new social media strategic marketing	KM Practitioners respondent[11/12] 5
	Well positioned practice and experience that are **work related**	KM Practitioners respondent[11/12] 6
	New practice, ideas, **research**	KM Education respondent[11/12] 1
	Miscellaneous	KM Development respondent[11/12] 2
	There is no restrictions what others share. However, you can only view and participate in areas that are of your interest. If you want to be part of other areas, you have to subscribe to that	KM Development respondent[11/12] 3
	Solutions and procedures	KM Development respondent[11/12] 4
	Practical experiences - problems & sharing good examples; ideas, etc	KM Development respondent[11/12] 5
	New practice, **work-related** practices, new KM practices, case studies, **research results** in KM	KM Development respondent[11/12] 6
	Ideas, opinions, **research outputs**	KM Development respondent[11/12] 10
	Work related new practices, KM solutions, new KM developments	KM Development respondent[11/12] 12
	It varies from one to another; some **work related**, others provide solutions, ideas etc	KM Development respondent[11/12] 17
	Their own **work related** new approaches to agriculture	KM Development respondent[11/12] 18
	Announcements, discussions starters, new resources, events	KM Non-classified respondent[11/12] 3
	Problem definitions, method to solve, **results and findings, and next steps**	KM Non-classified respondent[11/12] 6

		Solutions, questions, how-to's	KM Non-classified respondent[11/12] 7
		procedures, facts/research results, ideas	KM Non-classified respondent[11/12] 9
		FAQs and solutions - Insights from thought leaders - Internal and external stories that illustrate productive new thinking and practical application of effective practices. Book and article reviews - Upcoming events - Best practices - Questions - New ideas	KM Non-classified respondent[11/12] 12
		Events, information, engagement opportunities	KM Development respondent[11/12] 7
		Announcements, discussions starters, new resources, events	KM Non-classified respondent[11/12] 3

Question 16. What is your role in the VCoP (for example, read messages, edit contributions, provide solutions, write reports, etc.)? Please add more than one role if applicable.

		I am involve mostly in reading and writing knowledge in Gurteen Knowledge Community	Gurteen Knowledge respondent[11/12] 1
		Read messages, encourage conversation, organise and get involved in real meetings	Gurteen Knowledge respondent[11/12] 2
		Read, comment on stories, **provide solutions** if I have the capability to do so esp. to KM queries	Gurteen Knowledge respondent[11/12] 3
		Read messages, provide inputs,	Gurteen Knowledge respondent[11/12] 4
		Read,, edit, provide solutions, tell stories	Gurteen Knowledge respondent[11/12] 6
		Provide some solutions, read messages	Gurteen Knowledge respondent[11/12] 7
		Contributor in any new query, query raiser	KM Practitioners respondent[11/12] 3
		edit if necessary, **read other contributions**, provide KM and media related solutions, develop	KM Practitioners respondent[11/12] 4

	management information systems	
	ALL (read messages, **edit contributions**, **provide solutions**, write reports, etc.)	KM Practitioners respondent[11/12] 5
	None	KM Education respondent[11/12] 1
	Offer experience and research results	KM Development respondent[11/12] 1
	moderator	KM Development respondent[11/12] 2
	Provide feedback and ask questions	KM Development respondent[11/12] T4
	Usually read other contributions but also give opinions to others' ideas; offer research results; share some information such as **workshops, conferences** available that contributes to the group	KM Development respondent[11/12] T6
	I manage all VCoPs at EWB	KM Development respondent[11/12] 7
	Read, contribute, provide solutions, suggest new KM practice, develop KM systems	KM Development respondent[11/12] 12
	I contribute mainly but also look for meaningful and practical contributions from others	KM Development respondent[11/12] 13
	Provide solutions, consult on knowledge acquisition and sharing with others in the labor sector	KM Development respondent[11/12] 14
	Facilitate discussions in different languages; thus, web discussion **facilitator**	KM Development respondent[11/12] 18
	I contribute, read and listen. I participate in any topic that resonates with me and that I feel I can make a difference for someone in the community	KM Non-classified respondent[11/12] 1
	Facilitator, **moderator**, editor, technical support	KM Non-classified respondent[11/12] 3
	Contributors	KM Non-classified respondent[11/12] 4

	Facilitator, so all of the above (for example, read messages, edit contributions, provide solutions, write reports, etc.)	KM Non-classified respondent[11/12] 5
	Insert, edit, delete but my own contributions. For others contributions, just read or download.	KM Non-classified respondent[11/12] 6
	No defined role!	KM Non-classified respondent[11/12] 7
	I'm the community administrator: - **moderate** discussions - **develop surveys** - locate and help get best practices captured and shared - scan external discussions and publications to post items of interest	KM Non-classified respondent[11/12] 12

Question 19. How are the messages organized in the VCoP (that is, by date of receipt, author name, topic, subject area)?		
	By date	Gurteen Knowledge respondent[11/12] 1; Gurteen Knowledge respondent[11/12] 3
	Usually in **chronological order and by category**	Gurteen Knowledge respondent[11/12] 2
	Date and also author	Gurteen Knowledge respondent[11/12] 4; Gurteen Knowledge respondent[11/12] 5
	Author	Gurteen Knowledge respondent[11/12] 6; Gurteen Knowledge respondent[11/12] 7; Gurteen Knowledge respondent[11/12] 8; KM Practitioners respondent[11/12] 6;
	Author and topic	KM Practitioners respondent[11/12] 5
	Date, author, topic, subject area / author, date, and topic of discussion	KM Education respondent[11/12] 1 KM Practitioners respondent[11/12] 4
	On a **mind-mapping**	KM Non-classified respondent[11/12] 4
	Relevance rating of **search engine**	KM Non-classified respondent[11/12] 15

Question 20. If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)?		
	Enter the **name of the author or the topic**	Gurteen Knowledge respondent[11/12] 1; Gurteen Knowledge respondent[11/12] 3; Gurteen Knowledge respondent[11/12] 6
	Keyword, sometimes the author	Gurteen Knowledge respondent[11/12] 2
	Author	Gurteen Knowledge respondent[11/12] 7; KM Practitioners respondent[11/12] 6
	Search file per discussion topic and date	KM Practitioners respondent[11/12] 1
	Search by **author and trace by date**	KM Practitioners respondent[11/12] 4
	I save key conversations, and the group collate **themes**	KM Development respondent[11/12] 1
	Web archive	KM Development respondent[11/12] 2
	Search. The systems runs through the database and provides you results that match your **keyword**. This is done in seconds.	KM Development respondent[11/12] 3
	Archived by topic	KM Development respondent[11/12] 4
	Keyword	KM Development respondent[11/12] 5
	Go back to e-mails sent by core groups; ask the moderator when necessary	KM Development respondent[11/12] 8
	Ask editorial board	KM Development respondent[11/12] 10
	Save it in separate folder in my e-mail and return to **my e-mail trails** sent from the dgroups	KM Development respondent[11/12] 13
	Refer to my e-**mail subscription** or search on the site	KM Development respondent[11/12] 14
	Browse by type of content or do keyword search	KM Non-classified respondent[11/12] 12
	Google groups has a **google search** facility	KM Non-classified respondent[11/12] 2

Question 15. What do you do to ensure the knowledge that you share is simple to understand by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)?

Question 22. What formats do *you* usually use to transfer your ideas and experiences via the VCoP (for example, use diagrams, story telling, case studies, etc.)?

Question 23. What formats do *others* usually use to transfer their ideas and experiences via the VCoP (for example, diagrams, story telling, case studies, etc.)?

	Case studies and story telling	Gurteen Knowledge respondent[11/12] 1; KM Non-classified respondent[11/12] 8
	Other links, storytelling, technical data.	Gurteen Knowledge respondent[11/12] 2
	Case studies, **diagrams**, sometimes success stories Text, diagrams, and case studies; make it **simple language** to understand	Gurteen Knowledge respondent[11/12] 3; Gurteen Knowledge respondent[11/12] 4
	Text, **video**, real stories	Gurteen Knowledge respondent[11/12] 5
	Stories, **diagrams**, text, **video**, **photos** and many more	Gurteen Knowledge respondent[11/12] 6
	Use a **simple language** that people can easily capture	Gurteen Knowledge respondent[11/12] 7
	A mix of stories, diagrams, **text**, if possible download **video clips**, **pictures**, anything possible that makes easier to others to understand	KM Development respondent[11/12] 6
	By **demonstrating using diagrams**, case studies, texts, call on participants for face to face conversations and **demonstration**	KM Development respondent[11/12] 6
	Personal experiences shared as stories; text; pictorial representations	KM Development respondent[11/12] 11
	Use a **simple language** that the target people understand; make it more conversational rather than heavy jargons.	KM Development respondent[11/12] 13
	Promote **multilingual approach** so as all learn in their languages	KM Development respondent[11/12] 18

	Communication is a tricky business, any artefact that I deem could be ideal to put across my ideas and the information I want to communicate can be used. So any tool is used	KM Non-classified respondent[11/12] 1
	Plain English. hyperlinks where appropriate	KM Non-classified respondent[11/12] 3
	Depending of what, when and to what public	KM Non-classified respondent[11/12] 5
	PowerPoint presentations	KM Non-classified respondent[11/12] 6
	I tell stories if applicable, state things in easy ways to understand and sometimes add attachments.	KM Non-classified respondent[11/12] 11
	Typically word documents with **illustrations** for technical documentation. Sometimes voice over **PowerPoint** for on demand training. **Blog posts** for more quick insight, **reference links**. **Blog posts** - typically text, some diagrams/images	KM Non-classified respondent[11/12] 12
	If I were to publish I would choose the form that best suited what I was presenting at the time. It might be a diagram, a short paper or simply a series of **Q&A comments**	KM Non-classified respondent[11/12] 13
	In another discussion forum, I share the experience by text with photos or sometimes video, about the fishing trip.	KM Non-classified respondent[11/12] 14
	The trend seems similar for all members & they also tend to be guided by content	KM Non-classified respondent[11/12] 1
	Situational; it would differ case by case	KM Development respondent[11/12] 5
	Can be descriptive, informative, narrative or any other best way to transmit	KM Non-classified respondent[11/12] 1

Question 21. Who do you mostly share your knowledge with in the VCoP (for example, only selected groups, all members, core groups, etc.)?			
	All member	Gurteen Knowledge respondent[11/12] 1; Gurteen Knowledge respondent[11/12] 2; Gurteen Knowledge respondent[11/12] 3; Gurteen Knowledge respondent[11/12] 4; Gurteen Knowledge respondent[11/12] 6	
	With some **selected groups** with those who I think they know what I am talking	Gurteen Knowledge respondent[11/12] 8; KM Development respondent[11/12] 3; KM Development respondent[11/12] 5	
	It depends on the knowledge and the relevant audience	KM Practitioners respondent[11/12] 2	
	Whoever is interested in change management, media development, and knowledge management	KM Practitioners respondent[11/12] 4	
	Anybody interested in new marketing gurus	KM Practitioners respondent[11/12] 5	
	Core groups; **all members** if general information; specific or **selected groups** if targeted information	KM Development respondent[11/12] 6	
	To **selected groups mostly but also to every member interested** in the topic that I discuss	KM Development respondent[11/12] 15	
	Mainly **core group and anybody else interested**	KM Development respondent[11/12] 17	
	Core groups in km4dev website but all members can see on twitter	KM Development respondent[11/12] 19	
	Any individual member with same interests as mine	KM Non-classified respondent[11/12] 1	
	Whatever string I am responding to, sometimes **all members, sometimes selected groups**	KM Non-classified respondent[11/12] 11	
Question 24. How will you share your knowledge in the VCoP (for example, knowledge on how to manufacture a product; how to solve a problem at work; how to fix a flat tyre; how to prepare a meal; etc.)?			

Question 25. What is the contribution of the knowledge that you acquire in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?		
	It increases my own knowledge may help with a challenge I am encountering at the time. **Professional development** Use it to further in own IKM studies; **upgrade my knowledge** in IKM How to **grow as a person or as a new professional.**	Gurteen Knowledge respondent[11/12] 2, KM Education respondent[11/12] 1, KM Development respondent[11/12] 20, KM Non-classified respondent[11/12] 8
	Use it in daily life and at work Use it in decision making and **solve problems** at work and in life	Gurteen Knowledge respondent[11/12] 3, KM Development respondent[11/12] 10
	May use it at work if found relevant I use it in my work if I find it relevant to my work. People can use the knowledge to share with others**, apply at work, daily living improvement, and learn new practice and tools** in marketing. The user determines that to do with it anyway **Adapt to workplace tasks**	Gurteen Knowledge respondent[11/12] 4, Gurteen Knowledge respondent[11/12] 8, KM Practitioners respondent[11/12] 5, KM Development respondent[11/12] 9, KM Non-classified respondent[11/12] 17

	It gives more depth in how you **conduct operations** and perform tasks	
	Daily tasks if necessary, also **apply in my own personal daily life**	Gurteen Knowledge respondent[11/12] 5,
	Share with colleagues, upgrade my schema, use it in life	Gurteen Knowledge respondent[11/12] 9
	So as people can use them to gain some more **experience, insights**, and **use them in daily life and at work places**	Gurteen Knowledge respondent[11/12] 6
	Always brings new ideas	KM Practitioners respondent[11/12] 1
	Relevancy and accuracy	KM Practitioners respondent[11/12] 2,
	If it lies in my interest area definitely I will gain it and will **contribute** into it if required	KM Practitioners respondent[11/12] 3,
	If found necessary and relevant, integrate them into my current knowledge and practice	KM Practitioners respondent[11/12] 4
	I believe that the **tacit knowledge** is more or less to be **codified** [explicit knowledge] in this regard at the end of the day	KM Practitioners respondent[11/12] 6
	My participation in any of the VCoP is based on a specific task that I need clarity with.	KM Development respondent[11/12] 3
	Get some solution; **learn new ways of doing things; benchmark own practices with those of other practitioners;** clear my doubts in case there are certainties.	KM Development respondent[11/12] 6,
		KM Development respondent[11/12] 12,
	Reflect into my previous practice and evaluate its validity	
		KM Development respondent[11/12] 13;

	Integrate it in my tasks if construed as logical and crucial to do so	KM Development respondent[11/12] 16,
	By sharing my knowledge, people can use them for various relevant purposes, perhaps use them to manufacture goods	KM Development respondent[11/12] 18,
	Align people's awareness across regions so as they can have similar agricultural practice	KM Non-classified respondent[11/12] 1
	To advance and enrich the practice that I am in	
	Sharing point of view to understand or solve a situation	KM Non-classified respondent[11/12] 4
	New knowledge or re-affirming that you're on the right track. Collaboration	KM Non-classified respondent[11/12] 5
	Increase productivity and **problem solving capability** of other members	KM Non-classified respondent[11/12] 12

Question 26. What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible?

Question 27. How long should a knowledge sharing contribution be ideally open for discussion in the VCoP (that is, how long should the contribution stay in the VCoP so that it can be used as a reference by members)?

Question 28. If a discussion has been closed and archived, what are the requirements if a member wants to read, use or edit such discussion in case new ideas and/or developments came to the fore since it was archived? (for example acquiring permission from the moderator; requesting an unlock key; etc.)?

	It is a free to join and the only motivation to post and get involved is not for monetary benefit but for **the betterment of the community**	Gurteen Knowledge respondent[11/12] 2
	They were meant to share new dimensions to approaching tasks and new insights/knowledge no matter where you are; thus, good	Gurteen Knowledge respondent[11/12] 3, Gurteen Knowledge respondent[11/12] 4,

	in diffusion of knowledge across countries, firms, individuals no matter what culture you follow	
	It gives **new insights and practice**. thus, it generates new knowledge into my tasks	KM Practitioners respondent[11/12] 4,
	VCoPs **generate new ideas and developments**. Nevertheless, it depends on the dynamics of the members and relevancy of the topic of discussion.	KM Development respondent[11/12] 8,
	Gets fresh ideas from KM practitioners; there is enormous body of knowledge in management shared; new KM practice and challenges are also shared	KM Development respondent[11/12] 11,
	It **generates new ideas and insights**, the best to share with people	KM Non-classified respondent[11/12] 7
	Good enough to get wider perspective from various sources; esp in UNDP, get wider perspectives from various UNDP offices in the world which is usually situations from one country to the other	Gurteen Knowledge respondent[11/12] 5,
	Really **generates non-discovered practices** so as to adapt them to various business environments	Gurteen Knowledge respondent[11/12] 6,
	Give more insight into some practice - innovative ideas come out - undiscovered **perspectives** - Meet new people with **fresh ideas and expertise**	Gurteen Knowledge respondent[11/12] 7
		KM Non-classified respondent[11/12] 16
	It has really been important in transforming the business	

	processes as new ideas and practice do usually emerge in the discussions; thus, it really gave an impetus to evolving of the knowledge dynamics in the company	
	Contributes a lot in developing members professionally as per their work	KM Practitioners respondent[11/12] 1
	New and valuable , practically feasible content	KM Practitioners respondent[11/12] 3
	It is crucial in deepening discussions to come up with a purified knowledge and its management	KM Practitioners respondent[11/12] 5
	Generates new unforeseen knowledge but needs to be codified more and be easily accessible to people.	KM Practitioners respondent[11/12] 6
	The CoP provides quick access to new ideas and research on topics of interest thereby providing a rich foundation for the **generation of new knowledge.**	KM Education respondent[11/12] 1
	Of tremendous value - from the originality of the contributors, shared experience of practice, **sources of further ideas** etc.	KM Development respondent[11/12] 1
	As you meet people with similar problems and others with a variety of ways to tackle the same problem.	K KM Development respondent[11/12] 3
	It points to trends and opportunities	KM Development respondent[11/12] 4
	It has widespread and deep impacts on overall development. It will be able to ensure positive changes in society and professional lives.	KM Development respondent[11/12] 5
	Get original research results; learn new ways in virtual conversations; expand	KM Development respondent[11/12] 6

	knowledge geographically as well as from experts to learners or new people to practice.	
	About 5% of new knowledge generated within a project could be attributed to the VCoP - most new learnings are done in the real world	KM Development respondent[11/12] 7
	Of a **great value as it opens up for knowledge that was not propagated before and disseminated to various sectors and countries.**	KM Development respondent[11/12] 14,
	Very valuable in **providing new experiences to people** across regions	KM Development respondent[11/12] 18,
	They help reach out to individuals at a more global scale	KM Non-classified respondent[11/12] 1
	It **updates people with new experiences and new perspectives to solve problems**	KM Development respondent[11/12] 15
	I don't think VCoP can generate knowledge by itself: there's always the need of moderators that have to act and wrap up the discussions or the topics in a ordered way. On the other hands I consider Google Groups one of the best places where to find solutions to practical problems but you have to know where to search. If the "where to search step" is done by someone it can be considered a knowledge center tout court	KM Non-classified respondent[11/12] 2
	Empower everybody that participates, the contributors debate upgrade every month....	KM Non-classified respondent[11/12] 4
	It saves so much time and helps people find peers to collaborate	KM Non-classified respondent[11/12] 5

	with on topics even if the aim is different	
	Depends on the qualification of the person, where they work, what they do for living, the way they share their knowledge (Formal or informal), where they are from, their experience and if someone has used knowledge that they have shared before or have benefited from that knowledge.	KM Non-classified respondent[11/12] 8
	Information sharing is not knowledge generation, so it has been important to avoid information overload but to align needs with what is available	KM Non-classified respondent[11/12] 9
	Most valuable new knowledge comes through active discussion and collaboration, whether in the process of trying to solve a common problem or around an interesting new insight. Static sharing is effective for sharing existing know-how, but generally doesn't lead to new knowledge creation	KM Non-classified respondent[11/12] 12
	Since we have an integrated forum, **the unknowns are surfacing kind of automatically. Experts (also regular member) then try to fill the gap**	KM Non-classified respondent[11/12] 15

APPENDIX G: Survey Two (2016)

Questions	Answer	VCoP names and respondents' number codes
Question 1 and 2 – Personal details of participants		
3. What types of knowledge do you create or share in the VCoP (for example, original (your own) ideas, research results, academic articles; technical reports, news bits, etc.)?		
	Academic articles	KM Development respondent[16] 3
	Own ideas, research results, workshop initiatives, new developments in knowledge management	KM Non-classified respondent[16] 4
	Ideas	KM Non-classified respondent[16] 7
	Research results	KM Non-classified respondent[16] 8
	Technical reports	KM Non-classified respondent[16] 9
	Blogs	KM Non-classified respondent[16] 10
	research results, **Programme learning and experience of practice**	KM Non-classified respondent[16] 11
	Original ideas, research results, academic articles; news bits	KM Non-classified respondent[16] 12
	Original ideas and bit of news	KM Non-classified respondent[16] 13
	ANY kind of knowledge. It depends on the purpose of any particular CoP. What moves the	KM Non-classified respondent[16] 14

	learning and practice of members forward. It really varies	
	New knowledge development; peer review, discussions and dialogue leading to new insights	KM Non-classified respondent[16] 15
	Technical reports	KM Development respondent[16] 16
	Share own ideas or any **idea that we incorporate at work**; technical reports	KM Development respondent[16] 17
	Technical reports, **research results**	Gurteen Knowledge respondent[16] 18
	Research results in the field of Agriculture and food security; technical reports; news and feature stories	KM Development respondent[16] 19
	I mainly use the social media platforms....i.e. Facebook and Google to research where applicable, answer emails etc	KM Non-classified respondent[16] 20
	Some new concepts and **practices** in education	Gurteen Knowledge respondent[16] 21
	Research results and news bits	KM Non-classified respondent[16] 22
	Just queries usually	Gurteen Knowledge respondent[16] 23
	Technical errors	KM Practitioners respondent[16] 24
	Research results	KM Practitioners respondent[16] 25
	Research on business	KM Non-classified respondent[16] 26

	Research results	KM Development respondent[16] 27
	Articles, research, experience	KM Development respondent[16] 28
	Research results, business reports, some pieces in business	Gurteen Knowledge respondent[16] 29
	Academic reports, technical reports, research	KM Development respondent[16] 30
	I share some contents that I believe is important to KM group but within the context of the **tasks that I am involved**. Anything that I believe is worth of sharing with the groups that they can adopt into but I cannot impose on them though	KM Development respondent[16] 31
	Existing ideas but that could be used by the knowledge community	KM Development respondent[16] 32
	Innovative ideas, business reports, news bits	KM Practitioners respondent[16] 33
	Global initiatives taken on innovative mechanisms in managing data, information, and knowledge. Research results pertaining to such mechanisms are forwarded in the discussions with all core groups in Km4dev	KM Development respondent[16] 34
	Business reports; marketing research results	Gurteen Knowledge respondent[16] 35
	Research results and technical reports	KM Development respondent[16] 36

	Communicate my own ideas and opinions, share operational and **research results, academic** articles	KM Practitioners respondent[16] 37
	I share KM practices that are being implemented across the border in various companies that have international presence. KM is dynamic and changing from time to time with various approaches used by different KM experts and the organisations they represent	KM Development respondent[16] 38
	I work in such an organization inspired by some creative and innovative research results. I do share where possible to people that that I believe need to learn and adopt	KM Development respondent[16] 39
	Mostly experiential knowledge, but also documented knowledge and other recommended resources (experts, organizations, technologies etc.)	KM Non-classified respondent[16] 40
	To create awareness on strategies on transforming development, peace building and prevent crisis as per UNDP vision and mission. Some can be in the form of research reports for various projects in different countries of the world	KM Development respondent[16] 41

4. What is your role in the VCoP (for example, read messages, edit contributions, provide solutions, write reports, etc.)? Please add more than one role if applicable.		
	Read messages	KM Development respondent[16] 3
	Contribute articles; new practices in Knowledge management and sharing	KM Non-classified respondent[16] 4
	Read messages	KM Non-classified respondent[16] 7
	Read messages	KM Non-classified respondent[16] 8
	Write reports, provide solutions	KM Non-classified respondent[16] 9
	Report on Life Events	KM Non-classified respondent[16] 10
	Promote, read, edit, **moderate**, summarize	KM Non-classified respondent[16] 11
	Read messages, **facilitate** discussions, manage knowledge, moderate	KM Non-classified respondent[16] 12
	Read messages, insert contribution	KM Non-classified respondent[16] 13
	I've been leader, provocateur, scribe, supporter, **facilitator**, lurker - all of them! The point is one's role often changes over time	KM Non-classified respondent[16] 14
	Moderator (edit, review, stimulate), participant and lurker	KM Non-classified respondent[16] 15
	Contribute and read messages, share reports	KM Development respondent[16] 16

	Contribute and read messages, share reports	KM Development respondent[16] 17
	Contribute research results, provide inputs on anything that comes across	Gurteen Knowledge respondent[16] 18
	My role ranges from **contributing** research results to editing and providing solutions when asked	KM Development respondent[16] 19
	Read messages	KM Non-classified respondent[16] 20
	Do all - **contribute**, suggest solutions, submit relevant reports	Gurteen Knowledge respondent[16] 21
	Read messages, write reports	KM Non-classified respondent[16] 22
	Read messages, occasional query	Gurteen Knowledge respondent[16] 23 and KM Development respondent[16])
	Provide Solutions	KM Practitioners respondent[16] 24
	Provide solutions	KM Non-classified respondent[16] 25
	Read message and give my opinion	KM Non-classified respondent[16] 26
	Observe other members' participation, assist in the ongoing maintenance of the VCoP when my skills match a need	KM Development respondent[16] 27
	Write reports, **moderate**	KM Development respondent[16] 28
	Moderate, **contribute**, **provide business solutions**	Gurteen Knowledge respondent[16] 29

	Almost all - read and contribute, provide solutions, seek solutions from others	KM Development respondent[16] 30
	Read, contribute when possible	KM Development respondent[16] 31
	Read, edit, write reports, share analysis	KM Development respondent[16] 32
	I do participate in all aspects - lurker, **contribute** reports, provide solutions	KM Practitioners respondent[16] 33
	Contribute reports and new mechanisms of knowledge management	KM Development respondent[16] 34
	I provide Consultancy to businesses on how to grow and expand, capitalize on market share and find niche areas	Gurteen Knowledge respondent[16] 35
	Contribute towards the learning and development of entrepreneurs	KM Development respondent[16] 36
	Contributing some sound ideas and opinions as stated above	KM Practitioners respondent[16] 37
	Contribute in the form of consultancy	Respondent 38 (K4Dev)
	Advise solutions based on specific requests and questions	KM Development respondent[16] 39
	I created "Solution Exchange" and now advise UN offices setting them up. My two current operations are SE Africa where	KM Development respondent[16] 40

	we have a Planning Community and a Statistical Community	
	Contribute reports on UNDP development projects	KM Development respondent[16] 41

5. How are the messages organized in the VCoP (that is, by date of receipt, author name, topic, subject area)?

6. If you need to read a contribution posted some time ago, how do you trace and gain access to it again (for example, do you search files one by one, per date or keyword, etc.)?

	Not always the same	KM Non-classified respondent[16] 3
	Author name, topic, subject area search author name or topic or **keyword**	KM Development respondent[16] 4
	Subject area **search file**	KM Non-classified respondent[16] 7
	date of receipt Keyword	KM Non-classified respondent[16] 8
	Author name, topic, subject area Search by subject area, date	KM Non-classified respondent[16] 9
	Date I will scroll up and if information is to far up then I will opt for the search function	KM Non-classified respondent[16] 10
	Search	KM Non-classified respondent[16] 11
	subject area By subject and by date	KM Non-classified respondent[16] 12
	Topic and subject area	KM Non-classified respondent[16] 13

	Files by names, and sometimes by dates	
	In my **email based** CoPs they are typically chronological. Where there is threading of messages, then there would be the topic line as an additional organizing tool. I go to the **archives and search**	KM Non-classified respondent[16] 14
	Topic and date **Search or through topic locator**	KM Non-classified respondent[16] 15
	By topic or author name Use key word to search	KM Non-classified respondent[16] 16
	By topic or author name Use key word to search	KM Development respondent[16] 17
	Author name and date I search by author name or go down to relevant date if I remember the post exactly	Gurteen Knowledge respondent[16] 18
	By date, author, topic **Search for keywords** or for **author names** if I know. It depends what I am looking for when I conduct the search	KM Development respondent[16] 19
	By date, user name and relevant topic Filing system or information stored, keywords definitely and	KM Non-classified respondent[16] 20

	create links to speed up the search	
	Date, author, topic, field of interest Search for keyword	Gurteen Knowledge respondent[16] 21
	By **topic** and then by **date** By date and then **search file** name	KM Non-classified respondent[16] 22
	Date Keyword	KM Development respondent[16] 23 (KM Development respondent[16] & Gurteen Knowledge respondent[16])
	Topic **Keyword**	KM Practitioners respondent[16] 24
	Date of Receipt **Keyword**	KM Practitioners respondent[16] 25
	Date I'll use **google website to search** for it	KM Non-classified respondent[16] 26
	Depends on the platform used I suppose, on the low-tech listserv the messages come to my inbox by date of receipt I have found the search interfaces to vary depending on the platform. The Dgroups listserv has limited search functionality for archival messages, making searching for past messages a sometimes tedious process.	KM Development respondent[16] 27

	Often it is better for me to flag an interesting post and save it to a folder in my inbox so that I may access it later	
	You can view by various criteria, **author, date, subject** I do a general search by topic or author, then examine results	KM Development respondent[16] 28
	Whichever is helpful - date, Author, topic, subject area Usually by keyword but whichever is easier to search is what I use	Gurteen Knowledge respondent[16] 29
	Date, author, and topic search for keyword	KM Development respondent[16] 30
	Author, date, topic - all Search by author, date, topic depending on which is easier to do so	KM Development respondent[16] 31
	Date, author, topic, subject area search keyword	KM Development respondent[16] 32
	Mostly author name and date Search for author name if you know or look for keyword	KM Practitioners respondent[16] 33
	Topic, author, date Search keyword	KM Development respondent[16] 34
	Author and date; then you can add a title Keyword	Gurteen Knowledge respondent[16] 35

	Author and topic and date of publishing By author name or keyword	KM Development respondent[16] 36
	All of the above - date, author, topic Search keyword or by author name	KM Practitioners respondent[16] 37
	Author, date of receipt, topic and all in chronological order Search keyword	KM Development respondent[16] 38
	Author, topic, date Search for author, topic and date	KM Development respondent[16] 39
	Virtual exchanges are over an **e-mail** mailgroup (Mailman), and post a query for community responses by a "reply by date", then write them up as Consolidated Replies and send them to the group. They are also posted on the Community's site. I usually just **search my e-mail**, for now. We have been building a keyworded, cross-referenceable repository but it is not complete	KM Development respondent[16] 40
	Author, topic, date in various project areas	KM Development respondent[16] 41
7. What do you do to ensure the knowledge that you share is simple *to understand* by all members in the VCoP (that is, do you use anecdotes, diagrams, text, video, etc to support what you share)?		

	Would use **diagrams**	KM Non-classified respondent[16] 3
	Success stories, **text**, **video** at times	KM Development respondent[16] 4
	Diagrams	KM Non-classified respondent[16] 7
	Diagrams and **text**	KM Non-classified respondent[16] 8
	Flow charts, diagrams, text, stats	KM Non-classified respondent[16] 9
	Video and Text	KM Non-classified respondent[16] 10
	Occasionally **diagrams** and **video** but mainly try to use **plain non-academic language** and remember that many in the CoP do not speak English as their first language. Also try to be as brief as possible	KM Non-classified respondent[16] 11
	Text and videos, but most importantly I structure my text so that there are very small paragraphs and are indented	KM Non-classified respondent[16] 12
	Text and video	KM Non-classified respondent[16] 13
	I don't think the intent is that things are SIMPLE to understand, but that we have practices to help each other make meaning and understand. Delivery of content is never enough. There have to be meaning making practices such as conversations etc	KM Non-classified respondent[16] 14

	Review, edit and provide **guidance to (new) members**	KM Non-classified respondent[16] 15
	Various media such as text, video, PowerPoint etc	KM Development respondent[16] 16
	Various media such as text, video, **PowerPoint** etc	KM Development respondent[16] 17
	I use text and diagrams or post a video link if available. At times, do **a live chat** with people	Gurteen Knowledge respondent[16] 18
	Tell **success stories** by **illustrating** with text and video to ensure that all understand the information that I am sharing	KM Development respondent[16] 19
	Provide as much detail as possible, text mostly in my line of **work**	KM Non-classified respondent[16] 20
	Illustrate by using **video clips**, **text**, models. I use simple words and avoid jargons	Gurteen Knowledge respondent[16] 21
	Diagrams and videos	KM Non-classified respondent[16] 22
	Keep it brief	Gurteen Knowledge respondent[16] 23
	Diagrams	KM Practitioners respondent[16] 24
	Diagrams and text	KM Practitioners respondent[16] 25
	I use diagrams	KM Non-classified respondent[16] 26
	I try to use **examples**	KM Development respondent[16] 27

	No, I post text/narrative mostly - the VCoP is made up of professionals	KM Development respondent[16] 28
	Make it as simple as possible	Gurteen Knowledge respondent[16] 29
	Use simple words to describe stories; sometimes **illustrate** with diagrams when applicable	KM Development respondent[16] 30
	Use simple language for all individuals to understand	KM Development respondent[16] 31
	Use all - diagrams, text, video if required, simple words	KM Development respondent[16] 32
	Simplify the reports with the help of graphs and diagrams in addition to normal written text	KM Practitioners respondent[16] 33
	All - stories, diagrams, text, video, graphics, **PowerPoint presentations**	KM Development respondent[16] 34
	Make it simple and brief	Gurteen Knowledge respondent[16] 35
	Line graphs and diagrams to accompany the text and content	KM Development respondent[16] 36
	I use easy to understand words with some **illustrations** such as diagrams, PowerPoint presentation, video clips etc	KM Practitioners respondent[16] 37
	Use various forms of media to make it brief and easier for others to use. Diagrams and video simulations actually are crucial in online discussions	KM Development respondent[16] 38

	Diagrams, text, face-to-face if the necessity arises	KM Development respondent[16] 39
	They're just e-mail. Our moderation team edits the messages before posting for clarity and language	KM Development respondent[16] 40
	Text, tabular data, reports, diagrams, and video presentations	KM Development respondent[16] 41

8. Who do you mostly share your knowledge with in the VCoP (for example, only selected groups, all members, core groups, etc.)?

	All members	KM Development respondent[16] 3
	Selected groups and **core groups**	KM Non-classified respondent[16] 4
	All members	KM Non-classified respondent[16] 7
	Selected groups	KM Non-classified respondent[16] 8
	Selected groups	KM Non-classified respondent[16] 9
	Only **Select Groups**	KM Non-classified respondent[16] 10
	Would share with **all members** (all posts are open) but expect to engage primarily with sub-sets depending on the post	KM Non-classified respondent[16] 11
	All members	KM Non-classified respondent[16] 12
	Selected group	KM Non-classified respondent[16] 13
	I overshare to **everyone all** the time	KM Non-classified respondent[16] 14

	In principle to all	KM Non-classified respondent[16] 15
	Selected groups	KM Development respondent[16] 16
	Selected groups	KM Development respondent[16] 17
	It depends. there are posts that I see are relevant to selected groups; and there are issues that affect all members	Gurteen Knowledge respondent[16] 18
	People whom I think have an interest in what I share. Therefore, there has to be with **selected groups or core groups**	KM Development respondent[16] 19
	On social media, its with FB friends, at work important information with internal and external customers	KM Non-classified respondent[16] 20
	To **selected groups** mainly	Gurteen Knowledge respondent[16] 21
	Selected groups	KM Non-classified respondent[16] 22
	All members	Gurteen Knowledge respondent[16] 23
	Selected group	KM Practitioners respondent[16] 24
	Only **selected groups**	KM Practitioners respondent[16] 25
	Friends	KM Non-classified respondent[16] 26
	Large range-- I typically share my experiences which relate to the research I am working on. Others share everything and anything related to KM4Dev	KM Development respondent[16] 27

	All	KM Development respondent[16] 28
	Selected groups; But, it could be applicable for all members	Gurteen Knowledge respondent[16] 29
	Selected groups	KM Development respondent[16] 30
	Selected groups, core groups	KM Development respondent[16] 31
	All groups	KM Development respondent[16] 32
	Selected groups	KM Practitioners respondent[16] 33
	Core groups	KM Development respondent[16] 34
	Selected groups and businesses	Gurteen Knowledge respondent[16] 35
	Selected groups and whoever else has requested to get an advice from me	KM Development respondent[16] 36
	People within the field of communication as that is my expertise	KM Practitioners respondent[16] 37
	Selected groups	KM Development respondent[16] 38
	Selected groups but all are welcome if they are looking for any expert advice that I have mastered	KM Development respondent[16] 39
	Professional groups. Solution Exchange is a knowledge-sharing service offered by UN offices to communities of practice - It's important to understand that "practice" is equal to "profession".	KM Development respondent[16] 40

	As such we are strengthening the interaction of people who all work in the same professional domain, and sharpening their practice. The UN plays the convening role, since it is trusted by all parties and can therefore engage community members of all perspectives and persuasions. Also the Facilitation Teams are skilled moderators, raising the comfort level of persons contributing	
	Selected groups who work within similar projects	KM Development respondent[16] 41

9. What is the content of the messages that *others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

10. What is the content of the messages that *you or others* have been sharing in the VCoP (for example, work-related problems, solutions, new practice, ideas, beliefs, procedures, etc.)?

	Work related	KM Development respondent[16] 3
	Work related; new practices, case studies of other success stories	KM Non-classified respondent[16] 4
	Solutions	KM Non-classified respondent[16] 7
	Solutions	KM Non-classified respondent[16] 8
	Policies, procedures, work instructions, **work related queries**	KM Non-classified respondent[16] 9
	Ideas, Views, **General Information**	KM Non-classified respondent[16] 10

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	Generally discussion on what research findings mean for decision-making and practice. Sometimes work related problems and learning from our own practices	KM Non-classified respondent[16] 11
	Individual, group and collective societal best practices	KM Non-classified respondent[16] 12
	General ideas	KM Non-classified respondent[16] 13
	The diversity is huge (and for me, that is as it should be.) What is useful now? That is what we share now. What gets responses? That is what stimulates me to share more	KM Non-classified respondent[16] 14
	New insights, work questions, clarifications, peer review and collaboration	KM Non-classified respondent[16] 15
	Usually related to work or own ideas, opinion, and belief	KM Development respondent[16] 16
	Usually **related to work** or own ideas, opinion, and belief	KM Development respondent[16] 17
	Various contents - it could be problems solvers, obviously people share emerging practice and ideas, beliefs, procedures, and new policies	Gurteen Knowledge respondent[16] 18
	I usually share what I believe is important to other people. It could be what we practice whether new or old, opinions, and solutions. There is always new dimensions	KM Development respondent[16] 19

	to approach and resolve certain problems	
	Updated information, changes to our product, processes to follow, who to contact etc.	KM Non-classified respondent[16] 20
	Usually **work-related** educational materials and new educational practices	Gurteen Knowledge respondent[16] 21
	Beliefs, ideas and procedures	KM Non-classified respondent[16] 22
	Problems, solutions, resources	Gurteen Knowledge respondent[16] 23
	Solutions, new ideas	KM Practitioners respondent[16] 24
	Solutions	KM Practitioners respondent[16] 25
	Work and business related	KM Non-classified respondent[16] 26
	Large range-- I typically share my experiences which relate to the research I am working on. Others share everything and anything related to KM4Dev	KM Development respondent[16] 27
	New ideas, solutions to specific KM scenarios, experiences in various conditions, new technologies	KM Development respondent[16] 28
	Work-related problems and solutions	Gurteen Knowledge respondent[16] 29
	Work-related, new ideas	KM Development respondent[16] 30

	Yes, mostly **work-related** or anything similar to what I do and what I believe is important to the group	KM Development respondent[16] 31
	Work-related	KM Development respondent[16] 32
	New reports and they are for the most **work-related**	KM Practitioners respondent[16] 33
	Work-related challenges and how to address them	KM Development respondent[16] 34
	Innovative solutions to your business	Gurteen Knowledge respondent[16] 35
	Work-related	KM Development respondent[16] 36
	Work-related mostly	KM Practitioners respondent[16] 37
	Work-related and anything that affects many organizations	KM Development respondent[16] 38
	Work related	KM Development respondent[16] 39
	All of the above, but primarily we share knowledge, not opinions. Once and a while we have an e-discussions for brainstorming and opinions are welcome, but primarily Solution Exchange is a knowledge-sharing service	KM Development respondent[16] 40
	Work-related projects and experiences gained from grassroots that are benefiting various communities	KM Development respondent[16] 41
11. What is the contribution of the knowledge that you acquire	Personal experiences	KM Development respondent[16] 3

in the VCoP (for example, if somebody shares his/her experience on how to create a certain product, shares how to bake a cake, how to fix a flat tyre, etc.)?		
	Use it in daily **problem solving** both individual and work related	KM Non-classified respondent[16] 4
	How to create a certain product	KM Non-classified respondent[16] 7
	How to apply the solution	KM Non-classified respondent[16] 8
	To **improve business processes and increase profit margins**	KM Non-classified respondent[16] 9
	Most of the above examples as well as any information needed to be sent quickly	KM Non-classified respondent[16] 10
	It varies but I would say primarily knowledge gained **contributes to more effective management and better design and delivery of the projects I work on**	KM Non-classified respondent[16] 11
	Individual, group and collective societal **best practices**	KM Non-classified respondent[16] 12
	I give a different insight on political comments	KM Non-classified respondent[16] 13
	I don't think I understand this question	KM Non-classified respondent[16] 14
	Not in all cases viewed as new but sometimes a new view can be shared with interesting dimensions	KM Non-classified respondent[16] 15

	Use it for my **individual consumption or incorporate in my work**	KM Development respondent[16] 16
	Usually related to **work** or own ideas, opinion, and belief	KM Development respondent[16] 17
	It might be something that I have **to include in my work**; might be helpful how to do things elsewhere where I can also benefit from. Also adds knowledge to myself	Gurteen Knowledge respondent[16] 18
	I do take it into consideration if I find it relevant to what I do and what I believe. It might be useful in **my daily tasks to integrate**	KM Development respondent[16] 19
	Knowledge is power, there is certain information that is worth passing along to create awareness	KM Non-classified respondent[16] 20
	People can adopt them if they are found necessary	Gurteen Knowledge respondent[16] 21
	News feeds, historical and geographical information	KM Non-classified respondent[16] 22
	How to make a KM strategy	Gurteen Knowledge respondent[16] 23
	Find a solution	KM Practitioners respondent[16] 24
	Shares solutions	KM Practitioners respondent[16] 25
	Helps us make informed decision	KM Non-classified respondent[16] 26

	I don't understand this question	KM Development respondent[16] 27
	The focus of the VCoP is knowledge Management - so the **information helps with work, with broadening knowledge and with improved solutions**	KM Development respondent[16] 28
	It enables me to **perform better in business** and adopt to new dimensions as an entrepreneur	Gurteen Knowledge respondent[16] 29
	Utilise them at work or for **personal purposes**	KM Development respondent[16] 30
	Adoption of new contributions in what I do in my consultancy; **Get best international practices** elsewhere and localize them	KM Development respondent[16] 31
	A Great deal of the knowledge shared contributes towards **enhancement of individual knowledge** to do your work better and more efficient	KM Development respondent[16] 32
	Great! I am always open to **new paradigms and practice** in the financial sector. That definitely makes me aware of the **new developments in the sector**	KM Practitioners respondent[16] 33
	Experiences are shared and incorporated to **extend to existing work ethics and practice.**	KM Development respondent[16] 34
	It creates an opportunity to check where you went wrong and correct in your business dealings and operations. Besides, VCoPs	Gurteen Knowledge respondent[16] 35

	have quite so many expertise lying there **for individuals to leverage and capitalize**	
	It contributes to the learning and **upgrading of skills of entrepreneurs in their particular business area**	KM Development respondent[16] 36
	I do not understand this question.	KM Practitioners respondent[16] 37
	Anybody has the choice to implement the knowledge acquired from various individuals. That is based on what you want to implement and what you think is relevant	KM Development respondent[16] 38
	I may utilize the knowledge if **there is a gap that I need to fill in my expertise.** I also forward to others who might need it	KM Development respondent[16] 39
	These are one-answer questions, which are more appropriate for a Help Desk arrangement. Solution Exchange works best when there are **many possible answers to a question.** Go on the site http://www.solutionexchange-un.net/africa/plan for the latest examples	KM Development respondent[16] 40
	Other countries and communities may benefit new experiences to adapt them to their various sectors	KM Development respondent[16] 41

12. What is your evaluation of the value of the VCoP in generating new knowledge? Please explain as comprehensive as possible?		
	New ideas and information	KM Development respondent[16] 3
	There is always **new knowledge generated** by individuals	KM Non-classified respondent[16] 4
	Not that much	KM Non-classified respondent[16] 7
	Application of the task at hand	KM Non-classified respondent[16] 8
	Means to **create new knowledge**	KM Non-classified respondent[16] 9
	In my opinion, it is a much quicker, easier and more effective way of sharing information and even using the group chats you can speak and share to so many different people all over the world with just one text	KM Non-classified respondent[16] 10
	Again it is very variable depending on the context where it is being used and the approach taken. I think they can help to **generate new knowledge** - for example by being	KM Non-classified respondent[16] 11
	It is not that it generates new knowledge. Although it can do that, it mostly bring to the members knowledge that is already out there	KM Non-classified respondent[16] 12
	Yes**, people can learn something out of what is displayed but the problem that**	KM Non-classified respondent[16] 13

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	there is no enough originality, and this makes it boring to me. Because **people pick up ideas from left and right, then they share them as their own.** For instance, you can see people appearing as genius on the messages but when you talk to them in the presence, you discover that they are just opposite from what you thought. I think even lawyers or doctors when you mislead them, the impact can work hard on yourself. That's why people should refrain being fake and accept their level so that other people can know how to guide them	
	I think it is not just about generating new knowledge per se - or even sharing that knowledge, but making meaning of, contextualizing and USING knowledge to forward the domain the community cares about	KM Non-classified respondent[16] 14
	Positive although it does not apply to all CoP I'm a member off	KM Non-classified respondent[16] 15
	Definitely there are **new ideas coming in from individuals**	KM Development respondent[16] 16
	new ideas	KM Development respondent[16] 17
	As you discuss more, you generate more knowledge. It	Gurteen Knowledge respondent[16] 18

	naturally happens during the **discussions and debating with other experts. Communities of Practice is just another platform to enable us to generate knowledge on regular basis**	
	I found CoPs having a comprehensive and more international perspectives. It is the nature of the Internet that makes them to draw a multitude experience from a wide range of expertise. CoPs are still utilized in our organisation as we are more international almost reaching several countries. **Therefore, CoPs have been useful to get a first-hand data from the real people in the ground. There are always new things to learn from people over there**	KM Development respondent[16] 19
	It's definitely to create awareness. I have witnessed how quickly information can spread via social media i.e. missing persons. Once word gets out it is shared amongst fellow FB users and more than half of the time the missing persons return home	KM Non-classified respondent[16] 20
	VCoPs are informal communities but they can really **generate massive data and information available to people who may**	Gurteen Knowledge respondent[16] 21

	need them. This time, you do not need to panic where to get information, you only need to present your questions and someone will come up to respond to your needs.	
	Security measures to protect social media users. Everyone must be identified by in a unique way (example: finger print) when logging into his/her profile, which identifies a certain amount of factual information about the the user (example: criminal record etc.) User are then aware of who they associate with on a social platform. In this way users cannot create fake user names and identities	KM Non-classified respondent[16] 22
	Through synthesis and discussion, inspiration	Gurteen Knowledge respondent[16] 23
	Very informative and resolving of issues must quicker	KM Practitioners respondent[16] 24
	Solution needs to be given	KM Practitioners respondent[16] 25
	How to start a small business. drawing up a business plan	KM Non-classified respondent[16] 26
	New is in the eye of the beholder. there is a large range of experience represented in the VCop. Some members are long-time professionals, others are new to the field. Sometimes old	KM Development respondent[16] 27

	topics reappear to be debated by a new set of members who weren't involved before. Other times, a change of policy or technology will prompt old topics to reappear from a new angle. How people use or participate in these discussions likely matters for whether or not new knowledge is obtained	
	It is excellent at **sharing new concepts, new installations or projects and in sharing evaluations of said initiatives which assist is creating knowledge and throwing up new questions**	KM Development respondent[16] 28
	New experiences and paradigms are gained in the discussions and through the contributions by other professionals. There are things that you do not see or have not experienced what others have been doing and practicing	Gurteen Knowledge respondent[16] 29
	There are always **new ideas and opinion emerging in VCoP** discussions. It is up to the participants to either use them or reject	KM Development respondent[16] 30
	Sometimes new that I never had knowledge of but some	KM Development respondent[16] 31

	others are still existing practice but I never thought of using them	
	The discussion around a topic encourages members to tackle a problem in various alternative ways as presented by various individuals. People have different ways of approaching a problem and resolving it. Therefore, there is always **a new dimension and approach to a problem in the VCoPs**	KM Development respondent[16] 32
	There is always **something new to learn of course**. The determinant factor is to open up yourself to ideas and opinions suggested by other experts in the field	KM Practitioners respondent[16] 33
	Discussions with core groups in CoPs could either **expand or generate new knowledge**	KM Development respondent[16] 34
	Definitely, VCoPs **generate new solutions and** knowledge. They should form part of the learning environment in businesses	Gurteen Knowledge respondent[16] 35
	VCoPs are initially encouraged to facilitate informal discussions so that people can either put forward what they know or ask what they are challenged with. I know of many companies currently motivating for CoPs to be	KM Practitioners respondent[16] 37

	incorporated as part of their communication strategy to their stakeholders. This gives companies an advantage to better know their clients and serve them accordingly. Therefore, there are always **new ideas channelled by CoPs for business growth and up-skill people**	
	I don't think there is new knowledge generated in VCoPs. **People just have the opportunity to articulate their knowledge that was already out there so that other people can be aware and use them if they require them**	KM Development respondent[16] 38
	I can evaluate CoPs as one of the alternative ways to share and discuss knowledge that has not been shared otherwise. For example, there are shy people or people who keep their knowledge but they are more comfortable to share in their online groups. In other words, online knowledge groups may enable to get the knowledge of individuals that have kept them secret	KM Development respondent[16] 39
	These are one-answer questions, which are more appropriate for a Help Desk arrangement. Solution Exchange works best when there	KM Development respondent[16] 40

	are many possible answers to a question. Go on the site http://www.solutionexchange-un.net/africa/plan for the latest examples	
	UNDP **gains new and adaptable experiences from various grassroots communities in various UNDP-targeted sectors.** We share this as communities of practice to **extend the experiences to other communities that fall within similar projects**	KM Development respondent[16] 41