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KNOWLEDGE MANAGEMENT FRAMEWORK TO ENHANCE INNOVATION

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ABSTRACT

This article questions whether knowledge resources can act as critical enablers for successful innovation in an enterprise in the South African information communications technology (ICT) industry, and discusses the role of knowledge resources in enhancing innovation. The research reported on indicated that there is little empirical evidence that knowledge resources are used to enhance innovation in the enterprise. A case study was conducted in an engineering enterprise functioning in the high-end market of the ICT industry. Data was gathered through in-depth interviews with managers and documents were reviewed for an in-depth understanding of the enterprise. The enterprise has defined its software development processes as agile processes and has placed a very high premium on learning and knowledge transfer within these processes. The Development Engineering Division relies on small teams for knowledge resource sharing. The Sales and Marketing Division collects information to transfer into knowledge resources. The Research and Technology Design Division identifies solutions that are ahead of the market and employees share knowledge on lessons learnt from practice. The Business Services Division ensures that structures and practices are in place to support and encourage innovation. The Internal Support Services Division provides operational support and knowledge resources harnessed through these processes may enhance innovation of the product offering. A knowledge creation (KC) model was developed by combining several models and theories to analyse the use of knowledge resources for knowledge creation in the enterprise. It is recommended that knowledge

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management be aligned with the enterprise's business strategy to enhance innovation.

Keywords: case studies; enterprises; innovation; knowledge management; knowledge resources

1. INTRODUCTION

Management are increasingly aware that knowledge resources are essential to the development of their enterprises. In the knowledge economy, there is an increased reliance on knowledge and innovation (Du Toit 2003, 112). Patalas-Maliszewka and Hochmeister (2011, 75) state that knowledge resources are critical resources in an enterprise and are represented by the employees' knowledge, skills and capabilities. Knowledge has become a primary factor of production supporting the traditional economic resources, namely, land, labour and capital. Aranda and Molina-Fernández (2002, 290), confirm that knowledge resources are a source of competitive advantage and knowledge is often regarded as an enterprise's most important resource (Wang, He and Mahoney 2009, 1270).

The importance of knowledge as a resource of competitive advantage is higher in enterprises where innovation is continually implemented (Decarolis and Deeds 1999, 953; Pisano 1994, 93). Innovation is driven by acquired knowledge and access to new knowledge (Deng 2008, 175). Davenport and Prusak (2013, 5) define knowledge 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. It originates and is applied in the mind of knowers. It often becomes embedded in documents, repositories, processes, routines, practices and norms.

Various authors, such as Badaracco (1991, 48) and Nonaka (1994, 16) categorise knowledge as being either tacit or explicit. Tacit knowledge is "knowing *what* things work" and "how to *make* things work", whereas explicit knowledge is "knowing *why* things work". It is codified in terms of taxonomies and theories which establish cause and effect relationships. The process of codifying tacit knowledge to create empirical knowledge involves successive rounds of dialogue, often involving the use of metaphors to articulate individual perspectives and release trapped tacit knowledge which is otherwise hard to communicate.

Key to the knowledge economy is the ability to reinvest knowledge, reinvent the business, and innovate constantly. The concept of organisational knowledge and learning has been researched for many years and innovation and the creation of new knowledge are the most popular topics in today's management literature. The most common application referenced in the literature is the creation of new products or enterprise capabilities (Esterhuizen, Schutte and Du Toit 2012).

This article will address the following question: "Can knowledge resources act as critical enablers for innovation in an enterprise in the South African information and communications technology (ICT) industry?" The central argument of the article is that knowledge resources play a fundamental role in an enterprise's ability to innovate successfully. In the literature review the concept of innovation and how the management of knowledge resources enhances innovation are discussed. The case study discusses how knowledge resources contribute to innovation in a specific enterprise.

2. KNOWLEDGE MANAGEMENT AND INNOVATION

There are several definitions of innovation and creativity and many people use innovation and creativity interchangeably. According to Gurteen (1998, 6), "creativity is about the generation of ideas, and innovation is about putting them into action". Firestone (2003, 20) defines innovation as a knowledge process life cycle event that has been completed. The cycle begins with a problem that emerges, moves through knowledge creation processes, and ends in incorporation of knowledge structures. Katz (2007, 35) defines innovation as:

> The successful generation, development and implementation of new and novel ideas, which introduce new products, processes and/or strategies to an enterprise or enhance current products, processes and/or strategies leading to commercial success and possible market leadership and creating value for stakeholders, driving economic growth and improving standards of living.

Johannessen, Olsen and Lumpkin (2001, 23) state that by focusing on newness as the essence of innovativeness, it provides a useful starting point for innovation applications. According to these authors, innovation is something more than mere change. They state that it allows people to distinguish between changes that are simply alternatives or copies, and changes that are novel and original. Torjman and Leviten-Reid (2003, 16) expand the definition of innovation to include "the application of existing ideas in new ways or to new fields". Aranda and Molina-Fernández (2002, 291) state that traditional innovation theories consider innovation as a radical act generated by the introduction of a new element or a new combination of already known elements in a determined product.

According to Fenwick (2003), innovation further involves a complex mix of tacit knowledge, implicit learning processes and intuition. Mosurovic (2011, 430) emphasises that enterprises that create systems for the definition and development of innovative products and processes will not achieve success if their organisational context is unfavourable. Their organisational structures and processes must encourage technological change. She specifically mentions that organisational redesign means a change from traditional mechanistic bureaucracies to organic forms, which encourage flexibility and creativity. Wong (2013, 261) explains that organisational innovation can be further categorised into innovation in administrative systems (administrative innovation) and innovation in human capital (human capital innovation). Wong (2013,

262) defines administrative innovation as the introduction of new measures or practices to change the organisational structure or administrative procedures of an enterprise whereas "human capital innovation refers to an enterprise's adoption of new practices and measures in the process of identifying and hiring of innovative personnel".

Only limited research has been done in South Africa on how knowledge resources can enhance innovation, thus no formal guidelines exist for the use of knowledge resources for innovation. Although several innovation frameworks exist, the majority of them focus on the traditional resources (land, labour, capital and entrepreneurship) and none focus on knowledge as a resource. Esterhuizen, Schutte and Du Toit (2012) developed a knowledge management framework to develop innovation capability maturity but this framework focuses on innovation capability and has not been applied in a practical situation. The *innovation engine* (Seelig 2012) as discussed in the book *inGenius* provides an attractive alternative framework and was conceptualised through years of teaching creativity and innovation (see Figure 1). According to Seelig (2012, 186), knowledge resources help to enhance innovation and this is the reason why this framework was used in this research. She explains that although creativity is generated internally and can be stimulated by mastering skills, such as reframing problems, challenging assumptions, and connecting and combining ideas, creativity is also deeply influenced by what people know; the spaces in which people work; the people in a team; the rules, rewards and constraints in the work environment; and by a person's own attitude and the culture of the enterprise.

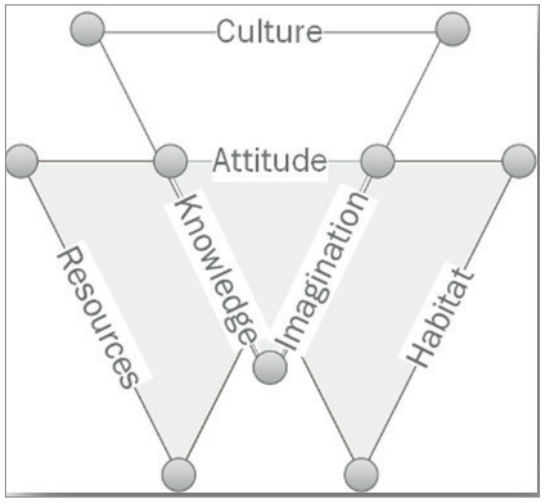

Figure 1: The innovation engine (Seelig 2012, 13)

The innovation engine (Figure 1) consists mainly of an internal part that is made up of knowledge, imagination and attitude. The external factors are resources, habitat and culture. Seelig (2012, 184) explains that the internal section of the engine was inspired by

Bloom's (1979, 50–70) original work on learning. Bloom focuses on what people know, what they do, and how they feel, which are generally known as knowledge, skills and attitude. Seelig adapted Bloom's (1979) skills category to imagination, as imagination refers to the specific skills needed for creativity. Knowledge in this context is what an individual knows and learns. Knowledge is acquired in many ways. Every single bit of information that an individual internalises throughout his/her life will form the sum-total of his/her knowledge. Knowledge is the basis for innovation, but knowledge does not imply that an individual must be an expert in the field where innovation is required. A lack of knowledge, combined with the correct attitude and access to required resources, may very well lead to fresh innovations, but acquired knowledge is a first step on the ladder to innovation.

Seelig (2012, 186–187) explains that imagination is the catalyst required for creative combustion. She refers to psychology and neuroscience research that reinforces the hypothesis that the same parts of the brain are involved when an individual remembers and imagines, including evidence that an individual who does not have the ability to remember the past is unable to conjure up a vision of the future. Therefore, imagination is fuelled by knowledge. This implies that the bigger the individual's well of knowledge, the greater his/her possibility for fresh innovation. If knowledge exists and imagination is triggered by a fresh idea, then attitude will determine if the idea becomes a feasible innovation. Seelig (2012, 188) explains that attitude is the spark that jump-starts creativity. Attitude is a complex neurological process and the field of psychology has done various studies in this regard. Some attitudes are better suited to drive innovation processes as seen in the research done by Moser et al. (2011, 1484–1489). They found that individuals, who believe that intelligence develops through effort, normally see mistakes as opportunities to learn and improve. These individuals show a stronger resilience and capacity to bounce back from mistakes, whereas individuals who believe that intelligence is a given and that mistakes reflect a lack of ability, find it harder to recover from mistakes.

Access to resources becomes a critical driver for innovation. Seelig (2012, 13) includes the following as resources:

- funds that can be invested in new enterprises;
- natural resources;
- individuals with knowledge and expertise;
- organisations such as universities and local enterprises that foster innovation.

The more knowledge individuals have, the more resources can be mobilised. Knowledge and resources are closely linked to one another, and the one drives the other in an ever expanding wealth of more knowledge. Therefore, the available resources influence knowledge and allow individuals to access more resources.

Habitat consists of the spaces in which people work and live. McIntosh (2010) describes seven different types of spaces optimised for innovation that can exist in both the physical and the online world, namely:

- private/secret spaces: places where people can be by themselves;
- group spaces: places where small teams of people can work together. Group spaces provide the opportunity for intense collaboration;
- publishing spaces: spaces designed to showcase what is going on;
- performing spaces: spaces where people can either share an idea or act them out;
- participation spaces: places that allow personal engagement with what is going on;
- data spaces: libraries or databases where people archive information that will be needed later;
- watching spaces: places that allow people to passively observe what is happening around them.

Seelig (2012, 13) defines culture as the way in which groups of people perceive, interpret and understand the world around them. If an enterprise chooses to be creative and innovative, then the culture of the enterprise must be clearly defined as such and the behaviours that support creativeness must be encouraged. This encouragement is done by enthusiastic employees who take the lead but also by policies that are written to support them.

The European Union (2007) found that diversity drives innovation. Etuka (2010, 56) describes how a more diverse workforce will contribute to an enterprise's ability to innovate. Puia and Ofori-Dankwa (2013, 416) demonstrate that culture and ethno-linguistic diversity are positively associated with national innovation. Diversity contributes to the innovation engine by adding value to the culture, resources and knowledge bases of the innovation engine.

Failures prompt new pathways to investigate solutions, but undocumented failures become null and void of meaning. Therefore, it is important that the failures be carefully documented to ensure that the knowledge gained from these experiments becomes apparent. According to Lanks (2011), the types of failures need to be defined and managed. Failing to succeed is a valuable culture to nurture in an enterprise that aims to be innovative by nature. It is important to decide in which manner failures are recognised as part of the successful innovation process. Similarly, it is critical to identify those failures that are unacceptable and should be limited as far as possible. Learning programmes should be developed in such a way that employees feel it is safe to fail.

As discussed in the previous paragraphs, knowledge and innovation are complementary issues. Knowledge resources act as critical enablers for the innovation process. According to Murray and Rowan (2000, 2), knowledge resources are the "primary drivers of innovation dynamics that create and maintain superior innovating power". Nonaka and Takeuchi (1995, 38) consider the mobilisation and conversion of

tacit knowledge as the key to successful innovation. According to them, innovation is the creation of new knowledge, but knowledge creation is not always innovative. Innovation usually involves a high degree of tacit knowledge and because it is uncodified it is difficult to communicate to employees.

3. CASE STUDY

3.1. Research methodology

The philosophy employed in the research can be defined as action research, that is, a case study combination with an interpretive approach. Argyris (1985, 4) describes action research as: "Action science is an inquiry into how human beings design and implement action in relation to one another. Hence it is a science of practice." This is true of the approach envisaged for the research as the main focus was to critically analyse how subjects engage with knowledge resources to enable knowledge creation and innovation.

The research methodology was based on a case study of the current situation in a South African information communications technology (ICT) enterprise. The case study method was used to assess whether the enterprise uses knowledge resources to enhance innovation. Yin (1994, 49) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. A case study method was chosen not only because of the qualitative nature of the data, but also because of the inductive nature of the study and the fact that it allowed the researchers to collect data from multiple sources (Leedy and Ormrod 2001, 60). Three managers were selected as a pilot study to test the structured in-depth interview. The case study was conducted in two phases. The first phase employed an analysis of the enterprise's documents. The second phase employed in-depth interviews with 10 managers from departments directly involved with the management of knowledge resources. Yin (1994, 55) defends a case study method for research by emphasising that the case does not necessarily have to define a universal principle, but can be used to demonstrate the applicability of theory to a practical environment. The objective of the current research was to demonstrate the applicability of Seelig's (2012) framework to the South African enterprise. It would then be left open to the research community to assess whether the case has broader implications and application.

The data from the respondents was analysed to determine the frequency of individual answers, but due to the relatively small sample size no statistical analysis was conducted to compute measures of validity and representivity of the data. The data from the case study was processed using content analysis. Conclusions were drawn from this information through interpretation in the context of the literature survey which allowed

the findings to be presented as key issues for the development of the three learning for innovation models.

3.2. Case study setting

The case study used for the research was a small engineering enterprise situated in Stellenbosch, South Africa. The enterprise functions in the high-end market of the ICT industry. The enterprise develops and produces communication solutions that are both innovative and specific to customer needs. The strategic position of the enterprise is to invest in research and development, enabling the enterprise to deliver just-in-time new and innovative products to the market. The enterprise develops electronic products and the subsequent software products as a total solution to specific requirements. The enterprise further designs innovative solutions based on novel research. The enterprise employs mainly engineers and ICT specialists. The level of qualification amongst the employees is very high and consists mainly of graduates at Level 7 and higher of the National Qualifications Framework of South Africa (SAQA 2012). The enterprise has further defined its development processes as agile processes, which are a different way to manage ICT teams and projects. The processes focus on active user involvement and frequent delivery of products. A very high premium has been placed on learning and knowledge transfer within these processes. Organisational learning is a priority in the enterprise to increase experience of its employees.

The data from the case study setting was primarily collected from semi-structured interviews with 10 managers in the enterprise. Other data, consisting of documents, was made available to the researcher in electronic or hard copy format.

4. FINDINGS

The organisation under study defines innovation as the process of taking new concepts to market. Two main spheres for innovation exist within the organisation (see Figure 2). The innovation spheres are stimulated by innovation triggers, usually in the form of needs, opportunities and technology. The product side of the chart is directed by market trends and requirements and the project side is directed by existing customer needs and existing technology and products. Therefore, both spheres are in the business of creating innovative solutions; the only difference is the drivers. The two input spheres exert constant pressure on each other and this is indicated by the diagonal line in Figure 2. The line represents a balancing act that ensures that the organisation only sells what exists. Each of the spheres may contribute, support or enhance the other spheres of innovation in the organisation.

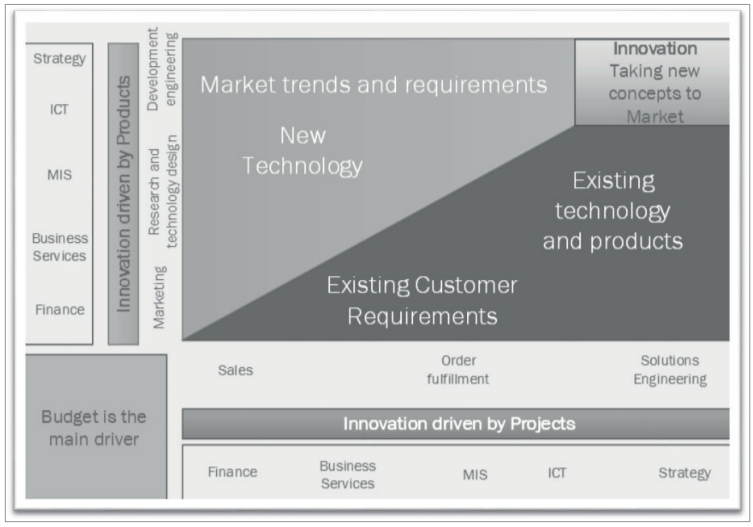

Figure 2: Innovation spheres of the enterprise under study (input provided by the CEO of the organisation)

The product development sphere consists of the Development Engineering Division, the Research and Technology Design Division and the Sales and Marketing Division. These three divisions drive the product development process. The Development Engineering Division produces and maintains products. This division has adopted a team-based iterative approach to development and relies on small teams for knowledge resource sharing. The approach embraced by the enterprise shows some similarities to agile engineering processes.

The Research and Technology Design Division aims to identify and develop solutions that are ahead of the market and employees share knowledge on lessons learnt from practice. The goal is to ensure that the relevant solutions are in place by the time the future technologies are viable. The division develops solutions up to the point where conceptual solutions can be demonstrated. Knowledge workers in the division have regular discussions to transfer knowledge and often must move to other divisions physically to enable transfer of technology and knowledge.

The Sales and Marketing Division uses business intelligence about competitors, markets and customers to plan better, identify new opportunities and change accordingly. The division collects information from agents and trade shows and turns it into knowledge resources.

The organisation has strategically agreed that user needs and opportunities are a critical if not the most important driver of development in the organisation. Sales, order fulfilment and solutions engineering, therefore, present the front that leads the projects. This is the group that interfaces closely with existing customers.

The organisation has strategically agreed that user requirements are a critical if not the most important driver of development in the organisation. A new division, namely Solutions Engineering, was formed, with the specific goal to focus on analysing and defining customer requirements, which create the baseline for projects. Therefore, this department will define system architecture based on customer requirements as contractually agreed. Ill-defined user requirements normally lead to faulty design and, in the end, may result in serious revenue losses. This division is also closely involved with the writing of research proposals and in-depth knowledge of the products and systems of the organisation is required.

The sales team is required to exhibit intimate knowledge of the product offering. Customers are a valuable source of innovation, therefore, the sales team builds close customer relations to harness the knowledge that customers might bring to a product offering. By embracing the dynamic nature of customer needs, it is possible to make innovative changes to product offerings that might stimulate new market segments or customers. The sales team is concerned with existing customers and may take on board new customers that seem viable. The sales team has been in existence for some time in the organisation and in many cases is the first interaction that potential customers might have with an organisation.

Workers in the Order Fulfilment Division are key experts when it comes to product logistics and the installation of products. This knowledge is valuable and, in most cases, consists of tacit knowledge gained through experience. Order Fulfilment is one of the main customer interfacing functionalities in the organisation. This division is a valuable source of customer experience and knowledge.

The Business Services Division provides administrative and strategic support to the organisation. These services do not directly contribute to the innovation processes of the product offering, but internal innovation of their processes may contribute to the success of the product offering. The division ensures that structures and practices are in place to support and encourage an innovative culture. The division initiates and facilitates appropriate team interventions to enhance the flow of knowledge and communication between team members. Per the manager of the division, the greatest asset of the organisation is the ideas of people: more specifically, the intellectual property and knowledge. The division must nurture these assets and continuous learning is one of the keys to nurturing and develop knowledge resources and ideas for innovation.

The Internal Support Services Division does not contribute to the product offering innovation, but can utilise innovative processes to enhance the success of the product offering. These services include ICT and management information systems (MIS) offerings.

The Finance Division forms the backbone and is a critical driver of the organisation, since the budget is the overall directive for all planned processes. The degree of innovative and agile abilities within these services will also contribute to the innovative culture in an organisation.

5. RECOMMENDATIONS

In order to enhance the degree of innovation in the enterprise, knowledge resources should be leveraged more effectively. The enterprise currently does not capture, transfer and leverage knowledge resources effectively. Customer knowledge is a valuable resource and the enterprise does not extract this knowledge in a formal manner. It is recommended that the enterprise should motivate and nurture the employees' professional skills which will enable them to generate and share their knowledge. Influencing and aligning individual interests with organisational interest can create unique knowledge resources and research-based innovation which provides competitive advantage. In this way effective knowledge resources will become a precursor to innovation. The enterprise should develop effective strategies to integrate innovative efforts, professional experience, skills and interactive capacities to create value for the enterprise's competitiveness.

The enterprise lacks a coherent approach to learning. Learning programmes need to be selected and developed that ensure that higher levels of learning are addressed. Constant learning must be encouraged and rewarded as part of the enterprise's culture. To enable learning, quality knowledge resources must be identified and made available.

The literature review showed a strong link between the management of knowledge resources and innovation. Knowledge resources can add value to the enterprise by enhancing innovation and innovativeness. It is very important that the management of knowledge resources in the enterprise should be aligned with the business strategy to enhance the enterprise's capability to innovate. A knowledge culture should be established in the enterprise which would include better corporate alignment, improved innovation through knowledge resource sharing and a rise in customer satisfaction. Effective management of knowledge resources will stimulate the development of creative skills and the development of a platform for asking questions and providing innovative solutions.

The next section will demonstrate a model that was developed based on a theoretical framework that will serve as a tool to survey the enterprise's knowledge creation capability. The knowledge creation (KC) model demonstrated in Figure 3 hinges on the following core principles: problems, skills, learning process, attitude and available knowledge and resources. The model was developed by combining the following models and theories:

- Seelig's innovation engine (Seelig 2012, 14);
- Bloom's revised model (Kratwohl 2002, 214);
- Buckler's model (Buckler 1996, 33);
- Illinois Mathematics and Science Academy's (IMSA) problem-based learning (PBL) model;

- insights gained from the literature research into the fields of innovation, KC and learning;
- the researcher's own insights into how such a model can function.

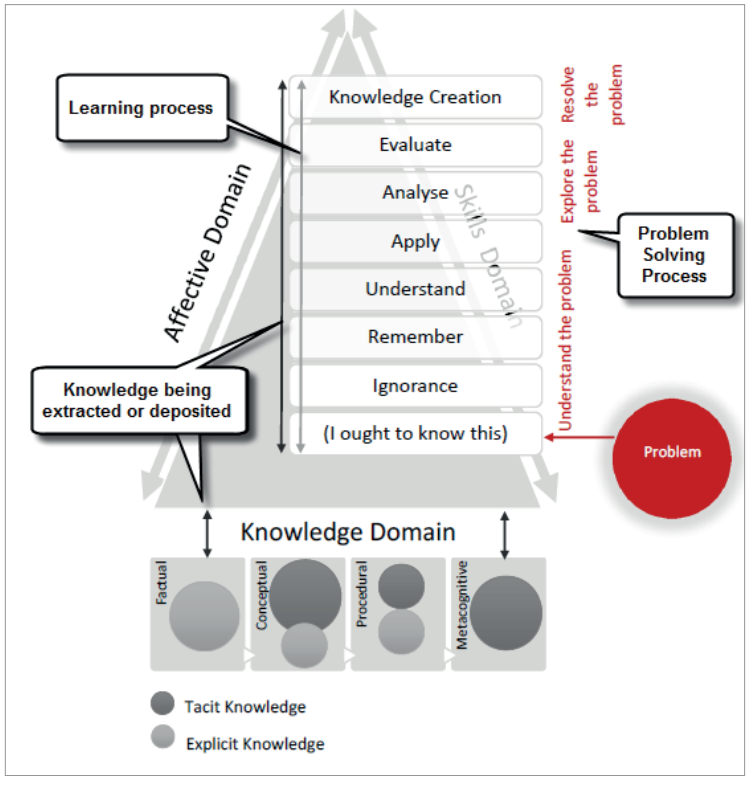

Figure 3: The KC model

6. THE KNOWLEDGE CREATION MODEL

The KC model will now be discussed in more detail. The KC model operates within the following domains:

6.1. The problem domain

As mentioned beforehand, problems are the main drivers of innovation today. The model in Figure 3 demonstrates how the problem, sometimes in the form of user requirements, stimulates the ignition of a problem-based learning process that might lead to new knowledge being created to solve a problem. The IMSA PBL model fits well in the KC

model, as demonstrated by the red text showing how the different PBL levels make use of the cognitive and knowledge domains to drive the KC process.

6.2. The cognitive domain

KC depends on information being available, as well as the critical learning activities that should take place for knowledge to be created. An important stimulus for these activities to initiate is the acceptance of ignorance and the conviction that "I ought to know this". To solve a problem using this methodology implies that the worker gradually moves through the various learning phases. The knowledge worker will, however, at any given point be able to refer back to any of the lower-order categories as the need to know more becomes apparent (e.g. when reaching the applied category, the need to understand more might become clear). The KC model now incorporates Bloom's revised model (Kratwohl 2002, 214).

6.3. The knowledge domain

Knowledge resources act as critical enablers for the innovation process. Figure 3 demonstrates that all aspects of the KC model hinge on the accessibility of data, information and knowledge, collectively named knowledge resources. The KC model demonstrates how the new knowledge created at the end of cycles will then contribute to the knowledge domain. If these aspects are unavailable, then no new learning can take place. The KC model further supports the revised model of Kratwohl (2002, 214–215) when showing how information moves from knowledge through to knowledge creation and then becomes new knowledge to be embedded in documents, repositories, organisational routines, practices and norms.

Knowledge can be codified and deposited as explicit knowledge. Access to knowledge and the variety of users of specific items of knowledge are bound to create various new innovative developments. Therefore, to ensure continuous renewal in a particular environment, the most important aspect will be the ability of individuals to access a diversity of data, information and knowledge.

6.4. The affective domain

The affective domain is encapsulated in the attitude section of the KC model. Attitude is what drives the search for solutions. The "why" question is important here, as is an attitude that demonstrates the principle of "The more I know the more I know that I don't know". Embracing failures is another important attitude that will enhance the KC cycle.

6.5. The skills domain

To move through the learning process, specific skills are required. Skills may exist for the domain in which a person is working, or they may include specific skills that are geared towards KC. By investing in the necessary skills, the organisation will ensure that the requirements for an innovative workforce are in place. Most of these skills can be enhanced through various learning programmes and workplace initiatives.

The KC model may assist researchers to analyse and manage KC capability. Figure 3 shows that all aspects of the KC model hinge on the accessibility to data, information and knowledge. If these aspects are unavailable in the enterprise, then no new development can take place. Access to knowledge and the variety of users of specific items of knowledge are bound to create various new innovative developments. Therefore, to ensure for continuous renewal in a specific environment, the most important aspect will be the ability of individuals to access data, information and knowledge.

Utilising Bloom's learning process will ensure that learning leads to KC. Practically this is done by constantly pushing learners/employees to engage with the higher learning outcomes, namely:

- Analyse.
- Evaluate.
- Create.

Combining Seelig's (2012) innovation engine (see Figure 1) in the KC model enables innovation to be embedded in the KC process.

The model described in Figure 3 supports the theory of Torjman and Leviten-Reid (2003, 16) that "knowledge is crucial to the development of organizational competencies and learning is the process through which organizations harness and apply knowledge".

By integrating life-long learning aspects into the model and by combining innovation theory with it, it becomes possible for individuals to contribute to new developments throughout their working life.

7. CONCLUSION

The aim of the research was to investigate whether knowledge resources can act as enablers for innovation in an enterprise in the ICT sector. In the attempt to elaborate on the role of knowledge resources to enhance innovation, a literature survey was conducted and it was argued that continuous innovation and knowledge resources that enable innovation lead to a competitive advantage. According to the literature review, enterprises that are able to stimulate the use of knowledge resources are more prepared to face rapid changes and to innovate. The findings of the case study show that there is little empirical evidence that knowledge resources enhance innovation in an enterprise.

Because of this finding the KC model was developed to serve as a framework for a quantitative survey to understand the enterprise's KC capability.

The results of the research should be viewed in the context of their limitations. Firstly, the research was based on a case study in only one enterprise which restricts the generalisability of the findings. This limitation leaves scope for further empirical research. The sample was obviously biased since interviews were conducted with only 10 managers. Given the above limitations, generalisation from the results of the study should be treated with caution. It is worth noting, however, that the study findings are mostly in line with the related prior research referred to in the study. Future research should investigate the use of the KC model as a framework to test and enhance innovation in other South African enterprises.

In the light of world-wide interest in the use of knowledge resources for innovation, the hope is expressed that South African enterprises will in future use knowledge resources as critical enablers for innovation.

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