

UNIVERSITY OF KWAZULU-NATAL

TITLE

The Strategic Role of Knowledge Management in African Universities

By

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Acronyms and Abbreviations

BI	Business Intelligence
CIO	Chief Information Officer
CL	Collaborative learning
DVC	Deputy Vice Chancellor
EDM	Educational Data Mining
ESD	Education for sustainable development
HE	Higher Education
KM	Knowledge Management
KPI	Key Performance Indicators
MI	Management Information
ICTS	Information and Communication Technology Services
IS	Information Systems
IT	Information Technology
MOOCs	Massive Online Open Courses
ODeL	Open, Distance and e-Learning
OLAP	Online Analytical Processing
UK	United Kingdom
WWW	World Wide Web

Abstract

This thesis articulates an empirical research study that examines the role of Knowledge Management, inclusive of Business Intelligence in an African Higher Education setting. There are an abundance of studies that show how Knowledge Management plays a key role in organisational strategy, productivity, efficiency, performance and competitiveness in developed countries. The same is not true for developing economies in Africa. This study addressed this gap by investigating the influence of Knowledge Management on institutional strategy development at leading African universities. Furthermore, Web 2.0 was also rigorously investigated as an e-Learning and Knowledge Management strategy for the effective transfer and dissemination of knowledge in Higher Education. The study targeted 20 leading African universities (based upon the Times Higher Education Rankings). The study was built around the constructs of 3 applicable frameworks including Kogut and Zander Knowledge Management Model, Organisational Learning Theory and Organisational Culture Theory. The research instruments were designed around the constructs of the frameworks. Questionnaires were sent to senior employees responsible for Knowledge Management at the respective institutions. In addition, in-depth interviews were also conducted with these individuals as part of the qualitative arm of the study. Both quantitative and qualitative data underwent rigorous statistical analyses in relation to the aims and frameworks of the study. This study found that Knowledge Management does influence institutional strategy and plays an informing role in providing knowledge on demand for strategic decision making and strategy formulation. However Knowledge Management was primarily used in strategy formulation at operational and support areas of the institutions as opposed to teaching and research. There was also a lack of sophisticated and powerful Knowledge Management Information Systems in most of Africa's leading institutions. The study also showed that Web 2.0 is not being utilised as an e-Learning and Knowledge Management Strategy. Knowledge Management is currently not at Executive Level in African Higher Education. The study further revealed an important finding, that being, those institutions that do make strategic use of Knowledge Management, inclusive of Business Intelligence and Web 2.0, in key areas such as academic teaching, learning and research were higher up in the academic ranking scale as opposed to those that did not. Relating to this, the study showed that effective use of Knowledge Management including Knowledge Management Information Systems does add value to the institutions. In addition, if Knowledge Management including more specialised Knowledge Management Information Systems can be more effectively used to inform strategies in teaching and research then it will promote more academic value and institutional competitiveness. Furthermore, if Web 2.0 can be used effectively as an e-Learning and Knowledge Management strategy it will yield significant benefits in research and pedagogy and increase competitiveness. The Organisational Learning framework can be used to predict the trajectory of African universities if they engage with Knowledge Management strategically. Other future studies, amongst others, that can be generated from this study includes avenues such as the measurement of success derived through effective practice of Knowledge Management in African universities or a study similar to this across BRICS nations.

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CHAPTER ONE

Introduction

1.1 Introduction

Chapter one provides a detailed introduction to the research study. This chapter defines the research problem (problem statement), research question and sub questions, and objectives of this study. An overview of the study is also presented which depicts the key focus areas of the study along with the motivation of the study. In addition, a brief outline of the method and of each chapter is provided. Holistically, this study examines the role and use of Knowledge Management as a strategic driver of institutional strategy at African Higher Education institutions. The study also examines the role of Web 2.0 as a subset of Knowledge Management in the creation, management and dissemination of knowledge within these institutions.

1.2 What is Knowledge Management

There are many of definitions of Knowledge Management (KM). While the literature review (Chapter 2) provides detail definitions of KM, a brief introduction to the concept is presented here.

Knowledge is an intellectual resource and is generated from ‘information’ (Kidwell, van der Linde and Johnson, 2000). William and Amin (2006), assert that knowledge is generated from information and value is given to it based on the organised accrual of the information through experiences, communication or extrapolation. Building from this, comes Knowledge Management. Therefore knowledge is primarily about strategic information which constitutes extracting/deriving value from information and using it strategically to suit a specific need. Knowledge Management can therefore be seen as the effective creation, control, transfer and dissemination of knowledge that is derived from an organisation’s information and intellectual resources that can be used to:

- Generate new capabilities, promote innovation and performance, and improve customer value (Beckman, 1999)

- Make strategic decisions and take strategic actions (Kidwell, van der Linde and Johnson, 2000)
- Better achieve organisational goals (Marshall, *et al.*, 2003)
- Promote competitive advantage, strategy development (Kebede, 2010)
- Facilitate Organisational Learning (Kebede, 2010)

Knowledge Management Information Systems also form part of a organisations' Information Systems (IS) and becomes an important facet of IS Strategy (Kebede, 2010). Knowledge Management is not just about technology and systems that are used to generate knowledge. In order for the full potential of KM to be realised, any KM system must involve 3 crucial elements: people, processes and technology, (Patrides and Nodine, 2003). Kebede (2010) also argued that Knowledge Management Information Systems can in turn fulfil key organisational purposes of gaining a sustainable competitive advantage, strategy development and improving organisational learning.

1.3 Key focus areas of the study

The key focus areas of this study are KM, Business Intelligence (BI), e-Learning and Web 2.0 in Higher Education (HE) institutions in Africa. All of these areas are examined in detail and the crux of the study is to find out how KM is influencing institutional strategy in African HE institutions. To achieve this, the study examines how knowledge that is gathered from KM Information Systems (KM/BI systems) is being used to inform institutional strategy formulation. In addition, it will be investigated if KM is adding value and competitiveness to the institutions. The study further focuses on the role of Web 2.0 technology as a KM and e-Learning strategy for the creation, management and dissemination of knowledge within the HE context.

1.4 Problem statement

Knowledge Management plays a key role in organisational strategy, productivity and competitiveness. Numerous studies have confirmed this key role, for example, Kamara, Anumba and Carrillo (2002), Dasgupta, Sahay and Gupta (2009), Massa and Testa (2009) and López-Nicolás and Merono-Cerdán (2011). The literature review (Chapter 2) reveals an

abundance of research that exist on KM and the strategic role of KM in HE in both developed countries and other developing countries. These studies show how KM is being seen and used as a fundamental and strategic entity in HE institutions and is yielding significant benefits such as increased levels of quality, innovation, decision making and productivity. However, there is a lack of evidence whether KM is being used in a similar way in African HE. This lack of evidence stems from the paucity of research that exists on the role of KM in contributing to effective strategy development in HE in Africa. A comprehensive literature search using electronic and library resources revealed a dearth of this type of research in an African context. Whether HE institutions in Africa are actually utilising KM in a strategic way to enhance productivity, efficiency, innovation and competitiveness at their institutions is unknown.

1.4.1 Background to the problem

Knowledge Management is an important resource for advancing the development of Africa into the 21st century, Mchombu (2007). In addition, universities in Africa face various challenges in a global market relating to HE (Thiaw, 2007; Mwapachu, 2010). Africa is a developing continent and KM should form a significant part of Africa's present and future. In order to keep abreast of developed countries, knowledge creation and harnessing of that knowledge is critical. It has been stated that educational institutions can achieve higher levels of innovation, functionality, productivity, quality, and competitiveness by using KM strategically (Psarras, 2006). Furthermore, studies from various authors including Metaxiotis and Psarras (2003), Kende, Noszkay and Seres (2007), Cranfield and Taylor (2008), Krajcsó (2009) Laal (2010) and Lubega, Omona and van der Weide (2011) highlight this.

Universities are the central hub where knowledge is created and disseminated. From the earliest of times, universities have been occupied with the pivotal elements of knowledge creation, knowledge collection, knowledge preservation and knowledge dissemination which are now collectively regarded as knowledge management (Oosterlinck and Leuven, 2002). Economics Intelligence Unit (2008) noted that HE helped develop the mindset and skills necessary for effective learning through knowledge which prepared students for engagement in academically productive and rewarding activities. Students and graduates should be able to then use this knowledge gained from HE to contribute to the development of their countries and continent.

It is therefore important to ascertain if African HE institutions can attain similar levels of quality, innovation and productivity as compared to HE institutions in developed countries through the strategic use of KM. It is also important to establish if universities in Africa are employing KM as strategic information practices to develop strategy and drive institutional value which can also contribute to combatting the challenges (global and local) that they face. Hence, the strategic use of KM as a contributor to institutional success and competitiveness needs to be examined in an African HE context. There is a need to examine KM as driver of strategy to keep abreast of universities in developed countries and towards making African universities globally competitive.

E-Learning is also a fundamental feature of KM and the strategic use of e-Learning needs to be examined in an African context. Knowledge Management and e-Learning are both approaches that contribute to the improved creation, transfer, utilisation and preservation of knowledge and something that HE institutions should look at as an advantage (Maier and Schmidt, 2007; Milam, 2001; Marshall, *et al.*, 2003). There is hence a need to examine KM as an e-Learning strategy for the effective transfer and dissemination of knowledge in Higher Education and address the knowledge gap that exists in Africa. Building on e-Learning comes the phenomenon of Web 2.0 technology which advances the capabilities of e-Learning by promoting online 'real-time' interactivity which is now a global trend in multi-modal knowledge creation, management and dissemination in HE (Williams, Karousou and Mackness, 2011; Bennett, *et al.*, 2012; Eales-Reynolds, *et al.*, 2012). It is shown that Web 2.0 plays an important and strategic role in HE in namely developed countries and is used extensively in creation, management and dissemination of knowledge. Therefore, while this has been extensively studied in developed countries, the same is not true for developing economies like Africa.

It is therefore important to investigate the status of Web 2.0 in an African HE setting as a subset of KM and towards enhancing knowledge creation and dissemination. This study therefore also addresses this gap and explores the role of Web 2.0 as strategic KM intervention in Higher Education in Africa.

1.5 Research Question

The problem statement generates the research question:

How do Knowledge Management practices influence Institutional Strategy at leading African Universities?

1.5.1 Research Sub-Questions

The sub-questions that will assist in answering the primary research question and hence achieve the objectives of the study are:

1. What is the role of Knowledge Management in strategy formulation at the institution?
2. How is Knowledge Management:
 - (i) Adding value to the institution at a continental level?
 - (ii) Adding value to the institution at a global level?
 - (iii) Promoting competitiveness at a continental level?
 - (iv) Promoting competitiveness at a global level?
3. What is the role of Web 2.0 technologies:
 - (i) In the creation of e-Learning?
 - (ii) In the management of e-Learning?
 - (iii) In the dissemination of e-Learning?
4. What is the role of Web 2.0 technologies:
 - (i) In the creation of knowledge?
 - (ii) In the management of knowledge?
 - (iii) In the dissemination of knowledge?
5. Where is KM represented within organisational structure of the institution?

1.6 Motivation for the Study

We are currently living in a knowledge based society where knowledge and information are the primary drivers of productivity, wealth, sustainability and competitive advantage, (Hamidi, *et al.*, 2011). Furthermore, there is substantial evidence of HE institutions in developed countries and more importantly, other developing countries that are utilising KM strategically for continuous improvement and effective institutional strategy development. The literature review reveals that institutions, mainly in developed countries, that are employing KM systems, strategies and practices are yielding significant benefits (see 1.4). Additionally, Web 2.0 based e-Learning, which is a fundamental part of KM , is proving to be the latest trend in developed countries to promote more agile and interactive teaching and learning among students which is contributing to more effective knowledge creation and dissemination.

Furthermore, it is evident that there are no African universities that are listed in the global top 100 university ranking list (Times Higher Education, 2014). However, universities from developed countries dominate the top 100 global rankings. There may be many reasons why African universities are not in the top 100 listing, however, this got the investigator thinking that perhaps a lack of KM could also be one of the factors. Upon delving deeper, it was found that the area of KM has not been conclusively explored in an African context and therefore there is no conclusive evidence if KM is being used toward institutional strategy development and knowledge creation. The motivation for this empirical research is therefore to:

- Explore the area of KM in detail in leading African HE institutions.
- Contribute to KM research from a strategic perspective in a HE setting. In addition, other areas such as strategic e-Learning via Web 2.0 will also be examined and reported on. Limited research has been carried out in this area in Africa.
- Provide an indication as to where African HE institutions are placed in terms of KM, e-Learning, Web 2.0 and Massive Open Online Courses (MOOCs).
- Provide feedback from some of Africa's leading HE institutions in the areas of KM, e-Learning and Web 2.0.

- Demonstrate the potential of KM to the executives, academics, administration and students in HE institutions
- Discover possible challenges that could exist in relation to KM implementation, adoption and its role in strategy.
- Provide valuable insights on KM to the Department of Higher Education in various African countries
- Make new discoveries regarding KM and Web 2.0 from an African perspective

1.7 Objectives

In relation to the motivation for the study and the research questions, the objectives of the study are hence to:

- determine whether KM is contributing to overall institutional value
- investigate whether knowledge gathered through various KM Information Systems is being used to contribute towards institutional strategy
- examine the role of Web 2.0 as an e-Learning strategy
- examine the role of Web 2.0 as a KM strategy
- establish whether KM is contributing to strategy development at Executive Level

The investigator posits that these primary objectives will lead to the ultimate objective of creating new empirical knowledge and applicable theory development in the field of Knowledge Management. This ultimate objective can be better understood as the output of the study to be used to:

- generate significant amounts of publications that will in turn promote new knowledge in the area of KM
- expedite the development of a new framework/s for measuring KM in Higher Education in Africa and /or other developing economies

- allow KM to become a critical entity in strategy development in HE institutions in Africa and other developing countries around the world
- make recommendations towards the effective and strategic use of KM and Web 2.0 in Higher Education
- be used as an informative reference for other KM and Web 2.0 related studies in developing economies

1.8 Contributions of the Research

In relation to the motivation for the study shown above (1.7), the potential value of the research (based on the results) is hereby shown. This study:

- Explores the area of KM in detail in leading African Higher Education institutions.
- Generates new theory in relation to KM, e-Learning and Web 2.0 in a HE context, both in an African context and globally.
- Fills the research gap in Africa relating to the influence of KM on institutional strategy formulation in African Higher Education.
- Applies three international frameworks that pertain to KM and Information Systems, in an African context. Based on this, it also confirms the framework/s that is fitting to the effective practice of KM in African institutions.
- Portrays the role of Web 2.0 in regard to the creation, management and dissemination of knowledge in an African HE setting.
- Contributes to the area of KM from a strategy development perspective in a Higher Education setting.
- Reports back on what some of Africa's leading HE institutions are doing in the areas of KM, e-Learning and Web 2.0.
- Makes other discoveries pertaining to KM that goes beyond the scope of the study

1.9 Method and Outline

To answer the research questions and fulfil the objectives of the study, the top 20 universities in Africa were selected to participate in the study. This includes the top 10 ranked universities from South Africa, together with the top 10 universities from outside South Africa (based upon the Times Higher Education Rankings). The targeted respondents from each of the selected university were key personnel who specialised in KM and Business Intelligence (BI) and this included people in positions of Chief Information Officers (CIO), Executive Directors, Information Technology (IT) Directors and strategic managers.

This mixed method study utilised both questionnaires and interviews as research instruments. The study is built around the constructs of 3 applicable frameworks which included Kogut and Zander (1992) Knowledge Management Model, Argyris and Schön (1978) Organisational Learning Theory and Schein (1985) Organisational Culture Theory. The questionnaire and interviews were therefore designed around the constructs of each framework allowing the frameworks to be applied to the results of the study to predict the trajectory of African universities if they engage with KM strategically.

The actual research data collection involved questionnaires sent to all respondents as part of the quantitative part of the study. Interviews were also conducted as part of the qualitative measure of the study. The interviews serve as a means to positively support and enhance the quality of the results obtained from the questionnaire (quantitative). The aim of the interviews was to gain deeper insight (deepdive) into the selected institutions and to extract in-depth data regarding KM practice and strategy at the institutions. This also added more depth to the data that was collected and provided an avenue to explore and discover further underlying issues related to the study. The combination of both quantitative and qualitative research methods gives the study an added advantage in the collection of data. It also provides a more powerful and rich set of results to support the research question and objectives of the study in both a deductive (questionnaire) and inductive (interview) way.

In-depth statistical analyses are pivotal for both quantitative and qualitative data. Both sets of data were analysed by a professional statistician. Quantitative analysis entailed techniques such as Cronbach reliability analysis, frequency statistics, Pearson correlations, Chi-Square analysis and multiple regression analysis. Qualitative analysis involves the use of NVIVO

and consisted of detailed cluster analysis, tree map analysis and tag and word frequency clouds to reveal key themes and patterns relating to the study. Key results, findings and discussion of results are detailed in Chapter 5 and Chapter 6.

1.10 Overview of Thesis

- **Chapter 1:** This chapter provides the introduction to the study focusing on the research problem, objectives and research question that the study will address. It also gives a basic outline of the study.
- **Chapter 2:** This chapter delivers a detailed supply of supporting literature that relates to the study. It shows research literature relating to the study from both developed and developing countries. It defines and examines all of the key terms and areas that the study will address. In addition the theoretical framework is also thoroughly detailed.
- **Chapter 3:** This chapter describes the methodology used to conduct the study. It explains and justifies the reasons why the methodology was chosen and how the study was conducted. Aspects such as sample size, respondents, data collection methods and type of analysis used are the key focal points of the chapter.
- **Chapter 4:** This chapter reports the descriptive statistics consisting mainly of the frequency results derived from responses to the questionnaire. It presents the results in the form of numbers, graphs and tables.
- **Chapter 5:** This chapter forms the crux of the study. The quantitative and qualitative analyses are presented and discussed. Supporting theories from other related and applicable studies around the world are presented. This chapter forms the basis of how the research question has been answered and objectives achieved.
- **Chapter 6:** This chapter highlights the key findings which are represented with reference to the analysis and discussion. This includes the findings in relation to the research questions, objectives and theoretical frameworks of the study. This chapter concludes the study. Implications of the study and recommendations are also shown

in this chapter. Recommendations for further research are presented.

1.11 Summary

This chapter introduced the study and the research problem. It provided the opportunity for the reader to identify with the research question, sub-questions and objectives that stemmed from the research problem. The motivation for the study along with the potential contributions that the study makes to the body of knowledge was presented. This chapter also gives the reader a basic outline of the study and a snapshot of what each chapter entails. The next chapter gives a very comprehensive review of related literature and theories that form the supportive structure of this study.

CHAPTER TWO

Review of Literature

2.1 Introduction

This chapter presents the theoretical background for this study. It also provides a review of the literature on Knowledge Management (KM) and the use and application of KM in a strategic way in Higher Education (HE). Knowledge Management studies conducted in developed and developing countries in a HE context will be listed and discussed. The concept of e-Learning and Web 2.0, which is a pivotal part of KM, will be comprehensively covered.

2.2 Information Systems

Information Technology (IT) is recognised universally as a pivotal and enabling resource. Rapid developments in Information and Communications Technologies (ICT) in the last three decades have positively impacted upon society and made technology an inevitable part of life (Dastan, Mesut and Naralan, 2011). It has been suggested that society has undergone a critical transformation from the industrial to the information age, and those who have realigned their (business) practices to maximise the advantage to be gained from the universal availability of information would gain substantial benefits (Grineski, 1999). Information Systems (IS) are considerably different from IT in that it consists of data and application systems built upon an IT infrastructure. This also includes ‘people’ as an important entity that use IS to deliver information and communications services in an organisation (Davis, 2000). Information systems are a combination of technical components such as IT and human activities within an organisation (Avgerou and McGrath, 2007). These systems have become much more than just an enabler or support tool, but a powerful strategic entity. However, even though many organisations are investing in IS and technology, ineffective use and non-strategic practice of IS can hinder its real potential (Tanlamai, 2007). Information Systems thus becomes a wasted resource and fail to create institutional value. A study by Tanlamai (2007) investigating the use of IS to sustain competitive advantage using Porter (1980) competitive strategies concept, confirmed that Information Systems are ineffective and inefficient when used for mundane tasks such as recording, support and analysing the

efficiency of internal operations, instead of being utilised in a competitive and strategic fashion.

2.3 Information and Information Strategy

As early as 1997, Hughes (1997) defined the term Information Strategy as one that is used to view information as a key resource on its own which must be managed and valued strategically in the same way as any other important organisational resource. A more recent view is that the strategic use of information can be regarded as the way in which information is manipulated and used to suit a specific need (Omosho, 2009). Studies by Barroero, *et al.* (2010), Chen, *et al.* (2010) and Johnson and Lederer (2010) confirm this and show how information is used strategically to produce better results and other benefits such as improved productivity, efficiency and business turnaround. This relates well to Hamidi, *et al.* (2011) where he argued that knowledge and information are the primary drivers of productivity, competition and wealth in today's society.

2.4 Information Strategy

Information on the internal and external environment of an organisation is a significant factor in the process of strategy development and decision-making by management in almost any industry (Citroen, 2011). Citroen (2011) showed in detail how the strategic use of information led to strategic decision making by executives in a German setting across 13 companies. The research highlighted that information played a crucial role in reducing uncertainty at any given time for the executives. Information about market developments, economic developments, customers, competitors and even technology information was considered to be indispensable for strategic decision-making by the executives. Furthermore, it was shown that management viewed the 'quality' of information as an important aspect of information based strategy. Quality of information meant integrity, transparency, robustness, timeliness and also completeness or a fair degree of completeness. Technology also played a vital role in this process. The results further showed that some of the 13 companies surveyed had their very own information departments, driven by technology, and which was made up of a variety of specialised staff including information specialists, business intelligence

specialists, analysts and legal professionals. This gave the companies a very strategic standing in industry.

The advances in ICT can effectively and feasibly facilitate information sharing and integrity across any organisation which can lead to more information based decision making and strategy development. This is supported by Yang and Maxwell (2011) who highlighted the role of information sharing as a strategy in the public sector based on interpersonal, intra-organisational and inter-organisational success factors. They concurred that information sharing is an important aspect of increasing organisational efficiency, performance and strategy. This view was convergent with those expressed by other researchers including Marshall and Bly (2004), Zhang, Dawes and Sarkis (2005), Cress and Kimmerle (2006), Razavi and Iverson (2006), and Willem and Buelens (2007).

Yang and Maxwell (2011) found that the establishment of IS that facilitated information flow and processes are pivotal to organisational success. Strong leadership support for information sharing and the harnessing of that information puts an organisation in a strong position in terms of decision-making and strategy development. Furthermore, information sharing provides a platform for building trusted relationships within the internal environment of the organisation, which leads to more internal cohesion. Lastly, by supporting the development of effective IS to support information creation, accuracy, timeliness and exchange of information, organisations could proceed with their daily activities with greater confidence and better outcomes.

Global challenges place pressure on organisations to act strategically as a method to saving money, harnessing resources and remaining sustainable. This is supported by Naranjo-Gil and Hartmann (2007) who highlighted the role of strategic information in the form of Management Information (MI) in a hospital setting. The authors argued that organisations, including hospitals, needed to revisit their strategies in terms of operational and cost efficiency to cope with both local and global challenges (e.g. Recession). Data was gathered from 218 Chief Executive Officers (CEOs) of public hospitals in Spain. The results showed that CEO's stressed the value of accurate information as a basis for strong strategy (Operational and Cost Reduction strategies) and conveyed that further investments in the area of Management Information would be done to make it a key source of strategy development. Furthermore, alignment of the hospital strategy with the information strategy was going to be

looked at in the future by the CEO's (Naranjo-Gil and Hartmann, 2007). The strategic use of Management Information is therefore seen as a strategic approach to improving internal operations as well as making more informed decisions based on accurate information.

Similarly in a business context and in the changing economic climate, businesses need to cope with rapid changes. This can be possible through the strategic use of information. This is supported by Alexopoulos and Theodoulidis (2003) when they argued that often information overload complemented by the lack of strategic information structures as are the main reasons for an organisation not being able to acquire, harness and provide accurate information. This could have a negating effect on the business. Alexopoulos and Theodoulidis (*ibid*) looked at information strategy from a business point of view and developed an information model, known as the generic information business model that could provide a structured representation of the way information was used within the organisation.

Information from entities such as customers, suppliers, markets, competitors and the economic environment could be analysed to establish relationships and correlations. This provided an organisation with the relevant structure to harness information and provide direction for organisational information use as well as simplify the identification of problems and promote the development of solutions (Alexopoulos and Theodoulidis, 2003). Similarly Zahay and Peltier (2007) examined information strategy derived from customer information from an interactive marketing perspective. Interactive marketing requires an organisation to learn more about its customers and customise product and services to those customers (Zahay and Peltier, 2007). It was shown that strategies that were created based on the knowledge gained from the customer information and those organisations that managed customer information as a strategic resource seemed to have derived significant benefits such as increased customer satisfaction, increased sales and retention of customers.

The above literature depicts that information becomes a key resource in almost any organisation when used strategically. This links to the next section of 'knowledge'.

2.5 Knowledge

The above studies reflect how information can be used strategically to enhance an organisation in respect to efficiency, productivity, quality and competitiveness whilst also promoting strategic decision-making and informing organisational strategy. Strategic information results in or can be referred to as knowledge. This is supported by Kidwell, van der Linde and Johnson (2000) who asserted that the terms, knowledge and strategic information are sometimes used interchangeably, however KM has become more of a key term relating to how organisations utilise their informational and intellectual resources strategically. Furthermore, according to Laal (2010), information that is derived from data and then used strategically by any entity can be referred to as knowledge. However, knowledge should be distinguished from data and information in the sense that data is a representation of raw facts out of context, and hence not directly meaningful (William and Amin, 2006). Information arises when raw data is placed within some meaningful context and transformed into something that is readable and understandable. Knowledge is derived from that information and given value based on the organised accumulation of the information through experiences, communication or extrapolation (William and Amin, 2006). A visual articulation of the view of knowledge by William and Amin, (2006) is shown in Figure 1.

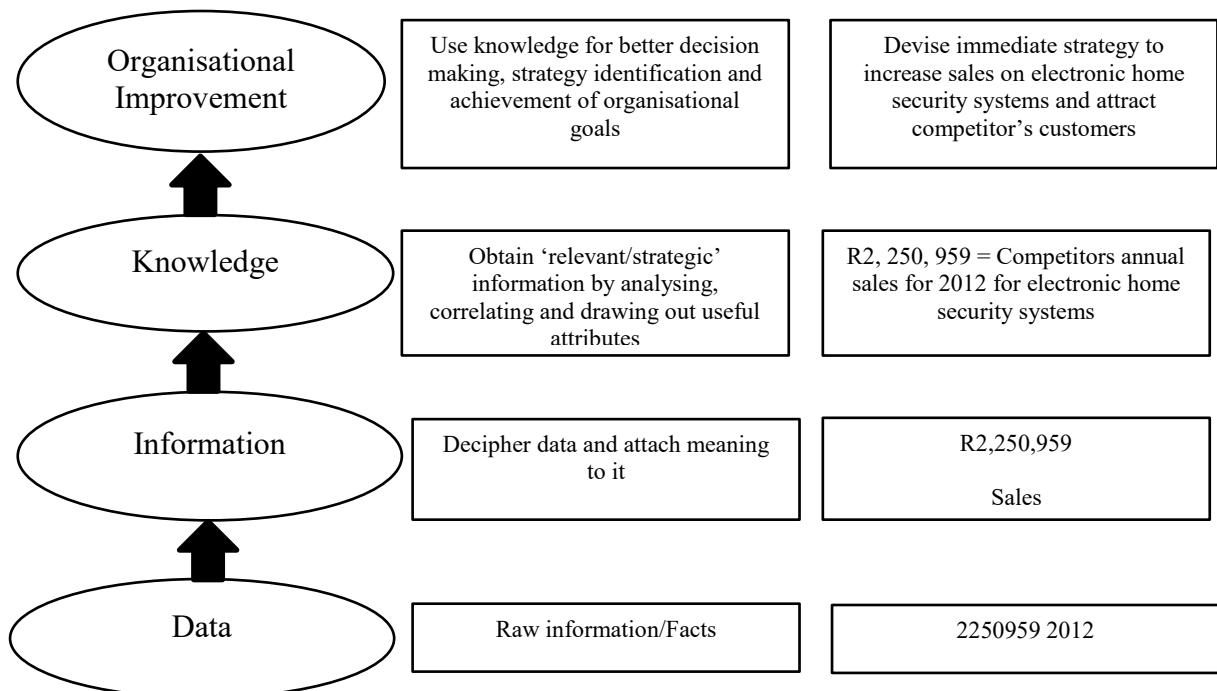


Figure 1: Example of Knowledge articulated from (William and Amin, 2006)

The articulation of knowledge shown in Figure 1 also related well to Nilsen (2008) who argues that data is merely symbols (e.g. numbers, letters) that represents something in reality and cannot deliver any meaning unless put into some sort of context. Once it is put into some kind of context, it then becomes information. This information then becomes knowledge when it is used or leveraged strategically to execute or accomplish a specific task. This concurred with Davenport and Prusak (2000) who asserted that knowledge was derived from information which in turn was derived from data. The next part of the review takes an in-depth look at KM and its attributes with the main focus on Higher Education.

2.6 Knowledge Management

Knowledge Management forms an important part of IS and is an artefact resulting from the strategic use of IS. This is supported by Kebede (2010) who asserts that KM emerged in IS as it primarily highlights the 'Management of Knowledge' as the highest form of 'manifestations of information'. This is hence understood as KM manifesting itself on a scale that runs from data, to information, to knowledge. The author emphasises that the goal of KM in IS is to help make information and knowledge accessible for effective decision making in any environment which can in turn lead to solving problems. This included using KM via IS for the mandatory purposes of gaining a sustainable competitive advantage, strategy development and improving organisational learning (Kebede, 2010).

There is no standard definition of Knowledge Management (Laal, 2010), but instead a variety of accepted definitions indicating what KM is all about. Relating to this, there are many definitions of KM given by an abundance of studies done in this area. Knowledge Management was defined by Beckman (1999) as the creation, accessibility, control of experience, knowledge and expertise that generated new capabilities, encouraged innovation and performance, and improved customer value. According to Kidwell, van der Linde and Johnson (2000), KM is a process of creating value out of information and other intellectual assets which in turn becomes knowledge and then used by people to make relevant decisions and take appropriate action. It was posited by Firestone (2001) that the process of good KM was one where organisations had formulated ways to identify knowledge assets that were derived from various departments within the organisation and even from other organisations that shared similar areas of interests.

It was also postulated by Rumizen (2002) that Knowledge Management is a logical and systematic process whereby knowledge is created/captured, analysed, shared and leveraged by an organisation in order to succeed in its goals and objectives. Knowledge Management can also be seen as the creation of pertinent knowledge derived from the data or information found in an organisation's available resources and using that knowledge to achieve organisational goals (Marshall, 2003). Laal (2010) extrapolated that successful Knowledge Management involves processes that improves an organisation's ability to learn and gain knowledge which then allows the organisation to perform effectively and deliver positive results. Furthermore, Aranganathan and Lakshmi (2010) viewed KM as a process of making the right knowledge available to the right people, at the right time and in the right form.

It is important to note that even though Knowledge Management and Information Management are terms that are used interchangeably, they are actually different in the sense that KM comprises of a range of practices to create/generate, categorise, represent and distribute knowledge for empowerment and learning. A key distinction is that KM involves the human component (people) as well as the IT/IS systems (KM Systems) while Information Management is associated primarily with the IT that helps to create, store and use information. This is also supported by Patrides and Nodine (2003) who affirms that people, processes and technologies are the three critical elements when it came to KM and KM strategy. Similarly, as per Omona, van der Weide and Lubega (2010), even though there are several perspectives on KM, all share the similar core constituents, namely: People, Processes and Technology. The technological or techno-centric based KM involves systems to enhance knowledge creation, integration and dissemination. The process based KM involves processes to optimise organisation design and workflows whilst people based KM involves important aspects relating to interpersonal interaction, knowledge and environmental factors (Omona, van der Weide and Lubega, 2010).

2.7 Knowledge Management synonymy with Business Intelligence

Knowledge Management and Business Intelligence (BI) are synonymous with each other. Similarly to KM, there are various definitions of BI. It was asserted by Azma and Mostafapour (2012) that BI was first adopted by an individual called Vilensky in 1967, and

BI was all about the collection of necessary data followed by intense and calculated processing of that data to derive valuable information also known as ‘intelligence’, that lead to better decision-making and competitive advantage. An interesting definition came from Maria (2005) where BI was a set of processes and systems designed to improve business decisions by using data that was gathered from various organisational sources. This mainly included the analysis and processing of data to create useful information and then distribution of that valuable information throughout the organisation for more strategic decision making. Similarly, and as conveyed by Elbashir, Collier and Michael (2008), BI was a strategic resource that provided the ability to analyse information that is locked up in an organisation’s data resources. This could then generate valuable knowledge to enhance management decision making and business processes across the organisation. Furthermore, Davis (2002) argued that when an organisation utilises BI strategically, it is able to make intelligent decisions that promote better organisation sustainability, productivity and competitive advantage.

Based on the definitions provided for KM (in 2.6), it can be understood that KM and BI are related whereby they provide an organisation with accurate and critical information that can be seen as ‘knowledge’ and/or ‘intelligence’ to holistically promote organisational value. However, the term BI is usually affiliated with a ‘business’ environment and focuses more on business analytics (Elbashir, Collier and Michael, 2008), whilst KM is a term that is more fitting to a non-profit type of organisation. Hence, for purposes of this study the term ‘Knowledge Management’ will be primarily used and it will encompass BI from a systems perspective, whilst also encompassing e-Learning and Web 2.0 from a knowledge perspective.

2.8 Knowledge Management and Business Intelligence Systems

Knowledge Management and Business Intelligence are enabled via Information Systems (Kebede, 2010). Building from this, comes ‘KM and BI systems’. These are Information Systems that are designed purely for the intense analytical processing of information and data with the aim of generating useful ‘knowledge’ reports from that (Maria, 2005; Elbashir, Collier and Michael, 2008). There are a variety of KM and BI systems that exist. Some of the

most widely used KM/BI systems include data mining, data-warehouses, online analytical processing (OLAP), predictive analytics and digital dashboards (Sharman, 2010).

Brief definitions of some of the main KM/BI systems are presented below.

- Data mining - this is also known as ‘knowledge discovery’ and is an inductive type of analysis that determines relevant patterns/ relationships/trends from data that is hidden in a data group or database (Corne, Dhaenens and Jourdan, 2012). It is a highly mathematical process and also uses various statistical methods which can include cluster analysis, artificial intelligence and/or neural network techniques (Sharman, 2010). Data mining is used primarily to discover key knowledge from data allowing business to make pro-active decision based on that knowledge.
- Data warehouse - this is more than just a data storage facility but a specialised data repository that is used to support decision making (Ariyachandra and Watson, 2010). It provides easy and convenient access to large volumes of data (internal and/or external). This is because it acts as a central data repository for all data that that may come from various smaller databases within or outside the organisation (Mannino, Hong and Choi, 2008). This data is then integrated, cleaned, and archived into the warehouse to support decision-making according to management requirements (Mannino, Hong and Choi, 2008).
- OLAP - is a popular KM/BI tool that allows for the effective and rapid analysis of information from not just one but multiple databases/data sources (Sharman, 2010). In other words, data from various data bases can be analysed at once and not in a serial fashion. As a result, OLAP is regarded as multi-dimensional analysis tool as it analyses and compares information in a variety of ways and uses operations and functions such as slice and dice, roll-up and drill-down (Prat, Comyn-Wattiau and Akoka, 2011). OLAP is also used to generate knowledge reports derived from the various data sources and is often used in conjunction with data warehouses and data mining (Hsu and Li, 2011).
- Predictive analytics - this innovative KM/BI tool allows one to predict future trends by using both current and past data. This is supported by Eckersen (2007) who asserts that predictive analytics is a set of BI technologies that is forward looking and can discover

future patterns, trends and relationships from current and past data available in large datasets, databases and/or data sources. Similarly IBM (2010) posited that predictive analytics allows one to connect data with strategic action by making reliable conclusions based on data about current conditions that can influence future events.

- Digital dashboard - this is an Executive Information System with an interface that provides knowledge to management in the form of numbers, charts and graphics and is designed to present the overall organisational picture on a single page (Wu and Phillips, 2012). According to Sharman (2010), digital dashboards are easy to read and allow management/executives to continuously monitor the performance of their organisation via key performance indicators. This gives them a visual snapshot of overall performance with a special emphasis on areas that may be reflecting poor performance and needing attention. It presents various benefits such as (Sharman, 2010):
 - Ability to view performance instantaneously.
 - Identification and correction of negative trends and identification of new trends new trends.
 - Measurement of both efficiencies and inefficiencies.
 - Promote more informed decisions based on collected knowledge.
 - Assists in developing organisational strategies.
- Performance Scorecard - These are similar to dashboards in regard to graphical representation. However, the major difference is that dashboards display the status of an organisation at a 'specific point in time', while scorecards indicates 'progress over time' (Rouse, 2010). Scorecards are made up of mainly two essential concepts which are key performance indicators (KPI) and targets. Key performance indicators (KPI) involve metrics that are used to measure factors that are critical to organisational success such as performance, efficiency, and quality among others. Targets are in turn the specific goals for the KPIs (Rouse, 2010).

'Big Data' is also a recent advent in KM and BI and the term 'Big Data' is the latest term or buzzword that encapsulates the explosion of large datasets, both structured and unstructured, that exists globally and are present in business, public and society as a whole (SAS, 2014). As also asserted by Manyika, *et al.* (2011), digital data is prevalent in every economy, sector,

and organisation as well as any user of technology. As posited by IBM (2014), we create over 2 quintillion bytes of data on a daily basis and this data is generated from various avenues such as mobile phones/devices, Information Systems, Social Media, digital devices, equipment, GPS, sensors and so forth. In other words, any device that uses data is a contributor to 'Big Data'. All of this data dominates the virtual resources that exist in organisations' which include networks, servers, storage and IS as a whole. In simple terms, organisations' around the world are at an 'information overload' due to 'Big Data'.

The challenge that lies herein for organisations is that the data is too large, too fast and comes in diverse quantities. This is relates to SAS (2014), whereby the mainstream definition for 'Big Data' is referred to as volume, velocity and variety. This poses the major challenge in the sense that the common data processing tools and technologies are no longer adequate in dealing with these vast amounts of data, along with its speed and variety (IBM, 2014; Webopedia, 2014). These include the traditional databases, data warehouses, storage devices, networks and even more so, data processing and analysis tools.

There is substantial value in Big Data. Research conducted by Mckinsey Global Institute, as asserted by Manyika, *et al.* (2011), found that data created substantial value for the global economy by boosting productivity and competitiveness of both business and the public sector which in turn created a significant economic surplus for consumers. This goes to show that 'Big Data' should not be ignored, underanalysed and underutilised. There is considerable value present in big data and the only way to harness this value is to strategically utilise more specialised IS that can handle 'Big Data' efficiently and effectively. This is supported by IBM (2014). Therefore, the advent of 'Big Data' has also sprouted the development of more sophisticated IS that are highly specialised in the analysis and processing of 'Big Data'.

One of the main systems is Hadoop. Apache Hadoop is a specialised data analysis software that is equipped to handle the distributed processing of large datasets across widespread servers (IBM, 2014). Hadoop consists of sophisticated development tools, analytics, accelerators, visualisation, performance and security features and can be scaled up to thousands of machines and has a very high level of fault tolerance. This therefore becomes an effective solution to handle 'Big Data' due to its analytical ability, scalability, flexibility and fault tolerance (IBM, 2014).

Another specialised system that is designed to effectively deal with 'Big Data' is 'Stream Computing'. This is an analytical processing system that is effectively designed to deal with frequently changing data (data in motion). It uses predictive analytics to promote real-time decisions. It also captures and analyses data at any given time whilst working on a just-in-time basis. One of the main benefits of this is the ability to store less and analyse more which in turn promotes better and faster decision making (IBM, 2014). Other systems that can satisfy the processing of 'Big Data' also include Content Management Systems which effectively manages documents and data contents allowing them to be properly controlled. Advanced or high-performance databases and data warehouses are also used that function at high speed and have intense analytical capabilities to deal with large scale data (IBM, 2014).

These are among the main systems used in KM and BI. There is little evidence of them being used in HE in Africa. However, substantial evidence exists of its use in developed countries. This will be covered in greater detail in section 2.13.

2.9 Knowledge Management as a driver of Organisational Strategy

Knowledge Management plays a key role in organisational strategy and competitiveness. Studies conducted by various authors including Kamara, Anumba and Carrillo (2002), Dasgupta, Sahay and Gupta (2009), Massa and Testa (2009) and López-Nicolás and Merono-Cerdán (2011) confirm this. According to Gottschalk (2006), KM even proved to be a vital and strategic asset in the public sector such as police investigations. This study focuses on KM and its strategic role in Higher Education in Africa. There is an abundance of literature and research on KM in HE that exists from developed countries and shows how KM and strategic information are being used as a fundamental entity in developing strategy in HE.

2.10 Strategic use of Knowledge Management in business and public sector in developed Countries

A study by Ibrahim, Edgar and Reid (2009) showed how KM is seen as a strategic entity in the car manufacturing industry. The authors assessed the strategic role of KM in six organisations in the car manufacturing industry in the United Kingdom (UK). It was found that KM was seen as a strategic resource and used in various areas of the organisations which

in turn supported and enhanced core organisational processes. Across all 6 organisations, KM was mainly used (*ibid*):

- as core support to Product Development Manufacturing (PDM)
- to share knowledge through various team networks
- to enhance the capturing, storing and organising of best practices in the form of Standard Operating Procedures and this was done via specialised technological KM tools
- as part of process improvement and achievement of strategic objectives
- as part of policy deployment which in turn allowed KM to become a company-wide strategy for the management of knowledge resources

One of the companies had an interesting and also the largest KM system in place out the six surveyed companies. In context, the company's best practices were documented, reviewed and refined and stored in a global systems database. This technology based system significantly improved the manufacturing process of the organisation and facilitated the sharing of best practices for process improvement activities within the company groups around the world (Ibrahim Edgar and Reid, 2009). The overall findings showed that KM was contributing to organisational performance and delivering benefits in various ways which related to performance, processes, quality and productivity. Cultural approaches also played a vital role when it came to team motivation towards adopting KM as a knowledge sharing tool and therefore staff participation was deemed a critical element in any KM initiative (Ibrahim, Edgar and Reid, 2009).

Based upon their findings, the authors derived the following framework of KM (Figure 2). This framework is not just limited to the automotive sector, but can apply to almost any manufacturing type of organisation that opts to utilise KM strategically.

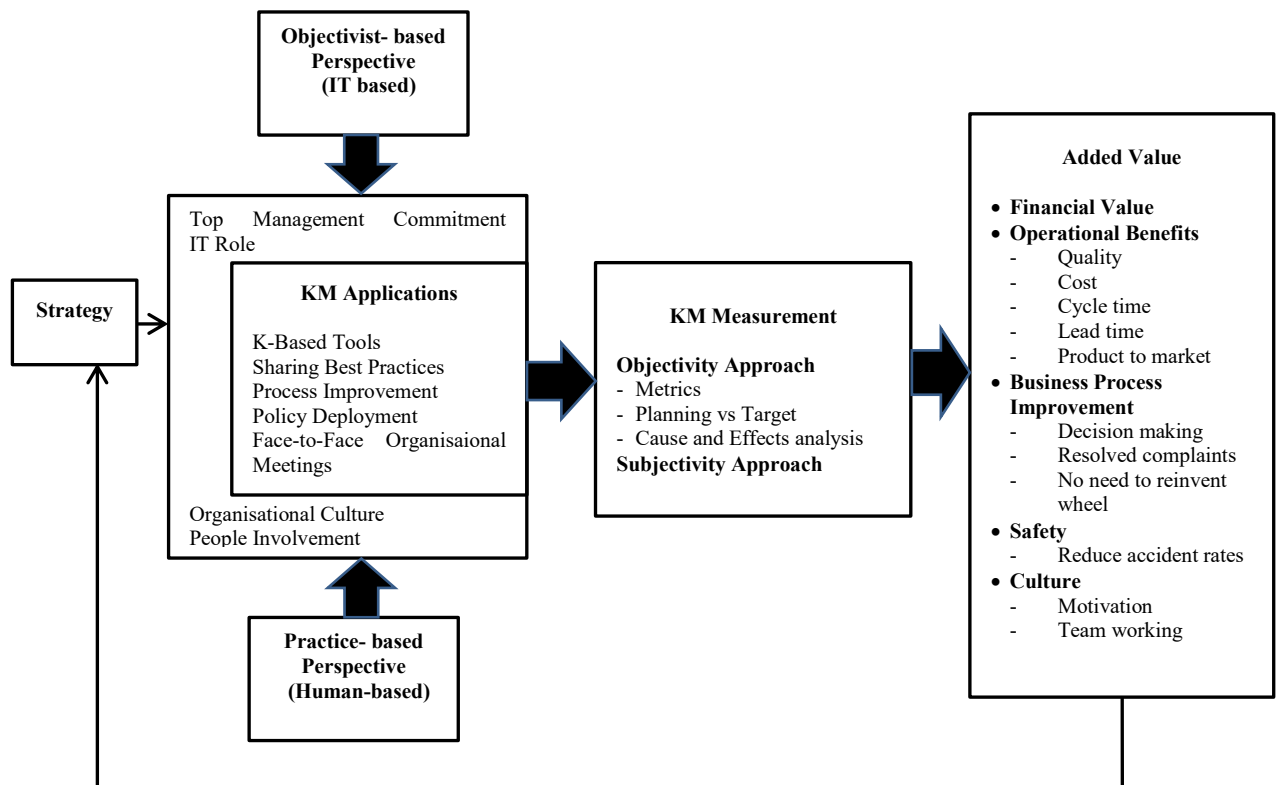


Figure 2: Conceptual framework of Findings

Source: Ibrahim, Edgar and Reid (2009)

This related well to Kamara, Anumba and Carrillo (2002) who developed the CLEVER (cross-sectoral learning in the virtual enterprise) framework that focuses on the organisational and cultural dimensions of KM. The author assessed the role of KM across fifteen companies in the manufacturing and construction industries and built the CLEVER framework based on the findings. The main findings that facilitated the development of CLEVER included the integration of Information Technology systems that ensured reliability and consistency in KM related activities across the organisation (Kamara, Anumba and Carrillo, 2002). Effective use of technology-based project management tools, documentation and revision-based systems (to revise project plans based on lessons learnt from past activities) was also incorporated in to the framework (Kamara, Anumba and Carrillo, 2002).

By utilising the CLEVER framework as a KM strategy platform, organisations could derive a strong KM strategy. The CLEVER framework is depicted in Figure 3.

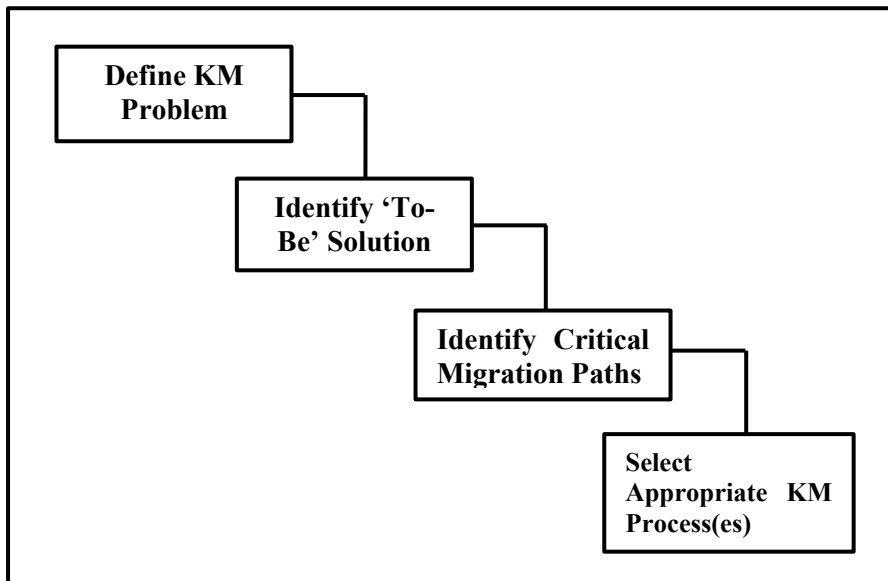


Figure 3: The CLEVER Framework

Source: Kamara, Anumba and Carrillo (2002)

Knowledge Management is also being used as a strategy in the public sector such as in the conducting of police investigations in some countries. It was argued by Gottschalk (2006), that there was a need to identify stages of growth in KM systems and apply them to police investigations. The author referred to these stages as officer-to-technology systems, officer-to-officer systems, officer-to-information systems, and officer-to-application systems (Gottschalk, 2006). On the basis of this, a model was developed to strategically facilitate the planning of KM systems in police investigations and law enforcement. Each stage documented in Gottschalk (2006) provided its own advantages to how this model could be strategically applied to police investigations. In context, the study showed that harnessing information and converting that to knowledge through proper KM modelling can prove vital to the public sector. A visual description of this is shown in Figure 4.

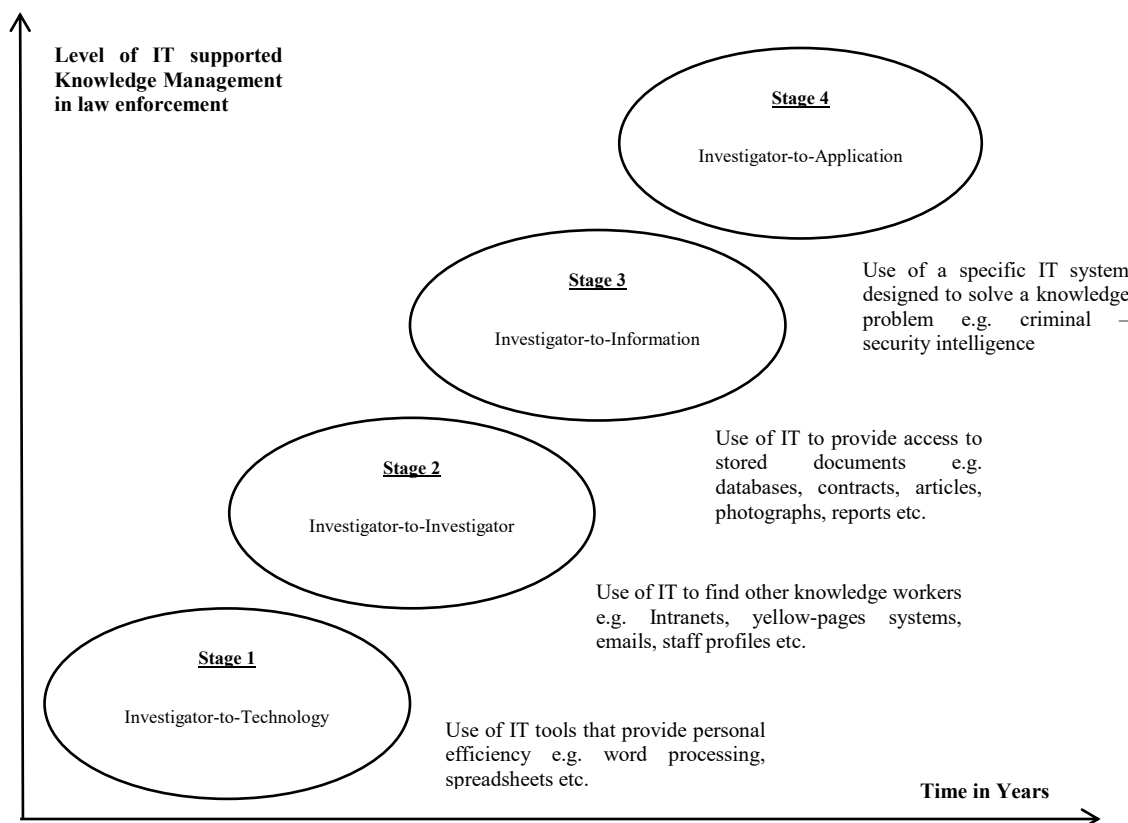


Figure 4: The Knowledge Management Systems Stage Model

Adapted from Gottschalk (2006)

2.11 Higher Education and Universities

Higher Education is a place where primary knowledge creation occurs. Higher Education institutions are the key players in the knowledge business as knowledge creation, dissemination and learning are their primary activities, Metaxiotis and Psarras (2003). For Pircher and Pausits (2011), HE institutions are also organisations that allow experts in various fields to contribute their expertise and experience to the core purpose of producing and preserving knowledge.

Universities, as the primary sub-set of HE, are considerably different to business and profit-driven organisations in the sense that their primary objective is not to make a profit, but to create, collate and disseminate knowledge. Cranfield and Taylor (2008) asserted that universities exist in today's knowledge economy primarily to deliver quality teaching, learning and to conduct research.

Oosterlinck and Leuven (2002) suggest that a modern university embraces the following fundamental elements:

- The most important element is that of knowledge creation which is primarily related to academic research.
- The second element is that of knowledge dissemination which relates to the knowledge created and then spread among university students. An important point to note that this didn't just mean 'dissemination' through regular classes, but also through innovative methods and systems.
- The third element is that of its academic service to society which points to how knowledge creation and dissemination from the university is used to improve society.

It is clear that HE and universities in particular are key catalysts for knowledge creation, collation and dissemination.

2.12 Knowledge Management and Higher Education

Universities have a major role to play in the modern economy as knowledge has surpassed wealth and labour and had become the dominant production factor, Oosterlinck and Leuven (2002). Consequently, universities needed to explicitly and effectively manage the critical processes related to knowledge creation and to realise the value of their knowledge capital (Rowley, 2000). This implies an increasingly important role for KM within universities.

The need for rapid innovation, driven by globalisation spurred on by ICT has made KM necessary for the empowerment of today's universities so that they can use KM to successfully respond to their changing role in a knowledge-based society, Metaxiotis and Psarras (2003). It was asserted by Duderstadt (2000) that a 21st century university is one that would go beyond its purpose of education and research and be a knowledge server that produces, conserves, applies and disseminates knowledge. It should also serve as a learning community for teachers and students by preparing them to engage in life-long learning. Furthermore, a university of the 21st century should look at changing into learner-centered systems whereby the learners themselves could determine what, when, where, how, and with

whom to learn (Duderstadt, 2000). Leem and Lim (2007) argue that achieving the goals asserted by (Duderstadt, 2000) would only be possible through KM and the application of ICT that is designed to support universities to become knowledge servers and learning communities.

Universities also encounter extreme changes in the knowledge-based economy as emerging players and competing markets for knowledge production emerge. The demands of globalisation and the changing economic environment forces HE institutions to rethink their methods in which they teach, conduct research and manage the institution, Cranfield and Taylor (2008). This also includes how they manage their 'Knowledge' resources. Higher Education institutions are known as 'knowledge organisations' and hence need to enhance KM strategies to respond effectively to the demands and challenges of the internal and external environments in which they operate (Pircher and Pausits, 2011).

For Lubega, Omona and van der Weide (2011), factors such as the increasing pace of change, increased complexity of the HE environment, strong competitive pressure, high levels of workload and other socio-technical problems requires HE institutions to realign their operational processes and organisational learning with KM to achieve their goals. This would in turn improve performance allowing institutions to strategically leverage KM within their HE processes (Lubega, Omona and van der Weide, 2011). Laal (2010) concurs that an institution-wide approach to KM can lead to exponential developments and a surge in benefits. Omona, van der Weide and Lubega (2010) argued that for KM to succeed, HE institutions need to effectively link KM strategy, initiatives and processes with their vision, mission and competitive strategy and should provide the criteria for assessing the relevance of knowledge to the organisation holistically, Hendriks (2001). Successful KM is hence the key to fulfilling the knowledge-based role of the modern university as described by Kende, Noszkay and Seres (2007).

Information Systems play a critical role in enabling effective KM and KM strategy, (Cepeda and Vera, 2007; Hendriks, 2001). The rapid growth and development of ICT functionality unlocks great possibilities for developing and exploiting information, and converting that information into knowledge (Ghaffari, Rafeie and Ashtiani, 2012). Furthermore in order for KM to be successful in Higher Education, it is essential to properly assess and define ICT and IS capabilities as these are the key enablers and support structures of KM processes, Omona,

van der Weide and Lubega (2010). These processes are knowledge capture, storage, updates, access, dissemination and sharing and collaboration. Lubega, Omona and van der Weide (2011) showed that the adoption and use of technology and systems had a direct effect on KM and various other learning technologies that were used to support HE processes. This could in turn lead to performance improvement. Furthermore, for HE institutions to be integrated and function holistically, they require an ICT infrastructure that can handle all institutional processes and administrative functions efficiently, while also supporting strategic managerial decision-making, Pircher and Pausits (2011).

Numerous studies have affirmed that HE institutions can achieve high levels of productivity, innovation, functionality, quality and competitiveness by strategically using KM (Metaxiotis and Psarras, 2003, Psarras, 2006; Kende, Noszkay and Seres, 2007; Cranfield and Taylor, 2008; Krajcsó, 2009; Laal, 2010; Lubega, Omona and van der Weide, 2011). The next section expands upon this and presents relevant studies conducted in developed and developing countries reflecting the strategic use of KM in Higher Education.

2.13 Literature on Application of Strategic Knowledge Management in Higher Education in Developed Countries

Studies on the strategic use of KM in HE in various countries abound. This section reviews some of the studies that reflect the strategic role of KM in HE institutions in developed countries and how it is yielding significant benefits.

To achieve success, HE processes need to be refined in conjunction with new and effective KM methods to facilitate effective academic services and learning, student life-cycle management, innovation management and institutional development (Omona, van der Weide and Lubega, 2010). Successful KM depends on processes that encourage an institution to learn, and gain knowledge which can in turn allow it to perform in a manner that promotes positive results, Laal (2010). Similarly in Higher Education, KM becomes a substantial part of quality enhancement that leads cooperative efforts to create and share knowledge, which in turn promotes better working and learning practice (Yang, 2007).

An institution wide approach to KM promotes enhancements in knowledge distribution and sharing. Universities have substantial opportunities to apply KM practices to effectively support their education, service and research missions, (Milam, 2001; Laal, 2010). Employing strategic KM practices and systems in HE is just as important as it is in the corporate and business sector. Knowledge Management initiatives in Higher Education can be successful based on key factors such as strategy development, organisational infrastructure, financial resources, IT/IS and effective leadership such as a senior level champion driving KM (Laal, 2010).

By implementing KM practices in Higher Education, the nature of the institution changes and in turn leads to better decision-making, reduced costs and promotes better quality of both academic and administrative services, (Kidwell, van der Linde and Johnson, 2000; Laal, 2010). Higher Education institutions in developed countries have adapted to this changing role, Singh (2010). This means that they are no longer just knowledge providers to students but also focus on the management and collation of existing knowledge for both current and future reference. Knowledge Management also facilitates learning within an organisation. Metaxiotis and Psarras (2003, p356) proposed that HE institutions become “learning organisations” by strategically applying KM to their practices because it:

- “Creates a flexible and innovative link and relationship between education and the workplace
- Helps students to closely match their skills/talents with the demands of the current workplace
- Contributes to the adaptation and integration of new knowledge with existing knowledge
- Contributes to the re-connection of learning with work experience and this ensured that a curriculum reflects the real time, real place and real problems” (Metaxiotis and Psarras, 2003, p356)

A learning organisation is one where learning and working becomes synonymous throughout the organisation. This becomes possible by creating values, practices and procedures that facilitate learning and working. Knowledge Management plays a role in this and by using this concept to implement or promote KM, it provides universities with a variety of features.

These features of a 'learning organisation through KM' were presented by Metaxiotis and Psarras (2003) who asserted that a 'Learning Organisation':

- Is business-oriented, institutionally structured and creates a link between academia and the workplace as it is closely related to the marketplace.
- Promotes on-going improvement of students' core competences via participation in large scale business and research projects.
- Promotes the effective exchange of know-how, innovation, experience and research through co-operation and partnerships with large local and international organisations.
- Facilitates lifelong learning through problem-based and project-based learning which is the crux of a learning organisation.
- Gives high priority to KM (capture, storage, sharing and utilisation of knowledge) that builds from research, participation in international conferences, publications, knowledge repositories, knowledge networks and many more (Metaxiotis, *et al.*, 2003).
- Creates new forms of Masters and PhDs by research as it introduces more business orientation to narrow the gap between academia and the business world.

The above features are all made possible through the strategic practice and application KM principles and systems.

Cranfield and Taylor (2008) conducted a study across seven HE institutions in the UK. The authors believed that even though HE institutions were primarily non-profit organisations, the external HE environment was continuously changing which drove institutions to reflect on how they did 'business' given the external environmental pressures. Furthermore, market forces and the influences of globalisation impacted directly on institutions' ability to uphold their prestige and rank. The authors used Stankosky (2005) KM pillars including enterprise learning, leadership, organisation, technology and learning as a platform to investigate and understand KM practices within the various HE institutions.

It was found that the seven HE institutions sampled did have a significant level of KM activities. Two institutions engaged KM in a systemic and in an institutional-wide manner. Another two had champions that engaged KM explicitly in their respective faculties. Therefore, these four institutions appeared to be more proficient in responding to the changing market and environmental forces as they had effectively prioritised 21st century management and technological aspects such as KM, Lean Management, and Process Improvement (Cranfield and Taylor, 2008).

It was shown that management prioritisation of KM plays a significant role in KM implementation and orientation. Two of the seven institutions had Vice Principals of KM who were primarily responsible for strategically driving KM across the institution. Organisational culture also plays a vital role in the implementation and dissemination of KM at these institutions. Academic and administrative personnel each had their own culture in terms of knowledge acquisition and sharing. A key finding was that not enough cultural management was exercised within this context. It was also found that both academic and support staff needed to understand the benefits of KM before adopting it. One of the key benefits identified in this study was that KM promoted knowledge creation, acquisition, sharing and dissemination both at an academic and administrative level that complimented the virtues of the university itself (Cranfield and Taylor, 2008).

The strategic use of KM is shown to improve overall organisational performance and competitiveness. Lubega, Omona and van der Weide (2011) argued that HE institutions need to align operational processes and organisational learning with KM technology to achieve their goals and create an environment that strategically leveraged KM technologies with HE processes. By doing this, organisational performance and competitiveness would be greatly improved. A theoretical approach for integrating KM technologies in HE processes by Lubega, Omona and van der Weide (2011) shows a high degree of success for the design, development and integration of KM systems in HE. It also provides tangible rewards for key HE stakeholders as it harnesses a large range of enabling technologies and tools. These tools and technologies integrated with KM show a significant improvement in overall institutional performance in terms of decision-making, teaching and learning, process enhancement and more (Lubega, Omona and van der Weide, 2011).

Chen, Huang and Cheng (2009) measured KM performance at universities from a competitive perspective. This approach incorporated an analytical network process model based on multiple criteria decision-making and dealt with both tangible and intangible information. The primary indicators of KM performance measurement used included four perspectives, that being the customer perspective, internal business perspective, innovation and learning perspective and financial perspective (Chen, Huang and Cheng, 2009). The model was tested in a case organisation, a 'rapid-growth technology university' consisting of ten thousand students, along with three rival institutions to the case organisation. It is shown that the model can be used for comparing an organisation's KM performance with its major rivals with the advantage of obtaining a competitive advantage. Based on this, the model was also designed to provide effective knowledge to enhance decision-making at the organisation. Most importantly, the findings from the case organisation revealed the competitive position of the organisation in comparison to its major competitors. It also showed that the organisation needed to upgrade its KM with regard to its knowledge based resources in order to keep abreast and ahead of its major competitors (Chen, Huang and Cheng, 2009).

Chandarasupsang, *et al.* (2006) showed how KM could be used strategically to enhance research collaboration between developed and developing countries. Sharing of knowledge among researchers (research insights, experiences and findings and so forth) and even sharing of knowledge across other universities seemed to be a challenge for universities with very little effective solutions. To address this, the authors developed a KM strategy for knowledge creation and sharing across universities globally whereby researchers could share and exchange knowledge about ideas, problems, strategies, literature, methodologies and tools and techniques. This was done by applying a KM methodology known as the Knowledge Analysis and Data Structuring (KADS) methodology as a basis for knowledge creation, transfer and sharing. The model divided knowledge into three areas which included Task Knowledge, Inference Knowledge and Domain Knowledge. This method formed the basis of an IT-based KM System which utilised Web 2.0 technology, Microsoft Visio and Sharepoint. The system was tested using 2 universities; the University of Bradford (UK) and Chiang Mai University (Thailand). It was shown that KM based KADS system made it possible to create and disseminate research knowledge which included research problems, literature, designed methods and techniques. These could be used to empower other researchers to develop new research themes. Furthermore, technology based KM systems were a key enabler of this knowledge sharing methodology and enabled the researchers to communicate, collaborate,

and practice globally and on any research task (Chandarasupsang, *et al.*, 2006). This is a key example of how KM could enhance research activities at any university.

However, in some instances, HE institutions may claim to have a KM strategy but may not regard it or refer to it as a KM Strategy and instead use it interchangeably with other information or IT strategies. It was shown by McKnight (2007) how only twelve universities in the UK had a KM strategy in terms of strategy development, change management and business practices. Of those twelve, only two used the term - 'Knowledge Management' (University of Edinburgh and King's College, London). Five of the universities conveyed that they were developing a KM strategy and one clearly asserted that they wished they had done so sooner. This shows that some HE institutions may not have a KM strategy in itself, but rather a by-product of another strategy (McKnight, 2007).

It is likely that more institutions will develop KM strategies in the future due to the information environment becoming more abundant and complex which will require more strategic approaches to managing knowledge. It was also found that there was a hesitancy to use the term 'Knowledge Management' and this was possibly due to the term being used interchangeably with Information Management or some other IT strategy (McKnight, 2007). It is therefore important to develop an institutional understanding that KM was different from Information Management as it deals with the 'Human' component as opposed to just technical systems. A strategic view of KM is also required as institutions need to unlock information and knowledge to remain competitive.

Strong leadership is also needed to drive KM. Without a strong directive, KM will not be harnessed and used strategically and will inevitably become a mediocre by-product of another strategy. For KM to be regarded as a strategic resource, it has to be driven at a managerial or leadership level, (McKnight, 2007), which should be focused on overcoming resistance to change and breaking barriers to KM across the organisational and executive levels, (Cranfield and Taylor, 2008; Omona, van der Weide and Lubega, 2010; Lubega, Omona and van der Weide, 2011). This then fosters a new culture and climate for KM (Omona, van der Weide and Lubega, 2010; Lubega, Omona and van der Weide, 2011).

As shown in section 2.8, KM and BI systems play a vital role in enabling KM in business. The same is applicable to HE where the development and effective use of KM Information

Systems can act as a strategic enabler of KM in HE institutions. A good example of this came from Sahay and Mehta (2010), when they proposed a KM strategy that involved the use of a web-based KM tool to provide predictive analytics and statistics regarding students at universities which could effectively promote student success rates. The authors postulated, as did King (2013), that one of the biggest challenges that HE was currently facing is predicting the academic paths of students. Many HE institutions are unable to assist students in selecting career paths, courses and monitoring of the overall student population that are at risk of dropping out because of lack of information from the relevant institutional systems (Sahay and Mehta, 2010). By utilising a community college as a case study, the authors developed a web-based KM tool that used data mining and predictive tools that assisted in analysing, managing and predicting issues related to student success.

The online tool was developed around the concept of predicting the issues that are pivotal to student success at the institution by using knowledge discovery and data mining principles. This included the use of data classification, categorisation, visualisation and estimation to draw out data from the institution's databases and predicting the variables such as enrolments, dropouts, transfers, retention and course success (Sahay and Mehta, 2010). This was then linked to a digital dashboard that was readily available to the key management of the institution. The tool expressed the epitome of strategic KM and its capabilities. It was concluded that a KM strategy that incorporated knowledge discovery should be regarded as fundamental to HE and could be effectively used to address and solve issues and problems critical to student success (Sahay and Mehta, 2010). This is further supported by Ghaffari, Rafeie and Ashtiani (2012) who emphasises that the time had come for new approaches such as data mining and knowledge discovery systems to open new avenues in HE and for developing new methods to promote better teaching and learning processes.

More than a decade ago, Weber and Weber (2000) posited that the use of a data warehouses would present a strong set of advantages for HE institutions through timely access to knowledge and this included knowledge for identifying the trends in enrolment, market trends and target marketing, new offerings, competitor trends, student information and knowledge for identifying strengths and weaknesses within the institution and for better decision making. Research shows that developed countries have adopted strong KM systems as a strategy to enhance Higher Education.

It was asserted by King (2013) that retention and graduation rates are big problems for HE and, therefore, HE institutions were now opting to employ KM systems and techniques such as predictive analytics to address the problem. According to King (2013), the provost and vice president for Academic and Student Affairs at Austin Peay State University stated that there have been noticeable improvements in student performance and retention through the use of predictive analytics as this tool assisted in finding correlations between proper course selection and factors relating to a student's ability to complete courses on time.

Similarly, Eduventures (2013) conducted interviews with executives from various HE institutions who had utilised predictive analytics to measure student life cycles. All of the executives concurred that by using predictive analytics, key areas such as recruitment, resource utilisation and retention was significantly improved. This translated into more efficient use of resources and improved student retention. A good example was posited by Eduventures (2013), whereby the national United States average freshman (1st year student) to sophomore (graduate) retention rate is approximately 75%. This meant a dropout rate of approximately 25%. If this was translated into figures, then an institution that enrolled 5000 freshmen would lose up to 1250 of them by graduation. A median acquisition cost of \$2185 would then imply a loss of \$2,731,250 for acquisition alone. If that was then multiplied by 4 subsequent years of predetermined tuition and fees for the 1250 non-returning students then the costs of poor retention are very high. Therefore, by using predictive analytics that can help universities/colleges to make data-driven decisions about students that were likely to graduate in time would lead to a significant improvement in efficiency, effectiveness and financial gain and promote student graduation (Eduventures, 2013). Therefore, predictive analysis was an effective KM tool that could be used to (*Ibid*):

- identify students at risk of dropping out
- identify course pathways that expedite student retention and graduation
- provide knowledge that could be used to develop interventions to retain students

Data mining is also being used as a strategic enabler of KM in HE and this was shown by Goyal and Rajan (2012) when they argued that a huge challenge that faced HE was intense growth of educational data and how to use that data to enhance institutional strategy and executive decisions. They had then proposed the use of Educational Data Mining (EDM) which is a specialised system for data mining that is applicable to a Higher Education setting.

The authors articulated how EDM utilised various statistical techniques and could be used to generate strategic knowledge from vast amount of accumulated data. This knowledge could effectively be used to/for (Goyal and Rajan, 2012):

- analyse profit margins
- identify high and low yielding courses of study
- competitive intelligence
- target marketing to potential students
- knowledge driven strategies for growth of the institution university
- resource allocation
- financial knowledge such as purchases, accounts and other income/expenses

In addition, EDM could be integrated with an e-Learning environment so that results obtained the actual data mining could be easily and directly applied to students along with interventions (Goyal and Rajan, 2012).

Similar to the preceding study, Delavari, Phon-Amnuaisuk and Beikzadeh (2008) asserted that data mining was a way to improve the HE institutions of today. The authors rigorously analysed previous studies and projects that utilised data mining in a HE setting. These included studies done on the use of data mining to (Delavari, Phon-Amnuaisuk and Beikzadeh, 2008):

- predict pledges (income) from institution's alumni
- analyse CRCT (Criterion-Referenced Competency Tests) scores
- create significant learning outcome models
- develop institutional models and strategies
- develop academic strategies
- predict student performance, retention and graduation

Based on the above, the authors formulated their own data mining model called DM-HEDU (Data Mining in Higher Education System) which was especially designed to target the superior advantages of data mining in an HE environment. The model was tested and highly recommended for use by HE institutions as an effective KM tool (Delavari, Phon-Amnuaisuk and Beikzadeh, 2008). This also concurred with Mamta (2012) who conveyed that HE

institutions created vast amounts of knowledge through academic teaching and learning, research and operational activity. However, proper use and dissemination of this knowledge for improved decision-making, enhanced performance, process improvement and improved academic teaching and learning and research would be dependent on effective KM systems and tools such as data mining (Mamta, 2012).

Sharman (2010) gave an example whereby a digital dashboard could be used by executives in HE institutions such as a Dean, for both operational and academic purposes. Operational purposes could relate to using the dashboard to display actual costs/income vs. budgeted cost/income for the department. Relating more to academic uses, dashboards could provide a visual description of enrolment and dropout status as well as students performances that were below a certain criteria and needed improvement. It could also be used to forecast future enrolments and critical financial information for the department (Sharman, 2010). Harel and Sitko (2003) argued that factors such as student recruitment/admission, staffing turnover, funding, graduation rates and research and academic quality all directly affected a university's performance. Therefore, digital dashboards were essential as a management tool for harnessing knowledge regarding all of these key areas through simplistic and understandable charts and knowledge reports that reflected the status at any given time. The authors also concurred that digital dashboards could professionalise HE institutions by enabling executives to make better decisions based on accurate and real-time knowledge (Harel and Sitko, 2003).

The authors showcased an existing effective dashboard that was being used by various executives at the University of California, San Diego. Dashboards such as this helped users strategically when it came to (Harel and Sitko, 2003):

- Setting performance goals and tracking performance indicators.
- Identifying trends and operational efficiencies.
- Establishing measures and criteria for monitoring progress of students/staff.
- Having an early warning system to correct problems.
- Effective reporting with charts and graphs.
- Evaluating and understanding the institution's operational condition.
- Meeting regulatory requirements.

A visual description of the University of California dashboard is shown in Figure 5:

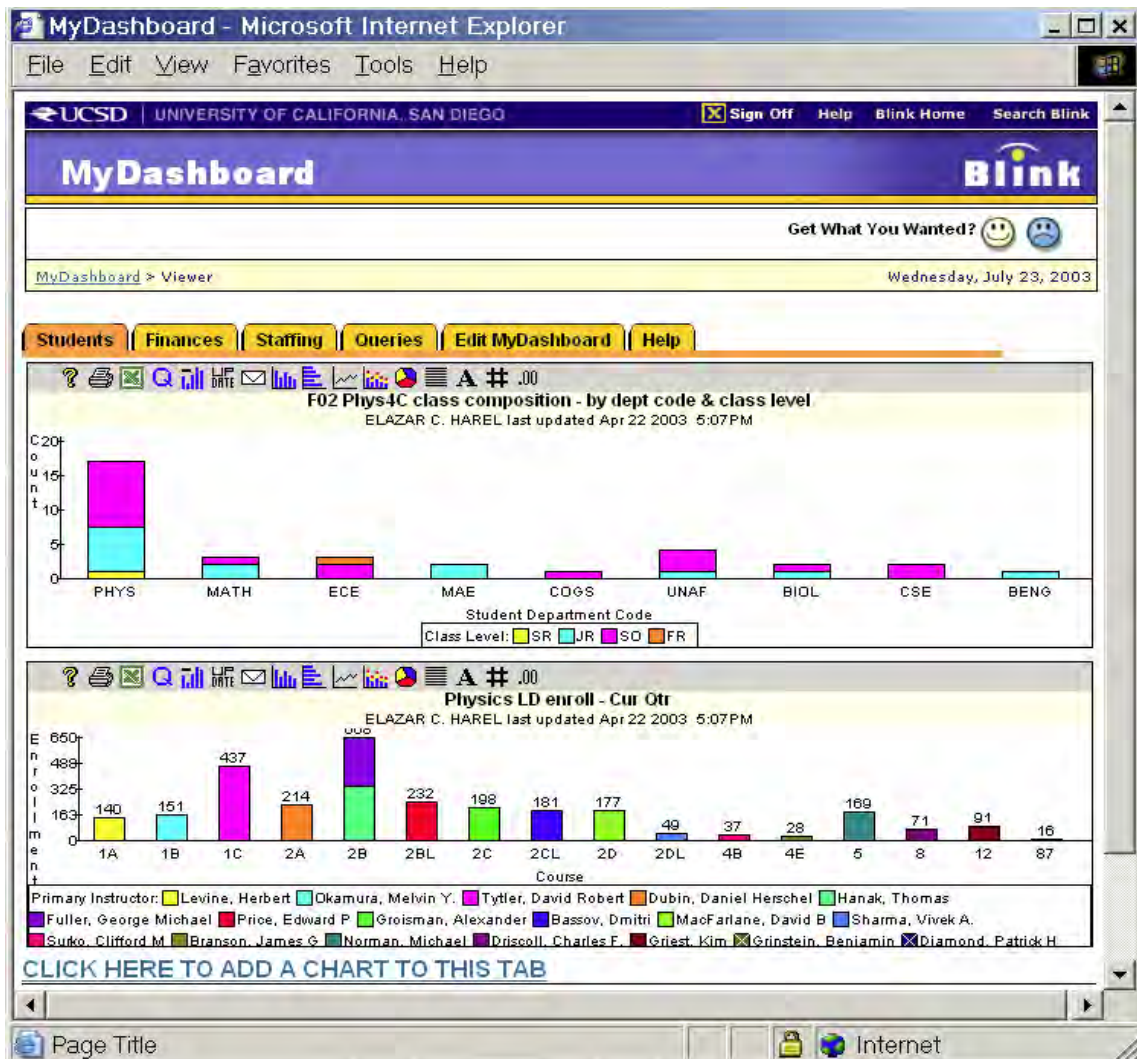


Figure 5: University of California Digital Dashboard

Source: Harel and Sitko (2003)

The above literature shows how KM is being strategically used and valued in HE institutions in developed countries, and is in turn, yielding significant benefits. The next section takes this to another level to show how KM is being used strategically, to enhance HE in developing countries.

2.14 Literature on Application of Strategic Knowledge Management in Higher Education in Developing Countries

Apart from the abundance of literature that exists in developed countries regarding the strategic application of KM in Higher Education, other developing countries are also following the examples of developed countries in relation to KM practices. This shows that developing countries are looking at KM strategically in a Higher Education Context and they are hence becoming fertile grounds for research in this area.

In an Iranian HE context, Ghaffari, Rafeie and Ashtiani (2012) asserted that Iranian systems of education are currently lagging not because it lacked the capacity and resources, but the lack of KM. This in turn also affected the quality of education in the country. The authors used this as a basis and explored various literature, highlighting strategies and examples of the importance of KM in Higher Education in the hope of looking at KM possibilities and implementing them in the Iranian context. Ghaffari, Rafeie and Ashtiani (2012) supported the points once made by Milam (2001) that it is through KM that HE institutions can:

- Be more effective in increasing student retention and graduation rates.
- Increase new web-based offerings.
- Preserve and promote a technology orientated workforce to benefit both institution and employee.
- Transform existing systems or create new systems to provide information, and not just 'data, for strategic management use.
- Facilitate effective e-Learning.
- Compete in an environment where institutions both local and global were continuously striving to be the one that met student needs anytime and anywhere.

This showed that even a developing country with minimal KM strategy was attempting to keep abreast with KM practices in developed countries.

William and Amin (2006), from a Sudanese HE perspective, put forward that HE institutions in Sudan needed to manage knowledge in a more systematic and effective way. They felt that HE was subject to the same pressures of the marketplace. The authors concurred with Brown and Duguid (2000) with their view that changes and competition had made HE institutions to

think like businesses. This meant that universities needed to develop strategies and adjust them accordingly in order to respond to economic, market and technological changes as well as for the increasing demands of stakeholders. William and Amin (2006) posited that KM is one such strategy but it was not at its peak in the HE sector in Sudan. Therefore, the HE sector was planning to invest in KM as a strategy of improving the sector and responding to both local and global changes in the HE environment. Some universities were making progress with KM. This included institutions such as the Open University of Sudan, Khartoum Academic Technology, University of Khartoum, El Neelien University and Sudan University of Science and Technology (William and Amin, 2006).

Research is often seen as the core knowledge creation process in HE Education (Oosterlinck and Leuven, 2002). Relating to academic research activity in HE and concurring with Loh, *et al.* (2003) and Chandarasupsang, *et al.* (2006), highlighted the strategic role of KM in universities from the Singaporean context. University research has become more sensitive to industry collaboration opportunities and commercial exploitation (Loh, *et al.*, 2003). Hence HE institutions can derive benefit from KM by addressing the demands of research and create and maintain relevant knowledge repositories, improve knowledge access and enhance the knowledge environment. Using Rowley's (2000) typology of KM objectives, the author investigated the possibility of utilising strategic KM to enhance research in HE and this was done on a case organisation, the Singapore Management University.

It was found that to become a KM-enabled university and to implement a KM-based research focus, a number of outcomes would have to be achieved. These included the continuation of knowledge-sharing culture amongst the university's members to support the exchange of knowledge between individuals and groups or teams. This would include both sharing of research results and knowledge of how to produce desired end-results such as tier 1 publications (Loh, *et al.*, 2003). Furthermore, a standard KM tool would need to be identified to accommodate the increasing knowledge base between the university and other universities/industry/public to be able to transfer best practices quickly from one unit to another. Lastly, and concurring with Cranfield and Taylor (2008), KM should be labelled as a corporate value at university board level. Top management support is vital and sufficient resources should be allocated to KM such as suitable organisational structures i.e. personnel such as a Chief Knowledge Officer for KM units, a reward system that encourages KM innovation and knowledge sharing strategies (Loh *et al.*, 2003).

Knowledge sharing strategies can include a variety of approaches. Some of them include:

- Presentations and Workshops: an effective way to present, collate, share and build on existing and/or create new knowledge. This type of activity requires active engagement and interaction from individuals' thereby enhancing the knowledge exchange process. Focuses more on people coming together to listen, share knowledge, learn and derive solutions (Tsui, *et al.*, 2006).
- Journal groups/clubs – a strong emphasis on research based knowledge sharing among peers and colleagues. However, this may mainly be applicable to those with a research background or research minded individuals (Tsui, *et al.*, 2006).
- Newsletters- A more passive way to spread and share organisational knowledge on current happenings, trends, events and processes (Tsui, *et al.*, 2006).
- Online- Interactive Web 2.0 technologies such as wikis and blogs can expedite online collaboration and effectively enable the knowledge sharing process (Hong, Suh and Koo, 2011). This can also include websites and online discussion forums.
- Water-cooler effect: this simply means that more tea, coffee or lunch breaks as opposed to formalised meetings can facilitate more active communications and thereby enable more productive knowledge sharing (Pentland, 2009).

Organisational culture also plays a key role in the knowledge sharing process and strategies (Hong, Suh and Koo, 2011) and this relates to Schein (1985).

Relating more to academic improvement via KM, Kalaiselvi and Uma (2010) devised an integrated and strategic KM approach for academic improvement in ubiquitous computing from an Indian context. The authors stated that “Ubiquitous Computing is a user-centric which helps the learners to share their knowledge” (Kalaiselvi and Uma, 2010, pg 1). In the ubiquitous computing environment, knowledge can be shared as collaborative learning (CL) among the learners (Kalaiselvi and Uma, 2010).

The six components of the KM approach to knowledge sharing were emphasised (Kalaiselvi and Uma, 2010):

- K-Create- involved the creation of learning content by the instructor and this was stored at different levels for different learner category.
- K-Store- involved the storage of the content in the respective access controlled database.
- K-Share- involved the retrieval of learning content and acquisition of knowledge out of it by learners themselves. Different course/learning materials were accessed by learners who could learn the content with the help of collaborative learning.
- K-Transfer- involved the successful transfer of knowledge from one learner to another pose completion of CL.
- K-Reasoning- involved the assessment of the learnt content by the tutor/subject experts.
- K-Reuse- involved the updating of the learning content authenticated by the tutor in the database.

It was found that by integrating KM into an academic programme, it promoted better quality learning and facilitated knowledge flow between learners and also between learners and instructor which in turn created a continuous process of learning. It also promoted an innovative process of discovering new knowledge from the learned content through the process of CL. Hence, the authors asserted that KM is a key strategy for knowledge sharing and CL and affirmed that this greatly enhanced academic quality at the institution (Kalaiselvi and Uma, 2010).

The use of KM in problem solving and strategic decision making towards improved organisational performance was highlighted by Shams, Rad and Hooshmand (2009) in a Tehran HE context. Their study was based on two dimensions, the first of which being the role of KM practices in problem-solving process and the second being the type of problem they addressed (Shams, Rad and Hooshmand, 2009). Senior managers from large HE institutions in Tehran were selected for the study based on the rationale that they would have a considerable amount of exposure to KM practices (Shams, Rad and Hooshmand, 2009). It was found that the problem-solving process forms the platform for linking knowledge and

performance. This means that KM is crucial to solving organisational problems that in turn lead to improved organisational performance.

Knowledge also gained economic value when used to solve problems, explore opportunities and make decisions that improved organisational performance (Shams, Rad and Hooshmand, 2009). This concurred with Ibrahim, Edgar and Reid (2009), Yang and Maxwell (2011) and Lubega, Omona and van der Weide (2011). Hence, this provided a new and innovative way to understand the link between KM practices and institutional goals. This was due to their proposed framework focusing attention on the significance of problem-solving in transforming knowledge into business value (Shams, Rad and Hooshmand, 2009).

Figure 6 visually outlines the framework:

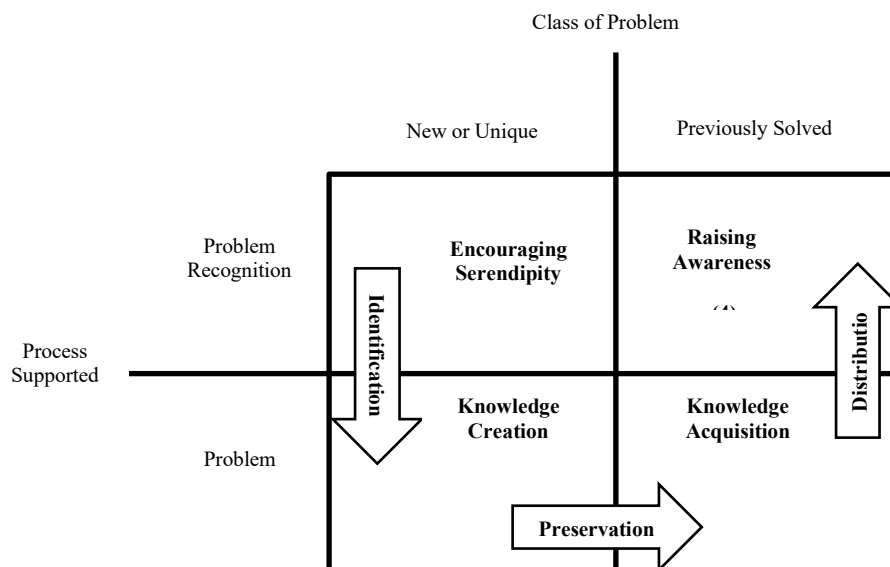


Figure 6: A framework for Knowledge Management practices

Source: Shams, Rad and Hooshmand (2009)

This relates well to Loh, *et al.* (2003), especially when it comes to the aspect of knowledge sharing strategies which are used to create and build new knowledge.

Relating to Shams, Rad and Hooshmand (2009), and using KM as a strategy to improve decision-making to benefit an organisation, Ranjan (2008) examined KM in business schools in India to investigate the role of KM in decision-making to enhance effectiveness, performance and overall organisational improvement. The author posited that business

schools in India have been using IT for years to improve the efficiency and effectiveness of academic services and programmes. However, the use of IT itself does not necessarily improve decision-making nor have any positive outcomes from decision-making (Ranjan, 2008). This related well to Tanlamai (2007) who argued that IT and IS will not be effective when used for mundane tasks instead of being used strategically. It also related to Schein (1985) whereby technology, as an artifact, can only be effective if it was aligned to espoused goals and values of the organisation.

The highest academically ranked business school in India, which was alias as 'Test Business School' (TBS) was selected and an in-depth analysis of the entire IT infrastructure was conducted. It was found that the IT infrastructure did not incorporate the aspect of KM, namely, knowledge creation, transfer and knowledge sharing. The author hence developed a framework that focused on linking all of the academic and administrative activities of the school and allowing that to be shared (knowledge sharing) with the key players of the school. It also took into account all of the human resources, academic processes and technological advancements involved in the organisational structure of business schools (Ranjan, 2008). The framework was successfully implemented at the TBS and it yielded significant benefits. These included online sharing and dissemination of knowledge, collaboration and statistics. All of this proved to be vital to management for better decision-making. Detailed benefits were listed in Ranjan (2008). The framework also incorporated strong the aspect of having a strong organisational culture (Schein, 1985) concurring with Omerzel, Biloslavo and Trnavčević (2011), Shao, Feng and Liu (2012) and Alavi, Kayworth and Leidner (2006). This study shows that having a strong IT infrastructure and platform alone does not constitute strategic KM practice. KM needs to be viewed on its own in a strategic light and then linked up to Technology to deliver benefits in various areas. This can in turn place an institution in a strategic position and provide a competitive advantage.

Today, knowledge is not only just known as the foundation for constant and continuous development, but also as a source of competitive advantage for an organisation (Argyris and Schön, 1978; Kogut and Zander, 1992). Organisational culture also plays an important role in promoting competitive advantage (Serrat, 2009) as well as in the success of KM adoption, implementation and strategic use of KM (Park, Ribeire and Schulte, 2004, Leidner and Kayworth, 2006). Relating to this, Allameh, Zamani and Davoodi (2011), in a HE context (Isfahan University) examined the relationship between KM and organisational culture

(Schein, 1985) to determine the best culture applicable to promote and harness KM in a competitive way. The organisation culture framework by Cameron and Quinn (1999) was used which highlighted the four types of culture and six dimensions of KM. The four types of culture included Group (tribal) culture, Developmental culture, Hierarchical culture and Market (logical or reasonable) culture.

As indicated by Allameh, Zamani and Davoodi (2011):

- Group culture included flexibility, teamwork, interactivity, participation, commitment and loyalty.
- Developmental culture was more inclined towards accomplishing tasks that needed high levels of technology and tasks that were difficult, uncertain and ambiguous. Risk taking personalities were complimentary to this kind of culture.
- Hierarchical culture was more of a top-down management approach and it emphasised on constancy, efficiency and predictability and was also bound by official formal rules and processes.
- Market culture incorporated competitiveness, accomplishment and productivity and these made up its central values.

It was shown that the dominant culture in Isfahan University was a hierarchical culture. This was a key reason why KM was not being used strategically and KM resources not being properly utilised. The results highlighted that market (logical) culture shows more inclination towards promoting KM at the institution and if the institution wanted to make considerable progress with KM, it needs to align its culture more towards a market culture (Allameh, Zamani and Davoodi, 2011). Overall, the study shows that organisational culture (Schein 1985) played a vital role in the position, usage and progress of KM at the university and the same could apply for other HE institutions as well. For KM to be viewed in a strategic light, it needs to be instilled into the culture of the organisation.

Similarly, Eftekhazade and Mohammadi (2011) examined KM in an Iranian HE context (Islamic Azad University) in relation to organisational culture, organisational structure, IT and human resources of the university. It was found that even though the human resource was suitable for the function of KM, the organisational structure and culture was at an average level and needed to be further developed to promote KM practice. Furthermore, the status of

IT was regarded to be in a poor situation to apply KM from a systems perspective and this also needed critical development (Eftekharzade and Mohammadi, 2011). The results of this study concurred with studies by Coukos-Semmel (2006) and Piccoli, Ahmad and Ives (2006). In context, the authors' postulate that KM can be of strategic advantage to the universities however, universities need to adjust themselves accordingly to adopt and harness the potential of KM. They also convey that strong leadership and direction from management (Loh, *et al.*, 2003, McKnight 2007, Cranfield and Taylor 2008, Omona, van der Weide and Lubega, 2010) plays a critical role in the adoption of KM (Eftekharzade and Mohammadi, 2011).

Based on the above literature both in developed and more importantly, other developing countries, it raises the general question of why there is inconclusive and minimal research on the Strategic role of KM in HE in an African context (Google Scholar, Emerald Insight, Science Direct, South African Journal of Information Management and University of KwaZulu-Natal Libraries: 13/05/2013). Ironically, South African authors Mavodza and Ngulube (2012) conducted a study on KM in HE on a university in New York to examine the KM principles and practices in place at the university and its impact on the university's performance and quality of education. Even though it proved to be an interesting study, the question remains as why research such as this has not been widely conducted in an African context. Hence, the strategic role of KM in African Higher Education is something that should be investigated.

2.15 E-Learning

This section discusses e-Learning which is synonymous with Knowledge Management (Maier and Schmidt, 2007) and refers to studies on the strategic use and application of e-Learning in developed and other developing countries.

The heightened use of the Internet globally has transformed the world into a borderless place and the Internet has become a driving force behind economic, business and commercial activities and socio-political changes (Pamfilie, 2012). The internet is regarded as a technological asset due to its vast capabilities to disseminate large volumes of information to any individual around the world (Zazaleena, *et al.*, 2011). Furthermore, the Internet is no

longer just an information environment, but has now also become a social and communication medium and a commercial entity (Zazaleena, *et al.*, 2011). This inevitably led to the advent of Electronic Learning (e-Learning).

The term e-Learning can be defined as the delivery of education, teaching and learning through electronic media (Koohang and Harman, 2005). A basic definition came from Lee and Lee (2006) when they asserted that e-Learning is the real-time delivery of education via the Internet to the respective end-user or learner. However, for Alonso, *et al.* (2005) e-Learning makes use of the Internet and multimedia technologies to enhance the quality of pedagogy and learning by enabling creation, collaboration, sharing of knowledge and knowledge based resources. Bermejo (2005) similarly considered e-Learning as education that used IT and Internet based systems as a pedagogical environment for teaching, learning, research and exchange of knowledge.

Brijs and Lecomte (2006) defined e-Learning as a strategic method to transfer and exchange knowledge, attitudes and performance via interactive electronic platforms. The preceding definition forms a direct link to KM as both e-Learning and KM is all about the creation, storage, application and sharing of knowledge. Furthermore, KM and e-Learning can be considered a significant part of KM because KM facilitated e-Learning by increasing the effectiveness of knowledge creation and dissemination (Yordanova, 2007). In context, e-Learning is defined as the creation, transfer, sharing and acquisition of knowledge via the use and application of IS.

2.16 The Role of e-Learning as a KM Strategy

E-Learning is seen as an important a strategic entity in Higher Education. This is supported by various authors including Marshall, *et al.* (2003), Maier and Schmidt (2007), Krajcsó (2009) and Boling, *et al.* (2012). E-Learning is also a fundamental aspect of KM and it was asserted by Maier and Schmidt (2007) that KM and e-Learning were both approaches that contributed to the improved construction, preservation, integration, transfer and use of knowledge. E-Learning is seen as a KM strategy and various studies done in other countries view e-Learning as a strategic KM entity. According to Milam (2001), e-Learning is a very important aspect of KM and it was something that HE institutions should look at as an

advantage. Collaborative e-Learning is an avenue where computers and IT facilitated an increased interaction between the learners to exchange knowledge (Liaw and Huang, 2007). For Zazaleena, *et al.* (2011) e-Learning in HE institutions present a strategic advantage that eliminates barriers such as time and distance and also gives students' a high level of independence regarding the content and the method by which they learn.

E-learning has led to the creation of a new pedagogical paradigm for HE, as stated by Alias, *et al.* (2012). Academic institutions around the world, both private and public are embracing e-Learning in an effort to enhance their teaching and learning processes, promote effective knowledge transfer and complement their existing pedagogical environment. This concurred with Kuntoro and Al-Hawamdeh (2003), who further asserted that e-Learning paves the way to better education and improved access to knowledge resources for countries with large populations, limited resources and remote geographical areas. Furthermore, collaborative e-Learning environments are regarded as the key platform for the formation of new knowledge and sharing of the knowledge that goes beyond geographical borders (Tomsic and Suthers, 2005). It was argued by Kende, Noszkay and Seres (2007) that knowledge production and dissemination and the e-Learning systems that support them are of great importance as e-Learning takes a prominent place in the renewal of knowledge of both the individual and society.

2.17 Literature supporting the role of e-Learning as a Knowledge Management strategy in Higher Education

Garrison and Kanuka (2004) argued that e-Learning is becoming highly prevalent in Higher Education. Hence, the leaders of HE should be challenged to meet the growing demands and expectations for higher quality learning experiences and outcomes by strategically positioning their institutions through e-Learning. Similarly for Ozkan and Koseler (2009), due to the rapid development of the Internet as a delivery platform and the continuous directive towards borderless education, universities are encouraged to invest their resources in developing online pedagogical programs or e-Learning. Furthermore, the transformation of HE learning environments for an increasingly electronic world is both critical and mandatory to ensure that the benefits can be fully realised (Williams, 2002). Hence, e-Learning is shown to positively transform and expand HE around the world and provide significant benefits

especially when used as a KM strategy (Becker and Jockivirta, 2007; Allan *et al.*, 2012; Pundak, Herscovitz and Schacham, 2010).

The convergence of KM and e-Learning was shown to contribute to the improvement and success of the learning process at the University of Arizona. Marshall, *et al.* (2003) used the relevant learning theories, information search processes and application technology platform to create a strategic e-Learning system known as the 'GetSmart system' used at the university. This system served as a real-time digital library and knowledge creation tool and applied KM practices to integrate information search and import tools, curriculum support and concept mapping. The system proved to be a strategic entity in supporting the creation of new knowledge from external resources and facilitated information flow from outside sources to users (students) (Marshall, *et al.*, 2003). The system supported teaching and learning with an emphasis on visual learning that assisted students in acquiring, processing, organising and controlling new knowledge.

Similarly, in an Austrian HE setting, Krajcso (2009) argued that growing competition in the global HE environment is a challenge for universities and universities were seeking innovative methods to promote shared access to key resources namely knowledge, experiences and ideas of academic personnel. In light of this, Krajcso (2009) presented an 'Idea Exchange' model that combined KM and e-Learning. The crux of the model was interactivity and collaboration to facilitate sharing of knowledge and ideas. The system was tested at the University of Vienna and proved to be a vital KM and e-Learning strategy that improved knowledge creation and idea exchange for academics both locally and internationally.

A good e-Learning strategy focuses on 'bringing the campus to the students' and this type of strategy would be able to provide a sense of community to students in Higher Education, Boling, *et al.* (2012) and Mason and Rennie (2004). The authors Mason and Rennie (2004) saw e-Learning and broadband technology as a strategy to improve online learning in rural areas (Western isles of Scotland). Learners in the area were disadvantaged in terms of distance, poor connections and other logistical factors. It was found that broadband-based e-Learning would be the ideal strategy and solution to combat these challenges for e-Learning to thrive within rural areas. It was shown how an e-Learning strategy could include a range of learning opportunities ranging from information portals, social networking and formal

education and training courses (Mason and Rennie, 2004). It was also found that a considerable number of individuals that were part of the survey indicated their readiness to embrace e-Learning and educate themselves online (Mason and Rennie, 2004). Similarly, Holmes and Gardner (2006) suggested that e-Learning must be seen as an innovative means to go beyond distance and be a strategic enabler to education.

Boling, *et al.* (2012) looked at enhancing the adoption and usage of e-Learning as a strategy to conduct effective distance education. The authors concurred with Desai, Hart and Richards (2009) that educators were facing the challenge of how to redefine their communication skills in distance education. After interviewing 6 instructors and 10 postgraduate students of an online course in an American university, it was shown that students enjoyed the interactivity and collaboration of e-Learning, namely, the activities of completing real-world projects and assignments that required them to interact with others in their local communities. Based on this, Boling, *et al.* (2012) found that both instructors and students experiences played a key role in e-Learning design and adoption and asserted that students' and instructors' experiences should be considered when it comes to the design of e-Learning systems.

Another good example of effective e-Learning strategy was shown by Xiangqian and Fuqing (2012) in a Chinese setting. According to the authors, China faced challenges within the HE context with regards to the high unemployment rates of graduates as skills acquired at HE level did not match the requirements of the real world. Due to this, Xiangqian and Fuqing (2012) proposed a development-driven e-Learning model to address the challenge. The model focused on holistic e-Learning with a strategy of incorporating industry type situations and experiences concurrently with the formalised college courses. The model was tested in a college setting and was shown to positively augment the learning process of students and increase their suitability to the workforce market via industry-based collaboration.

An indication of how this development-driven e-Learning model was enhancing the learning process as opposed to traditional learning is shown in Table 1.

	Traditional Education	Development - Driven e-Learning
Objective	Credits and Graduation Outdated Skills	Student Development Career Related Practical and real time (current) skills
Method	Physical teaching and listening in classroom by teacher and student. Teacher. Fixed in Time and Place, low levels of motivation and efficiency. Teacher Centered	Advanced Technology/ies and Internet. Highly motivated and efficient Student centered
Contents	Simple Passive Standard guideline to textbook	Multimedia Active Diversity Focused in students' self interests and abilities development

Table 1: Comparison between Traditional Teaching and Learning and development-driven e-Learning education

Source: Xiangqian and Fuqing (2012, P 856)

Leem and Lim (2007) identified e-Learning as something that can enable one to enjoy high quality academic programs and could promote universities to become quality learner-centered educational entities. This was examined in a Korean HE context to encourage the development of e-Learning systems that aimed to enhance Korea's academic competitiveness. After surveying 201 universities in Korea (Public and Private) the authors highlighted key strategies that are vital for e-Learning to thrive which include (Leem and Lim, 2007):

- Establishing necessary e-Learning support strategies and systems according to the type of university structure and culture.
- Developing e-Learning quality assurance systems.
- Creating knowledge sharing systems to be used between universities and industry.
- Enhancing international collaboration between universities through e-Learning.

- Developing e-Communities of knowledge sharing/transfer for effective research.

Leem and Lim (2007) also emphasised that ‘quality’ of the actual learning content placed on e-Learning systems is an important factor in e-Learning strategy as this plays a key role in attracting students who are considering the e-Learning route to Higher Education. Similarly, Das, *et al.*, (2011) highlighted the importance of quality in e-Learning in an Indian context. E-Learning content needed to be precise, reliable, up to date and easily accessible and understandable to promote acceptability among students. A quality based e-Learning model was proposed to enhance the Gross Enrolment Ratio of West Bengal and it was found that quality of e-Learning content was indeed a strong factor for promoting e-Learning in HE. Furthermore, students showed enthusiasm towards e-Learning adoption based on quality of the content and this also positively influenced gross enrolment ratio of West Bengal (Das, *et al.*, 2011). This also converged with a study conducted by Ehlers (2004) in a developed country setting.

Other studies have also highlighted quality of e-Learning as a strategic factor in the adoption of e-Learning such as Ozkan and Koseler (2009) and Casanova, Moreira and Costa (2011) who proposed frameworks of evaluation to serve as on-going monitoring and evaluation of the quality of e-Learning. They strongly believed that quality played a vital role in the effective adoption and usage of pedagogical e-Learning. For instance, Ozkan and Koseler (2009) proposed a conceptual e-learning assessment model known as the hexagonal e-learning assessment model (HELAM) that can be used to measure e-Learning quality using six dimensions. Those dimensions included system quality, service quality, content quality, learner perspective, instructor attitudes, and support issues.

The model was tested on an e-Learning management system in a UK university and proved to be successful in evaluating the quality of e-Learning systems and it also reflected weaknesses that could be further developed and improved (Ozkan and Koseler, 2009). Similarly, Casanova, Moreira and Costa (2011) proposed the development of a framework for monitoring and evaluating e-Learning practices that incorporated the various dimensions of the teaching and learning process. The framework proposed 28 criteria that could be used for evaluating e-Learning quality (Casanova, Moreira and Costa, 2011) that could be referenced and used under different learning contexts. It was highlighted how the framework could assist e-Learning practitioners to enhance their own teaching and learning practices. The preceding

studies related to Siragusa, Dixon and Dixon (2007) who developed a model known as the 'Instructional Design for Online Learning' (IDOL) model that incorporated 24 pedagogical dimensions to accommodate the pedagogical needs of learner. These dimensions were detailed in Siragusa, Dixon and Dixon (2007) and highlighted the decisions that needed to be made during the analysis, design, delivery and evaluation of e-learning HE in order to optimise their pedagogical quality.

Zazaleena, *et al.* (2011) argued that 'awareness' of e-Learning primarily from a student's perspective is also a vital factor in e-Learning strategy development and adoption. As part of e-Learning strategy development in a Malaysian university, the authors showed that students were very enthusiastic regarding e-Learning and that e-Learning would be easily acceptable if it maintained a similar learning experience that was congruent to the current education style. Interactivity is also highlighted as a positive for the acceptance of e-Learning. Hence, the acceptance level for e-Learning was very high at the institution and the authors posit that e-Learning would derive benefits for any institutions that would adopt it (Zazaleena, *et al.*, 2011). This concurred with Al-Siraihi Al-Harbi (2011) who conducted a larger study in Saudi Arabian context with 512 students. It was shown in this study that students' attitudes toward e-Learning is the most important element in the development of an effective e-Learning strategy and that the drivers of e-Learning strategy should take this into account when developing proper e-Learning strategies and systems (Al-Siraihi Al-Harbi, 2011). Interactivity and ease of use also makes e-Learning attractive to students and it is therefore stressed that developers of e-Learning systems must consider this when designing e-Learning systems. Furthermore, Ndubisi (2006) asserted that users are more inclined to embrace e-Learning if it is easy and exciting to use.

However, the drive for implementing e-Learning should not only be dependent on student's perceptions, but should also come from the institution itself. This was highlighted by Alkhalaf, *et al.* (2012) when he asserted that e-Learning is widely used in developed countries and developing countries needed to invest more in e-Learning. The author argued that e-Learning systems had a positive organisational impact and that university management including academic staff need to improve their skills in dealing with technologies such as e-Learning. This will allow them to not only improve their jobs, but also their performance in their jobs (Alkhalaf, *et al.*, 2012). This view was also convergent with studies conducted by Blake (2009), Allan, *et al.* (2012) and Graham, Woodfield and Harrison (2012) that

emphasised the importance of staff perception in the adoption of e-Learning and development of e-Learning strategies. For e-Learning to be successful, the institution and its staff and management support is vital. Hence, universities also need to play a supporting role in the adoption of e-Learning.

Caplan (2004) and Davis (2004) explained how educators, instructional designers and e-Learning system developers all needed to work cohesively to create effective online pedagogical environments to attain the best results in e-Learning. In addition, Zazaleena (2005) proved that for successful e-Learning to happen, it is dependent on various elements that are built from student perceptions of e-Learning. The elements included appearance, structure and layout, ease of use, linkage, reliability, content, efficiency, support and security. Alias *et al.* (2012) conducted a similar study in a Malaysian setting using 120 university students and affirmed that an e-Learning strategy is subject to failure if it does not take into account the factors highlighted by Zazaleena (2005). Furthermore, Ghaffari, Rafeie and Ashtiani (2012) affirmed that successful KM and e-Learning depends on proactive participants and an institutional environment that facilitates collaboration, builds trust, shares understanding and inspires the creation of learning communities.

E-Learning is also potentially proving to be a strategy for an alternative solution for traditional learning. As argued by Plesea, Onete and Maioreescu (2011), working students were disadvantaged in the sense that they were unable to attend lectures on campus. Educational needs were different to those of campus-going students and therefore e-Learning and online distance education was an ideal solution (Plesea, Onete and Maioreescu, 2011). Pamfilie, *et al.* (2012) utilised the argument by Plesea, Onete and Maioreescu (2011) and conducted a study that focused on analysing the view of students with regards to e-Learning as an alternative pedagogical solution especially for distance learners. Surveys were conducted at the Bucharest Academy of Economic Studies both on traditional undergraduate class-going learners and postgraduate (working) learners that were mainly utilising e-Learning methods.

It was primarily shown that students who were already employed and continuing their studies part-time appreciated the flexibility and accessibility of e-Learning. This confirmed that E-learning was in fact a good approach to sustainable lifelong education. Furthermore, students that were already utilising e-Learning methods were ready to embrace it as an alternative

solution to traditional classes. Those who were used to the classroom based pedagogy reflected a certain amount of reserve, but also showed an inclination to welcoming new technology that was flexible and interactive (Pamfilie, *et al.*, 2012). This shows that even traditional learners are open to new and innovative methods of pedagogy such as e-Learning. This related to studies by Zazaleena (2005), Al-Siraihi Al-Harbi (2011), Zazaleena, *et al.* (2011) and Alias, *et al.* (2012).

E-Learning has been shown to be the enabler of 'Blended Learning' (Garrison and Kanuka, 2004; Gupta, Bostrom and Huber, 2010). Since there is still a fair amount of reserve regarding the use of e-Learning as a replacement or substitute for traditional learning, the idea of 'Blended Learning' has surfaced. Blended Learning is the amalgamation of face-to-face and technology-mediated learning or e-Learning and this is increasing in HE especially in developed countries (Ross and Gage, 2006). It has been asserted that through technology, Blended Learning is slowly becoming the new traditional model or the 'new normal' method of teaching and learning in HE (Ross and Gage, 2006; Norberg, Dziuban and Moskal, 2011). Furthermore, the Internet and information and communication tools provided a flexible platform of time and place which could be used to enhance unlimited educational resources. This did not signify the demise of the campus-based institutions, but provides a strategy to utilise both face-to-face and online learning for purposes of HE (Garrison and Kanuka, 2004; Leem and Lim, 2007).

Garrison and Kanuka (2004) highlighted the potential of Blended Learning and its applicability to the challenges facing HE and argued that Blended Learning was key to support deep and meaningful learning in HE. Interactivity was one of the properties and this concurred with various authors including Garrison and Cleveland- Innes (2003), Alias, *et al.* (2012) and Pamfilie, *et al.* (2012). A predominant factor that makes Blended Learning very effective is its ability to provide an interconnectedness that facilitates free and open dialogue, critical debate, negotiation and agreement which is a key characteristic of HE (Garrison and Kanuka, 2004). In context, Blended Learning is a strategic e-Learning approach that can provide increased control and independence in terms of learning which is crucial to fostering critical thinking among students. This also promotes a 'flipped classroom' effect whereby, through multiple Web 2.0 technologies, such as podcasts, online courseware, content access and social networking, students are able to interactively engage with study material online before the actual lecture (Centre for Digital Education, 2012; Educause, 2012). Due to

students interacting with study material before-hand, it allows them to make optimal use of lecture time to strategically engage with the lecturer/teacher/instructor in open discussions regarding study and course materials (Educause, 2012). This brings about various strategic benefits for both student and teacher. This was highlighted by Centre for Digital Education (2012) whereby benefits included,

- Increased classroom time of study content.
- More interactive discussions instead of passive absorption of study content.
- Reduced time spent on repetitive tasks and questions.
- Increased ability to coach academically weak students.
- Ability for employed students to interact with study content even if they do not attend class due to work schedules.

Furthermore, with the growth of student enrolment rates globally, the ‘flipped classroom’ allows for a flexible and effective way of pedagogy to be extended to large scale classes that may not be accommodated due to physical space constraints.

Graham, Woodfield and Harrison (2012) examined the adoption of e-Learning via Blended Learning at six HE institutions in the United States and highlighted Blended Learning as a powerful e-Learning strategy that improved learning outcomes. Ramakrishnan, *et al.* (2012) proposed an effective Blended Learning framework as a strategy to develop a motivation for e-Learning adoption through Blended Learning in a developing country’s HE setting such as in Indonesia. They assessed the frameworks from Gupta, Bostrom and Huber (2010) and Packham, *et al.* (2004) and showed that technology based Blended Learning can help to enhance students’ motivation to adopt e-Learning. Blended Learning supports student engagement to learn and understand better in class and this is due to the incorporation of different learning styles, technology and multimedia adoption. Institutional management is also important and needs to drive both e-Learning and Blended Learning approaches to facilitate adoption and usage and derive the necessary benefits (Ramakrishnan, *et al.*, 2012).

Another example of strategic e-Learning was in a Military University setting in a Hungarian context. This particular university’s e-Learning strategy incorporated various powerful e-Learning systems to promote distance learning as well as effective online learning. Some of these systems included e-Tutoring, e-Tasks, e-Tests and robotic tutoring (Kende, Noszkay

and Seres, 2007). It was emphasised that shown that HE institutions needed to apply their minds to technology-based solutions to be able to provide effective and efficient e-based education systems to promote successful e-Learning. “It is also very important that these innovative solutions and possibilities become accessible for more and more people by the ambience and by the IT solutions developed by the society of knowledge” (Kende, Noszkay and Seres, 2007, P 14). Figure 7 shows an example of the Robot-Tutor System.



Figure 7: An experimental Robot-Tutor e-Learning system

Source: Kende, Noszkay and Seres (2007)

E-Learning is also seen to be a key strategy in the enhancement of medical and health care education in a UK setting from a surgical training perspective (Evgeniou and Loizou, 2012). Surgical training was facing challenges in terms of working hours affecting the time for training. Hence, e-Learning became an excellent strategy to compensate for the lost training hours due to its flexibility and advantages of time and space. Similarly, Pfefferle, *et al.* (2010) emphasised the strategic role of e-Learning in nursing education and presented the Leonardo-da-Vinci pilot project ‘e-Learning-assistant’ which aimed to enrich quality and utilisation of e-Learning by creating innovative pedagogical and technical e-Learning tools for nursing education across Europe. This unique and effective system, ‘e-learning-assistant’, was tested within a European HE setting and yielded significant benefits, which are listed in Pfefferle, *et al.* (2010).

Furthermore, the 'e-Learning for Healthcare' project was developed by the Department of Health (UK) in collaboration with other professional healthcare organisations to provide e-Learning as an online training strategy for healthcare professionals and this made the Department of Health the largest e-Learning provider in Europe (Evgeniou and Loizou, 2012). This shows that even governmental departments along with HE are viewing e-Learning as a strategic entity and creating and supporting country-wide e-Learning initiatives in developed countries.

Overall, this section relayed effective use of e-Learning in HE in various contexts in both developed and developing countries. The examples provided show how e-Learning in enhancing the HE institutions and turning them into effective knowledge providers for students that goes beyond the barriers of space and time. This clearly shows how e-Learning is seen as an effective KM strategy. The next section depicts some of the limited evidence of e-Learning literature in an African context.

2.18 Research Evidence of e-Learning initiatives in Africa

With reference to Google Scholar, Emerald Insight, Science Direct, South African Journal of Information Management, University of KwaZulu-Natal Libraries and other local academic libraries (Accessed: 13/05/2013), there is paucity of research of KM and e-Learning in HE in Africa. However, the following studies indicate that some activity is taking place relating to e-Learning in Africa.

The relationship between institutional policy, organisational culture and e-Learning use in four South African universities was examined by Czerniewicz and Brown (2009). Data was used from an existing survey done in 2007 that examined ICT access and use which was conducted in six South African universities. It was shown that there is a strong relationship between policy and the use of ICT for teaching and learning (Czerniewicz and Brown, 2009). Furthermore, supportive and non-restrictive institutional policies could promote staff innovation when it comes to effective e-Learning in the classroom to enhance pedagogical practices. It was also asserted that unstructured collegium institutions are more favourable in promoting innovation in e-Learning as opposed to unstructured bureaucratic institutions. Organisational culture was also found to play a critical role in the way that e-Learning

strategy was embedded within the organisations (Czerniewicz and Brown, 2009) and this concurs with other studies such as Alavi, Kayworth and Leidner (2006), Ranjan (2008), Omerzel, Biloslavo and Trnavčević (2011) and Shao, Feng and Liu (2012).

In a Kenyan HE setting, Nyerere, Gravenir and Mse (2012) highlighted the challenges around the delivery of Open, Distance and e-Learning (ODeL) in Kenya. The system of ODeL was regarded as a viable and cost-effective means of increasing the provision of education without costly outlay in infrastructure (Pityana, 2009 cited in Nyerere, Gravenir and Mse, 2012). This was much needed in Kenya to cater for the increase in demand for continuous learning. Two of the top ranking universities in Kenya were examined and data was collected from students, lecturers and administrators. It was shown that the major challenges included economic and infrastructural challenges that hindered the optimum delivery of ODeL in Kenya. Another main challenge was non-guidance by national policies to the efforts made by the ODeL providers (Nyerere, Gravenir and Mse, 2012). Other challenges included infrastructural constraints, funding constraints, low teaching staff level as well as the ineffective use of ODeL programme facilities. These challenges need to be addressed to allow ODeL to be successful in Kenya Higher Education (Nyerere, Gravenir and Mse, 2012). Similarly as shown by Thiaw (2007) and Mwapachu (2010), universities in Africa face various challenges both from a student and institutional perspective. These challenges included financial, geographical, economic, infrastructural, political and governmental challenges as well as poverty related constraints. Challenges such as these can indirectly, if not directly hinder the effective creation and dissemination of knowledge and thereby hinder the learning process for African students. It is therefore added motivation to examine the influence of KM on HE institutional strategy that can also possibly assist in combatting these challenges.

El-Deghaidy and Nouby (2008) underlined how the Blended e-Learning approach (BeLca) was showing promise in HE in an Egyptian context. Participants in the study that utilised Blended Learning was shown to have higher achievement levels in their post-overall-course tests as well as positive attitudes and motivation towards e-Learning as compared to those not using Blended Learning. The full details of the benefits yielded were listed in El-Deghaidy and Nouby (2008). Other studies on Blended Learning that relate to this include Garrison and Kanuka (2004) and Graham, Woodfield and Harrison (2012). Furthermore, the preceding study related closely to another study in Egypt by Abdelaziz, *et al.* (2011) who assessed the

effect of e-Learning utilisation versus traditional face-to-face lectures among nursing students at the Ain Shams University (Egypt).

It was shown that students found the e-Learning to be effective and had significantly expanded their understanding of the various subjects. The students also relayed that their technology and computer skills had significantly increased toward the completion of the e-Learning programme (Abdelaziz, *et al.*, 2011). However, it was also noted that the students were not willing to participate in another e-learning programme unless they had the essential resources to promote e-Learning such as computers and Internet at home, relevant training and other resources applicable to e-Learning adoption. Hence, due to limited resources and skills in the country, the Blended Learning approach is considered as the best strategy to integrate both e-Learning and face-to-face lectures to be able to provide the most efficient and effective pedagogy in nursing education (Abdelaziz, *et al.*, 2011).

The authors Nagel and Kotzé (2010) examined the role and usage of e-Learning for large online classes and highlighted factors that could maintain ‘quality’ (Ozkan and Koseler, 2009; Casanova, Moreira and Costa, 2011; Das, *et al.*, 2011) of e-Learning education despite supersized online classes. It was argued that the quality of learning need not be inferior in supersized classes if students and instructors engage in quality interaction (Nagel and Kotzé, 2010). They used the Community of Inquiry framework as an instrument to assess the quality of teaching in a specific online course in a South African University. Factors such as teaching, social and cognitive presences are shown to be important to promote successful learning. Furthermore, techniques such as double-blind electronic peer review presents a deeper dimension of learning to large online classes and this further promotes teaching, cognitive and social presences (Nagel and Kotzé, 2010).

The above studies seem to be the only studies done on e-Learning in Higher Education in the entire continent of Africa. This gives added motivation to examine Knowledge Management towards institutional strategy development and e-Learning across the various universities in Africa.

2.19 Web 2.0

Since the advent of the Internet and the World Wide Web (WWW), web technologies have been evolving to increase efficiency, ease of use, and effectiveness of the Internet (Ebner, *et al.*, 2010; Bennett, *et al.*, 2012; Brown, 2012). This has led to innovation and modernisation of the Internet as we know it and the advent of Web 2.0 (Nugultham, 2012).

There are various definitions and explanations of what Web 2.0 is. Web 2.0 is regarded as ‘the social web’, which incorporated software that enables group interaction (Shirky, 2003). For Nugultham (2012), Web 2.0 is the second generation of the WWW and promotes interactivity, collaboration, sharing and facilitation. Kose (2010) concurs that Web 2.0 promotes interactive applications and systems that can be used to build, share and adjust information content according to their needs. Furthermore, the surfeit of digital networking tools on the Internet that facilitate interaction, collaboration and sharing of information is referred to as Web 2.0 or social software technology, Birdsall (2007) and Kesim and Agaoglu (2007). Nugultham (2012) expressed that in this new and advanced age of technology and Internet, Web 2.0 has sprung up to deliver interactive features such as social networking, blogs and wikis which in proving to be the most effective method of people connecting and knowledge sharing among a global community. In context, Web 2.0 simply points to web-based technology that incorporates ‘interaction’ and ‘sociality’.

Due to factors such as continuous globalisation of information, rising costs, poverty and the need for life-long learning, other forms of pedagogy and education such as e-Learning and distance learning need to be considered (Usluel and Mazman, 2009). This applies to various fields and levels of education. Hence, Web 2.0 facilitates this process as it brings with it a variety of interactive software applications and services that can be used for personal, social, business and educational purposes, Grosseck (2009). These software applications and services include social media/networking, wikis, blogs, RSS, video and slide sharing, podcasts and many more which are proving to be powerful and strategic interactive tools providing user interface and flexible web design (Murugesan, 2007; Grosseck, 2009).

2.20 Brief description of some of the main Web 2.0 technologies used

As highlighted above (Murugesan, 2007; Grosseck, 2009), there are a variety of Web 2.0 technologies and applications. Pettenati and Ranier (2006) and Brandtzaeg and Heim (2007) asserted that social networks are an interactive software platform that promote knowledge sharing, communicative interaction and collaboration, among users irrespective of place and background. Hence, users can use these platforms as a means of coming together to share and build knowledge regarding a common interest, need or goal. It was argued by Bartlett-Bragg (2006) that social networks are part of a range of software applications that creates cyber spaces for relationship building and collaboration and encourages group interactions. This in turn facilitates the aggregation of knowledge and information exchange. For McLoughlin and Lee (2007), social networks are pedagogical tools that promote knowledge discovery, sharing, and dissemination of knowledge which support a vast network of people. This in turn connects people and facilitates informal learning and creative exercises.

Other applications such as blogs are interactive web based applications that enables users to create, edit, post and organise or systemise their own web pages that could contain various content made up of entries, views, comments and discussions (Alexander, 2006). Blogs also allows one to publish information collected from various sources and establishes a relation between them which makes blogs a social-interactive and collaborative software tool (Petter, Reich and Scheuermann, 2005). Wiki's were similar to blogs in terms of posting information and interactivity. Schwartz, *et al.* (2004) emphasised how the creators of the wiki concept, Leuf and Cunningham, developed wikis as an expandable and flexible collection of interlinked web pages that can be used for creating, storing and modifying information. Any user can visit a wiki website and read, add or even update the respective content on the wiki and this content could include text, images, videos or any other data structure (Augar, Raitman and Zhou, 2004; Schwartz, *et al.*, 2004).

Podcasting is also a powerful Web 2.0 technology. Meng (2005) defines podcasting as the process of capturing an auditory event and then uploading that audio file which becomes a digital format onto a website or blog. These files could then be downloaded from the relevant webpage on their computers or storage devices. Petter, Reich and Scheuermann (2005) concurs that podcasts are information content such as recordings of lectures, seminars and presentations that are made into a digital audio format and then uploaded at real-time. This

can be then be downloaded and listened to by users in their own time on either a computer and/or a variety of digital devices. Podcasts therefore allow users to catch up on audio content even if they are in different vicinities or while completing other tasks, Usluel and Mazman (2009). Slide and Video Sharing are also a growing trend in Web 2.0 and e-Learning technologies whereby instructors can create video's or slides on specific subjects and then share and disseminate them via a specific web or video sharing site i.e. YouTube (Grosseck, 2009). In relation to education, Dale (2007) asserts that podcasting promotes both innovative and creative avenues to support effective learning.

2.21 Literature supporting the role of Web 2.0 as an e-Learning / Knowledge Management Strategy in Higher Education

There are an abundance of studies that show how Web 2.0 is used as a successful e-Learning strategy and promotes the creation, sharing and dissemination of knowledge. The strategic role of Web 2.0 within a Blended Learning environment was highlighted by Kose (2010) in a Turkish context. The author proposed a Web 2.0 model that could be integrated with a mathematics course which could prove to improve results of students in the respective subject. The model consisted of podcasting, video sharing, blogs and slide share which enabled teachers to create interactive content relating to the subject. This allowed the students to interactively engage in mathematical problems and solutions which in turn enhanced students' performance in two consecutive term examinations (Kose, 2010).

Similarly, Eales-Reynolds, *et al.* (2012) used Web 2.0 to address the challenges of technological change and information overload among nursing students at a university in the UK. They proposed a Web 2.0 based pedagogical tool known as the Web Resource Appraisal Process (WRAP) to support the learning process and that allows students to advance their own practice by using and discriminating between various sources of knowledge which in turn develops their capacity for critical thinking (Eales-Reynolds, *et al.*, 2012). The tools included advantages such as virtual libraries, on-line note taking, discussion boards, blogs and report generation. It was shown that students who used traditional resources when preparing work for assessments did not seem to exercise critical thinking skills in their respective exercises whereas student who utilised WRAP revealed better performances,

interaction and found it more instructive, useful and enjoyable to use (Eales-Reynolds, *et al.*, 2012).

Silvia and Beatriz (2012) argued that due to the various challenges faced by organisations, there is a demand from employers for students to have both knowledge and apposite skills to be productive and effective in the working world. This stems the need to produce qualified and well-equipped professionals and a strategy is needed by universities to fulfil that. Hence, Silvia and Beatriz (2012) emphasised the use of Collaborative Web-Based Environments (CWBE) based on Web 2.0 technologies as a strategy to redesign teaching and learning methodologies. Collaborative Web-Based Environments is a Web 2.0 enabled environment that focused sharing and collaboration between users and it incorporated Web 2.0 applications such as social networks, video sharing, blogs and wikis (Fernandez, Simo and Sallan, 2009). It was shown that CWBE did improve the quality of education primarily by improving the transfer of knowledge and skills from teacher to student and from student to student. It also enhances other aspects of a student such as work management, critical thinking, task planning, collaboration and teamwork. The full list of other benefits of Web 2.0 based CWBE is descriptively highlighted in (Silvia and Beatriz, 2012). The strategic use of Web 2.0 in the form of CWBE in this study is supported by similar views made by Morrison (2011).

Web 2.0 is also seen as a strategic platform in Emergent Learning (Williams, Karousou and Mackness, 2011). Emergent Learning is learning that arises via interaction between a number of people and resources in which relevant learning processes are organised and determined by the learners themselves (Cetina, 2005 and Goldstein, 2009). This type of learning mainly occurs via physical or virtual networks. An examination of Web 2.0 towards effective emergent learning was done by (Williams, Karousou and Mackness, 2011) to reveal its strategic offerings for effective collaboration, interaction and knowledge sharing for emergent learning to be possible from an educational perspective. It was shown that that Web 2.0 is the ideal platform to facilitate emergent learning due to its flexibility, interactivity and agility. Furthermore strong IT/IS infrastructural conditions are pivotal for emergent learning to thrive and organisational change is important in the sense that academics and institutional drivers need to form a culture (Schein, 1985; Alavi, Kayworth and Leidner, 2006), of supporting Web 2.0 and emerging learning (Williams, Karousou and Mackness, 2011).

It is important to appreciate that Web 2.0 is slowly creating a learning generation that goes beyond physical boundaries and can apply to anybody with access to a computer and Internet (Wheeler, 2009). Stemming from this, Loureiro, Messias and Barbas (2012) highlighted the importance of Web 2.0 as a tool to support lifelong learning. Life-long learning is regarded as any constructive learning activity that is undertaken throughout the duration of one's life which could include formal, informal or natural learning with the aim of improving knowledge, skills and competences (Harvey, 2004). Web 2.0 enables users from diverse backgrounds and geographical locations irrespective of age, gender or race to be able to log on start learning either formally or informally (Loureiro, Messias and Barbas, 2012). Life-long learning is hence a rapid growing trend in developed countries and this was made possible through Web 2.0 technology.

The strategic role of Web 2.0 implementations and its benefits was also described in an Australian HE setting through a collective case study of six Web 2.0 implementations across six HE institutions (Bennett, *et al.*, 2012). It was shown that 3 out of the 6 institutions that were engaged in strong and successful Web 2.0 implementations were already deriving significant benefits. These benefits included better student interaction, effective knowledge/content creation and sharing, improved performances, more creative and efficient teaching, learning and research (Bennett, *et al.*, 2012). Furthermore, these institutions were the ones that had strong institutional support to the acceptance of Web 2.0. This is convergent with the views (Loh, *et al.*, 2003; Alavi, Kayworth and Leidner, 2006; Leidner and Kayworth, 2006; Williams, Karousou and Mackness, 2011; Shao, Feng and Liu, 2012). The remaining 3 institutions that were having difficulties in implementing and sustaining Web 2.0 as a strategic pedagogical tool was seemingly due to tensions between Web 2.0 and educational practices. Even though the study could not prove as to why these tensions existed, it could be related to Mitra and Arora (2010) and Grosseck (2009) when they highlighted the difficulties in convincing teachers to change their mind-set towards new pedagogical methods. These type of tensions need to also be considered when implementing Web 2.0 tools into formal educational contexts (Bennett *et al.*, 2012). Perceptions of academic staff and teachers can sometimes be the catalyst factor with regards to the adoption of Web 2.0 (Grosseck, 2009). Through a deep analysis of academic perception at a research intensive university in the UK, Brown (2012), descriptively showed how the academic perceptions influenced the adoption of Web 2.0 strategy and technology.

It was argued by Mitra (2010) cited in Williams, Karousou and Mackness (2011) that one of the main reasons for poor adoption of Web 2.0 is possibly because a change in teaching methods is considered difficult since it challenges practices that are already embedded pedagogically, culturally and socially. Grosseck (2009) highlighted similar factors that hinder the adoption of Web 2.0 by teachers and educators and if these factors could be explored, then it could create a way to enhance the adoption process. Hence, teachers need to acknowledge that Web 2.0 and e-Learning should not replace physical teaching but should be looked at as an effective complement to traditional teaching methods (Blake, 2009; Maharaj, 2010).

The advent of Web 2.0 tools has produced a variety of possibilities for international collaboration as the focus shifts from just access to information but also to access to other people all over the world (Brown and Adler, 2008). Wiki technology has proven to be a collaborative asset in this as it provides students with collaborative opportunities that initiate a knowledge creating culture among themselves and others (Huijser, Bedford and Bull, 2008). This enables students and other users to become part of a global knowledge sharing domain with on-going efforts to promote knowledge (Parker and Chao, 2007). Ertmer, *et al.* (2011) established the influence of wiki-based international collaboration on pre-service teachers and students. The study focused on the comfort of using Web 2.0 tools as a means of collaboration with unknown colleagues, cultural competencies, and perceptions of using Web 2.0 tools in future classrooms.

The study involved students and pre-services teachers from a United States university, along with 4 other universities from England, Russia, South Korea and Sweden. All participants were enrolled in the same online course and used wiki's and blogs to collaborate on tasks/assignments and tests. It was shown that majority of the student's online wiki experiences provided a deeper understanding of working with diverse individuals from other countries along with their input to the projects from their perspective. This enhanced knowledge creation and sharing. Furthermore, students developed a great sense of respect for the differences of others and as well as an appreciation of other cultures by learning more about them via wiki collaboration. Overall, the benefits of Web 2.0 based collaboration were welcomed by students and pre-services teachers due to its relevance, ease of use and flexibility which meant that Web 2.0 was definitely being considering for future classrooms (Ertmer, *et al.*, 2011).

Similarly, Engstrom and Jewett (2005) highlighted wikis as an exploratory educational tool with eleven in-service teachers and 400 science students as a means of considering innovative ways to implement scientific inquiry projects. Furthermore, Vratulis and Dobson (2008) also highlight wikis when they used it to successfully engage 800 students across Canada in academic discussions and classroom practices. Bonk, *et al.* (2009) used wikis to engage students in cross-institutional collaborations whereby they created a 'wikibook' relating to academic subjects and course content. It was emphasised that if educators look at finding new and innovative ways to use Web 2.0 technologies in pedagogy, then the potential for more knowledge creation and learning would continue to grow as well (Bonk, *et al.*, 2009).

The actual design of Web 2.0 pedagogical tools also plays a key role in the adoption and usage of Web 2.0. Carmichael and Burchmore (2010) emphasised the design of Web 2.0 systems in a strategic way. Students themselves acted as co-designers of the applications and helped the developers develop Web 2.0 tools that complimented how their way of study. For the successful development of transformative Web 2.0 tools in Higher Education, Web 2.0 has to be matched to academic practices and to the existing patterns of technology use. The study showed in detail how postgraduate students from diverse fields of study including social sciences, computer sciences and education all contributed to Web 2.0 development to improve the existing collaboration environment. The students reflected on their existing academic practices from undergraduate to postgraduate research with the intention of improving their practices with the use of technology. The tools were then developed in accordance with these practices and proved to be a worthy strategy in developing Web 2.0 tools. This also emphasises the need for more flexible design approaches with student collaboration, if Web 2.0 tools are to be effectively integrated into HE (Carmichael and Burchmore, 2010).

Laru, Naykki and Jarvela (2012) looked at Web 2.0 as a pedagogical complement to the traditional face-to-face style of teaching and highlighted how Web 2.0, when combined with face-to-face teaching activity did increase students' individual knowledge acquisition during various academic courses. Hemmi, Bayne and Land (2009), Wheeler (2009), and Schroeder, Minocha and Schneider (2010) concurs that Web 2.0 can be a powerful pedagogical tool especially when it is designed in correlation to the methods of traditional teaching. In addition, Halic, *et al.* (2010) asserted that technological tools are more effective when they

were coupled with compatible pedagogical conceptions. Furthermore, blogs, wikis, video sharing and interactive content management systems (CMS) seems to be the highly popular Web 2.0 technology favoured by students and plays an important role in knowledge acquisition (Laru, Naykki and Jarvela, 2012).

Blogging was seen to be one of the Web 2.0 developments in Higher Education in Austria, Ebner, *et al.* (2010). Micro-Blogging was a condensed form of a blog and offered up to 140 characters of typing and students at the University of Applied Sciences Of Upper Austria were using the tool throughout their courses. Micro-blogging was proving to help students to be virtually present and be part of a learning community that could work on a problems and solutions without any time or geographic constraints (Ebner, *et al.*, 2010). A full examination and list of these benefits of micro-blogging was detailed in Ebner, *et al.* (2010).

In respect of developing countries, Forkosh-Baruch and Hershkovitz (2012) empirically examined how Social Networking Sites (SNS) are being utilised by HE institutions for facilitating informal learning in Israel. Twenty six Twitter accounts and Forty seven Facebook accounts of Israeli universities and colleges were critically examined and based on their content (posts/tweets/comments and discussions), were classified into categories to attain a better understanding of how they could accelerate informal learning for the various Israeli communities. It was shown that SNS does indeed promote knowledge creation and sharing of knowledge which expedites informal learning within the Israeli community (Forkosh-Baruch and Hershkovitz, 2012). Social Networking sites succeeded in opening academic institutions to the community. The communities could access information and knowledge created by students on these social networking sites and thus promotes informal learning and empowerment. Overall, this study infers application and use of SNS as a Web 2.0 enabler for sharing academic knowledge between HE institutions and the community is indeed proving successful and hence being explored as a Web 2.0 KM tool by these organisations (Forkosh-Baruch and Hershkovitz, 2012).

Web 2.0 is also a key enabler of distance learning (Usluel and Mazman, 2009). Podcasting is one such effective Web 2.0 based technology tool that strategically supports distance learning. Podcasting has been highlighted as a very effective learning enhancement tool in HE by many authors. Donnelly and Berge (2006), Kamel-Boulos, Maramba and Wheeler (2006), Kreider-Eash (2006), Lim (2006), Maag (2006) and Evans (2008) describe strategic

use of podcasting in various developed universities. Podcasting was regarded as the new word of the year in 2005 when it was first announced worldwide (Skira, 2006).

Fernandez, Simo and Sallan (2009) showed how podcasting proved to be a pivotal asset in distance education. By applying podcasting (13 podcasts) to a course made up of 90 distance learners, it showed that podcasting is indeed a powerful online tool that allowed students to experience enjoyable and interactive sessions of live lectures. The teacher's voice gave students more of a feeling of proximity and provided a reassuring feeling of contact for both between students and teacher. Students still felt as if they were part of a live lecture even when not physically in attendance. Podcasting also contributes towards creating a permanent contact between distance students and teachers which in turn, increases student's motivation (Fernandez, Simo and Sallan, 2009). This related to Chan and Lee (2005) who found that podcasting supported 'time-shifted' learning whereby students can learn anywhere irrespective of time and space and while even in movement such as cars, bus, trains and other vehicles. Podcasting has been found to be effective in knowledge creation and sharing due to its interactive nature thereby facilitating collaborative learning even across diverse academic communities (Alexander, 2005). A key benefit of podcasting was its ability to make learning more appealing to learners from diverse backgrounds including those with learning difficulties/problems and/or learners whose first language was different from the language that the course was being taught in (Cebeci and Tekdal, 2006).

Maharaj (2010) emphasised the value of podcasting in a Higher Education context in South Africa. It was asserted by Maharaj (2010) that podcasting provides an added dimension to which students can interact with learning material. Podcasting provides a 'multi-modal learning environment' whereby students can become active participants in creating learning content and not just be a 'passive absorber' of lecture material (Maharaj, 2010). Podcasting also provides almost immediate access to lecture content which allows a student to listen and participate more in the lecture rather than primarily concentrating on copying lecture notes in class. However, podcasting is not being used widely in Higher Education in South Africa (Maharaj, 2010).

Web 2.0 and distance education was examined by Usluel and Mazman (2009) in a Turkish setting and highlighted the educational use of Web 2.0 tools as a means to support distance learning as well as the process of adoption of Web 2.0 tools. The Technology Acceptance

Models 1 and 2 (Davis, 1989; Venkatesh and Davis, 2000), Theories of Reasoned Action and Planned Behavior (Ajzen and Fishbein, 1975) and Unified Theory of Acceptance and Usage Theory (Venkatesh, *et al.*, 2003) were applied. It was shown that blogs, wikis, podcasts and social networks are the most adoptive Web 2.0 technologies in distance education in Turkey. It was also shown that the adoption to Web 2.0 as pedagogical tools can be more productive through research and by utilising the various theories and models listed above (Usluel and Mazman, 2009).

Grosseck (2009) analysed important models, perspectives, advantages and barriers to the use of Web 2.0 as a strategy in Higher Education. Key strategic benefits of investing in Web 2.0 strategy included, (Grosseck, 2009):

- Reduction of costs
- Knowledge creation and management
- Efficient and easy access to information
- Integration of a various Web 2.0 technologies in Academic activities
- Vast opportunities for collaboration across geographical borders
- Distance education
- Effective sharing of information, knowledge and experiences (blogs, wikis, youtube) and more
- Compatibility with the elements of the educational field and the existing contextual dynamics
- Reliability (Information not getting lost e.g. Cloud)
- Flexible Information and Knowledge Management
- Innovation of processes via Web 2.0
- Creating digital content (podcasting and videocasting)

Grosseck (2009) affirmed that Web 2.0 is the future of education and the alignment of Web 2.0 strategy and tools to HE is highly recommended. This was similar to the views made by McLoughlin and Lee (2007) and Hargadon (2008). Lastly, the author also provides some key points emphasising why 'ignorance' by educators still exist with regards to the adoption of Web 2.0 orientated learning (Grosseck, 2009, P 481).

This section ends off by highlighting a key study from an African Higher Education Context. Lwoga (2012) conducted a study across 6 public Tanzanian universities to measure the degree to which learning and Web 2.0 technologies were being used to promote teaching and learning. Tertiary education demands in Africa was not entirely matched by the effective supply of facilities, staff and resources which meant that proper tertiary education was not available to a large part of the African population, Lwoga (2012). Web 2.0 therefore had critical place in African higher Education as a strategic means of transforming Higher Education, thereby addressing the demands for more education and combatting the challenges of staff and resource shortages by facilitating more online and interactive learning. However, after surveying 6 public HE institutions, it was found that the key challenges faced by Tanzanian universities in the adoption and use of Web 2.0 included (Lwoga, 2012):

- poor technological infrastructure
- staff attitudes towards e-learning
- deficiency of resident expertise in e-learning and Web 2.0 curriculum development
- lack of technical support for e-learning and Web 2.0 initiatives

However, positive views made by Lwoga (2012) were that Web 2.0 could promote learner satisfaction within HE. Web 2.0 promoted the increase of student participation and expedited student centered learning environments that went beyond, space, time and resource barriers. Web 2.0 technologies could effectively complement pedagogical approaches such as constructivist, collaborative and reflective learning. In addition, Web 2.0 could contribute to the strategic imperatives of the institution being fulfilled. Furthermore, it also enabled effective sharing of knowledge and experiences which is important for fostering e-Learning success in African HE institutions and enhancing overall teaching and learning (Lwoga, 2012).

A key finding by Unwin, *et al.* (2010) cited in Lwoga (2012), who conducted a study across 25 African countries and found that overall the use of Web 2.0 technologies including wikis, blogs, social media and podcasting to support pedagogical activities in HE institutions were quite low and e-Learning was mainly used for mundane activities such as user management, e-mails, glossaries, presentations, document management and libraries. Therefore as one can see, the potential of Web 2.0 is not being realised in African Higher Education.

2.22 Massive Open Online Courses (MOOCs)

Massive Open Online Courses (MOOCs) originated in 2008 in a highly crowded e-learning landscape (Fini, 2009). Hence, the term MOOCs became a buzzword in e-Learning pedagogy in 2012 (Daniel, 2012). There is limited research done on MOOCs worldwide due to it being an emerging phenomenon (Educause, 2011). This section will provide definitions, insight, usage and application from the available literature.

There are various definitions of MOOCs in literature and other online sources. Wikipedia (2013) defines MOOCs as recent developments in distance education with online courses aimed at large scale participation and open access via the Internet. Furthermore, assessment of learning may be done for certification. A detailed definition was provided in Educause (2011), which summarises MOOCs as being a model for the effective online delivery of study and learning content to any person with Internet access. Most MOOCs are free and provide course activities that could include online reading, watching videos, posting on discussion boards and blogs, and commenting via social media platforms. Furthermore, MOOCs are not dependent on the attendance of or a required number of learners, and can accommodate numbers ranging from a single student to thousands of students (Educause, 2011). Kop, Fournier and Fai-Mak (2011) asserted that MOOCs act as a platform where new forms of distribution, storage, archiving, and retrieval promotes the creation and sharing of knowledge and distributes intellect. Building from this, MOOCs have become a new model of learning based on adaptive responses from instructors and learners. This promotes learning engagement in a continual flow of knowledge exchange and for reflective action on the part of the learner (Kop, Fournier and Fai-Mak, 2011).

Weigel (2013) conveyed that at the January 2013 World Economic Forum held in Switzerland, global leaders were astounded when Khadija Niazi, a 12-year-old Pakistani girl had received free, college-level education via MOOCs. Massive online open courses were initially offered by education providers such as Coursera and Udacity, however, they are now being produced and offered by long established universities, namely in the United States of America (Weigel, 2013). MOOCs are built on a Web 2.0 platform (Fini, 2009; Daniel, 2012). A good description was given by Educause (2011) whereby MOOCs are usually hosted on accessible websites using Web 2.0 technology, such as wikis, blogs, and other provider specific Web 2.0 site. Furthermore, course interactions may occur on that specific site or via

blogs, tweets, and other public, online venues. Online registrations for courses are straightforward and easy and students are able to receive relevant information, content and announcements (Educause, 2011).

2.23 Literature supporting the Emergence of MOOCs

McAuley, *et al.* (2010) gave an in-depth representation of MOOCs in their study entitled ‘The MOOCs Model for Digital Practice’. In the study, a comprehensive insight was given to the phenomenon of MOOCs and the study answered the enquiring questions that revolved around:

- The reflection of MOOCs in effective practices within the digital economy.
- The implications of MOOCs for knowledge-making within the digital economy.
- The economic opportunities/challenges brought by the open model of learning.
- Factors that limit participation in MOOCs.
- The application of the MOOCs model to engage and develop an effective digital citizenry.

The answers depicted MOOCs as an effective online pedagogical practice with potential to yield significant benefits detailed in McAuley, *et al.* (2010).

For Weigel (2013), MOOCs are being renowned as the democratizer of opportunities for education. A survey done in 2012 revealed that 41% of the respondents (learners) studying via MOOCs were working professionals, 31% were undergraduates and postgraduates and almost 40% of the respondents enrolled due to casual interest in a specific subject. This showed that MOOCs are gaining popularity through various reasons and motivations from prospective learners (Weigel, 2013). MOOCs are also seen as a potential cost reduction strategy for education as it has the ability to target millions of learners online and provide free education. This could eventually have a game-changing effect on education dissemination. It was also highlighted how an Import/Export approach can be incorporated to MOOCs whereby formal academic credits become available, at a reasonable fee outside the offering institutions, which could then promote a high economical reduction in faculty and administrative labour expense (Weigel, 2013).

Kop, Fournier and Fai-Mak (2011) examined MOOCs via a case study with the intention of establishing how emergent technologies could impact the design of the learning environment. The primary focus was on the roles of educators and learners in creating learning experiences through MOOCs. Surveys were used to capture the learning experiences and activities of learners from two MOOCs provided by the Institute for Information Technology at the National Research Council of Canada and the Technology Enhanced Knowledge Research Institute at Athabasca University. It was shown that meaningful learning occurs when social and teaching presence governs the design, facilitation, and direction of the actual educational learning outcomes (Kop, Fournier and Fai-Mak, 2011). This was convergent to the views made by Shedroff (2009).

Furthermore, learners with different learning objectives lead to different levels of participation in learning activities which eventually leads to different learning outcomes. The study emphasised on 'e-Learning maturing' via MOOCs whereby students had higher levels of participation as they became more experienced with the MOOC phenomenon (Kop, Fournier and Fai-Mak, 2011) and concurred with (Mak, Williams and Mackness, 2010). It should also be noted that support structures play a key role in the adoption of MOOCs whereby the learning environment should be based on the creation of a community where learners felt comfortable, safe and valued (Kop, Fournier and Fai-Mak, 2011). Hence, this allows for critical and effective learning to take place. Lastly, instructors/teachers need to be dynamic and adaptable to change by effectively communicating, sharing and collaborating with learners throughout the course. Further results and highlights of the study are listed in detail in (Kop, Fournier and Fai-Mak, 2011).

A case study by Educause (2011) showed how an academic instructor, Margaret Lane, offered her course entitled 'Novel Writing' via a MOOC. Approximately 1,600 students signed up at no cost, of which most being from around the world including seven countries outside America. The MOOC students had access to recorded class lectures and social networking tools for interaction with one another and the instructor. As the semester progressed, the MOOC students organised themselves into peer-review groups and participated in intense online collaboration with one another and the instructor. At the end of the course, it showed that more learning took place via the MOOC as opposed to the traditional lecture students. An example was how some students received numerous critiques

and also had the opportunity to read content from other potential novelists. This in itself was a key knowledge sharing experience. Furthermore, the exposure provided by the MOOC for the online writing course allowed the instructor's university to become quite popular and was viewed by prospective novelists as one key institution for aspiring writers, Educause (2011).

Similarly in 2008, George Siemens and Stephen Downes co-taught a course called 'Connectivism and Connective Knowledge' which was presented to 25 paying students at the University of Manitoba whilst concurrently offered to 2300 students from the general public for free via MOOCs (Fini, 2009). The course primarily gained popularity and momentum because of the 2,300 MOOC students as opposed to the classroom students. Furthermore, a MOOC at Stanford University entitled 'Introduction to Artificial Intelligence' facilitated by experts in the field, Sebastian Thrun and Peter Norvig, attracted a world-wide enrolment of over 100 000 students (Educause, 2011). Friedman (2013) highlighted the experience of his friend, an Academic, Professor Michael Sandel who lectured an online Justice lecture in Seoul, South Korea in an outdoor venue to 14,000 people with Chinese subtitles. This generated over 20 million views on Chinese websites and gave Sandel similar popularity in China that was usually reserved for Hollywood movie stars (Friedman, 2013). This entire popularity and educational breakthrough was possible through MOOCs.

A new MOOC has been developed via the coalition of Harvard University and Massachusetts Institute of Technology (MIT), known as Harvard-MIT Edx (Allison, *et al.*, 2012; Friedman, 2013). This is available at edX (2013). A person can study a course at no cost from any university listed on this MOOC website including courses from Harvard University, MIT, Rice University, University of Texas, University of Toronto and many more (edX, 2013). This initiative stemmed from a USD 60 million investment, pledged by both institutions (Solomon, 2012). It was asserted by Solomon (2012) that Harvard and MIT envisioned edX to augment on-campus education at both institutions whilst concurrently making Harvard and MIT education available to anyone with an Internet connection.

Allison, *et al.* (2012) posited EdX as:

- A strategic platform for the creation and dissemination of online learning and knowledge resources.

- A research initiative that will create large amounts of data reflecting the interaction of students with online knowledge resources.
- A strategic method of satisfying the worldwide educational missions of its founding institutions.
- A strategic resource that will complement 'residential learning at its founding institutions (Harvard and MIT), along with other institutions that join the initiative.

EdX builds on both of the universities' online pedagogical content and the technological platform is designed to deliver online versions of courses which includes video lessons, quizzes, student-ranked questions and answers, online laboratories, student-paced learning and immediate feedback mechanisms, (Allen and Longbrake, 2012). The MIT President, Susan Hockfield asserted that EdX would help both institutions to increase the vitality of their universities in a more effective and creative way whilst simultaneously increasing educational opportunities for learners and teachers across the world (Solomon, 2012). Similarly, Harvard president, Drew Faust, conveyed that that EdX would give both institutions an unparalleled opportunity to radically extend their educational reach by conducting state-of-the-art research into effective and quality online education (Allen and Longbrake, 2012). This research, coupled by new technology will create a new culture of online learning that will benefit many across the nation and the globe (Allen and Longbrake, 2012).

Even though EdX has just emerged, it ran its first course, from MIT, in Circuits and Electronics which totalled approximately 155 000 registrations. Learners were from almost 160 countries which included United States of America, India, London, Columbia, Spain, Pakistan, Canada, Brazil, Greece and Mexico (Daniel, 2012). Approximately 10 000 learners passed the course as whole which included a 15-year-old learner from Mongolia who attained a reasonably high score in the final exam (Daniel, 2012). The abovementioned 'Online Justice course' by Michael Sandel is also the first course in the Humanities discipline to be listed on MIT-Harvard EdX online platform (Friedman, 2013). An abundance of courses are currently freely available from both Harvard and MIT and many other universities that have recently joined EdX (edX, 2013). It should also be noted that EdX is a non-profit initiative and is said to improve, and not replace, the traditional campus based learning (Allen and Longbrake, 2012).

In regard to the future direction of MOOCs holistically, Educause (2011) sees MOOCs as an emerging model with benefits and challenges. However, as it evolves, methods of presentation would become more consistent and predictable. It is highly possible that MOOCs may become the most effective outreach pedagogical tool to engage learners from all over the world (Educause, 2011). In addition, as MOOCs embrace the future, the scale on which courses can be taught and the diversity of students they serve will allow institutions to tread on new terrain by opening their content globally and extending their reach into almost every community (McAuley, *et al.*, 2010; Educause, 2011).

2.24 Dearth of KM/e-Learning/Web.2.0 research in Higher Education in Africa (The Gap)

All of the above studies, which support the current study, indicate a profusion of studies that exist on the strategic role on Knowledge Management, e-Learning and Web 2.0 in Higher Education. However, these studies stem from both developed and other developing countries around the world while a paucity of research exists on KM, e-Learning and Web 2.0 from a strategic perspective in an African HE setting (Google Scholar, Emerald Insight, Science Direct, South African Journal of Information Management and University of KwaZulu-Natal Libraries: 13/05/2013). These scholarly research websites also show that considerable research on strategic KM exists in Africa from a business context but very minimal exists in a Higher Education context.

Even though Mavodza and Ngulube (2012), who were South African authors, conducted a good study on KM, it was however done on a university (New York University) in a developed country. Furthermore, as shown in section 2.18, there are minimal studies conducted in the area of e-Learning in African Higher Education. In addition, Lwoga (2012) seems to be one of very few authors who gives an interesting and in-depth outline of Web 2.0 in a Tanzanian HE context, whilst Unwin, *et al.* (2010) shows that Web 2.0 is not being used to its full potential across HE institutions in 25 African countries. Lastly, there is no documented research evidence of MOOCs in Africa. All of these factors add to the gap in research based knowledge in the area of KM and its strategic role in Higher Education in Africa as a whole. Therefore, it places this study in an effective stance to address this gap.

2.25 Theoretical Framework/Models used in the study

There are a variety of frameworks/models that have been created and adopted to measure/implement and utilise KM strategically. Haslinda and Sarinah (2009) gave a detailed review of numerous models and their applicability to the measurement of KM. Some of these models included:

- Boisot's Knowledge Category Model (1987)
- Kogut and Zander's Knowledge Management Model (1992)
- Hedlund and Nonaka's Knowledge Management Model (1993)
- Nonaka's Knowledge Management Model (1994)
- Frid's Knowledge Management Model (2003)

The relevant frameworks that underpin this study include the Organisational Learning Theory (Argyris and Schön, 1978), Organisational Culture Theory (Schein, 1985) and Kogut and Zander Knowledge Management model (1992).

2.26 Kogut and Zander Knowledge Management Framework

Figure 8 shows a visual of the Kogut and Zander (1992) Knowledge Management framework.

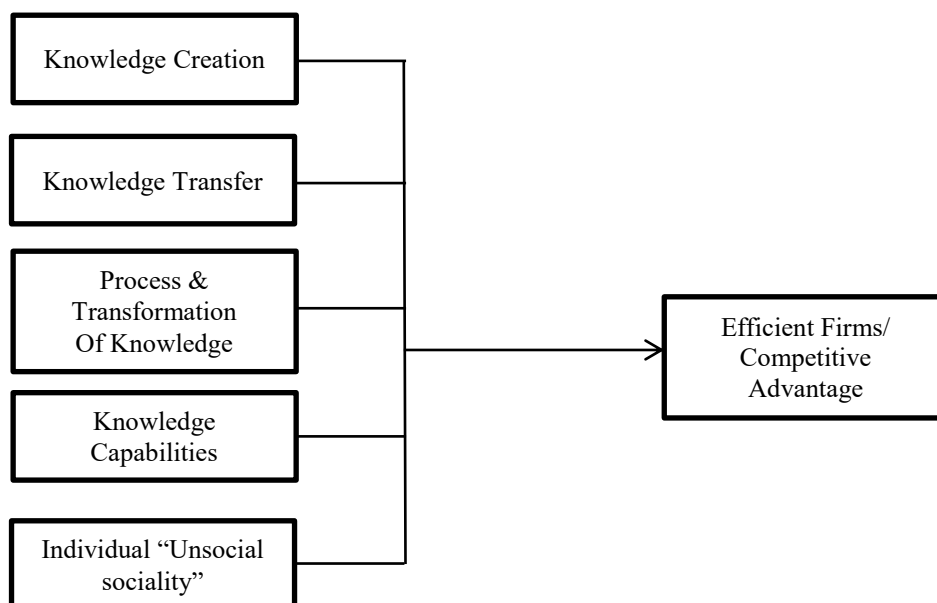


Figure 8: Kogut and Zander (1992) Knowledge Management framework

The authors Kogut and Zander (1992) were among the first to establish the basis for the knowledge-based theory of the firm when they highlighted that knowledge was a strategic source of competitive advantage (Haslinda and Sarinah, 2009). This foundation comes from their model of Knowledge Management. Their work focuses on the idea that the creation and transfer of knowledge within the organisation is more important than relying on the economic markets (Kogut and Zander, 1992). It was emphasised that “the central competitive dimension of what firms know how to do is to create and transfer knowledge efficiently within an organisational context” (Kogut and Zander, 1992, P 384).

Organisations can be seen as a ‘repository of capabilities’ that is determined by the knowledge embedded in individual relationships which was structured by organising principles, Kogut and Zander (1992), and these organising principles relate primarily to how the firm organises its activities pertaining namely to its knowledge. Firms could also expand their markets based on their ability to create new knowledge and to replicate this knowledge. It is important to understand that an organisation is more than just mechanisms by which knowledge is transferred, but also by which new knowledge and learning is created (Kogut and Zander, 1992).

Kogut and Zander (1993) empirically tested their view and one of their results showed that technology/systems and ease of use of technology plays a pivotal role in the transfer of information and knowledge. The primary results showed that firms can be efficient in their operations based on the manner in which knowledge is created and transferred. It also showed that a consensus could be developed by the organisation through recurring interaction with individuals and groups as a means of transferring knowledge from ideas into production and markets.

Furthermore, an organisations’ boundary is determined by the difference in existing knowledge as compared to the actual rooted capabilities of the organisation and not market failure (Kogut and Zander, 1993). This meant that an organisation needs to be fully knowledgeable or aware of its true capabilities including its resources, products, revenue, customers, suppliers and other aspects in order to succeed and remain competitive. This can only be possible via proper and effective KM.

2.26.1 Literature supporting the use of the Framework

There are numerous studies that utilise the Kogut and Zander (1992) Knowledge Management framework. Hitt, Ireland and Lee (2000) argued that the 21st century brings a competitive era and that technological learning will play a critical role to promote success of an organisation. Hence, an organisation's ability to create, maintain and exploit their dynamic core competencies is linked to technological learning (Hitt, Ireland and Lee, 2000). Based on this, the authors utilised this theory and highlighted that KM and technological learning can allow organisations to create and manage technological knowledge from both internal and external sources. By linking technological knowledge with strategy, an organisation can proactively use this knowledge to innovate and create more core competencies, improve efficiency and sustain a competitive advantage (Hitt, Ireland and Lee, 2000).

Lengnick-Hall and Griffith (2011) believed that organisational success depends on a firm's capability to properly manage its knowledge in a strategic way to enhance its organisational achievements, products and services, innovation, operations and economies of scale. Hence a framework using (Kogut and Zander, 1992) was developed to categorise knowledge resources to distinguish evidence-based knowledge resources and knowledge that is suitable to contribute to innovation, efficiency and improvement within a firm. This framework was successfully tested and concurred with Kogut and Zander (1993) whereby successful KM does lead to efficient firms and competitive advantage. Similarly, with Cepeda and Vera (2007), who also based their results on the theory (Kogut and Zander, 1992), showed the utilisation of KM as a strategy to capture the processes involved in the development of dynamic capabilities and to examine its influence on operational capabilities. This in turn led to more efficient organisations (Cepeda and Vera, 2007).

Similarly, Molina, Llore'ns-Montes and Ruiz-Moreno (2007) referenced this theory and examined the relationship between quality and efficiency management and knowledge transfers. They found that the control of both social and technical aspects of quality management was possible via the use of practices that were strongly influenced by Knowledge Management, especially on knowledge transfers. The author Lichtenthaler (2008) utilised (Kogut and Zander, 1992) as a platform to develop a model of relative capacity for external knowledge retention within a firm. The model facilitated proficient knowledge retention and proved to be a crucial source of competitive advantage as it helps firms to

realise value from their knowledge assets (Lichtenthaler, 2008). Yang, Fang and Lin (2010) used (Kogut and Zander, 1992) model to examine the dimensions of organisational knowledge creation strategies and the relationships between the strategies and its knowledge assets. Drawing from both models, the authors proposed a new model for knowledge creation strategy known as the ‘exploration, institutional entrepreneurship, combination and exploitation’ (EICE) model (Yang, Fang and Lin, 2010). It was shown how the EICE model could assist managers in creating effective organisational strategies as well as aid in identifying knowledge creation strategies to improve overall organisational knowledge.

It was shown by Ding, Akoorie and Pavlovich (2009) by utilising the model (Kogut and Zander, 1992) how partnerships between firms and organisations in various industries were no longer just about profits, financial benefits, economies of scale or even buyer and supplier power, but about ‘knowledge partnerships’. It was shown how partnering firms were sharing knowledge about various key aspects/areas in industry. This was yielding benefits such as shared knowledge bases for vital industry information and strategy creation using shared knowledge (Ding, Akoorie and Pavlovich, 2009).

Relating to social software as a KM strategy, Janhonen and Johanson (2011) made reference to (Kogut and Zander, 1992) and showed how social networking contributes to knowledge creation. This in turn impacted positively on team performances. The importance of social networks in knowledge creation was further accentuated by top management as a source of value creation (Janhonen and Johanson, 2011). Von Krogh (2012), in regard to a knowledge based view of a firm (Kogut and Zander, 1992) highlighted how KM is changing rapidly at firm level and how social software is carrying great promise for KM value, KM strategy, firm boundaries and as a source of competitive advantage.

From an organisational performance perspective, Kiessling, *et al.* (2009) found that KM does clearly have a positive impact on organisational outcomes in a transitional economy which includes organisational innovation, product enhancement and employee improvement.

2.27 Organisational Learning Theory Framework

Figure 9 shows a visual of the Argyris and Schön (1978) framework.

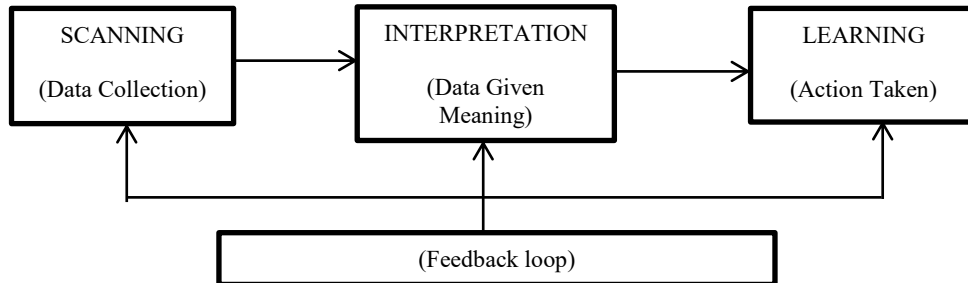


Figure 9: Argyris and Schön (1978) Organisational Learning Theory

Scanning of the relevant environment in which an organisation operates and collecting information can help shape future decisions, strategy and facilitate organisational learning (Vance, 2011). Hence, this theory is an action-orientated theory primarily contributed to by Argyris and Schön (1978). The theory conveys that an organisation's environment is continuously changing and in order to remain competitive, organisations need to change their goals as well as their actions to achieve those goals. Furthermore, for organisational learning to occur, the organisation must make cognisant decisions to change their actions in response to changing environmental circumstances. These actions and outcomes must be linked and those outcomes must be remembered (Argyris and Schön, 1978). If the organisation succeeded in doing this, then it could be referred to as a 'Learning Organisation.' The authors believed that in order to be productive, the organisational learning required complete, accurate, undistorted and verifiable information which constituted to as knowledge. It was believed that organisational learning occurs when inventions and evaluations of individual members are built into the organisation's shared mental models (Argyris and Schön, 1978).

The first part of the learning process involves data acquisition (IS Theories, 2013). The environment is continuously scanned and data is collected and stored within the relevant storage confines (databases/knowledge base) of the organisation. The second part of the process is interpretation. During this stage, organisations compare actual to expected results to update/add to stored data. The data is then interpreted and meaningful information or knowledge is attained. The third stage is adaptation or the actual action to be taken. At this stage, the organisation uses the knowledge that has been now interpreted to identify and

strategically select new action-outcome links applicable to the new environmental conditions. This stage highlights the key process of continual adaptation to environmental conditions, which may include internal, external, competitors, technology state and so on (IS Theories, 2013). Once action has been taken and adaptation has occurred, the organisation's knowledge base is then updated appropriately with the new applicable conditions, action-outcome and probabilities. The process then continues, as it is cyclic. The feedback loop focuses on error detection but mainly on outcomes, strategies, and assumptions around those errors and about the organisation and environments (Argyris and Schön, 1978).

As drawn from IS Theories (2013), the main dependent constructs of this model are organisational effectiveness. This relates to the degree to which expected outcomes matches the actual outcomes given the environmental conditions. The degree to which they do not match is referred to as a performance gap. This may also serve as a dependent construct. The main independent constructs of this model applicable to this study includes (IS Theories, 2013):

1. "Type and Levels of learning (Action-Outcome linkages, probability of outcome, level of uncertainty associated with probability of outcome)"
2. "Complexity of environment, degree of organisational change (high versus low)"
3. "Dynamism of environment (rapid change versus slow change)"
4. "Strategic design of organisation"
5. "Structure of organisation (centralized vs. decentralized)"
6. "Socio-cultural environment of organisation (endogenous factors which include technology, administrative processes and external environment (competitors, diffusion of learning))"

2.27.1 Literature supporting the use of the Framework

Pemberton and Stonehouse (2000) posited that a successful organisation is one that creates an organisational environment that combined organisational learning with KM. Vance (2011) found that that organisations needed to scan the environment in which they operated and collect information to shape future decisions, as this would facilitate organisational learning for the institutions. Furthermore, in today's fast changing environment, strategic decision making through organisational learning becomes crucial for organisations to quickly respond

and adapt to changes in their business setting in order to stay competitive and survive (Bhatt and Zaveri, 2002). Bhatt and Zaveri (2002) utilised the Argyris and Schön (1978) model to build a framework to show how a Decision Support System can enhance organisational learning. The authors used data scanning construct to collect data from the external environments and convert it into relevant information. By utilising the feedback mechanism, this allowed for errors to be identified and corrected in a repetitive way which eventually led to reliable information (knowledge). Action could then be taken based on that knowledge. A decision support system based on Argyris and Schön (1978) can assist management of almost any firm in finding the best solution consistent with their organisation's overall goals and mission (Bhatt and Zaveri, 2002).

Organisational learning does lead to strategic decision-making and this is supported by Argyris and Schön (1978; 1996). Hence, decision-making and organisational learning become interlinked. Bettis-Outland (2012) asserted that in many cases, comprehensive and strategic decision making is more successful in turbulent and competitive business environments. Argyris and Schön (1978) put forward that for an organisation to remain competitive in a changing environment, the organisations goals and action plans to reach those goals needs to change as well. Furthermore, when productive or beneficial decisions are made, organisations are more inclined to repeat its actions expecting positive outcomes. Whereas, whenever a bad decision is made which leads to bad actions, there is then an inclination to carefully assess each step made to determine what led to the bad decision with an intention to avoid or repair any bad steps in the future (Bettis-Outland, 2012). As posited by Argyris and Schön (1978), actions and outcomes must be linked and those outcomes must be remembered.

It was also suggested by Argyris and Schön (1978) that problem solving within an organisation is indeed a learning process that stimulates knowledge creation and fosters innovation. Based on this, Hung, *et al.* (2011) set out, in a Taiwanese industrial setting, to establish if organisational learning fostered innovation and to define the relationship between organisational learning and innovation to enhance Total Quality management (TQM). It was shown that organisational learning did have a significantly positive effect on innovation and how both organisational learning and innovation enhances TQM in various organisations (Hung, *et al.*, 2011).

Organisational learning fosters a learning culture within an organisation and this is supported by Argyris and Schön (1996) and can be correlated to strong organisational culture (Phang, Kankanhalli and Ang, 2008) in which people working and learning together can support an organisation's goals (Schein, 1985). Organisations learn from experiences about which parts of their existing knowledge works best for the organisation holistically (Schein 1990). Similarly and motivated by the IT-related environmental changes, Phang, Kankanhalli and Ang (2008) constructed a framework that combined Schein (1985) and Argyris and Schön (1996) and applied it to an e-Government project implementation. The framework highlighted the correlations between organisational culture and organisational learning and how it impacted positively on the e-Government project by allowing the project team to be able to readily adapt to IT-related changes posed by the external environment.

Garcia-Morales, Llorens-Montes and Verdu-Jover (2007) looked at the dynamic capabilities of organisational learning and its impact on innovation in a Spanish context using 401 firms. Using the theories of Argyris and Schön (1996) they highlighted organisational learning as a positive facilitator of organisational performance and innovation. It is important to understand that management support for organisational learning was vital to ensure that the organisation developed a learning culture which could inevitably favour innovation (Garcia-Morales, Llorens-Montes and Verdu-Jover, 2007). Other studies that highlight organisational learning promoting innovations include Liao, Fei and Liu (2008). Organisational learning is also key to enhanced performance and a competitive advantage (Jiménez-Jiménez and Cegarra-Navarro, 2006). It was shown that market orientation strongly influenced organisational performance when it was facilitated by organisational learning. Furthermore, organisational learning empowered an organisation to progress from a given situation to a desired situation of enhanced performance and market orientation.

Similarly, Bontis, Crossan and Hulland (2002), Farrell and Oczkowski (2002) and Tippins and Sohi (2003) asserted that that organisational learning inevitably has a positive impact on organisational performance. Janz and Prasarnphanich (2003) investigated the correlations between organisational learning, organisational climate and job characteristics and its influence in creating a knowledge centred culture in favour of knowledge creation and knowledge dissemination. Results of the study in concurrence with Argyris and Schön (1978), confirmed that there is a direct link between organisational climate and organisational learning. The nature of an employee's job often determines the level and motivation of

learning, as organisational learning has a strong influence on work satisfaction and work performance (Janz and Prasarnphanich, 2003). Hence, an organisation with a knowledge centred culture in which the organisational climate promotes organisational learning is shown to yield substantial benefits such as more knowledgeable employees, increased performances, operational efficiency, employee satisfaction and more (Janz and Prasarnphanich, 2003) and this could easily correlate with Argyris and Schön (1996) when they posited that when all members of an organisation are mindful of intellectual outcomes including work processes, learning transforms into overall organisational learning. Similarly, a learning culture in which people work and learn together can support an organisation by fostering a knowledge-creating system (Wang, Yang and McLean, 2007).

From an educational setting, Garcia-Morales, Lopez-Martin and Llamas-Sanchez (2006) utilised the theories of Argyris and Schön (1978; 1996) and showed how the personal and professional development of educators encourages the creation of a shared vision and team learning in an educational setting. This in turn favours organisational learning and yields an improvement in organisational performance as well as competitiveness (Garcia-Morales, Lopez-Martin and Llamas-Sanchez, 2006). Similarly, Barth and Rieckmann (2012) emphasised the role of organisational learning in HE to promote 'Education for sustainable development' (ESD) which was supported by (Argyris and Schön, 1978; 1996). Education for sustainable development showed significant benefits for HE in terms of initiating individual learning processes and facilitating social learning (Barth and Rieckmann, 2012). However, it posed a challenge in university curricula to promote ESD. This was mainly due to academic staff resistance and their non-willingness to support such processes. By applying the theories of Argyris and Schön (1978; 1996) to a HE institution, it allowed academic staff to see the benefits of ESD, thereby allowing them to change their strategy into incorporating ESD within the institution. This also impacted positively on the general organisational development of the institution. The preceding study related well to an earlier study by Peck, *et al.* (2009) who argued that environmental change in education is escalating significantly in both developed and developing countries and this required education institutions to strategically embrace that change. The authors referred to Argyris and Schön (1996) in building a framework that could assist in the strategic change/transformation of education by deducing complex social processes that formed the basis of organisational innovation, and change (Peck, *et al.*, 2009). By allowing an organisation to 'learn', they can simultaneously

contribute to improvement of organisational learning capacity and outcomes (Argyris and Schön, 1996).

This study utilises all three constructs of Argyris and Schön (1978). The Data Collection constructs plays a vital role in KM. The Interpretation construct will epitomise KM in the sense that data collected becomes meaningful. Lastly, the Learning construct signifies what has been learnt and what actions have been taken based on the knowledge gained throughout the process.

2.28 Organisational Culture Theory Framework

Figure 10 shows a visual of the Schein (1985) Organisational Culture Theory framework.

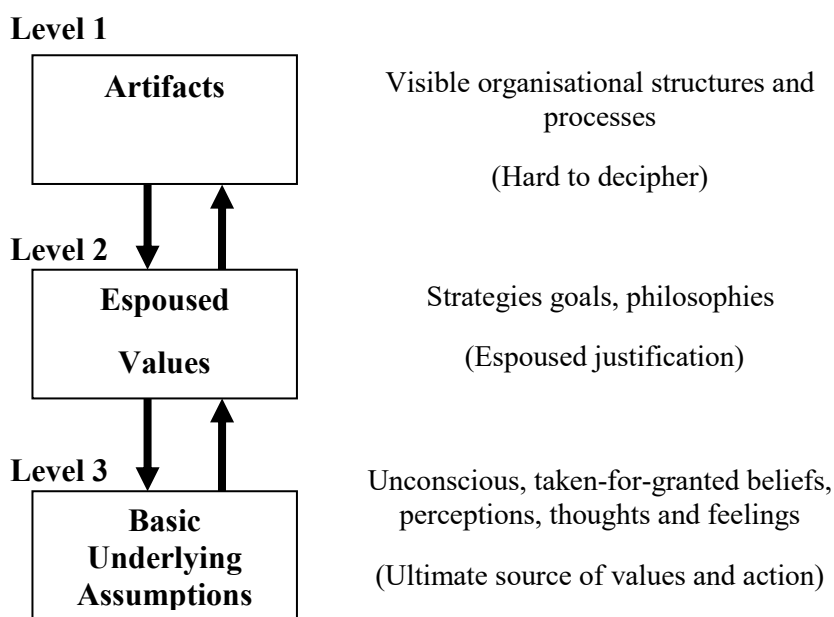


Figure 10: Organisational Culture Theory (Schein, 1985)

This study takes organisational culture into account in relation to the strategic role of KM. The Schein (1985) framework of Organisational Culture will be applied. According to Schein (1985), culture is regarded as a pattern of assumptions that is usually discovered and developed by an organisation, given group or entity, as it learns to deal with problems of external adaptation and internal integration. If the discovered assumptions are valid then they

can be used or taught as the correct way to perceive, think, and feel in relation to those problems.

There are three main constructs in the model, that being Artifacts, Espoused Values and Basic Underlying Assumptions (Schein, 1985). The Artefacts construct is difficult to measure (hard to decipher) and deals with organisational attributes that can be noticeably observed. Schein labels technology as an artefact. The Values construct deals with the espoused goals, strategies, ideals and objectives of the organisation. The underlying assumptions construct deals with perceptions and beliefs that are and taken for granted. This is the source of the values, motives and actions that causes an organisation to be inclined to the way it operated or functioned (Schein, 1985). The main dependent constructs of this model are performance, organisational effectiveness, and employee commitment and satisfaction. The main independent constructs are organisational culture type, organisation culture strength, and culture congruence.

2.28.1 Literature supporting the use of the Framework

An organisation's culture is viewed as its key competitive advantage to being successful, Serrat (2009). Organisational culture represents the shared ideas of an organisation, taking into account the external and internal environment (Park, Ribeire and Schulte, 2004). Organisational culture is strong when employees are aligned to organisational values and objectives. However, weak culture is when there is little or no alignment to organisational values and when control is exercised via extensive measures and bureaucracy, Serrat (2009). This indicates that where there is effective alignment of the organisation's human resources with organisational goals, then organisational culture is strong.

According to Boisnier and Chatman (2002), a strong culture provides organisations with significant advantages and organisations that foster strong cultures had clear values that give employees a reason to embrace the culture. Some of the benefits of having a strong organisational culture include better alignment of the organisation towards achieving its vision, mission and goals and improved cohesiveness among the various departments. Organisational efficiency is an added benefit (Boisnier and Chatman, 2002). There are an abundance literature that illustrates the impact of organisational culture from a technology

and Information Systems perspective (Park, Ribeire and Schulte, 2004; Alavi, Kayworth and Leidner, 2006; Iivari and Huisman, 2007; Jackson, 2011) as well as its impact on overall organisational performance (Skerlavaj, *et al.*, 2007; Gregory, *et al.*, 2009; Serrat, 2009; Zheng, Yang and McLean, 2010; Huang, 2012).

It was argued by Leidner and Kayworth (2006) that the understanding of culture is very important as culture at various levels in an organisation influences the successful implementation and use of IT. Iivari and Huisman (2007) analysed the relationship between organisational culture and staff perceptions about the use, support and impact of systems development methodologies (SDMs). They believed that SDMs formed an integral part of an organisation and could add value in terms of IS strategy. However, despite the efforts devoted to the development of SDMs, there was minimal adoption and usage of it. By applying the Schein (1985) theory, it was shown that organisational culture did play a crucial role in the adoption and usage of SDMs (Iivari and Huisman, 2007). Organisations with strong culture that focused on efficiency, productivity and goal achievement were more prone to adopt SDMs and utilise them strategically to benefit the organisation. Organisations with weak or varied culture showed less enthusiasm in adoption and failed to see value in SDMs implementation (Iivari and Huisman, 2007).

Similarly, Alavi, Kayworth and Leidner (2006) highlighted how organisational culture impacted KM strategy, practice and usage in a large global information services company. Overall, it was shown that organisational culture has a multifaceted relationship to KM and doesn't just only influence knowledge sharing behaviours, but also influences various other factors that are critical to KM adoption, use and strategy. These factors include KM technology selection and adoption, knowledge migration within the organisation, KM evolution, the role of KM leaders, and the estimated outcomes from strategic KM use (Alavi, Kayworth and Leidner, 2006). Furthermore, strong KM leadership plays a pivotal role in establishing a strong KM culture which resulted in strong KM practice. This is further supported by Leidner and Kayworth (2006) who emphasises the significant role that culture plays in managerial processes that directly impact on KM and IS adoption.

Similarly Jones, Cline and Ryan (2006) examined eight dimensions of culture and their impact on knowledge sharing during complex enterprise resource planning (ERP) systems implementations. The authors conducted a multi-site case study of organisations that were in

the process of implementing ERP systems. Some of the 8 dimensions of cultures examined included motivation, control and responsibility, truth and rationality, orientation to collaboration and orientation to change (Jones, Cline and Ryan, 2006). Based on this they developed a cultural configuration that outlined the cultural dimensions that effectively promoted knowledge sharing in ERP implementation. Furthermore, a model was developed (Jones, Cline and Ryan, 2006) that showed the link between culture and knowledge sharing. Leidner and Kayworth (2006) also showed the linkage between IT and organisational culture using Schein (1985) framework and presented six themes of IT-organisational culture research highlighting the positive impact of organisational culture on IT adoption, implementation and strategy.

Relating to the preceding study, Shao, Feng and Liu (2012) showed how transformational leadership, knowledge sharing and ERP success is directly related to organisational culture. They examined 4 types of organisational cultures which included development, group, hierarchical and rational culture. Development culture had a clear influence on ERP success, while group and rational culture primarily influenced knowledge sharing. They found that an analysis of these cultures by top management could enhance ERP knowledge sharing and achieve business benefits (Shao, Feng and Liu (2012). Omerzel, Biloslavo and Trnavčević (2011) examined the effect of Organisational Culture on KM from a HE context in a central European country. It was found that different organisational culture dimensions did influence the adoption of KM systems and methods for knowledge creation and transfer among academic staff. Similarly, Park, Ribeire and Schulte (2004) investigated the impact of organisational culture in KM technology adoption and found that the success of KM technology is facilitated by organisational culture. Furthermore, strong culture has a positive association with successful KM technology implementation, use and strategy.

This study will draw out the Espoused Values and Basic Underlying Assumptions Constructs from the theory. Espoused Values deal with strategies, goal and objectives and seeing that this study is examining strategy development through KM, hence makes this specific construct valuable to the study. Basic Underlying Assumptions also adds a unique angle as these are concretised beliefs that exist within an organisation. Hence, it can be established what beliefs exist regarding KM in general and the beliefs that occur after benefits are derived or observed from KM. The authors Park, Ribeire and Schulte (2004) related to organisational culture and KM technology, found that organisational culture promoted the

success of KM systems and technology and that positive culture had a positive correlation with the success of KM technology implementation.

2.29 Application of Theoretical Frameworks in Africa

None of the above theories, Kogut and Zander (1992), Argyris and Schön (1978) and Schein (1985), have been used from a Knowledge Management perspective in an African Higher Education context. The supporting literature and studies shown under each framework confirms that these frameworks are fitting to the current study and has worked in other countries. It would therefore be interesting and necessary to establish if these frameworks can be applied to an African Higher Education setting.

2.30 Summary

Key Literature relating to the study was presented in this chapter. This chapter defined KM and outlined a variety of literature that exists on the subject. The strategic use and application of KM in a Higher Education context in both developed and developing countries were shown. E-Learning was defined and explained. Literature portraying the strategic use of e-Learning as a KM resource to improve and enhance Higher Education was highlighted. This was also shown in both a developed and other developing countries. The phenomenon of Web 2.0 was explained in detail and examples and studies revealing the use of Web 2.0 as a strategic KM tool were portrayed. Stemming from Web 2.0, MOOCs were also defined and intensely explained. The chapter gave in-depth insight to the origination and current status of MOOCs and how MOOCs are being used as a strategic game changer in the global HE realm. The theoretical framework encompassing 3 models that are used in this study were explained in detail. Other applicable studies utilising the models were detailed as a means of showing the applicability of the models to the current study. This chapter also showed that even though there is a variety of literature on the study at hand that exists in other countries, there seems to be a paucity of this type of research in an African context. The next chapter provides a bird's-eye view of the research methodology of the primary study and will include the outline, methods, respondents, research instruments and amongst other aspects of the study.

CHAPTER THREE

Research Methodology

3.1 Introduction

This chapter focuses on the research methodology adopted for this study. It provides a detailed description on the specifics of the research structure, tools and techniques and discusses the recruitment of respondents for the study as well as describes the research design and data collection techniques. Furthermore, the various data analysis methods applicable to this study are discussed.

3.2 Research Question, Sub-Questions and Objectives of the Study

For ease of understanding of the research methodology selected for this study, the research question, sub questions and objectives of the study are shown. The aim of this study was to examine the role of Knowledge Management (KM) as a driver of strategy in African universities.

3.2.1 Research Question

The primary research question is:

- *How do Knowledge Management practices influence Institutional Strategy at leading African Universities?*

3.2.2 Research Sub-Questions

The above research question stemmed the following research sub questions:

1. What is the role of KM in strategy formulation at the institution?
2. How is KM:
 - (i) Adding value to the institution at a continental level?
 - (ii) Adding value to the institution at a global level?
 - (iii) Promoting competitiveness at a continental level?
 - (iv) Promoting competitiveness at a global level?

3. What is the role of Web 2.0 technologies
 - (i) in the creation of knowledge?
 - (ii) in the management of knowledge?
 - (iii) in the dissemination of knowledge?

4. What is the role of Web 2.0 technologies
 - (i) in the creation of e-Learning?
 - (ii) in the management of e-Learning?
 - (iii) in the dissemination of e-Learning?

5. Where is KM represented within organisational structure of the institution?

3.2.3 Objectives

It was important to formulate objectives that could address the research question and sub-questions, hence the primary objectives were developed and aligned to the research sub-questions of the study.

The primary objectives include:

- To investigate whether knowledge management is contributing to overall institutional value.
- To investigate whether knowledge gathered through various KM Information Systems is being used to contribute towards institutional strategy.
- To critically examine the role of Web 2.0 as a KM Strategy.
- To critically examine the role of Web 2.0 as an e-Learning Strategy.
- To establish if knowledge management is contributing to strategy development at Executive level.

3.3 Method of Sampling/Population for the Study

3.3.1 Sampling Strategy

Due to the large number of universities in Africa (598) (4 International Colleges and Universities, 2013), and the unlikelihood of being able to reach the majority of these universities, it was decided to target just the top institutions on the continent.

Hence, for this study, the 20 top academically ranked universities were chosen. These were made up of the top 10 universities in South Africa and the top 10 universities outside South Africa (greater Africa).

3.3.2 Selection of Top 20 universities based on Academic Ranking

The rankings were obtained from two popular academic ranking websites for South Africa and Greater Africa. The academic ranking for greater Africa came from ‘Africa.com- Top 10 universities in Africa’ (2013) and the academic ranking for South Africa came from ‘Africa.com-Top 10 universities in South Africa’ (2013). This was further correlated with other ranking sites such as ‘Top 100 Universities in Africa 2013’ (2013) and more importantly, Times Higher Education World University ranking for added reliability and validity (Times Higher Education, 2014).

3.3.3 Selection of leading African universities for the study in relation to rankings

Based upon the rankings the universities that were selected from South Africa were:

1. University of Cape Town
2. University of the Witwatersrand
3. University of Stellenbosch
4. University of Pretoria
5. University of KwaZulu-Natal
6. University of South Africa
7. University of the Western Cape
8. Rhodes University

9. University of Johannesburg
10. Cape Peninsula University of Technology

The universities selected from Greater Africa (outside South Africa) were:

1. Cairo University (Egypt)
2. The American University in Cairo (Egypt)
3. Makerere University (Uganda)
4. University of Nairobi (Kenya)
5. University of Dar es Salaam (Tanzania)
6. University of Botswana (Botswana)
7. University of Ghana (Ghana)
8. University of Lagos (Nigeria)
9. Polytechnic of Namibia (Namibia)
10. Ashesi University (Ghana)

Selecting the universities in this fashion ensured that there was an equitable representation from universities from outside South Africa.

3.3.4 Recruitment of the study participants

This study targeted all 20 technology directorates, chief information officers and executive directors from the target institutions. Sixteen respondents were willing to take part in the study of which a further 1 declined after the questionnaire was administered leaving 15 universities as the final respondents.

3.3.5 Respondents

The type of respondents allowed Knowledge Management to be viewed from both a technical perspective which focused on the actual Knowledge Management systems as well as from a strategic perspective which focused on how knowledge derived from KM systems were being used to develop strategy. Questionnaires were sent to all respondents at the selected universities. In addition, in-depth interviews were also conducted with 11 of the universities. The intention was to interview all of the selected universities to gain deeper insight to their

KM status, practice and systems and how KM was influencing institutional strategy (see 3.5.1).

3.3.6 Process of contacting respondents

Information from the institutional websites assisted the researcher to contact potential respondents via email or telephone. It was necessary to make telephone contact due to the following reasons:

1. The respondent's email was not listed on their departmental website
2. Even though some email addresses were listed, there was a poor response to the email invite
3. More clarification was needed by the respondent in terms of the study and its objectives.

Table 2 shows a summary of institutions and their responses to the invite to take part in the study. It also shows the methods and frequency of contact when it came to extending the initial invite to be part of the study.

Institution	Status	Frequency / method of initial invite
University of Cape Town	Agreed to participate	1 x email
University of Stellenbosch	Agreed to participate	1 x email
Rhodes University	Agreed to participate	1 x email
University of Witwatersrand	Agreed to participate	3 x email 1x telephone
University of the Western Cape	Agreed to participate	3 x email 3 x telephone
University of Johannesburg	Agreed to participate	1 x email 1 x telephone
Cape Peninsula University of Technology	Agreed to participate	3 x email 3 x telephone
University of South Africa	Agreed to participate	3 x email
The American University of	Agreed to participate	

Cairo		1 x email
University of Dar es Salaam	Agreed to participate	2 x email
University of Ghana	Agreed to participate	5 x email
University of Lagos	Agreed to participate	2 x email
Polytechnic of Namibia	Agreed to participate	1 x email
University of Botswana	Agreed to participate	2 x email
Addis Ababa University	Agreed to participate	1 x telephone 1 x email
Declined		
University of Pretoria	Declined	1 x email
Makerere University	Declined	1 x email 1 x telephone
University of KwaZulu Natal	Declined	1 x email 2 x telephone
Unreachable		
Cairo University	Unreachable	3 x email 2 x telephone
University of Nairobi	Unreachable	3 x email 2 x telephone
Ashesi University	Unreachable (Replaced with Addis Ababa University)	3 x email 3 x telephone

Table 2: Summary of Respondents decisions to participate and method/frequency of initial contact

Note: Ashesi University was later replaced with Addis Ababa University (Tanzania) due to Ashesi University being unreachable. Addis Ababa University ranked almost equally high as Ashesi University and was therefore considered a good replacement. It is possible that Cairo university was unreachable due to the problems being experienced in Egypt at the time of this research.

Signed gatekeeper's letters were requested from all of the study sites. These letters were also submitted as appendices to the investigator's ethical clearance application as proof of participation and to indicate that the investigator did go via the channels and procedures to

obtain the respective participants. Upon obtaining ethical clearance from the investigator's institution (University of KwaZulu-Natal), the questionnaires were administered via Questionpro® (see 3.6.3).

3.3.7 Overviews of selected universities that agreed to participate

Brief overviews of the selected universities are presented here.

North Africa

1. American University of Cairo

- American-style College with a strong emphasis on quality of teaching and learning.
- Student population of 6824 students.
- Academic staff compliment of 423 (Full-time) and 358 (Part-time).
- Has a total of 241 databases and its library possesses 538,680 journals.
- The Quacquarelli Symonds World University Rankings placed the American University of Cairo 348th in the world and the first in Egypt in 2013.

Source: Africa.com- Top 10 universities in Africa (2013), American University of Cairo (2013), Wikipedia (2013)

2. University of Dar es Salaam

- Oldest and largest public university in Tanzania, established in 1970.
- Research-focused institution, producing 279 journal papers in the academic year ending 2008.
- It comprises approximately 1127 academic staff and around 20,000 students.
- Ranked by University Ranking by the Academic Performance Centre as the 1618th best university in the world out of 2000 ranked universities in 2012.

Source: Africa.com- Top 10 universities in Africa (2013), University of Dar es Salaam (2013)

3. **University of Ghana**

- Originally founded as an affiliate college of the University of London and became independent in 1961.
- Population of around 38,000 undergraduate students.
- Research intensive university and has a graduate school of nuclear and allied sciences making it one of the few universities on the continent to offer programmes in nuclear physics and nuclear engineering.
- Its library boasts a collection of over 300,000 volumes.
- It has forged partnerships with the Norwegian Universities' Committee for Development Research and Education and the Commonwealth Universities Student Exchange Consortium.
- Former United Nations Secretary-General Kofi Annan is the university's chancellor.
- It is also part of the African Virtual University initiative.

Source: Africa.com- Top 10 universities in Africa (2013), University of Ghana (2013), Wikipedia (2013)

4. **University of Lagos**

- Among the first generation of universities in Nigeria that is accredited by the National Universities Commission.
- Population of around 45 000 students- constitutes as one of the largest student populations of any University in the country.
- Strong emphasis on research and has published over 1,700 papers (most publications derived from the medical, science and engineering).

Source: Africa.com- Top 10 universities in Africa (2013), University of Lagos (2013)

5. **University of Botswana**

- Started out as a part of a larger university known as the University of Bechuanaland (Botswana) Basotoland (Lesotho) and Swaziland and gained independence in 1982 to reduce dependence on South African universities under apartheid.
- Undergraduate population of approximately 16000 students.
- Academic staff compliment of 900.

- Main library is one of the largest on the continent with 460,000 books, 123,000 full text journals, and 200 internet-dedicated computers.

Source: Africa.com- Top 10 universities in Africa (2013), University of Botswana (2013)

6. **Addis Ababa University**

- Oldest and largest higher education institution in Ethiopia.
- Currently has 14 campuses and 65 undergraduate and 220 graduate programs (of which 69 are PhD).
- Student population of 50,000.
- Home to 2000 academic staff.
- Has contributed substantially to the economy of Ethiopia by providing trained and skilled manpower and research.

Source: Addis Ababa University (2013)

7. **Polytechnic of Namibia**

- Leading institution in Namibia and focused on the belief that development is based on knowledge and knowledge management.
- Formed in 1994 via the merger of 2 institutions (College of Out-of-School Training (COST) and Technikon Namibia).
- Population of 11 500 students driven by 300 Academic Staff and 670 Support staff.
- Offers undergraduate and postgraduate degrees in the areas of business and management, engineering, information technology, journalism, hospitality, natural resource management, and medicine.

Source: Polytechnic of Namibia (2013), Wikipedia (2013)

South Africa

1. **University of Cape Town**

- South Africa's oldest university and rated as the best university in Africa (Academic and Research).
- Placed prominently at 113th in the world.

- Population of around 25,500 students of which twenty per cent are international students from over 100 different countries locally and abroad.
- Home to approximately 1000 academic staff.
- Houses 32 leading and internationally acclaimed (A-rated) researchers and one of its most famous *alumni* includes heart surgeon Dr. Christiaan Barnard.

Source: Africa.com-Top 10 universities in South Africa (2013), University of Cape Town (2013)

2. University of Witwatersrand

- Regarded as one of the leading research institutions on the continent.
- Boasts 15 South African research chairs, seven research institutes and 20 research units.
- Made up of under 900 academic staff and approximately 28 000 students.
- Has a strong reputation built on research and academic excellence and it is one of only two universities in Africa ranked in two separate international rankings as a leading institution in the world.
- Possesses 14 museums, 2 art galleries, 12 libraries, over 1 million book volumes, 400,000 journal titles and over 40,000 new electronic resources.

Source: Africa.com-Top 10 universities in South Africa (2013), University of Witwatersrand (2013)

3. Stellenbosch University

- The Times Higher Education World University Rankings has recently ranked Stellenbosch University in the 251-275 category in the world and third in Africa.
- Predominantly Afrikaans-language university.
- Provides education to over 28,000 students facilitated by 915 academic staff.
- Prides itself on innovation, especially its iShack system, which was developed to improve living conditions of people living in shack/informal settlements. This was done via the use of a basic solar energy system.
- The university's Desmond Tutu TB Centre earned an international award for childhood tuberculosis research.

Source: Africa.com-Top 10 universities in South Africa (2013), Stellenbosch University (2013)

4. University of Western Cape

- Renowned for its pivotal role during South Africa's apartheid struggle.
- First enrolment of less than 200 'coloured' students in the early years of 1960.
- Currently prides itself with a population of 15000 diverse students.
- Has the largest dental school in Africa which is accredited as a World Health Organisation collaborating centre and is also rated as the best dental school on the continent.
- Research intensive university and academic staff are highly qualified with 50% of academic staff holding doctoral degrees.
- Research at the university has an international element and its vast network of international partners ensures a flow of students and distinguished scholars from other countries to enrich the university even further.

Source: Africa.com-Top 10 universities in South Africa (2013), University of Western Cape (2013)

5. University of Johannesburg

- Formed in 2005 via the merger of three universities.
- Caters to over 48,000 enrolled students and retains approximately 2942 academic staff.
- Invests heavily in intense research activity and boasts 22 research centres.
- Has 115 rated researchers of which six being A-rated researchers.
- Recipient of the highest external financial support from donors and partners all over the world which demonstrates its formidable reputation internationally.
- Ranked in the top 4% of universities in the world for the 2013/14 Quacquarelli Symonds World University Rankings after only eight years post establishment and the youngest of all ranked universities in South Africa and in Africa.

Source: Africa.com-Top 10 universities in South Africa (2013), University of Johannesburg (2013)

6. Cape Peninsula University of Technology

- Formed in 2005 via the merger of Cape Technikon and Peninsula Technikon.
- Internationally acclaimed and the only university of technology in the Western Cape
- Largest university in the Western Cape with a student population of approximately 32000.
- International student population of 2200.
- Has approximately 720 academic staff.
- Has five campuses and 6 faculties.

- The Department of Information Technology in collaboration with the Bridgetown Community, Athlone (Ireland), Co-operative Financial Institute of South Africa (COFISA) and Impact Direct Ministries launched the 'Athlone Living lab' in 2008. This is a community ICT innovation project and the first Living Lab in the Western Cape.

Source: Cape Higher Education Consortium (2013), Cape Peninsula University of Technology (2013), Wikipedia (2013)

7. Rhodes University

- Public Research University.
- Was a constituent college of the University of South Africa and became an independent university in 1951.
- Committed to rigorous research and research occurs across the 6 faculties (Commerce, Education, Humanities, Law, Pharmacy and Science) as well as in various Research institutes.
- Has approximately 7000 students (undergraduate and postgraduate).
- Home to 357 Academic Staff.
- Regarded as the institution with the most favourable academic staff to student ratio among South African universities.
- Webometrics ranked the university the 5th largest in South Africa and 700th in the world in 2011.

Source: Rhodes University (2013), Wikipedia (2013)

8. University of South Africa

- Established in 1873 as the University of the Cape of Good Hope and became the first public university in the world to teach exclusively by means of distance education in 1946.
- Largest university in Africa with a student population of almost 330,000 students.
- Academic and research intensive.
- Attracts a third of all higher education students in South Africa and has international students from 130 countries in Africa and abroad.
- Dedicated to open distance education and proclaimed as longest standing dedicated distance Education University in the world.
- Offers a variety of internationally accredited vocational and academic programmes in Engineering, Science, Health Science, Humanities, Law, Technology.
- Regarded as South Africa's most productive university and accounts for 12.8% of all degrees conferred in the country.

Source: University of South Africa (2013), Wikipedia (2013)

The primary reason for using these universities was due to them being academically ranked as the top universities in the African continent. Furthermore, the websites of each of the selected universities were analysed by the investigator and this exercise reflected that there was a potentially strong investment in IT/IS and e-Learning resources at these universities. It can be assumed that IS and technology is a strategic practice at these institutions. A general assumption is that technology plays a key role in the improvement of an institution's reputation. Hence, it was examined if these universities were engaging in successful KM practice and using KM as a source of strategy development for the institution.

3.4 Location of the Study

The researcher was based in Durban in the province of KwaZulu-Natal (KZN) within the Republic of South Africa. Correspondence with all respondents conducted via email, Skype and telephone.

3.5 Data Collection Strategies

Proper and correct data collection remains a critical process in research (Sekaran and Bougie, 2010) and it is the data that determines the actual results after it has undergone rigorous analysis.

For this study, a mixed method based data collection strategy was used which focused on both qualitative and quantitative data. The data for this study was derived from two data sources: group 1 (Quantitative) and group 2 (Qualitative). Group 1 data was collected via a questionnaire that was sent to the respondents. The questionnaire was designed using an online survey program known as Questionpro[®] and distributed to the participants via email. The feedback from each participant was recorded and stored on Questionpro[®].

Group 2 data involved qualitative data that was collected through interviews conducted with 11 institutions. The in-depth analysis took the form of open ended interviews that was conducted on the universities listed under 3.6.4. Details of interview design and development are listed under 3.6.1.2. The interviews were done via telephone and Skype and data from the interviews were recorded, transcribed and analysed qualitatively. The interview protocol is attached as Appendix 4.

3.5.1 Motivation to conduct interviews (Qualitative)

The interviews were conducted to positively support and enhance the quality of the results obtained from the questionnaire (quantitative). The aim of the interviews was to gain deeper insight into the selected institutions and to extract in-depth data regarding KM practice and strategy at the institutions. This also added more depth to the data that was being collected as the interviews focused on underlying issues related to KM. As asserted by Lichtman (2006) and Johnson and Christensen (2008), qualitative research supports the construction, exploration and discovery of research data that may not necessarily be evident from an quantitative perspective. It is also a key method used to identify themes, patterns, trends and features related to the research study. Similarly, Ospina and Wagner (2004) argued that sometimes, researchers find that quantitative methods in itself can be insufficient or not totally effective in explaining their study phenomenon and therefore qualitative research is looked at to satisfy this and provide explanations from a more in-depth perspective.

Furthermore, Lincoln and Guba (2000) affirms that qualitative research promotes an interpretive approach whereby items and areas of research can be studied in their natural setting which allows the study phenomenon to be interpreted based on the meanings and of people's experience with it. Qualitative research also allows for new and empirical evidence to be discovered (Ospina and Wagner, 2004). Therefore, qualitative research plays a crucial role in deriving rich data which generates unique findings (inductive). It is even used to support or contrast findings obtained through quantitative methods and thus enabling more effective research.

For this study, substantial value was derived from the qualitative data. The process of expediting the qualitative data collection started with interview invites that were sent to all participating institutions (15) of which 11 had agreed to be interviewed. The interviews were carried out via Skype and telephone and were recorded and transcribed onto Microsoft Word (see 3.6.4). The interviews provided very rich and pertinent data that were relevant to the study objectives and research questions. The results of the interviews were used as the main findings of the study.

3.6 Research Design

3.6.1 Construction of the instruments and survey tools

3.6.1.1 Questionnaire design and development

The questionnaire consisted of a total of 31 questions. Eight questions focused on the respondent's demographic and occupational details and 23 questions focused on the actual study. Each question was judiciously constructed to draw out the relevant data necessary for the study and to fulfil the objectives of the study and answer the research question. Each question was built on the relevant and applicable constructs of the models represented in chapter two under the theoretical framework section (2.25). The questionnaire was based on Likert scaling for added validity and reliability (Sekaran and Bougie, 2010). The questionnaire was analysed and approved by a professional statistician to ensure that the questions were linked to the objectives of the study as well as to the constructs of the models used.

3.6.1.2 Interview Schedule design and development

The interview schedule formed the qualitative part of the study and this instrument was used to gain deep insight into the selected institutions regarding their KM practices, systems and influence on institutional strategy. The interview consisted of 9 questions. Each question was meticulously and carefully formulated to derive valuable and in-depth data from the respective respondent. The questions primarily focused on KM with the intention of attaining a detailed view of the overall KM status, investment, motivation, usage, practice, benefits and value derived from or related to the strategic practice of KM at the institution.

Hence the objectives of the questions were primarily to:

- Get a clear and detailed view of KM in strategy formulation.
- Attain an insight to the motivation involved in developing strong KM strategy.
- Identify if KM was represented at board level at the institution.
- Acquire a detailed view of the various KM systems at the institution.
- Establish what went into the actual process of acquiring/developing strong KM systems.
- Look at how the institutions were using the knowledge that was derived from KM systems to make informed decisions.
- Acquire a detailed view of the use of Web 2.0 at the institution and its impact.
- Acquire a detailed view of E-learning, emerging technologies and MOOCs.
- Attain how KM and Web 2.0 has contributed to adding value and enhancing organisational competitiveness.

3.6.1.3 Mapping of research questions and instrument to Theoretical Frameworks

For the study to be successful, the research instruments were underpinned by the relevant frameworks. As shown in Chapter 2 (2.25), the frameworks were the Argyris and Schon (1978), Schein (1985) and Kogut and Zander (1992) frameworks. The research question and sub questions were hence built around the constructs of the relevant frameworks in order to apply the frameworks to the results of the study. The investigator then developed the questionnaire and interview schedule to match the constructs of the model with the intention of drawing out the maximum value from the questions itself in relation the frameworks and its constructs. Figure 11 is a detailed diagram that depicts how this was done.

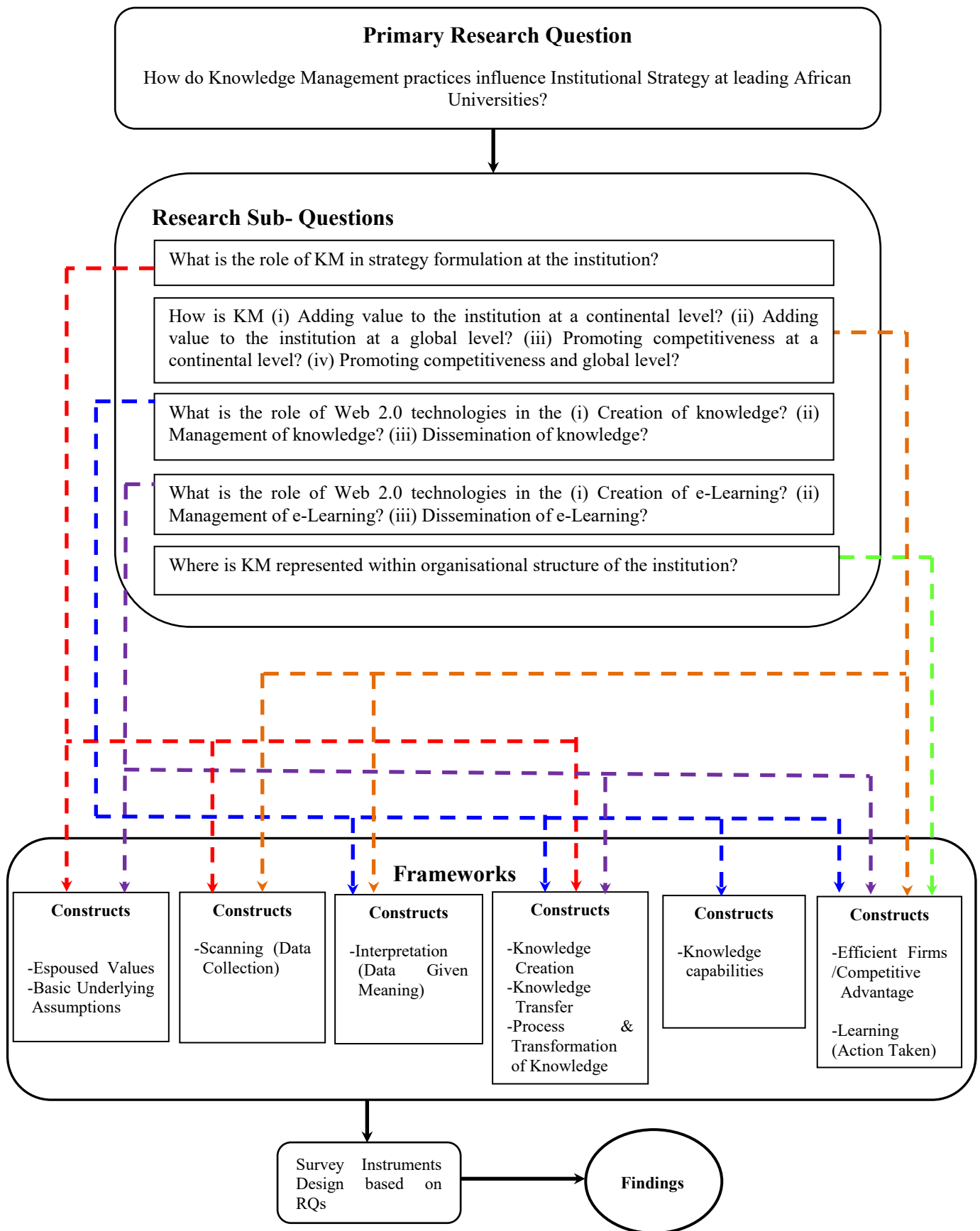


Figure 11: Building of Research instruments in relation to Frameworks

3.6.2 Data Validation and Pre-testing

The validity and reliability of data is crucial to ensuring that data collected is free from or contains minimal anomalies, inconsistencies and bias (Data Analysis Australia, 2009 and Sekaran and Bougie, 2010). In terms of reliability itself, there are several forms of reliability testing which include Test-retest reliability and reliability within a scale (Data Analysis Australia, 2009). Similarly, there are many tests that can be applied to ensure validity of data which include Face Validity, Content Validity and Criterion Validity/Predictive Validity testing (Sekaran and Bougie, 2010). Furthermore, there are a variety of measurement scaling techniques that can be used to ensure validity and reliability and these include Dichotomous scaling, Category scaling, Likert scaling and Graphic rate scaling among the few (Sekaran and Bougie, 2010). This study utilised Likert Scaling.

3.6.2.1 Validation of Questionnaire Instrument

The questionnaire for the study was developed to encompass a high degree of validity, testability and applicability measures. This was done to ensure that valid and purely applicable data could be drawn from the participants in regard to fulfilling the objectives of the study. Hence, the questionnaire consisted of 23 study related questions which were calculatedly designed to derive significant value in regard to the responses obtained.

The respective measures used to ensure this included the following:

- Questions were based on Likert scaling.
- Some of them based on Forced Likert scaling to minimise neutral based responses.
- The questions were built around the constructs of the model/theories that were applied to the study (Refer to Chapter 2 for the models/theories).
- The questions were directed primarily towards the objectives and research questions.
- Similar type questions were asked using different wording/style to ensure consistency.
- The questions were looked at by the investigator's supervisor for added validity and applicability.
- The questions were analysed by a professional statistician to ensure that it was linked to the study objectives and constructs of the model used.

3.6.2.2 Validation of Interview Instrument

Validation of the interview questions was also given a high degree of priority and attention. The interview consisted of eleven key questions pertaining to the study's objectives. Each question was open-ended which allowed the respondents to answer freely and without limitations. This allowed for very descriptive and detail data to be drawn out. The primary questions were backed by follow-up questions in order to ensure further reliability and validity. The questions were also primarily built around the factors and objectives listed under point 3.6.1.2.

3.6.3 Administration of the Questionnaire

The questionnaire was administered on 13 August 2013. The questionnaire was administered using Questionpro[®]'s distribution tool which enabled it to be sent to each participants via email. These included the Information Technology directorates from the following universities. The progress was tracked from time to time to see how much progress each participant was making. Three reminders were sent out to all participants who did not complete the survey before the responses were collected and analysed. It took approximately 1.5 months for all respondents to respond to the questionnaire. The first response was received on the first day of administration (13/08/2013) and last response was received on 26 September 2013.

3.6.4 Administration of Interviews

The invite to the interviews were sent on the 7 February 2014 describing the purpose, value and conditions of the interview. The invite also requested a date and time that was convenient for the respondent to be interviewed. Upon receipt of confirmation from those respondents that agreed to be interviewed, along with preferred date and time, the interviews were carried out accordingly.

Table 3 gives a summary of interviews conducted along with date and method of interview.

Interview Date	Institution	Method
17 / 02 / 2014	University of Cape Town	Skype
18 / 02 / 2014	American University of Cairo	Telephone
25 / 02 / 2014	University of Witwatersrand- Interview 1	Telephone
26 / 02 / 2014	Rhodes University	Telephone
26 / 02 / 2014	University of Lagos	Telephone
1 / 03 / 2014	Addis Ababa University	Telephone
6 / 03 / 2014	Stellenbosch University	Telephone
7 / 03 / 2014	University of Dar es Salam	Telephone
7 / 03 / 2014	University of South Africa	Telephone
12 / 03 / 2014	University of Witwatersrand- Interview 2	Telephone
14 / 03 / 2014	Polytechnic of Namibia	Telephone
17 / 03 / 2014	Cape Peninsula University of Technology	Telephone

Table 3: List of interviewed Universities

Each interview was recorded using a digital Dictaphone. The interview process was completed on 17 March 2014 and recordings were then submitted to professional transcription services personnel who meticulously transcribed all interviews onto Microsoft Word 2010. The investigator further interrogated the transcriptions ensuring that it matched the recordings. This provided added validity and reliability to the qualitative data collected.

3.7 Analysis of the Data

3.7.1 Quantitative

The questions on questionnaire (Quantitative) were carefully formulated to link up to the study objectives and constructs of the models used in the study. This was approved by a professional statistician and hence contributed to the effective analysing of the data. The questions were also articulated in a way to draw out maximum yet crucial data from the respondent. This in turn added more value to the data collected.

The responses were encoded to a Microsoft Excel based statistical template and sent to a professional statistician for full statistical analysis. The statistical tests that were conducted on the data included:

- Cronbach's Alpha reliability – for consistency of data (0.7 reliability obtained)
- Frequency analysis
- Chi-square – to test for association between variables
- Bivariate Correlations - to assess relationships between variables and constructs
- Regression- to look at the influence of independent variables on dependent variables

This quantitative data is descriptively reported chapter four in visual tables and graphs. It is further analysed and discussed in relation to the above statistical methods in Chapter 5.

3.7.2 Qualitative

The qualitative data was analysed using the NVIVO qualitative analysis software. Analysis was done according to themes and commonalities across all interviews. Some of the methods used to arrive at themes included:

- Word frequency analysis
- Tag Cloud analysis
- Word Tree analysis
- Cluster analysis

The data was also examined in relation to the objectives and research question of the study. This is presented in a detailed qualitative report and key items are discussed in Chapter 5.

3.8 Ethical Considerations

All research should be governed by ethics and this study is no exception. The investigator meticulously took ethical consideration into account from the onset of the study. Ethical measures taken by the investigator included the following:

- Respondents were well informed about the nature of the study
- Respondents' participation was purely voluntary
- Informed consent forms were sent to all respondents
- Gatekeepers letters were requested from respondents' institutions

- Research was not carried out until ethical clearance was granted to the investigator from the investigator's institution
- Anonymity of the respondent was/is guaranteed
- The data collected was treated with utmost integrity and confidentiality
- The data collected will be stored for a period of 5 years at the investigator's institution's and thereafter destroyed (as per investigator's institutional ethical procedure)
- All electronic devices, machines and files used to store research data are password protected

3.9 Summary

This chapter defined the research methodology that was used in this study. A total of 16 participants who were technology champions at their respective institutions were selected. This chapter outlined the recruitment of the study participants, construction of the instrument, data collection as well as the types of data analysis used. The data collection strategy was both qualitative and quantitative. Electronic surveys were developed using QuestionPro® and this was used to expedite the quantitative data collection and this was sent via email link to all respondents. After received responses, analysis was conducted using various analysis techniques applicable to the type of dataset. Interviews were also conducted with 11 institutions to gain deeper insight to KM at the institutions and this made up the qualitative part of the study. Qualitative data was analysed using Nvivo. The questionnaire and interview protocol were designed with the aim of meeting the study objectives. Proper reliability and validity of the surveys and questionnaires were highlighted. The descriptive results are presented in the next chapter (Chapter 4) whilst the full in-depth analysis and discussion of both quantitative and qualitative results are presented in Chapter 5.

CHAPTER FOUR

Descriptive Statistics

4.1 Introduction

This chapter reports the results of the frequency analysis derived from the questionnaire only. The aim of this chapter is to give an indication of the overall responses to the various questionnaire questions. The questionnaire was broken down into 23 questions (with sub-questions) that were built around the objectives as well as the theoretical frameworks of the study. The results are hereby presented primarily in charts and graphs.

4.2 The Census

A total of 20 leading universities in Africa were selected for the study of which 15 institutions had agreed to participate. Questionnaires were dispatched to respondents that fell under the categories of Information Technology (IT) and Information System (IS) Directors, Managers, Chief Information Officer (CIO)s and Executive Directors who were responsible for Knowledge Management (KM) and Business Intelligence (BI) at their institutions.

4.3 Biographical Data reporting

This section summarises the biographical characteristics of the respondents. The respondents were made up of universities from both South Africa and greater Africa.

4.3.1 Length of time employed at institution

Figure 12 indicates the length of time that the respondents have been at their institutions.

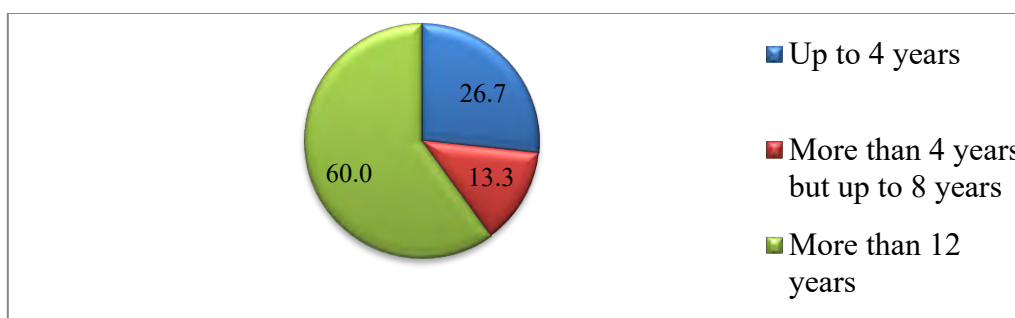


Figure 12: Length of time employed at the Institution

Sixty per cent of the respondents had indicated that they had been at their institutions for more than 12 years. This is a useful statistic as it indicates that the majority of the respondents had been in the university system for some time and would therefore understand the nature and complexities within the university operations.

4.3.2 Current Vocational Title of Respondent

Figure 13 depicts the current vocational title of the respondents

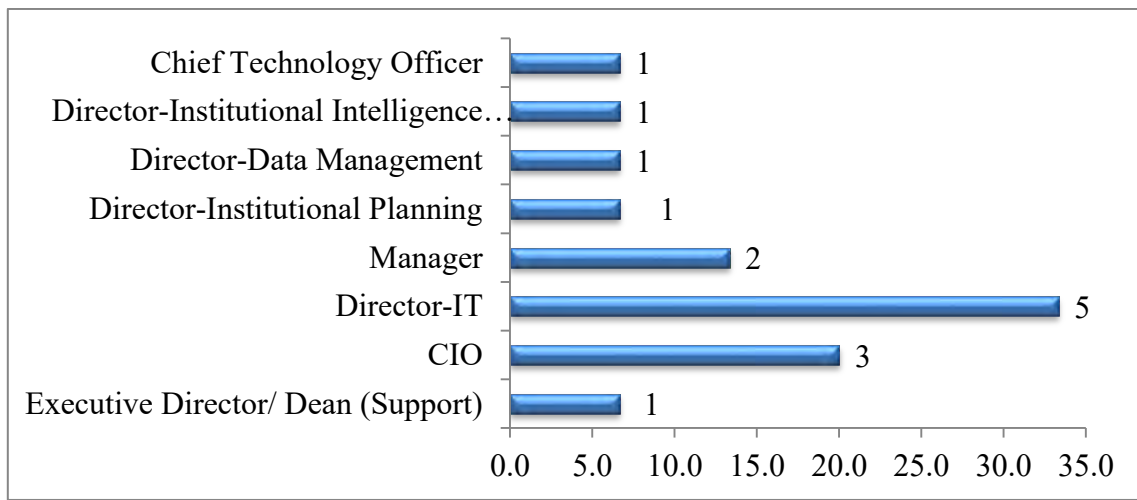


Figure 13: Current Vocational title of Respondent

Results showed that only 3 of the respondents were CIO's. Only 1 was at Executive Director level. This illustrates a lack of CIO's and Executive directorship in IT at these leading universities.

4.3.3 Line reporting Authority of Respondent

Respondents report to the following university authority (Figure 14).

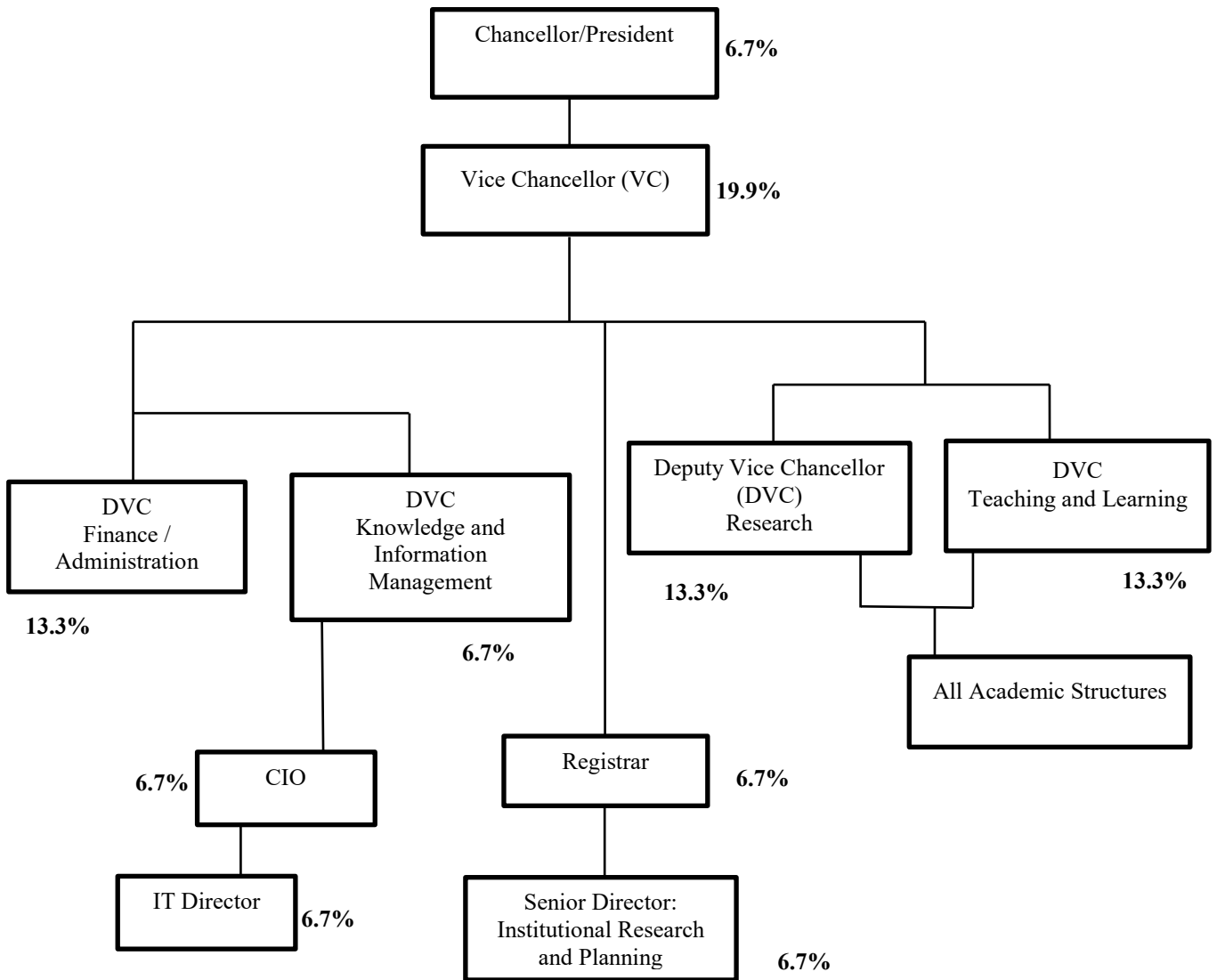


Figure 14: Line Reporting Authority of Respondent

Twenty per cent of the respondents reported to the Vice Chancellor. One respondent reported to the Chancellor. Majority of the respondents reported to Deputy Vice Chancellors (DVC) is various disciplines. This included,

- DVC (Research)
- DVC (Teaching and Learning)
- DVC (Knowledge and Information Management)
- DVC (Finance and Administration)
- DVC (Administration)

This finding indicates that KM is not found at Executive level in the institutions.

4.4 Frequency results – Questionnaire

The section that follows analyses the scoring patterns of the respondents per variable per section. Where applicable, levels of disagreement (negative statements) were collapsed to show a single category of ‘Disagree’. A similar procedure was followed for the levels of agreement (positive statements). This is allowed due to the acceptable levels of reliability. The results are first presented using summarised percentages for the variables that constitute each section. Results are then further analysed according to the importance of the statements.

4.5 Scanning (Data Collection)

This section examines how frequently data is collected by the institutions through scanning of the Higher Education (HE) environment and for what that information is being used. This is informed by the scanning and the learning construct of the Argyris and Schön (1978) model of organisational learning.

4.5.1 How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?

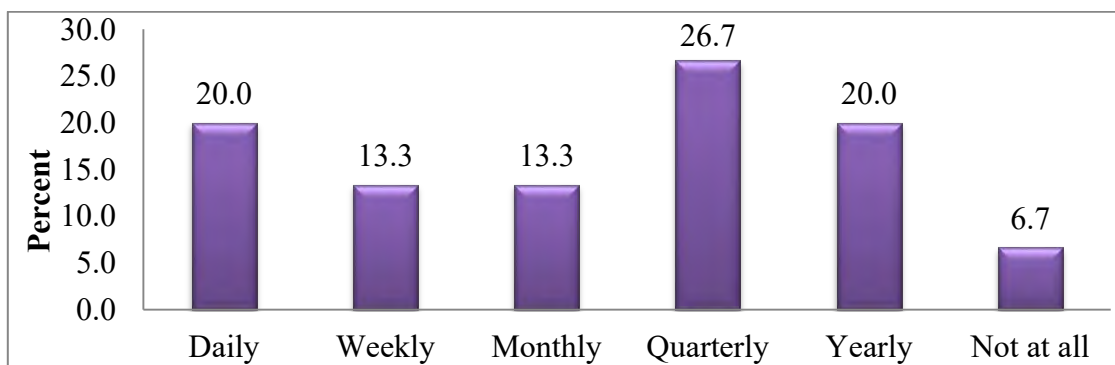


Figure 15: Percentage of Universities that scan the global Higher Education environment periodically

Overall, 93.4% of the institution scanned the global HE environment. However, only 20% of the respondents scanned the HE environment on a daily basis, 13.3% on a weekly basis and 13.3% on a monthly basis to collect information for strategic use. This entailed collecting information for:

- improving research and pedagogical practices
- improving technological practices/operational processes
- redefining institutional strategy
- monitoring and keeping abreast of other university's standards and practices

One leading institution did not scan the HE environment at all for the collection of strategic information. This shows that only 46.6% of the 15 leading African institutions were scanning the HE environment regularly and collecting information for strategic use.

4.5.2 The data/information collected (through environmental scanning) is used by your Division/Department as a means of:

Figure 16 is a summary of the scoring patterns for the variables that constituted how data/information that was collected was being used by the respondents' Division/Department.



Figure 16: How collected data/information is being used by the respondents' Division/Department

The average level of agreement (Strongly Agree + Agree) was 95.1%. However most of the responses leaned towards 'agree' as opposed to 'strongly agree'. This suggests that respondents may not be entirely certain if data/information that is being collected/gathered through scanning of the HE environment is actually being used strategically.

4.6 Espoused Values, Basic Underlying Assumptions and Knowledge Capabilities

This section reports on the questions that were built around the constructs of Schein (1985) model of organisational culture. These constructs included Espoused Values and Basic Underlying Assumptions. This section also utilised questions built on one of the constructs from the Kogut and Zander (1992) Knowledge Management model, that being knowledge capabilities. It focuses more on the current beliefs (basic underlying assumptions) and how KM is being used strategically to contribute to organisational strategy development (Espoused Values, Knowledge Capabilities).

4.6.1 Knowledge Management is regarded as something that adds value to your Division/Department?

	Valid Percent
Strongly Agree	73.3
Agree	26.7
Total	100.0

Table 4: Does KM add value to the division/department

All of the respondents agreed with the statement with 73.3% strongly agreeing.

4.6.2 How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?

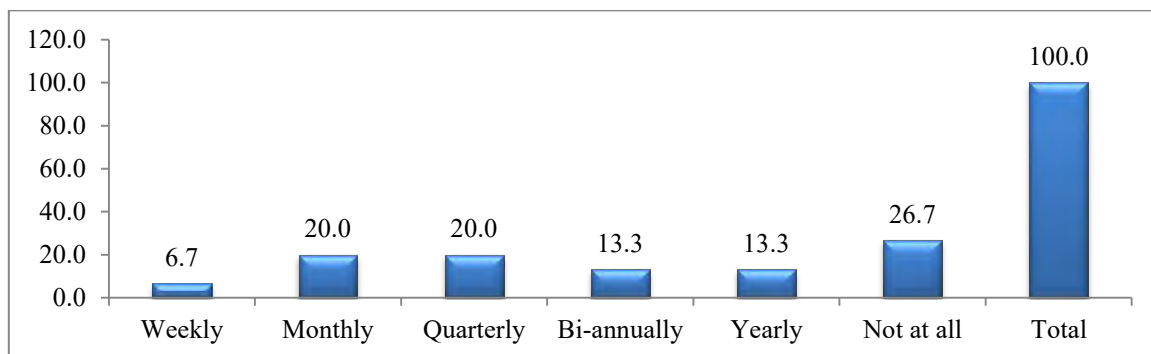


Figure 17: Frequency of Institutional Knowledge Management Presentations

More than a quarter of the respondents (26.7%) from these 15 leading universities did not make any institutional presentations to the university authorities. Of those that did, reports

were presented most often either monthly (20.0%) or quarterly (20.0%). Only 1 of the university made presentations on a weekly basis. This shows that 73.3% of leading universities were not making institutional KM presentations regularly, if at all.

4.6.3 Knowledge Management and Business Intelligence is used by your institution to:

An indication of how KM was being used in a strategic context is shown in Figure 18. Categories were developed that were applicable to a university setting and could contribute to the strategic use of KM. Respondents were asked to select the most appropriate categories where KM was mostly used at their institutions.

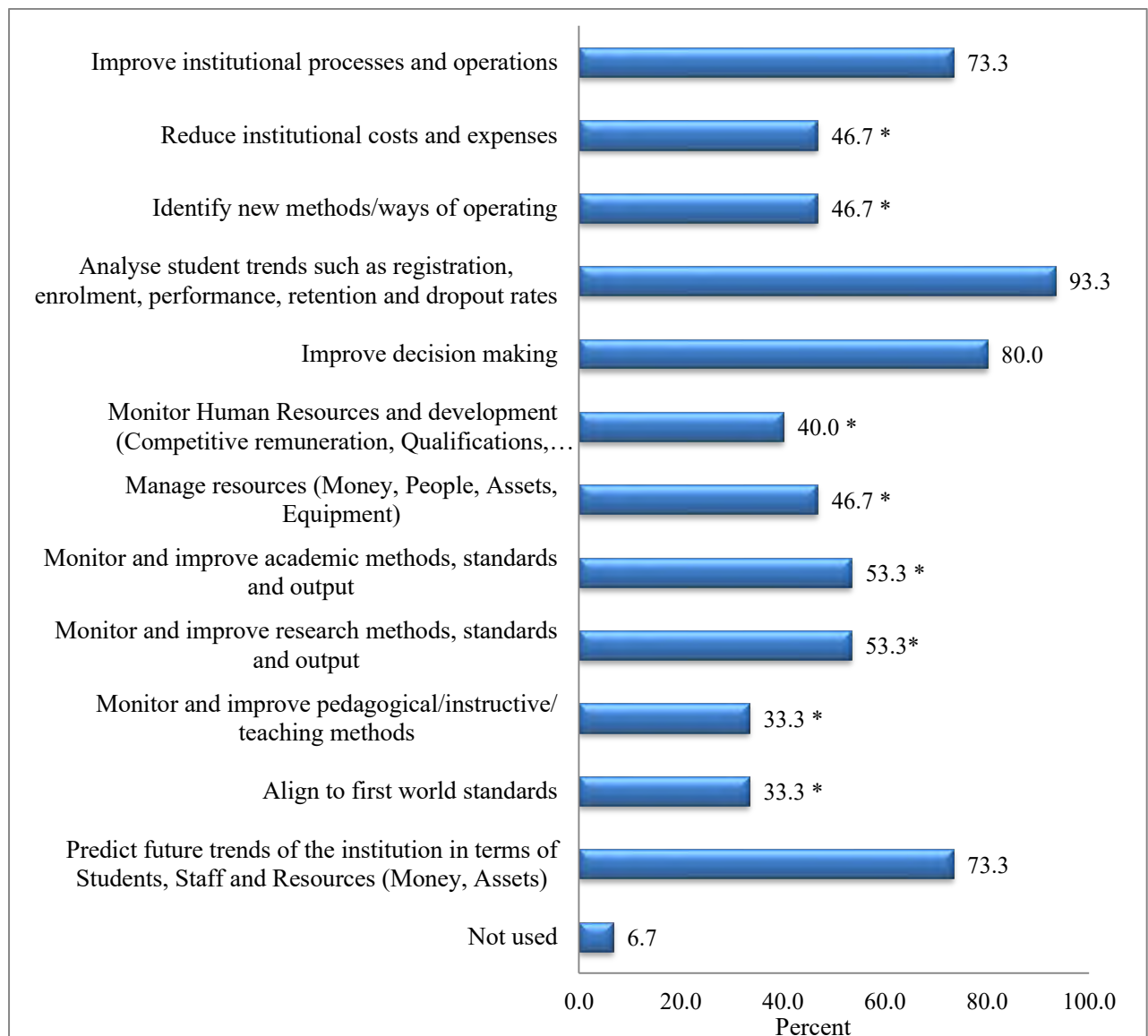


Figure 18: Strategic use of Knowledge Management and Business Intelligence used at the respondents' institutions

The scores marked with an asterisk (*) reflected areas in the 15 leading African universities where KM was not being used effectively. These were key areas in a university setting and yet showed minimal KM practices. Furthermore, the overall average of all scores reflected an average of 52% of strategic use of KM across the sample. This does not constitute a strong and strategic use of KM, but leans more towards a mediocre KM practice. This will be further discussed in the Chapter 5.

4.7 Knowledge Creation, Process & Transformation of Knowledge, Interpretation, Knowledge Transfer, Knowledge Capabilities

This section looks at the responses to the questions that were built around the constructs of Interpretation (Argyris and Schön, 1978) and of Knowledge Creation, Knowledge Transfer, and Process and Transformation and Knowledge Capabilities of Knowledge from the Kogut and Zander Model (1992) of KM. It focuses holistically on how knowledge is created, processed and transformed, interpreted and transferred or disseminated through the use or ease of use of various KM systems.

4.7.1 Transforming data into knowledge for better decision-making is important to your Division/Department

	Percent
Strongly Agree	86.7
Agree	13.3
Total	100.0

Table 5: Importance of transforming data into knowledge for better decision-making

All of the respondents agreed with the statement with 86.7% strongly agreeing.

4.7.2 How important are Knowledge Management Information Systems for transforming data into knowledge in your Division/Department?

Holistically, as shown in Table 6, most respondents associated some level of importance (86.7%) with 66.7 % rating the role of KM Information Systems for transforming data into knowledge as very important.

	Percent
Very Important	66.7
Important	20.0
Somewhat Important	13.3
Total	100.0

Table 6: Importance of Knowledge Management Information Systems for transforming data into knowledge

However, 13.3% of the selected leading universities rated it as somewhat important. These are leading universities and this showed a level of uncertainty and/or lack of importance for KM Information Systems.

4.7.3 What types of Knowledge Management Information Systems are used at your Division/Department and how often are they used? On a rating of (1= Least frequently used going up to 5 = most frequently used)

	1= Least Frequent	2= Seldom	3= Occasionally	4= Frequent	5= Very Frequent
Organisational Databases	6.7		6.7		86.7 *
Data Mining Systems	45.5	18.2	9.1	9.1	18.2
Data Warehouses	16.7		16.7	8.3	58.3 *
Digital Dashboards	46.2	7.7	23.1	7.7	15.4
OLAP	72.7		9.1	9.1	9.1
Predictive systems	72.7	9.1	9.1	9.1	
Institutional Intelligence Systems	36.4	9.1	45.5	9.1	
Other	25.0	25.0	25.0		25.0

Table 7: Types of Knowledge Management information systems used and frequency of use

The most frequently used KM Information Systems, marked with an asterisk (*) were Organisational databases (86.7%) and Data warehouses (58.3%). This shows that very few institutions utilised sophisticated and powerful KM Information Systems that are highly used in developed countries. Digital Dashboards, Online Analytical Processing (OLAP), Predictive systems and Institutional Intelligence systems seem to be very infrequently used. Leading universities in Africa seem to be deficient in these types of systems.

Some of the variables identified under the option for 'Other' included:

- Library Integration Systems
- SharePoint Document Repositories
- Management Information System - Integrated Tertiary Software
- Integrated Student Information Systems

4.7.4 The knowledge gathered from the Knowledge Management systems (selected in previous question) is being used to:

Figure 19 indicates what the knowledge gathered from the various Knowledge Management systems (selected in 4.7.3) is being used for.

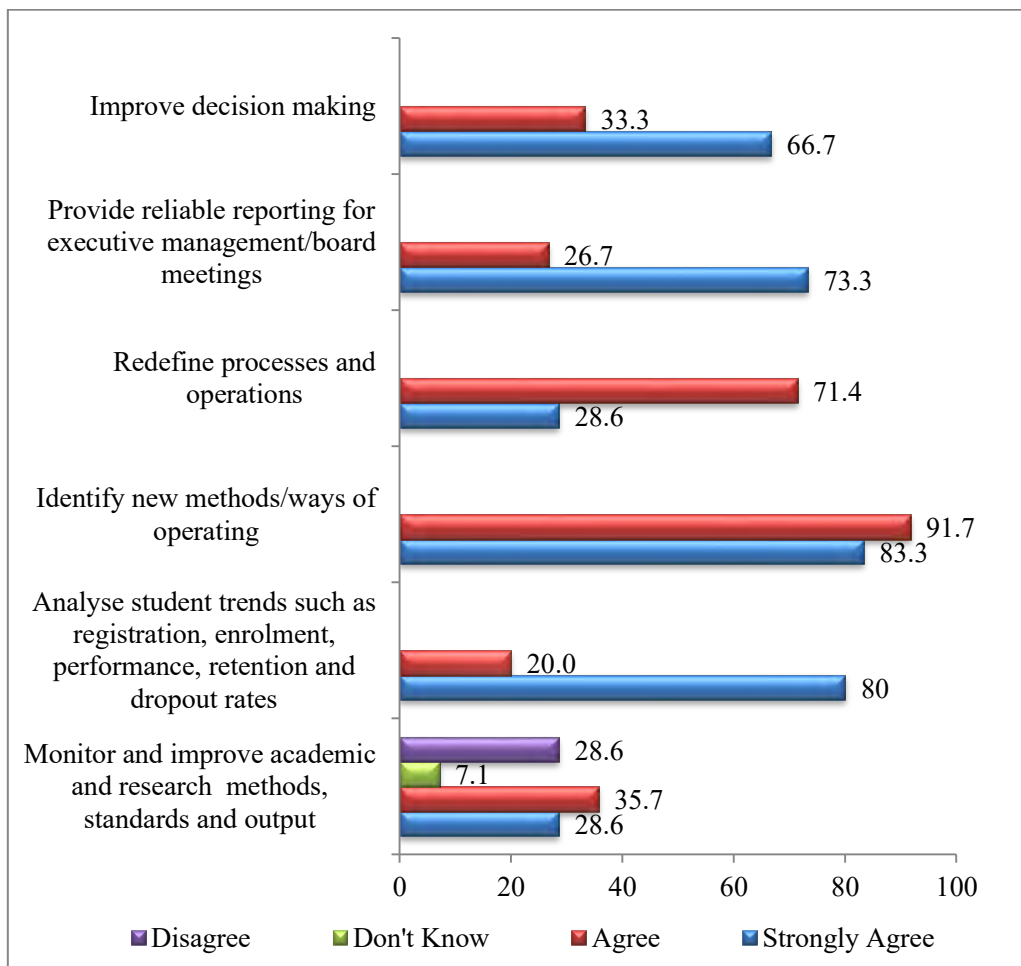


Figure 19: Strategic use of Knowledge Management and Business Intelligence

It was interesting to note that even though there was complete agreement with all of the statements with majority leaning towards 'Strongly Agree'. However, when it came to using

knowledge gathered from KM Information Systems to ‘monitor and improve academic and research methods, standards and output, there was a mixed reaction of which there was a 28.6 % level of disagreement and a ‘don’t know’ of 7.1%. In addition, only 28.6% strongly agreed. This proved to be a strange pattern considering that academic and research methods, standards and output should be the core fundamentals of any leading university.

4.7.5 Does your Division/Department provide Knowledge Management systems that facilitate academic research?

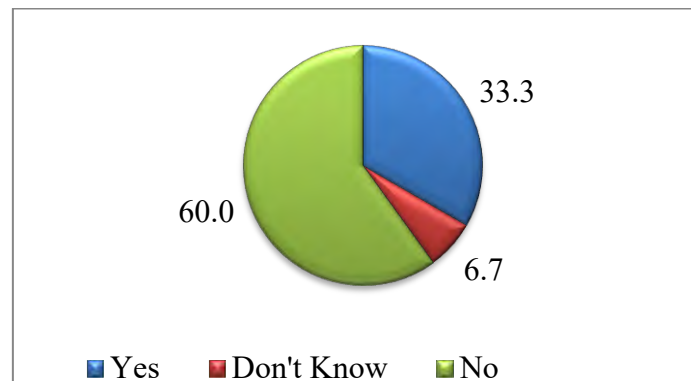


Figure 20: Provision of Knowledge Management systems to facilitate academic research

The results showed that only 33.3% of the respondents indicated that their institution provided KM systems that facilitated academic research. Sixty per cent confirmed that they did not provide KM systems for academic research and 6.7% did not know. Research should be a critical element of any university and KM systems should be seen as a strategic facilitator and technology enabler of research as this is the case in various developed countries.

4.7.6 Is Research output (Publications, Journals, Dissertations etc.) stored in electronic knowledge repositories at your institution?

	Yes	Don't Know	No
Is Research output (Publications, Journals, Dissertations etc.) stored in electronic knowledge repositories at your institution?	93.3		6.7

Table 8: If research output is stored in electronic knowledge repositories

4.7.7 How would you rate the accessibility of the above knowledge repositories to all students and staff at the university?

	Very Easy	Easy	Difficult
How would you rate the accessibility of the above knowledge repositories to all students at the university?		85.7	14.3
How would you rate the accessibility of the above knowledge repositories to all staff at the university?	7.7	69.2	23.1

Table 9: Accessibility of knowledge repositories to students and staff

Table 8 and Table 9 depict the use of electronic repositories for storing research output. Results show that 93.3% of the respondents do use electronic knowledge repositories for research output storage. However, even though most of the respondents indicated that the repositories were easily accessible to staff and students, 14.3% indicated that it was difficult for students to access these repositories while 23.1 % indicated that it was difficult for staff access them. Accessibility to research output should not be regarded as a difficult process. Research should be a key output of any university especially as these are leading universities in Africa. Both students and staff should have easy access to research output as this can be used to expedite and support research that is being conducted by students as well as staff.

4.7.8 Has the usage of knowledge repositories increased at the institution relative to one year ago?

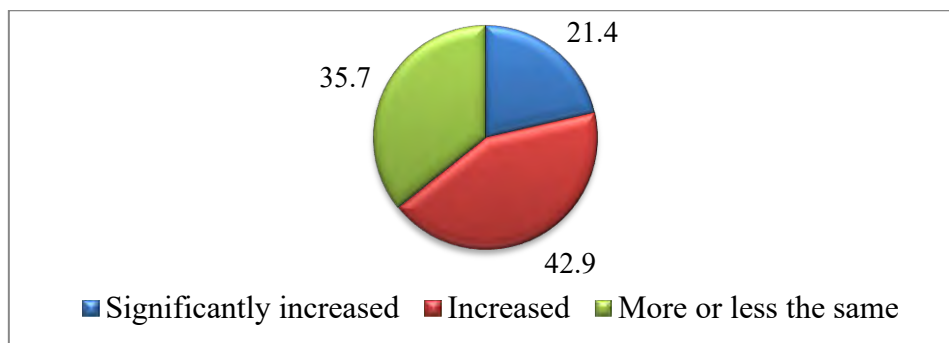


Figure 21: Usage of knowledge repositories at the institution relative to one year ago

Figure 21 shows that nearly two-thirds (64.3%) of the respondents indicated that there had been an increase in usage. This indicates that the usage of electronic knowledge repositories is growing at most of the institutions. However, 35.7% also indicated that the usage of

electronic repositories had not increased and were constant. This should not be the case as these are leading universities in Africa and if they are to increase their research output, then knowledge repositories should facilitate this and should be used more frequently. This can be related to the previous question of whether these repositories are easily accessible or not.

4.7.9 Does your institution use e-Learning as a pedagogical tool?

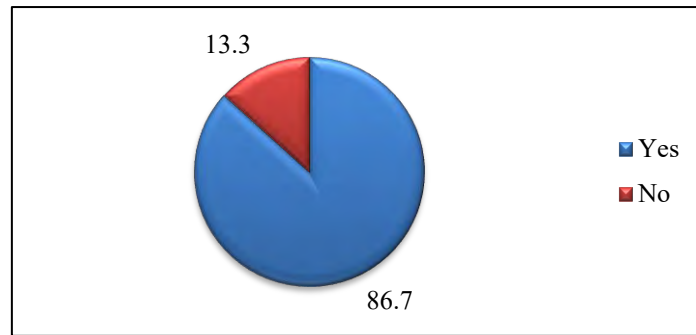


Figure 22: Usage of e-Learning as a pedagogical tool

A high percentage of respondents (86.7%) indicated that e-Learning was used for pedagogical purposes.

4.7.10 On a rating of (1= Least important and 5 = most important), the main reason/s for the use of e-Learning at your institution is to:

	1	2	3	4	5
Improve academic teaching and learning at the institution				15.4	84.6
Break geographical barriers in terms of teaching and learning		8.3	16.7	8.3	66.7
Create an interactive online university environment/experience			8.3	25.0	66.7
Make the institution a more effective knowledge provider to students			7.7	61.5	30.8
Make education more affordable for students	16.7	8.3	25.0	25.0	25.0

Table 10: Main reason/s for the use of e-Learning at institution

As shown in Table 10, the main reasons for the use of e-Learning by most of the leading universities were to:

- Improve academic teaching and learning at the institution
- Create an interactive online university environment/experience
- Break geographical barriers in terms of teaching and learning
- Make the institution a more effective knowledge provider to students

However, results show that e-Learning is not being used as a strategy to make education more affordable for students. Furthermore, 50% of the respondents rated the use of e-Learning for the provision of affordable education to students as less important. Africa houses some of the poorest nations and countries in the world and education is key to a prosperous future for all. African institutions should be looking at innovative means such as e-Learning to make education more affordable and accessible to its students.

4.7.11 On a scale of (1= Least effective and 5 = most effective), rate the effectiveness of Web 2.0 technologies used at your institution.

The effectiveness of Web 2.0 technologies at the universities were rated as follows in Table 11.

	1 Least effective	2 Not so effective	3 Average	4 Effective	5 Most effective
Wiki	14.3	28.6	35.7	21.4	
Blogs	14.3	14.3	35.7	28.6	7.1
Podcasting	15.4	23.1	30.8	30.8	
Content management Systems (CMS)		14.3	21.4	28.6	35.7
Online Collaboration Systems (e.g. Sharepoint, Dropbox)	6.7	13.3	13.3	46.7	20.0
Social Media (e.g. Twitter, Facebook, Google +, Youtube)		6.7	26.7	53.3	13.3
Videocasting (e.g. YouTube)		23.1	30.8	38.5	7.7
Other	33.3				66.7

Table 11: Effectiveness of Web 2.0 technologies as an e-Learning tool

The responses to this question confirm that Web 2.0 technology is not being used effectively and strategically as a pedagogical tool. It is evident based on the results shown in Table 11 that this is the case affecting most of the 15 leading African universities in selected for this study. The scoring scale of 4 and 5 depicts effective (4) and most effective (5). Anything scoring below this scale (1, 2 and 3) depicts a deficiency in effective use of Web 2.0. Hence, of the selected 15 leading universities in Africa,

- Only 21.4% made effective use of Wiki's
- Only 35.7 % made effective use of Blogs (28.6=effective) and (7.1=very effective)
- Only 30.8 % made effective use of Podcasting
- Only 46.2% made effective use of Videocasting

There was an average of 65% of the selected leading universities that made effective use of:

- Content management Systems (CMS)
- Online Collaboration Systems
- Social Media

Hence, it can be deduced that holistically, Web 2.0 technology is not being used effectively and strategically.

4.7.12 To what degree does your institution make use of Massive Open Online Courses (MOOCs)

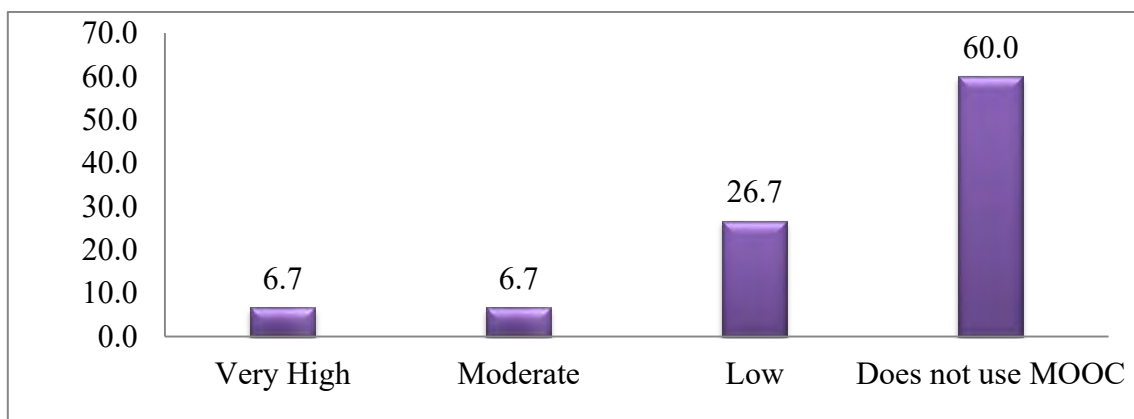


Figure 23: Usage of MOOCs as an e-Learning tool

4.7.13 What is your opinion regarding MOOCs?

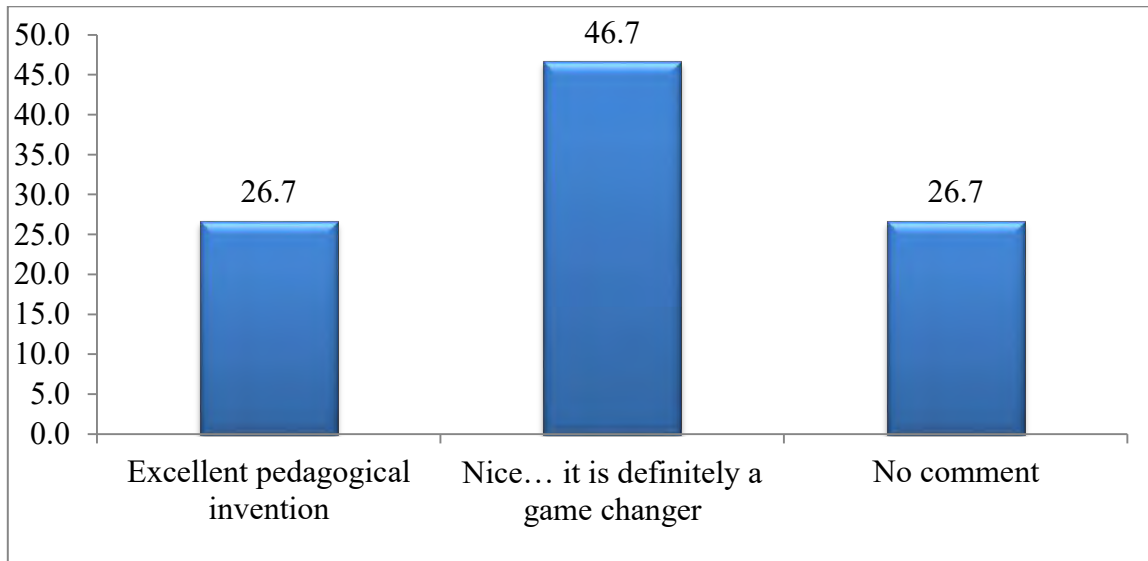


Figure 24: Respondents opinion regarding MOOCs

Based on the results reflected under 4.7.12 and 4.7.13 above, even though 73% were very impressed by the phenomenon of MOOC's, only one university was making use of MOOCs while 60% did not use MOOCs and 26.7% had low usage of MOOCs. This shows that African universities are falling behind in embracing MOOCs. This will be further discussed in Chapter 5.

4.7.14 How often is Web 2.0 technologies (Social Media, Podcasting, Wiki's, Blogs) used by your institution when it comes to the following?

	Very Highly used	Highly used	Average	Low use
Creation of knowledge		6.7	66.7	26.7
Transfer of Knowledge		40.0	46.7	13.3
Dissemination of Knowledge	6.7	40.0	46.7	6.7

Table 12: Usage of Web 2.0 Technologies for creation, transfer and dissemination of knowledge

This finding shows that Web 2.0 technology is not being used effectively in the creation, transfer and dissemination of knowledge by leading African universities. None of the

categories show high usage and thus does not constitute to effective and strategic use of Web 2.0 for the creation, transfer and dissemination of knowledge.

4.8 Efficient Firms / Competitive Advantage, Learning

This section reports on questions that were built on the constructs of efficient firms and competitive advantage which comes from the Kogut and Zander (1992) KM model. It also includes the construct of learning which stems from the Argyris and Schön (1978) model of Organisation learning. This section is related to the previous sections on knowledge capabilities, but it now focuses mainly on the questions of whether the use of KM has enhanced organisational efficiency and competitiveness and if KM has promoted a culture of organisational learning within the institution. These questions are hereby answered next.

4.8.1 Your Division/Department has made better decisions based on knowledge gathered through Knowledge Management practice

	Percent
Strongly Agree	20.0
Agree	80.0
Total	100.0

Table 13: If better decision-making has occurred based on knowledge gathered through Knowledge Management practice

There was a 100% unanimous agreement with 20% of respondents strongly agreeing.

4.8.2 The use of e-Learning has:

	Strongly Agree	Agree	Don't Know
Enhanced academic teaching and learning at your institution	60.0	33.3	6.7
Made your institution a better knowledge provider to students	40.0	53.3	6.7

Table 14: If the use of e-Learning has enhanced academic teaching and learning and made the institution a better knowledge provider to students

There are high levels of agreement (93.3%) for both of the statements in Table 14. However, only 40% of the respondents strongly agreed that e-Learning was making their institution a better knowledge provider to students. Furthermore, 6.7% in both cases did not know. This shows that there is still some level of uncertainty by respondents as to whether e-Learning is enhancing their institutions and making them a better knowledge provider to students.

4.8.3 The use of Web 2.0 (Social Media, Podcasting, Wiki's, Blogs) has:

	Strongly Agree	Agree	Don't Know	Disagree
Enhanced academic teaching and learning at your institution	21.4	71.4	7.1	
Made your institution a better knowledge provider to students	14.3	78.6		7.1

Table 15: If the use of Web 2.0 has enhanced academic teaching and learning and made the institution a better knowledge provider to students

There seems to be similarity to the responses in 4.8.2, whereby there are levels of agreement (average of 75%) for both statements. However, only 21.4% of the respondents strongly agreed that Web 2.0 had enhanced academic teaching and learning at their institution and 7.1% did not know. Only 14.3% strongly agreed that Web 2.0 made their institution a better knowledge provider to students and 7.1% disagreed with this statement. Again, this shows that the top level management personnel at these leading universities were not entirely convinced that Web 2.0 was enhancing and adding value to their institutions.

4.8.4 The use of Knowledge Management systems and practices at the institutions have resulted in the following:

	Strongly Agree	Agree	Don't Know	Disagree
Improved overall efficiency	13.3	73.3	6.7	6.7
Enhanced academic research activity	6.7	66.7	26.7	
Led to your institution becoming more competitive	13.3	80.0		6.7
Provided a means of continuous learning	6.7	73.3	13.3	6.7

Table 16: If the use of Knowledge Management systems and practices has improved efficiency, competitiveness and continuous learning

Overall, respondents are of the opinion that the use of the KM systems and practices has been beneficial to their institutions. However, respondents do not seem to be strongly convinced. This is due to the following:

- Only 13.3% strongly agreed that use of KM systems and practices had improved overall efficiency while 6.7% disagreed. A further 6.7% did not know.
- Only 6.7% strongly agreed that use of KM systems and practices had enhanced academic research activity and a substantial 26.7% did not know.
- There was an overall 93.3% total agreement, however, only 13.3% strongly agreed that use of KM systems and practices had made their institution more competitive while 6.7% disagreed.

This relates to some of the previous statements whereby there does not seem to be a strong amount of certainty or acceptance by the respondents that KM is in fact seen as something that can improve/enhance these leading institutions. Holistically, there is a strong possibility that KM is not being viewed in a strategic light and its potential is not being realised and exploited and neither do they ‘strongly feel’ that it is adding to the institutions’ competitiveness. However, there was an overall agreement of 93.3% that the use of Knowledge Management systems and practices has led to the institutions becoming more

competitive and 80% agreed that KM systems and practices had promoted continuous learning at their institutions with 6.7% strongly agreeing.

4.9 Summary

In this chapter, the responses to the questionnaire were primarily reported. The responses were from 15 management personnel from the 15 leading African universities responsible for KM and BI at their institutions. Responses were reported through basic frequency analysis and depicted using graphs, tables and charts. This gives the reader an indication of the overall responses, before delving deeper into the more comprehensive and in-depth results that will be analysed and discussed in the next chapter.

CHAPTER FIVE

Analysis and Discussion

5.1 Introduction

This chapter involves the analysis and discussion of the statistical results that were derived from the questionnaire and interviews. This chapter discusses the key results and will provide a comprehensive interpretation of both the quantitative and qualitative results linked to supporting theories and literature from various related studies. This chapter shows what the quantitative and qualitative results are revealing and therefore forms the most crucial chapter of the thesis. It discusses the results according to the objectives and research questions of the study. This chapter also discusses the results in relation to the constructs of the frameworks used in the study, through regression analysis. The study originally targeted the 20 leading African universities based on academic ranking. Fifteen of these top-ranked universities agreed to participate in the study. Respondents included Managers/Directors/Executive Directors from each participating university responsible for KM and BI. In addition to the survey of these institutions, in-depth interviews were conducted with 11 universities from the designated census. The questionnaire was broken down into 23 questions (with sub-questions) that were built around the objectives of the study as well as the theoretical framework of the study. The interviews further supported the objectives of the study and gave a more in-depth qualitative view of the Knowledge Management and Business Intelligence strategy, investment, systems, motivation and application at leading African universities. The quantitative data collected from the responses were analysed with SPSS version 21.0. A Cronbach's Alpha value of 0.7 showed that the responses were both reliable and consistent. Qualitative analysis software NVIVO 10 was used for the full analysis of qualitative data to discover patterns and trends amongst the vast amounts of data. Thematic analysis was therefore critical.

5.2 Research question, research sub-question and objectives of the study

For practicality, flow and understanding of how the results fulfil the aims of the study, the research question, research sub-questions and objectives of the study are hereby presented.

Research Question: How do Knowledge Management practices influence Institutional Strategy at leading African Universities?

Research Sub-Questions:

- What is the role of KM in strategy formulation at the institution?

- How is KM
 - (i) Adding value to the institution at a continental level?
 - (ii) Adding value to the institution at a global level?
 - (iii) Promoting competitiveness at a continental level?
 - (iv) Promoting competitiveness at a global level?

- What is the role of web 2.0 technologies
 - (i) in the creation of knowledge?
 - (ii) in the management of knowledge?
 - (iii) in the dissemination of knowledge?

- What is the role of web 2.0 technologies
 - (i) in the creation of e-Learning?
 - (ii) in the management of e-Learning?
 - (iii) in the dissemination of e-Learning?

- Where is KM represented within organisational structure of the institution?

Objectives

- To investigate whether Knowledge Management is contributing to overall institutional value
- To investigate whether knowledge gathered through various Knowledge Management Information Systems is being used to contribute towards institutional strategy
- To examine the role of Web 2.0 as an e-Learning strategy
- To examine the role of Web 2.0 as a Knowledge Management strategy

- To establish whether Knowledge Management is contributing to strategy development at Executive Level

5.3 The Research Instrument

The Research Instrument consisted of 23 items, with a level of measurement at a nominal or an ordinal level. The questionnaire was divided into 6 sections which measured various themes as illustrated below:

- Biographical data
- Scanning (data collection)
- Espoused Values, Basic Underlying Assumptions
- Interpretation (data given meaning), Knowledge Creation, Knowledge Transfer, Process & Transformation of Knowledge, Artefacts
- Knowledge capabilities
- Efficient Firms / Competitive Advantage, Learning (Action Taken)

5.4 Reliability Statistics

The two most important aspects of precision are reliability and validity (Sekaran and Bougie, 2010). Reliability is computed by taking several measurements on the same subjects. A reliability coefficient of 0.70 or higher is considered as 'acceptable'.

Table 17 reflects the Cronbach's alpha score for all the items that constituted the questionnaire.

Section	Number of Items	Cronbach's Alpha
B2	5 of 5	0.652
B8	7 of 7	0.725
B9.6	4 of 6	0.654
B15	5 of 5	0.729
B16	7 of 7	0.609
B19	3 of 3	0.679

B21	2 of 2	0.878
B22	2 of 2	0.583
B23	4 of 4	0.575

Table 17: Cronbach's Reliability Scale

Most of the questions have reliability scores that exceed the recommended value of 0.700. This indicates a high (overall) degree of acceptable, consistent scoring for these questions of the research. Questions B22 and B23 have values that are slightly lower than the standard. Primary amongst the reason for this is that the construct is newly developed and would require further testing. In addition, the sample size was small which affects consistency of answers and some questions have the minimum number of variables that constitute it.

5.5 Key Findings from Frequency results- Biographical

As shown in 4.3.1, 60% of the respondents had been at their institutions for more than 12 years and therefore very knowledgeable about the operations and academic nature, processes and complexities of the university operations. The respondents were also senior (4.3.2) which can have a positive influence on how KM is driven at the institution. The more senior the executive member responsible for driving the KM agenda, the more effective KM is (Cranfield and Taylor, 2008).

However, a key finding, which relates directly to one of the study's objectives, was that most of the respondents were not at Executive Level at the institutions, (4.3.3) but instead report to members of Executive Management. This shows that KM and BI is not at Executive level. It is important to also note that some of these executive members are experts in different disciplines and not KM e.g. Deputy Vice Chancellor (DVC) (Finance and Administration), DVC (Administration) and registrar. This could mean that the true potential and strategic value of KM may not necessarily be realised by these executive members especially when it comes to presenting KM at the Board level. Only one institution had a DVC of Knowledge and Information Management.

5.6 Chi-Square Analysis

Chi-Square tests were performed to determine whether there was a statistically significant relationship between the variables (rows vs. columns). If the p-value is less than 0.05, then the relationship between 2 variables is significant. That means that one variable is related to the other (Lind, Marchal and Wathen, 2010). This availed an opportunity to explore the relationship between the respondents' personal/vocational factors against the actual study related questions which inevitably revolved around the strategic use of KM.

The traditional approach to reporting a result requires a statement of statistical significance. A p-value is generated from a test statistic. A direct/significant result is indicated with 'p < 0.05'.

Some of the logical and direct/significant relationships are hereby presented.

5.7 Chi- Square: Direct/Significant Relationships

There was a strong and valid Chi-Square correlation found. This pertained to the using of knowledge gathered from KM Information Systems (to identify new methods/ways of operating) and the respondents' length of time in their current vocational position.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	12.000 ^a	3	.007	.083		
Likelihood Ratio	6.884	3	.076	.083		
Fisher's Exact Test	5.786			.083		
Linear-by-Linear Association	.176 ^b	1	.674	1.000	.417	.083
N of Valid Cases	12					

Table 18: Using knowledge gathered from KM Information Systems (to identify new methods/ways of operating) vs. Length of time in current title

Table 18 shows that the respondents' length of time in their current position is related to the utilisation of knowledge gathered from KM Information Systems (KM systems) to identify new methods/ways of operating (0.007). The majority of these senior personnel (76.7%) have

occupied their current position for more than 4 years and hence can be classified as long term and experienced individuals in their field and line of work. Furthermore, as shown under 4.7.4, there was a strong agreement by respondents that that the knowledge gathered from KM Information Systems was used to identify new methods/ways of operating (83.3%). This shows that this is a common occurrence across these leading universities. As discovered by Cranfield and Taylor (2008), the respondents' years of experience in their current role have exposed them to how their respective universities use knowledge derived from KM Information Systems. Building on this, identifying new methods/ways of operating becomes possible and a key priority through this knowledge. Senior level respondents need to act as champions to drive the strategic use of KM systems to promote new and innovative ways of university operations. McKnight (2007) also asserted that KM has to be realised and driven at a managerial or leadership level in order for it to be regarded as a strategic resource.

5.8 Key correlations applicable to the study

Bi-variate correlation was also performed on the data. Positive values indicate a directly proportional relationship between the variables and a negative value indicates an inverse relationship. All significant relationships are indicated by an asterisk (*) showing that the correlation is significant at the 0.05 level (2-tailed) or double asterisk (**) showing that the correlation is significant at the 0.01 level (2-tailed).

The correlations revolved around the research question and objectives of the study as the questionnaire was developed around these. Correlations were also done in relation to the constructs of the models used in the study. This allowed for the establishment of relationships between the independent constructs and the dependant constructs through responses to the questions that was built around these constructs. Altogether, there were approximately 136 significant correlations (both positive and negative), only 26 correlations (positive and negative) are expanded upon here as these were determined as causally linked correlations.

Before understanding the correlations of the variables, themes (constructs) and models, it is important to note the constructs used and the models that they were derived from. This has been documented in detail in Chapter 2 but for the ease of understanding the correlations, the constructs are listed below along with the frameworks and reference in Table 19.

Construct	Frameworks	Reference
Scanning (Data collection)	Organisational Learning	Argyris and Schön (1978)
Interpretation (Data given meaning)	Organisational Learning	Argyris and Schön (1978)
Learning (Action taken)	Organisational Learning	Argyris and Schön (1978)
Knowledge Creation	Kogut & Zander Knowledge Management Model	Kogut and Zander (1992)
Knowledge Transfer	Kogut & Zander Knowledge Management Model	Kogut and Zander (1992)
Process & Transformation of Knowledge	Kogut & Zander Knowledge Management Model	Kogut and Zander (1992)
Knowledge Capabilities	Kogut & Zander Knowledge Management Model	Kogut and Zander (1992)
Efficient Firms/ Competitive Advantage	Kogut & Zander Knowledge Management Model	Kogut and Zander (1992)
Espoused Values	Organisational Culture Theory	Schein (1985)
Basic Underlying Assumptions	Organisational Culture Theory	Schein (1985)

Table 19: Constructs, Framework and Reference

The correlation variables are presented below in respective tables. The construct/s of the framework applicable to that variable is also listed under the constructs heading per table.

5.8.1 Frequency of scanning the Higher Education environment and collection of data/information vs. use of knowledge (derived from KM systems) to analyse student trends such as registration, enrolment, performance, retention and dropout rates

Variables	Constructs	Correlation
How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?	<ul style="list-style-type: none"> Scanning (data Collection) 	(0.530, p<0.05)
The knowledge gathered from the Knowledge Management systems is being used to ‘analyse student trends such as registration, enrolment, performance, retention and dropout rates’	<ul style="list-style-type: none"> Learning (Action Taken) 	

Table 20: Frequency of scanning the Higher Education environment (data collection) vs. use of knowledge (from KM systems) to analyse student trends

Results indicate that there is a positive correlation between how often the department or division scanned the HE environment to collect data and the use of that data for student enrolment and performance analysis. The Global Higher Education environment is continuously changing, and if African universities are to be competitive on a global scale, it is imperative that they scan the HE environment regularly and collect the most updated information. This can lead to improved decision-making regarding current processes, operations and strategies. This is supported by the findings of Jiménez-Jiménez and Cegarra-Navarro (2006). Vance (2011) found that that all organisations needed to scan the environment in which they operated and collect information to shape future decisions, as this would facilitate organisational learning for the institutions. Therefore, continuously gathering information about the HE environment and other leading universities on the global landscape can lead to improved decision-making regarding current processes, operations and strategies which is also key to enhanced performance and maintaining and developing a competitive advantage. In addition, Peck, *et al.* (2009) asserted that due to environmental change in HE in both developed and developing countries, HE institutions needed to strategically embrace that change. This relates to Argyris and Schön (1996) who found that one of the key activities required to embrace change and act strategically was to ensure proper and frequent scanning

of the HE landscape in order to be able to collect data, process it and understand the dynamics to assist in the strategic change and transformation of the institutions.

5.8.2 Use of collected data/information (from scanning of environment) as a means of redefining of institutional strategy vs. use of knowledge (derived from KM systems) to redefine institutional processes and operations

Variables	Constructs	Correlation
The data/information collected (through scanning of environment) is used by your Division/Department as a means of: 'redefining Institutional strategy'	• Scanning (data Collection)	0.700, (p<0.05)
The knowledge gathered from Knowledge Management systems is being used to: 'redefine processes and operations'	• Learning (Action Taken)	

Table 21: Use of collected data/information (for redefining of institutional strategy) vs. use of knowledge (from KM systems) to redefine institutional processes and operations

There was a strong positive correlation between the use of data collected (through scanning of HE environment) for redefining institutional strategy and the use of KM towards the redefinition of the institutions' processes and operations of the institution. Universities in other parts of the world from both developed and other developing countries are using knowledge derived from KM systems to redefine their processes and operations that in turn contribute to institutional strategy development. This in turn promotes a knowledge based environment across the institution which then drives the overall institutional strategy. This finding is supported by abundant similar studies such as Metaxiotis and Psarras (2003), Chandarasupsang, *et al.* (2006), Kende, Noszkay and Seres (2007), Laal (2010), Omona, van der Weide and Lubega (2010), Sahay and Mehta (2010), Lubega, Omona and van der Weide (2011) and Ghaffari, Rafeie and Ashtiani (2012) among others.

5.8.3 Use of collected data/information (from scanning of environment) as a means of redefining of institutional strategy vs. use of knowledge (derived from KM systems) to monitor and improve academic and research methods, standards and output

Variables	Constructs	Correlation
The data/information collected (through scanning of environment) is used by your Division/Department as a means of: ‘Redefining Institutional strategy’	• Scanning (data Collection)	0.702 (p<0.05)
The knowledge gathered from Knowledge Management systems is being used to ‘monitor and improve academic and research methods, standards and output’	• Learning (Action Taken)	

Table 22: Use of collected data/information (for redefining of institutional strategy) vs. use of knowledge (from KM systems) to monitor and improve academic and research methods, standards and output

This correlation reveals a significantly strong and positive association. It shows that the data/information collected (through scanning of the HE environment) and use of that data towards redefining institutional strategy is positively related to the use of knowledge (derived from KM systems) for the monitoring and improvement of academic and research methods, standards and output. Similarly to the preceding argument (5.8.2), KM is widely used by universities in both developed and other developing countries to improve academic and research methods, standards and output (Metaxiotis and Psarras, 2003; Chandarasupsang, *et al.*, 2006; Cranfield and Taylor, 2008; Williams, Karousou and Mackness, 2011; Silvia and Beatriz, 2012).

5.8.4 Use of collected data/information (from scanning of environment) as a means of improving pedagogical practices vs. the use of e-Learning to improve Academic Teaching and Learning at the institution

Variables	Constructs	Correlation
The data/information collected (through scanning of environment) is used by your Division/Department as a means of: 'improving pedagogical practices'	• Scanning (data Collection)	(0.750, p<0.05)
The main reason/s for the use of e-Learning at your institution is to: 'Improve academic teaching and learning at the institution'	• Efficient Firms/Competitive Advantage	

Table 23: Use of collected data/information (as a means of improving pedagogical practices) vs. the use of e-Learning to improve Academic Teaching and Learning at the institution

This finding shows that there is a strong positive correlation between the use of collected data/information (from scanning) as a means of improving pedagogical practices and the use of e-Learning to improve academic Teaching and Learning at the institution. In other words, the use of e-Learning to improve academic teaching and learning is significantly related to the improvement of pedagogical practices at these leading institutions. E-Learning is widely used in developed countries as a strategic tool in teaching, learning and research (Marshall, *et al.*, 2003; Krajcso, 2009; Boling, *et al.*, 2012).

For greater effectiveness and outreach, academic teaching and learning must be able to go beyond the traditional face-to-face classroom routine and be accessible across space and time. E-Learning becomes a strategic means of embracing this as it provides a technology enabled learning platform in real-time and eliminates barriers, allowing learning to occur anywhere and at any time. This promotes more effective knowledge creation and dissemination in HE and this is occurring throughout the world. This is supported by Alias, *et al.* (2012) who considered e-Learning as a strategic method that has led to the creation of a new pedagogical era for HE. In addition, studies by various authors (Marshall, *et al.*, 2003; Leem and Lim, 2007; Krajcso, 2009; Xiangqian and Fuqing, 2012) show how e-Learning has improved academic teaching and learning in various parts of the world.

5.8.5 Use of collected data/information (from scanning of environment) as a means of redefining of institutional strategy vs. use of KM systems and practices to promote continuous learning

Variables	Constructs	Correlation
The data/information collected (through scanning of environment) is used by your Division/Department as a means of: 'Redefining Institutional strategy'	• Scanning (data Collection)	0.662 (p<0.05)
The use of Knowledge Management systems and practices at your institution has 'provided a means of continuous learning'	• Learning (Action Taken)	

Table 24: Use of collected data/information (as a means of redefining of institutional strategy) vs. use of KM systems and practices to promote continuous learning

Furthermore, there is a positive correlation between the use of data collected (through scanning of HE environment) for redefining institutional strategy and the use of KM systems and practices as a means of continuous learning. This reinforces the argument that KM is a facilitator of a Learning Organisation as demonstrated by Bhatt and Zaveri (2002), Bontis, Crossan and Hulland (2002), Farrell and Oczkowski (2002), Garcia-Morales, Llorens-Montes and Verdu-Jover (2007) and Hung, *et al.* (2011) among others.

5.8.6 Frequency of institutional presentations on Knowledge Management/Business Intelligence vs. the use of Web 2.0 to make the institution a better knowledge provider to students

Variables	Constructs	Correlation
How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?	• Basic Underlying Assumptions	(0.593, p<0.05)
The use of Web 2.0 (Social Media, Podcasting, Wiki's, Blogs) has 'Made your institution a better knowledge provider to students'	• Efficient Firms/ Competitive Advantage	

Table 25: Frequency of institutional KM/BI presentations vs. the use of Web 2.0 to make the institution a better knowledge provider to students

There is a strong positive correlation between how often institutional presentations are made on KM and BI and the use of Web 2.0 to make the institution a better knowledge provider to students. It is important for KM to become institutional wide to enabling its potential to be realised by Executive Management at the institutions. The only way this is possible is to make regular institutional KM presentations along with designated drivers or champions of KM in order to make KM visible to the greater university. This relates to Cranfield and Taylor (2008) when their study showed that 2 out of 7 universities surveyed in the United Kingdom had an institutional wide approach to KM and were therefore leading in regard to environmental changes, technological changes and process improvement. This is also supported by other authors such as Laal (2010). Similarly, Omona, van der Weide and Lubega (2010) found that KM needed to be integrated into institutional processes and objectives in order to work strategically which could then ensure both institutional and KM success. Therefore, the more KM presentations inclusive of Web 2.0, that are made to the Executive Management of the institutions, the more likely the usage of Web 2.0 will occur in both teaching and learning which will in turn make the institution a better knowledge provider to students.

This finding also supports the Organisation Culture Theory (Schein, 1985). An organisation's culture must be viewed as its key competitive advantage and needs to be supportive and aligned towards activities, process and strategies that lead to organisational success (Serrat, 2009). In light of this, KM itself needs to be instilled into the institution's culture. This again can be possible via frequent and institutional-wide KM presentations. This is supported by similar studies that use the theory in successful IS and KM adoption and implementation. A good example is Alavi, Kayworth and Leidner (2006) who emphasised how organisational culture was a key factor that influenced KM strategy within an organisation which also included KM technology selection, adoption and migration and KM evolution. From a HE perspective, Omerzel, Biloslavo and Trnavčević (2011) found that different organisational cultures influenced the adoption of KM systems and methods for knowledge creation and transfer among certain staff. Other studies that also support this finding in relation to organisational culture include Park, Ribeire and Schulte (2004), Jones, Cline and Ryan (2006), Leidner and Kayworth (2006), Iivari and Huisman (2007) and Shao, Feng and Liu (2012).

5.8.7 Frequency of institutional presentations on Knowledge Management/Business Intelligence vs. use of knowledge (derived from KM systems) to provide reliable reporting for executive management/board meetings

Variables	Constructs	Correlation
How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?	<ul style="list-style-type: none"> • Basic Underlying Assumptions 	(0.675, p<0.01)
The knowledge gathered from the Knowledge Management systems is being used to ‘Provide reliable reporting for executive management/board meetings’	<ul style="list-style-type: none"> • Learning (Action Taken) 	

Table 26: Frequency of institutional KM/BI presentations vs. use of knowledge (from KM systems) to provide reliable reporting for Executive Management

It was also shown that there is a positive correlation between the frequency of institutional KM and BI presentations and the provision of reliable knowledge reporting to Executive Management. Knowledge Management and BI needs to be made more visible and more institutional wide (Laal 2010, Omona, van der Weide and Lubega, 2010) as so its value can be realised at Executive Level. Executive decisions can then become driven by KM and BI and this can facilitate better decision-making at executive level. This then places KM as the driver of improved decision-making and institutional strategy development that can enhance an organisation in terms of performance, productivity and overall institutional strategy (Metaxiotis and Psarras, 2003; Chen *et al.*, 2009; Laal 2010; Lubega, Omona and van der Weide 2011; Pircher and Pausits, 2011).

5.8.8 Level of importance given to KM Information Systems for transforming data into knowledge vs. use of knowledge (derived from KM systems) to monitor and improve academic and research methods, standards and output

Variables	Constructs	Correlation
How important are Knowledge Management Information Systems for transforming data into knowledge	<ul style="list-style-type: none"> • Process & Transformation of Knowledge • Interpretation (data given meaning) 	(0.694, p<0.01)
The knowledge gathered from the Knowledge Management systems is being used to monitor and improve academic and research methods, standards and output	<ul style="list-style-type: none"> • Learning (Action Taken) 	

Table 27: Level of importance given to KM Information Systems vs. use of knowledge (from KM systems) to monitor and improve academic and research methods, standards and output

Results revealed a strong positive correlation between the importance given to KM systems and the use of these system to improve academic and research methods, standards and output (0.694, p<0.01). Studies by Loh, *et al.* (2003), Chandarasupsang, *et al.* (2006), Delavari, Phon-Amnuaisuk and Beikzadeh (2008), Sahay and Mehta (2010) and Ghaffari, Rafeie and Ashtiani (2012) found that when KM and BI Information Systems are integrated into academic teaching, learning and research, it leads to significant benefits such an improvement in quality, productivity, efficiency, interactivity, collaboration and flexibility which inevitable lead to holistic enhancement of academic and research standards and output. Academic and research standards and output are the most critical aspect of any university which in turn leads to the generation and dissemination of knowledge (Oosterlinck and Leuven, 2002; Metaxiotis and Psarras, 2003).

5.8.9 Provision of Knowledge Management systems to facilitate academic research vs. use of knowledge (derived from KM systems) to monitor and improve academic and research methods, standards and output

Variables	Constructs	Correlation
Does your Division/Department provide Knowledge Management systems that facilitate academic research?	<ul style="list-style-type: none"> • Knowledge Creation • Knowledge Transfer 	(0.641, p<0.05)
The knowledge gathered from Knowledge Management systems is being used to: 'monitor and improve academic and research methods, standards and output'	<ul style="list-style-type: none"> • Learning (Action Taken) 	

Table 28: Provision of KM systems to facilitate academic research vs. use of knowledge (from KM systems) to monitor and improve academic and research methods, standards and output

This result is an interesting one as it shows a positive relationship between the provision of KM systems to facilitate academic research and the use of knowledge gathered from KM systems to monitor and improve academic and research methods, standards and output.

Research activities are one of the primary drivers of knowledge creation and innovation at universities (Metaxiotis, *et al.*, 2003; Chandarasupsang, *et al.*, 2006). Findings and views by Harel and Sitko (2003), Loh, *et al.* (2003), Metaxiotis, *et al.* (2003) and Kalaiselvi and Uma (2010) highlight the strategic roles of KM systems for enhancing the areas of research in Higher Education in various parts of the world. This in turn contributes to the improvement of research standards, methods and output.

This is also linked to organisational learning as academic research creates knowledge and promotes learning and as asserted by Lubega, Omona and van der Weide (2011), HE institutions need to align operational processes and organisational learning with KM technology to achieve their goals.

5.8.10 Use of knowledge (derived from KM systems) to identify new methods/ways of operating vs. the use of Knowledge Management systems and practices to promote continuous learning

Variables	Constructs	Correlation
The knowledge gathered from the Knowledge Management systems is being used to: 'identify new methods/ways of operating'	<ul style="list-style-type: none"> Knowledge Capabilities 	(0.631, p<0.05)
The use of Knowledge Management systems and practices at your institution has 'provided a means of continuous learning'	<ul style="list-style-type: none"> Learning (Action Taken) 	

Table 29: Use of knowledge (from KM systems) to identify new methods/ways of operating vs. the use of KM systems and practices to promote continuous learning

Results indicate a strong correlation between the use of KM to identify new methods and ways of operating and the use of KM systems and practices to promote continuous learning at the institutions. Tippins and Sohi (2003), Garcia-Morales, Llorens-Montes and Verdu-Jover (2007), Phang, Kankanhalli and Ang (2008) and namely, Hung *et al.* (2011) found that organisation learning through KM fostered innovation and newer methods of processes and operations. This holistically can allow the institutions' to 'learn' to identify new and innovative ways of improving their institution through KM.

5.8.11 Provision of KM systems to facilitate academic research vs. the use of KM systems and practices to enhance academic research activity

Variables	Constructs	Correlation
Does your Division/Department provide Knowledge Management systems that facilitate academic research?	<ul style="list-style-type: none"> Knowledge Creation Knowledge Transfer 	(0.555, p<0.05)
The use of Knowledge Management systems and practices at your institution has 'enhanced academic research activity'	a. Efficient Firms / Competitive Advantage	

Table 30: Provision of KM systems to facilitate academic research vs. the use of KM systems and practices to enhance academic research activity

It is shown that the provision of KM systems to facilitate academic research is correlated to the improvement of academic research activity (0.555, $p < 0.05$). This finding is supported by Loh, *et al.* (2003), Metaxiotis and Psarras (2003) and Chandarasupsang, *et al.* (2006) and Mamta (2012) who show how the strategic use of KM and KM systems does in fact contribute to the improvement of research activity. Research is a key output of any public university and serves as the chief knowledge creating process in Higher Education (Oosterlinck and Leuven, 2002).

5.8.12 Extent of usage of knowledge repositories vs. the use of KM systems and practices to promote continuous learning

Variables	Constructs	Correlation
Has the usage of knowledge repositories increased at the institution relative to one year ago?	<ul style="list-style-type: none"> • Knowledge Creation • Knowledge Transfer 	(0.698, $p < 0.01$)
The use of Knowledge Management systems and practices at your institution has 'provided a means of continuous learning'	b. Learning (Action Taken)	

Table 31: Extent of usage of knowledge repositories vs. the use of KM systems and practices to promote continuous learning

This logical finding indicates that the frequency of use of knowledge repositories is positively correlated to continuous learning within the organisation via the use of KM systems. Knowledge repositories are large storage systems that form an important part of KM systems. They are used to store large volumes of academic and research content such as theses, dissertations, publications, articles, books and other academic material. Therefore they promote the creation, transfer and dissemination of knowledge and in turn facilitate organisational learning. Metaxiotis, *et al.* (2003) found that a learning organisation is one that promoted effective organisational learning by giving priority to KM systems (capture, storage, sharing, retrieval and utilisation of knowledge) that builds from research, participation in international conferences, publications, knowledge repositories, knowledge networks, expert systems for specific problem-solving and many more. This finding concurs with other findings related to KM and KM systems and its promotion of organisational learning such as Lubega, Omona and van der Weide (2011), Goyal and Rajan (2012) and

Mamta (2012) as well as Garcia-Morales, Llorens-Montes and Verdu-Jover (2007), Peck *et al.* (2009) and Hung, *et al.* (2011) who used the Organisation Learning theory (Argyris and Schön, 1978).

5.9 E-Learning Correlations

As detailed the literature review, e-Learning has successfully embedded itself as effective online method of pedagogy in both developed and even developing countries around the world. Relating to this, it was also found in this study that almost 90% of the leading African universities sampled were utilising e-Learning as a pedagogical tool (as shown in 4.7.9). The table below demonstrates some of the key e-Learning correlations.

5.9.1 Use of e-Learning as a pedagogical tool vs. the enhancement of academic teaching and learning via e-Learning

Variables	Constructs	Correlation
Does your institution use e-Learning as a pedagogical tool?	<ul style="list-style-type: none"> • Knowledge creation • Knowledge Transfer 	(0.577, p<0.05)
The use of e-Learning has 'Enhanced academic teaching and learning at your institution'	<ul style="list-style-type: none"> • Efficient Firms / Competitive Advantage 	

Table 32: Use of e-Learning as a pedagogical tool vs. the enhancement of academic teaching and learning via e-Learning

This is a key finding which indicates a significant positive relationship between the use of e-Learning and the enhancement of pedagogy at the institutions. The descriptive statistics (4.8.2) has shown that 93.3% of the respondents agreed that the use of e-Learning has enhanced academic teaching and learning at the respective institution with 60% strongly agreeing. The literature review depicts how e-Learning is seen as a strategic digital advent in the Higher Education realm which is effectively and successfully enabling the creation and dissemination of knowledge across the barriers of time and space (Zazaleena, *et al.*, 2011). Furthermore, both private and public around the world are embracing e-Learning as a strategy

to enhance their teaching and learning processes and promote effective knowledge transfer (Kuntoro and Al-Hawamdeh, 2003). This correlation therefore concurs with an abundance of studies that show how e-Learning has enhanced academic teaching and learning at institutions in both developed and developing countries. These studies include Marshall, *et al.* (2003), Leem and Lim (2007), Desai, Hart and Richards (2009), Krajcso (2009), Boling, *et al.* (2012) and Xiangqian and Fuqing (2012) among many more.

5.9.2 The use of e-Learning to break geographical barriers in terms of teaching and learning vs. the use of e-Learning to make education more affordable for students

Variables	Constructs	Correlation
The main reason/s for the use of e-Learning at your institution is to ‘break geographical barriers in terms of teaching and learning’	• Efficient Firms / Competitive Advantage	(0.749, p<0.01)
The main reason/s for the use of e-Learning at your institution is to ‘make education more affordable for students’	• Efficient Firms / Competitive Advantage	

Table 33: Use of e-Learning to break geographical barriers for teaching and learning vs. the use of e-Learning to make education more affordable for students

This was a key finding which not only indicates a positive correlation, but also a strong relationship between the use of e-Learning to break geographical barriers in terms of teaching and learning and the use of e-Learning to make education more affordable for students.

As mentioned in Chapter 4, Africa is home to some of the poorest nations and countries in the world. Therefore, education should be seen as a critical tool for the empowerment and upliftment of African society. Universities in Africa face various challenges both from a student and institutional perspective and this includes challenges such as infrastructure, economic, staffing, financial, political, poverty and many more (Thiaw, 2007; Mwapachu, 2010; Nyerere, Gravenir and Mse, 2012). Hence, students in Africa encounter these challenges in terms of financial and other economic challenges, which prevent them from physically attending lectures. The rising costs of daily living expenses can often overshadow the ability to purchase books and the utilisation of money for daily transportation to lectures, food, clothing and other logistical costs. E-Learning provides a means of combatting these

challenges by allowing the student to access learning content (notes, podcasts) from almost any location that has access to a computer and internet such as a public library, internet café and places with wireless access. This can allow a student to spend more time with the actual learning content and only attend lectures for practical learning exercises, problem areas and examinations. E-Learning must not be seen as a replacement for traditional learning, but rather as a means of making education accessible and affordable for students.

This is supported by other studies such as Mason and Rennie (2004), Holmes and Gardner (2006) and Boling, *et al.* (2012) that showed how e-Learning went beyond borders to deliver education and, thereby addressing logistical, infrastructural and financial constraints and cutting costs and expenses at the same time for both institution and student. As conveyed by Boling, *et al.* (2012), a good e-Learning strategy focuses on ‘bringing the campus to the students’, while Holmes and Gardner (2006) conveyed that e-Learning must be seen as an innovative means to go beyond distance and be a strategic enabler to education.

5.9.3 The use of e-Learning to make education more affordable for students vs. the use of e-Learning to make the institution a more effective knowledge provider to students

Variables	Constructs	Correlation
The use of e-Learning at your institution is to ‘to make the institution a more effective knowledge provider to students.’	• Efficient Firms / Competitive Advantage	(0.702, p<0.05)
The use of e-Learning at your institution is to ‘make education more affordable for students’	• Efficient Firms / Competitive Advantage	

Table 34: Use of e-Learning to make education more affordable for students vs. the use of e-Learning to make the institution a more effective knowledge provider to students

This was also key finding which relates to the preceding argument (5.9.2). The use of e-Learning to make the institution a more effective knowledge provider to students is positively correlated to the use of e-Learning to make education more affordable for students. Students may not have to incur physical expenses (as shown in 5.9.2) if e-Learning can be used effectively for knowledge provision. This concurs with Mason and Rennie (2004), Holmes and Gardner (2006) and Boling, *et al.* (2012). This finding also concurs with Kende, Noszkay

and Seres (2007), Maier and Schmidt (2007) and Krajcsó (2009), whereby it is indicated that the strategic use of e-Learning will in turn make the institution a more effective knowledge provider to the learning community, namely the students. The authors Leem and Lim (2007) found that e-Learning could produce high quality academic programs and turn universities into high quality learner-centered educational entities and knowledge providers.

5.10 Web 2.0 Correlations

Building on the platform of e-Learning, comes Web 2.0 which as shown in the literature review is known as the interactive web (Shirky, 2003) and is now being successfully used to replace the traditional read-only e-Learning platform (Cetina, 2005; Goldstein, 2009; Eales-Reynolds *et al.*, 2012; Kose, 2012). Web 2.0 facilitates the learning process as it offers a variety of interactive software applications that can be used effectively for educational purposes (Grosbeck, 2009). Web 2.0 has become a key platform for knowledge creation, sharing and dissemination (Pettenati and Ranier, 2006; Brandtzaeg and Heim, 2007) and takes e-Learning to another level by providing students with the opportunity to effectively interact with course material, teacher and other students.

The frequency analysis in Chapter 4 (4.7.11) showed that few institutions made effective use of Web 2.0 technologies such as wiki's (21.4%), blogs (35.7%), podcasting (30.8%) and videocasting (46.2%) as a pedagogical tool. In addition, Web 2.0 was not being used from the creation, management and dissemination of knowledge. The results showed that only 6.7% (1 university) indicated that Web 2.0 was being highly used in the creation of knowledge. Only 40% indicated that it was highly used in the transfer and dissemination of knowledge. Therefore, the frequency analysis deduces that Web 2.0 is not being used effectively by these leading universities, especially when it comes to the creation, transfer and dissemination of knowledge by leading African universities.

Hence, it is important to see the influence of Web 2.0 as a KM tool for the creation, management and dissemination of both e-Learning and knowledge. Below are some of the main Web 2.0 correlations in relation to this.

5.10.1 The effectiveness of Web 2.0 technology (Podcasting) vs. the use of e-Learning to make education more affordable for students

Variables	Constructs	Correlation
Rate the effectiveness of Web 2.0 technologies used at your institution- Podcasting	<ul style="list-style-type: none"> • Knowledge Creation • Knowledge Transfer 	(0.723, p<0.05)
The main reason/s for the use of e-Learning at your institution is to ‘make education more affordable for students’	<ul style="list-style-type: none"> • Efficient Firms/Competitive Advantage 	

Table 35: The effectiveness of Web 2.0 technology (Podcasting) vs. the use of e-Learning to make education more affordable for students

This indicates a strong relationship between the use of e-Learning to make education more affordable for students and the effective use of podcasting. Podcasting is a very effective Web 2.0 technology and widely used in developed countries. There is no literature that directly supports podcasting in relation to making education more affordable to students. This finding is therefore empirical in nature. However, studies by Chan and Lee (2005), Fernandez, Simo and Sallan (2009) and Usluel and Mazman (2009) show podcasting as a strategic enabler of distance learning, collaboration and interactivity. This means that a student can still learn effectively even whilst not being at class.

Podcasting is also a key attribute of e-Learning and, therefore, podcasting can eliminate physical barriers or distance to learning. As shown in 5.9.2, financial and economic constraints can prevent students from attending lectures or classes on a daily basis. Podcasting provides a means to still be able to access learning content via podcasts onto their computers and even mobile devices. It also allows students to interact with the learning content and have the reassurance of the lecturer’s or teacher’s voice (Fernandez, Simo and Sallan, 2009; Maharaj, 2010). Therefore, podcasting has the potential to make learning affordable despite physical or logistical expenses that can be encountered by students in Africa.

5.10.2 Use of Web 2.0 technologies in the creation of knowledge vs. use of e-Learning to make the institution a better knowledge provider to students

Variables	Constructs	Correlation
How often is Web 2.0 technologies (Social Media, Podcasting, Wiki's, Blogs) used by your institution when it comes to 'creation of knowledge'	• Knowledge Creation	(0.613, p<0.05)
The use of e-Learning has 'made your institution a better knowledge provider to students'	c. Efficient Firms/Competitive Advantage	

Table 36: Use of Web 2.0 technologies in the creation of knowledge vs. use of e-Learning to make the institution a better knowledge provider to students

Results show that there is a positive correlation between the use of Web 2.0 technologies in the creation of knowledge and the use of e-Learning to make the institution a better knowledge provider to students. Web 2.0 has transformed e-Learning in to an interactive learning platform taking it to another level by adding the dimension of interactivity, collaboration and two-way communication (Birdsall, 2007; Kesim and Agaoglu, 2007; Nugultham, 2012). Web 2.0 can therefore enhance e-Learning by making it a more interactive and effective KM tool for knowledge provision. This is supported by findings from other studies such as Vratulis and Dobson (2008), Kose (2010), Ertmer, *et al.* (2011), Bennett *et al.* (2012), Forkosh-Baruch and Hershkovitz (2012) and Loureiro, Messias and Barbas (2012).

In aggregate, these studies show that when Web 2.0 is integrated into e-Learning, it enables the institution to become a better knowledge provider by allowing knowledge to be passed to learners in a more interactive, collaborative, flexible, fun and multi-modal fashion. This also seems to have a positive impact on both learners and teachers, and holistically the institution.

5.10.3 Use of Web 2.0 technology in the creation of knowledge vs. the use of Web 2.0 to enhance academic teaching and learning at the institution / make the institution a better knowledge provider to students

Variables	Constructs	Correlation
How often is Web 2.0 technologies (Social Media, Podcasting, Wiki's, Blogs) used by your institution when it comes to: Creation of knowledge	Knowledge Creation, Knowledge Transfer	
The use of Web 2.0 (Social Media, Podcasting, Wiki's, Blogs) has	Efficient Firms / Competitive Advantage	(0.585, p<0.05)
- Enhanced academic teaching and learning at your institution		
- Made your institution a better knowledge provider to students		(0.595, p<0.05)

Table 37: Use of Web 2.0 technology in the creation of knowledge vs. the use of Web 2.0 to (enhance academic teaching and learning at the institution) and (make the institution a better knowledge provider to students)

Results show that there is a strong positive relationship between how often Web 2.0 is used in the creation of knowledge at the institution and,

- Enhanced academic teaching and learning at the institution through use of Web 2.0 and
- Making the institution a better knowledge provider to students through use of Web 2.0

This finding relates to preceding findings (5.10.2), and is supported by similar theory. Both these findings concur with findings from other studies, namely Kose (2010), Williams, Karousou and Mackness (2011), Eales-Reynolds, *et al.* (2012) and Silvia and Beatriz (2012). These studies as described in the literature review reveal how Web 2.0 stimulates knowledge creation and sharing and consequently enhances the teaching and learning process. Furthermore, it was shown by Hargon (2008) and Grosseck (2009) that one of the key strategic benefits of Web 2.0 in Higher Education was effective knowledge creation and

dissemination, especially when Web 2.0 was integrated into academic activities across an institution. This further enhanced the teaching and learning process. In addition, another benefit found included effective sharing of information, knowledge and experiences through Web 2.0 technologies such as blogs, wikis, podcasting and videocasting. This in turn increased knowledge provision and sharing among students. Studies listed above in 5.10.2 such as Vratulis and Dobson (2008), Ertmer, *et al.* (2011), Bennett *et al.* (2012), Loureiro, Messias and Barbas (2012) among others also support this finding.

5.10.4 Frequency of use of Web 2.0 technology in the creation of knowledge vs. the use of KM systems and practices to enhance academic research activity

Variables	Constructs	Correlation
How often is Web 2.0 technologies (Social Media, Podcasting, Wiki's, Blogs) used by your institution when it comes to: 'Creation of knowledge'	• Knowledge Creation	(0.745, p<0.01)
The use of Knowledge Management systems and practices at your institution has: 'Enhanced academic research activity'	d. Efficient Firms/Competitive Advantage	

Table 38: Frequency of use of Web 2.0 technology in the creation of knowledge vs. the use of KM systems and practices to enhance academic research activity

This correlation indicates a strong relationship between the frequency of use of Web 2.0 in the creation of knowledge (Teaching and Learning) and the use of KM system to enhance academic research activity at the institutions. Research is one of the most fundamental outputs of a university. It has been shown by Loh, *et al.* (2003), Chandarasupsang, *et al.* (2006) and Bennett *et al.* (2012) in universities around the world how Web 2.0 is being used to promote interactive and online research, and this is revealing significant benefits such as collaborative research with experts around the world, real time discussions with other researchers and universities, problem solving and usage of online research tools from other universities. Therefore, universities in Africa should be integrating Web 2.0 into their research strategy as a strategic enabler of online academic research.

5.10.5 Web 2.0 and Efficient Firms / Competitive Advantage

5.10.5.1 The use of Web 2.0 (to enhance Teaching and Learning) in relation to overall efficiency, research activity and competitiveness at the institution

The correlations below indicate that the Web 2.0 has a direct and positive influence on the performance and competitive advantage of Higher Education institutions.

Variables	Constructs	Correlation
The use of Web 2.0 (Social Media, Podcasting, Wiki's, Blogs) has 'enhanced academic teaching and learning at your institution'	<ul style="list-style-type: none"> Efficient Firms/Competitive Advantage 	
The use of Knowledge Management systems and practices at your institution has <ul style="list-style-type: none"> 'Improved overall efficiency' 'Enhanced academic research activity' 'Led to your institution becoming more competitive' 	<ul style="list-style-type: none"> Efficient Firms/Competitive Advantage 	(0.543, p<0.05) (0.585, p<0.05) (0.599, p<0.05)

Table 39: Use of Web 2.0 (for enhanced academic teaching and learning) vs. efficient firms / competitive advantage

These are interesting findings that indicates that there are positive correlation between the use of Web 2.0 to enhance academic teaching and learning at the institution and use of KM systems and practices for:

- Improved overall efficiency
- Enhanced academic research activity
- Increased competitiveness

5.10.5.2 The use of Web 2.0 (in making the institution a better knowledge provider to students) in relation to overall efficiency, research activity and competitiveness

Variables	Constructs	Correlation
The use of Web 2.0 (Social Media, Podcasting, Wiki's, Blogs) has 'made your institution a better knowledge provider to students'	<ul style="list-style-type: none"> • Efficient Firms/Competitive Advantage 	
The use of Knowledge Management systems and practices at your institution has <ul style="list-style-type: none"> - 'Improved overall efficiency' - 'Enhanced academic research activity' - 'Led to your institution becoming more competitive' 	e. Efficient Firms/Competitive Advantage	(0.600, p<0.05) (0.595, p<0.05) (0.692, p<0.01)

Table 40: Use of Web 2.0 (for making the institution a better knowledge provider to students) vs. efficient firms / competitive advantage

Similar to preceding correlations, these results also reveal that the use of Web 2.0 to make the institution a better knowledge provider to students is positively correlated to the use of KM systems and practices for:

- Improved overall efficiency
- Enhanced academic research activity
- Increased competitiveness

In relation to both of the findings in the above tables, Table 39 and Table 40, studies by Bennett, *et al.* (2012) and Chandarasupsang, *et al.* (2006) show how Web 2.0 enhances collaborative research activity at universities in both developed and developing countries. Similarly, Kose (2010), Bennett, *et al.* (2012), Loureiro, Messias and Barbas (2012) and Silvia and Beatriz (2012) show how Web 2.0 enabled more efficient teaching and learning. As a result, it made the institution a more effective knowledge provider to students which

also contributed to overall institutional efficiency. For example, the use of Web 2.0 for providing learning content (knowledge) online and at ‘real time’ prevents unnecessary waiting time for notes, administrative delays, and other physical and logistical delays.

Furthermore, Web 2.0 technology promotes interactive communications between students and instructors and, hence they can speak to instructors’ interactively through Web 2.0 technology such as blogs and wikis and have their questions answered at a ‘click of a button’ (Silvia and Beatriz, 2012). This also relates to efficiency. Authors such as Fernandez, Simo and Sallan (2009), Usluel and Mazman (2009) and Williams, Karousou and Mackness (2011) showed how Web 2.0 even enhanced efficiency of the institution when it came to distance learning. Increased efficiency of an institution will in turn lead to increased competitiveness (Kende, Noszkay and Seres, 2007; Cranfield and Taylor, 2008). The use of Web 2.0 in teaching and learning also directly influences competitiveness as it has been shown how Web 2.0 based e-Learning which improves the institution’s academic reputation in the way they teach and learn which then makes the institution a more attractive place to study. This concurs with the findings and views of Ndubisi (2006), Krajcso (2009) and Carmichael and Burchmore (2010), as well as Usluel and Mazman (2009) from a distance learning perspective.

5.10.6 The use of KM systems and practices to improve overall efficiency vs. the use of KM systems and practices in adding competitiveness to the institution

Variables	Constructs	Correlation
The use of Knowledge Management systems and practices at your institution has: ‘Improved overall efficiency’	• Efficient Firms/Competitive Advantage	(0.897, p<0.01)
The use of Knowledge Management systems and practices at your institution has: ‘Led to your institution becoming more competitive’	f. Efficient Firms/Competitive Advantage	

Table 41: Use of KM systems and practices to improve overall efficiency vs. use of KM systems and practices in adding competitiveness to the institution

This finding showed a very strong and positively significant relationship between the use of KM systems and practices for improved overall efficiency and the use of KM systems and

practices adding to competitiveness of the institution. Increased efficiency of an institution from both an academic and operational side such as faster decision-making, increased administrative processing, faster response time to students and more efficient delivery of academic and research based services will in turn lead to increased performance and competitiveness. In this fast paced society, learners from anywhere in the world do not wish to study/learn at an institution that has a slow response time. Therefore by utilising KM and KM systems to improve overall institutional efficiency, it can directly influence an institutions competitiveness. This has been proven by an abundance of studies such Metaxiotis and Psarras (2003), Chandarasupsang, *et al.*(2006), Yang (2007), Cranfield and Taylor (2008), Delavari, Phon-Amnuaisuk and Beikzadeh (2008), Chen, Huang and Cheng (2009), Lubega, Omona and van der Weide (2011), Pircher and Pausits (2011) and Goyal and Rajan (2012) among many others who found that the effective practice of KM and KM systems utilisation does lead to an overall improvement in institutional performance and competitiveness.

5.11 Inverse Correlations

Amongst the abundant causal positive correlations, results also revealed negative (inverse) causal relationships. Explanations and arguments are hereby provided.

5.11.1 Frequency of scanning the Higher Education environment for collection of data/information vs. enhancing academic teaching and learning via e-Learning

Variables	Constructs	Correlation
How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?	• Scanning (data Collection)	(-0.634, p<0.05)
The use of e-Learning has 'Enhanced academic teaching and learning at your institution'	• Efficient Firms / Competitive Advantage	

Table 42: Frequency of scanning the Higher Education environment (data collection) vs. enhancing academic teaching and learning via e-Learning

This result indicates that the frequency of scanning the HE environment and collecting data/information inversely affects the use of e-Learning to enhance academic teaching and learning. The result seems illogical and is not conclusive.

However, a valid argument is that, and as shown under 4.5.1, majority of the 15 leading African institutions (66.6%) were not scanning the Higher Education environment regularly and collecting information for strategic use. Hence, if they are not scanning the HE environment regularly, then they will not be connected to how other universities around the world (namely universities in developed countries) are enhancing academic teaching and learning (academia) and pedagogy through e-Learning. Hence this can inversely affect how e-Learning is used at these African universities for the enhancement of teaching and learning.

5.11.2 The use of e-Learning to make education more affordable for students vs. the use of KM systems and practices for enhancing academic research activity at the institution

Variables	Constructs	Correlation
The main reason/s for the use of e-Learning at your institution is to ‘make education more affordable for students’	• Efficient Firms / Competitive Advantage	(-0.602, p<0.05)
The use of Knowledge Management systems and practices at your institution has ‘enhanced academic research activity at the institution’	• Efficient Firms/Competitive Advantage	

Table 43: use of e-Learning to make education more affordable for students’ vs. the use of KM systems and practices for enhancing academic research activity at the institution

This finding indicated an inverse relationship. However, despite being an illogical correlation, it creates a valid argument. At present, frequency results indicate that KM systems are not being used to enhance research activity and neither is e-Learning being used to make education more affordable. If neither is being used effectively, there can be no positive correlation or relationship and an adverse relationship can occur.

5.11.3 Effectiveness of Web 2.0 technologies (Wiki/Video-casting) vs. the use of KM systems and practices as a means of continuous learning

Variables	Constructs	Correlation
Rate the effectiveness of Web 2.0 technologies used at your institution— - Wiki - Video-casting	<ul style="list-style-type: none"> • Knowledge Creation • Knowledge Transfer 	 (-0.587, p<0.05) (-0.597, p<0.05)
The use of Knowledge Management systems and practices at your institution has ‘Provided a means of continuous learning’	<ul style="list-style-type: none"> • Efficient Firms/Competitive Advantage 	

Table 44: Effectiveness of Web 2.0 technologies (Wiki / Video-casting) vs. the use of KM systems and practices as a means of continuous learning

This finding indicates that an inverse relationship exists between the use of wikis and video-casting as a Web 2.0 pedagogical tool at the institution and the use of KM systems and practices provide a means of continuous learning. There are various reasons for this negative correlation. Firstly, as shown in frequency results (4.7.11), only 21.4% of the respondents agreed that wiki’s were effectively used as Web 2.0 technologies at their institutions. In addition, only 46% agreed that video-casting was used as an effective Web 2.0 technology at their institutions. This means that a considerable number of respondents did not utilise these technologies. Furthermore, based on the sample size of 15 respondents, the number of those respondents that do not use these technologies will inadvertently create a negative result.

5.11.4 Effectiveness of Web 2.0 technologies (Social Media) vs. the use of KM systems and practices for enhancing academic research activity at the institution

Variables	Constructs	Correlation
Rate the effectiveness of Web 2.0 technologies used at your institution— ‘Social Media (e.g. Twitter, Facebook, Google +, Youtube)’	g. Knowledge Creation h. Knowledge Transfer	(-0.519, p<0.05)
The use of Knowledge Management systems and practices at your institution has ‘enhanced academic research activity at the institution’	i. Efficient Firms/Competitive Advantage	

Table 45: Effectiveness of Web 2.0 technologies (Social Media) vs. the use of KM systems and practices for enhancing academic research activity at the institution

Similar to the preceding argument in 5.11.3, there seems to be an inverse relationship between the use of social media as a Web 2.0 pedagogical tool at the institution and the use of KM to enhance academic research activity at the institution. Again, based on the sample size of 15 respondents, even a few ‘negative’ responses can inversely affect the entire correlation. In this case, and with reference to 4.7.11, social media is being used (65% agreement), hence 35% are not using it. Further, as shown under 4.8.4, there was a high degree of uncertainty by respondents as to whether KM systems and practices did enhance academic research activity. This may be the reason for the negative result.

5.12 Regression Analysis

Multiple Regression analysis was carried out on the quantitative data obtained via the questionnaire. The aim of the regression was to apply the theoretical framework to the study results. This could help predict the direction that the respective institutions could go if they engage with KM on a strategic level with regards to the constructs of the frameworks. The regression analysis entailed testing the independent variables against dependent variables of the models (Lind, Marchal and Wathen, 2010). The models used, as shown in Chapter 2, were the Kogut and Zander (1992) Knowledge Management Model, Argyris and Schön (1978) Organisational Learning theory and the Schein (1985) Organisational Culture model.

The questions of the questionnaire were built around the constructs of each model including the dependent and independent variables.

The three main tests were the R-Square, ANOVA and coefficient. The R-Square analysis is usually known as the determination/multiple determination, and is a measure of the closeness of data to the regression line. The closer the R-squared is to '1' then the better and more accurate the regression model suits the data. This ANNOVA indicates whether the independent variables collectively affect the dependant. The Coefficients tests breaks down the collective ANOVA test and shows how the individual independent variables affect the dependent variable.

5.12.1 Organisational Learning Model (Argyris and Schön, 1978)

The following regression tests the Argyris and Schön (1978) Organisational Learning Model in relation to the study.

For ease of understanding, the model is graphically presented hereunder (Figure 25).

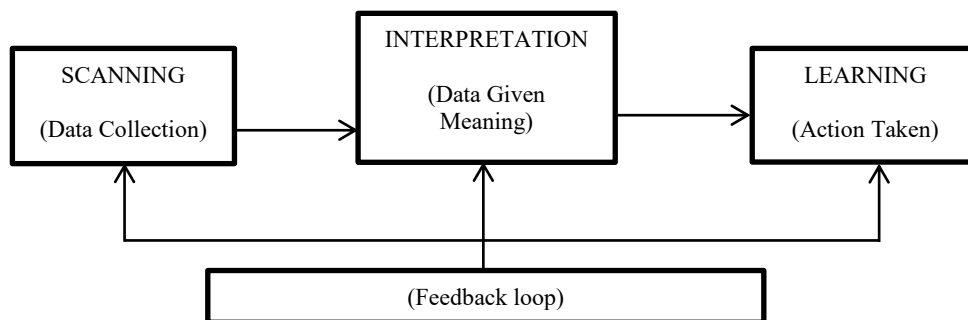


Figure 25: Organisational Learning Theory Framework

Variables tested

Construct	Type	Questions relating to Construct from questionnaire
Scanning (Data collection)	Independent	1, 2.1, 2.2, 2.3, 2.4, 2.5
Interpretation (Data given meaning)	Independent	7, 8
Learning (Action taken)	Dependent	6, 9, 20, 23.4

Table 46: Constructs and variables regression tested for Organisational Learning framework

Variables Entered/Removed

These variables are the actual questions for the question number shown in Table 46. The question numbers are next to each variable in brackets.

Mode 1	Variables Entered	Variables Removed	Method
1	Types of Knowledge Management Information Systems that are used (Q 8)		Enter
	Redefining Institutional strategy (Q 2.5)		
	Improving pedagogical practices (Q 2.4)		
	Monitoring and keeping abreast of other universities' standards and practices (Q 2.1)		
	Improving technological practices (Q 2.3)		
	Improving processes and operations ^b (Q 2.2)		

Table 47: Variables Entered/Removed for Organisational Learning framework

- a. Dependent Variable: Transforming data into knowledge for better decision-making (Q6)
- b. All other variables entered (as shown in table)

Model Summary

R-Square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.976 ^a	.954	.884	.138

Table 48: R-Square analysis for Organisational Learning Theory regression

a. Predictors: (Constant)

- Types of Knowledge Management Information Systems that are used
- Redefining Institutional strategy
- Improving pedagogical practices
- Monitoring and keeping abreast of other university's standards and practices
- Improving technological practices
- Improving processes and operations

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.560	6	.260	13.685	<u>.012</u>^b
Residual	.076	4	.019		
Total	1.636	10			

Table 49: ANOVA for Organisational Learning Theory regression

a. Dependent Variable: Transforming data into knowledge for better decision-making (Q 6)

b. Predictors: (Constant),

- Types of Knowledge Management Information Systems that are used

Scanning of the global HE Environment and collection of Data for:

- Redefining Institutional strategy

- Improving pedagogical practices
- Monitoring and keeping abreast of other university's standards and practices
- Improving technological practices
- Improving processes and operations

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.042	.214		-.198	.853
Monitoring and keeping abreast of other university's standards and practices	-.053	.054	-.114	-.968	.388
Improving processes and operations	-.361	.139	-.417	-2.604	.060
Improving technological practices	.071	.124	.092	.577	.595
Improving pedagogical practices	.440	.071	.762	6.203	<u>.003</u>
Redefining Institutional strategy	.398	.061	.818	6.519	<u>.003</u>
Types of Knowledge Management Information Systems that are used	.049	.041	.141	1.189	.300

Table 50: Coefficients analysis for Organisational Learning Theory

Dependent Variable: Transforming data into knowledge for better decision-making

Explanation and Interpretation of Regression equation

Let Y = Transforming data into knowledge for better decision-making,

X₁ = Monitoring and keeping abreast of other university's standards and practices,

X₂ = Improving processes and operations,

X₃ = Improving technological practices,

X₄ = Improving pedagogical practices,

X₅ = Redefining Institutional strategy,

X₆ = Types of Knowledge Management Information Systems that are used, then the regression equation is:

$$Y = -0.042 \text{ (Constant)} - 0.053 X_1 - 0.361 X_2 + 0.071 X_3 + 0.440 X_4 + 0.398 X_5 + 0.049 X_6$$

Therefore by keeping all other variables constant,

- A unit increase in X₁ leads to a 5.3% decrease in Y
- A unit increase in X₂ leads to a 36.1% decrease in Y
- A unit increase in X₃ leads to a 7.1% increase in Y
- A unit increase in X₄ leads to a 44% increase in Y
- A unit increase in X₅ leads to a 39.8% increase in Y
- A unit increase in X₆ leads to a 4.9% increase in Y

Note: All of the values above add up to more than 100%. This suggests that the relationship between the variables may be non-linear.

The most significant factors are X₄ (p=0.003) and X₅ (p=0.003). This shows that an increase in the improvement of pedagogical practices and the redefinition of institutional strategy has a direct influence on better decision-making at the universities. The test therefore indicates that the more the institutions in Africa scan the HE environment and collect relevant information on the environment and then transform that into knowledge in relation to redefining institutional strategy and improving pedagogical practices for the institution, then

it will lead to an improvement in decision-making in these areas (by 44% and 39.8% respectively). This can in turn promote organisational learning.

In addition, there was a strong positive correlation between the use of data collected (through scanning of HE environment) for redefining institutional strategy and the use of KM and BI towards the redefinition of the institutions' processes and operations of the institution (0.700, $p < 0.05$). Furthermore, there is a positive correlation between the use of data collected (through scanning of HE environment) for redefining institutional strategy and the use of KM systems and practices as a means of continuous learning (0.662, $p < 0.05$). This reinforces the argument that KM and BI are facilitators of a Learning Organisation as demonstrated by Bhatt and Zaveri (2002), Bontis, Crossan and Hulland (2002), Farrell and Oczkowski (2002), Garcia-Morales, Llorens-Montes and Verdu-Jover (2007) and Hung, *et al.* (2011) among others.

The frequency analysis (4.7.3) confirms that the more powerful and sophisticated type of KM and BI Systems such as Digital Dashboards, Online Analytical Processing (OLAP), Predictive systems and Institutional Intelligence systems are not effectively used. These types of KM and BI Information Systems are crucial for better decision-making and are prevalent in developed countries (Delavari, Phon-Amnuaisuk and Beikzadeh, 2008; Sahay and Mehta, 2010; Sharman, 2010; Goyal and Rajan, 2012; King, 2013). This lack of adoption is evident in that an increase in X_6 (Types of Knowledge Management Information Systems that are used) leads only to a 4.9% increase in Y (better decision making).

Similarly, it is shown that an increase in X_2 (improving processes and operations) leads to a 36.1% decrease in Y. This would imply that knowledge (derived from environmental scanning) and use of that knowledge for improving institutional processes and operations would have a negative impact on better decision-making. This counter intuitive finding requires further analysis and suggests that the relationship between the variables may be non-linear. However, there was a strong positive correlation between the use of data collected (through scanning of HE environment) for redefining institutional strategy and the use of KM and BI towards the redefinition of the institutions' processes and operations of the institution (0.700, $p < 0.05$). Secondly, the frequency analysis shows that most of the institutions were not scanning the HE environment regularly. This would in turn mean that adequate information is

not being collected regularly, and this is not being transformed into knowledge that can be used to improve processes and operations.

Overall, the R-Squared value is 0.954. This indicates that 95.4% of the time, changes in the dependant variables can be explained by changes in the independent variables (Predictors). The ANOVA test in this case ($p=0.012$) shows that the independent variables collectively affect the dependant variable. However, improving pedagogical practices (X_4) and redefining institutional strategy (X_5) are the most significant influencers of better decision-making at the universities. This is the crux of Argyris and Schön (1978) Organisational Learning Theory framework. Other studies that support this finding that utilised the Argyris and Schön (1978) theory in both a business and education contexts includes Bhatt and Zaveri (2002), Janz and Prasarnphanich (2003), Garcia-Morales, Lopez-Martin and Llamas-Sanchez (2006), Garcia-Morales, Llorens-Montes and Verdu-Jover (2007) , Peck, *et al.* (2009), Barth and Rieckmann (2012) and Bettis-Outland (2012).

A visual description of how the results of the regression are applied to the Argyris and Schön (1978) framework is shown in Figure 26.

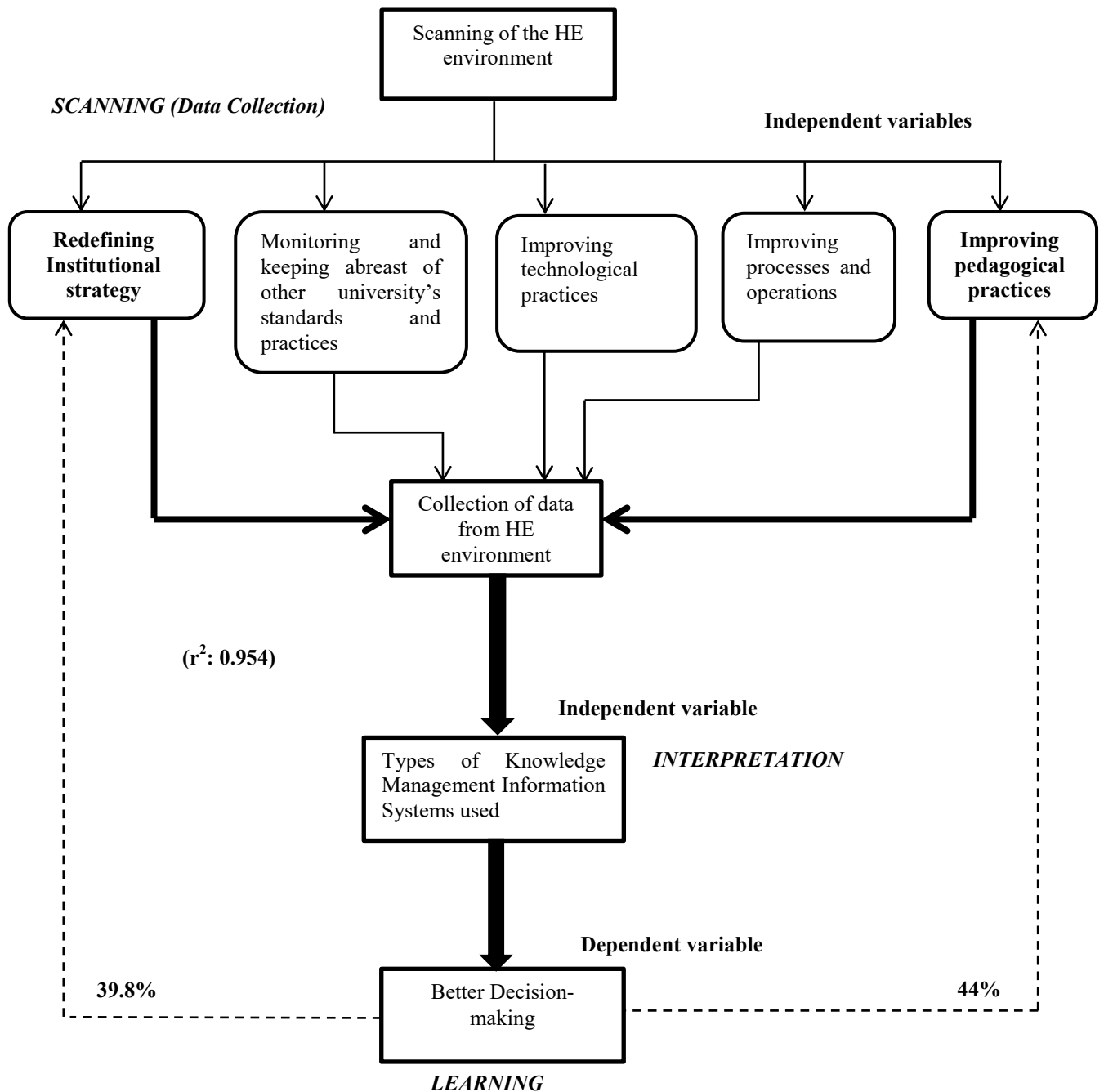


Figure 26: Results of Regression Analysis in relation to Organisational Learning Theory

As shown in Figure 26, 95.4% of the time, changes in the dependant variable (Better decision-making) will be influenced by changes in the independent variables. The independent variables are those in the 5 rounded rectangles under 'Data Scanning' as well the variable under 'Interpretation' (Types of Knowledge Management Information Systems used). The ANOVA test confirms that the independent variables collectively affect the dependant variable. However, the coefficient analysis shows that the most influential

independent variables that significantly affect the dependent are, ‘Improving pedagogical practices’ and ‘Redefining Institutional strategy’ indicated in bold (and bold arrows flowing out of them).

Hence, as documented in the overall interpretation, if these institutions scan the HE environment and collect relevant information (in relation to the 5 independent variables) on the environment and then transform that into knowledge, via KM systems (interpretation), it will contribute to better decision-making (dependent) in relation to redefining institutional strategy and improving pedagogical practices for the institution (indicated by broken arrow flowing out of better decision-making and into the 2 respective independent variables).

5.12.2 Organisational Culture Theory (Schein, 1985)

The following regression pertained to the Schein (1985) Organisation Culture theory model. The model is hereby graphically shown in Figure 27 for ease of understanding.

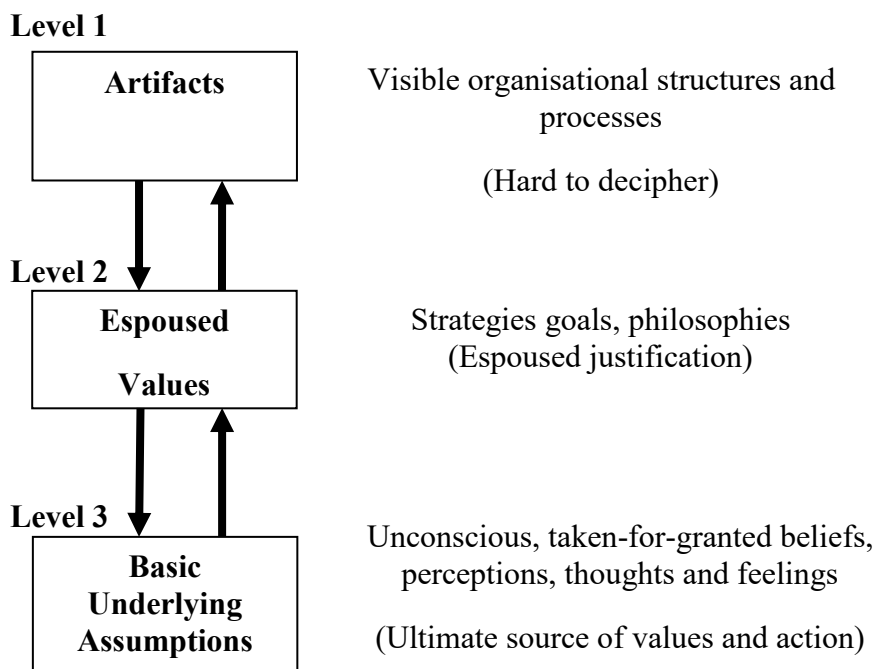


Figure 27: Organisational Culture Theory (Schein 1985)

Variables tested

Construct	Type	Questions relating to Construct from questionnaire
Basic Underlying Assumptions	Independent	3, 4, 6, 18
Espoused Values	Independent	5, 15, 21.1, 21.2, 22.1, 22.2, 23
Ranking	Dependent	N/A

Table 51: Constructs and variables tested for Organisational Culture Theory regression

Variables Entered/Removed

These variables are some of the actual questions for the question number shown in Table 52. The question numbers are next to each variable in brackets.

Mode 1	Variables Entered	Variables Removed	Method
1	Results on if the use of Web 2.0 has <ul style="list-style-type: none"> - Enhanced academic teaching and learning (Q 22.1) - Made the institution a better knowledge provider to students (Q 22.2) 		Enter
	Knowledge Management is regarded as something that adds value to your Division/Department (Q 3)		
	Results on if the use of e-Learning has <ul style="list-style-type: none"> - Enhanced academic teaching and learning (Q 21.1) - Made the institution a better knowledge provider to students (Q 21.2) 		
	Use of Knowledge Management and Business Intelligence (Q 5)		

Table 52: Variables entered/removed for Organisational Culture Theory regression

- a. Dependent Variable: Ranking
- b. All other variables entered (in Table 52)

Model Summary

R-Square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731 ^a	.535	.328	3.776

Table 53: R-Square analysis for Organisational Culture Theory regression

- Predictors: (Constant),
- Results on if the use of Web 2.0 has
 - Enhanced academic teaching and learning
 - Made the institution a better knowledge provider to students
- Knowledge Management is regarded as something that adds value to your Division/Department
- Results on if the use of e-Learning has:
 - Enhanced academic teaching and learning
 - Made the institution a better knowledge provider to students
- Use of Knowledge Management and Business Intelligence at institution

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	147.413	4	36.853	2.585	.109 ^b
	Residual	128.301	9	14.256		
	Total	275.714	13			

Table 54: ANOVA for Organisational Culture Theory regression

- a. Dependent Variable: Ranking
- b. Predictors: (Constant),
 - Results on if the use of Web 2.0

- Enhanced academic teaching and learning
- Made the institution a better knowledge provider to students
- Knowledge Management is regarded as something that adds value to your Division/Department
- Results on if the use of e-Learning
 - Enhanced academic teaching and learning
 - Made the institution a better knowledge provider to students
- Use of Knowledge Management and Business Intelligence

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7.386	7.615		.970	.357
Knowledge Management is regarded as something that adds value to your Division/Department	-1.404	3.240	-.143	-.433	.675
Use of Knowledge Management and Business Intelligence	-4.990	6.390	-.290	-.781	.455
Results on if the use of e-Learning has: <ul style="list-style-type: none"> - Enhanced academic teaching and learning at your institution - Made your institution a better knowledge provider to students 	-2.331	2.356	-.301	-.990	.348

Results on if the use of Web 2.0 has	7.066	2.738	.788	2.580	<u>.030</u>
- Enhanced academic teaching and learning at your institution					
- Made your institution a better knowledge provider to students					

Table 55: Analysis of Coefficients for Organisational Culture Theory

a. Dependent Variable: Ranking

Overall Interpretation

The R-Squared is 0.535. This indicates that the independent variables (Predictors listed in Table 52) do not directly influence the dependant variable which is the Ranking of the universities. The ANOVA test supports the R-Square whereby the independent variables collectively also do not affect the dependant variable ($p=0.109$). The regression therefore shows that the framework is not conclusive to the results of this study holistically.

However, the coefficients show that one of the independent variables does significantly affect the dependent. That independent variable is the use of Web 2.0. It therefore means that the use of Web 2.0 for enhancing academic teaching and learning and the use of Web 2.0 to make the institution a better knowledge provider to students does have a direct influence on the university ranking ($p=0.03$). University ranking is related to competitiveness of the institution and Web 2.0 makes up an intricate part of e-Learning. E-Learning in turn is a fundamental aspect of KM and as asserted by Maier and Schmidt (2007), KM and e-Learning were both approaches that contributed to the improved construction, preservation, integration, transfer and use of knowledge. Therefore, this small but also significant finding reveals that KM in the form of Web 2.0 based e-Learning can play a role in promoting competitiveness at HE institutions. There is no literature or studies that test or support whether Web 2.0 in itself directly promotes institutional ranking in HE. Therefore, this study becomes one of the first to do investigate that. However, there are many studies such as Williams, Karousou and Mackness (2011), Eales-Reynolds, *et al.* (2012), Loureiro, Messias and Barbas (2012) and Silvia and Beatriz (2012), that show how Web 2.0 enhances the teaching and learning process

thereby making institutions that use Web 2.0 a more attractive place to learn, making the institution more popular and competitive as opposed to those institutions that do not use Web 2.0. Reference is made to Bennett, *et al.* (2012), as shown in the literature review, in an Australian HE setting, a study of Web 2.0 implementations across six HE institutions showed that 3 out of the 6 institutions that were engaged in strong Web 2.0 practice were deriving benefits such as better student interaction, effective knowledge/content creation and sharing, improved performances and more creative and efficient teaching, learning and research. This in turn made those institutions a more attractive and popular place to study.

Therefore, in regard to the Schein (1985) Organisational Culture theory framework, this can be interpreted as, while the beliefs (basic underlying assumptions) regarding the use of Web 2.0, which is a subset of KM, supports the espoused values of the institutions which include the enhancement of academic teaching and learning as well as the ability to become a better knowledge provider to students. This then contributes to the ranking of the institution, which is in turn linked to competitiveness.

A visual description of this is shown in Figure 28.

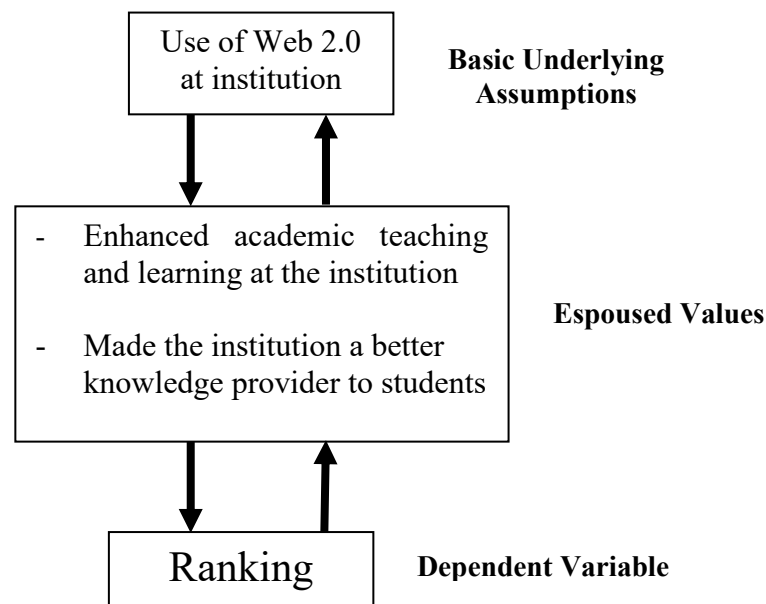


Figure 28: Regression Analysis in relation to Organisational Culture Theory pertaining to use of Web 2.0

The diagram portrays the narrative of the overall interpretation. It demonstrates how when Web 2.0 is instilled into the beliefs and culture of the institution (Basic underlying

assumptions), then it can have a direct influence on the espoused values of the institution. This included the enhancement of academic teaching and learning at the institution and makes the institution a better knowledge provider to students. Consequently, this has a direct positive influence on the ranking of the institution.

5.12.3 Kogut and Zander Knowledge Management Model

The following regression relates to the Kogut and Zander (1992) Knowledge Management framework.

Variables tested

Construct	Type	Questions relating to constructs from questionnaire
Knowledge Creation, Process & Transformation of Knowledge, Knowledge Transfer	Independent	8, 11, 12, 13, 14, 16, 17, 19.1, 19.2
Knowledge Capabilities	Independent	5, 9
Efficient Firms/Competitive Advantage	Dependent	15, 21, 22, 23

Table 56: Constructs and variables tested for Kogut and Zander Knowledge Management Model

Variables Entered/Removed

These variables are some of the actual questions for the question number shown in Table 56. The question numbers are next to each variable in brackets (Table 57).

Model	Variables Entered	Variables Removed	Method
1	Effectiveness of use of Web 2.0 technologies (Q16)		Enter
	Types of Knowledge Management Information Systems that are used (Q8)		
	Has the usage of knowledge repositories increased at the institution relative to one year ago? (Q13)		
	Does your institution use e-Learning as a pedagogical tool? (Q14)		

Table 57: Variables entered/removed for Kogut and Zander Knowledge Management Model

- a. Dependent Variable: Efficient Firms
- b. All requested variables entered.

Model Summary

R-Square

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1				
1	.267 ^a	.072	-.341	.30095

Table 58: R-Square analysis for Kogut and Zander Knowledge Management Model

- a. Predictors: (Constant),
 - Effectiveness of Web 2.0 technologies
 - Types of Knowledge Management Information Systems that are used
 - Has the usage of knowledge repositories increased at the institution relative to one year ago?
 - Does your institution use e-Learning as a pedagogical tool?

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	.063	4	.016	.173	.947 ^b
Residual	.815	9	.091		
Total	.878	13			

Table 59: ANOVA for Kogut and Zander Knowledge Management Model

- a. Dependent Variable: Efficient Firms
- b. Predictors: (Constant),
 - Effectiveness of Web 2.0 technologies
 - Types of Knowledge Management Information Systems that are used
 - Has the usage of knowledge repositories increased at the institution relative to one year ago?
 - Does your institution use e-Learning as a pedagogical tool?

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.177	.441		4.937	.001
Types of Knowledge Management Information Systems that are used	.015	.066	.074	.228	.825

Has the usage of knowledge repositories increased at the institution relative to one year ago?	-.008	.081	-.036	-.094	.927
Does your institution use e-Learning as a pedagogical tool?	-.089	.214	-.183	-.416	.687
Frequency of use of Web 2.0 technologies	.096	.127	.314	.755	.470

Table 60: Analysis of Coefficients Kogut and Zander Knowledge Management Model

a. Dependent Variable: Efficient Firms

Overall Interpretation

The regression tests conducted utilising Kogut and Zander (1992) Knowledge Management Model does not seem to provide conclusive results from a quantitative perspective. The model posits that effective KM practice leads to efficient firms and competitive advantage. In this case, variables were chosen from the questionnaire that related to the relevant constructs of the model. The main independent variables included the types of KM Information Systems used at the institutions, use of e-Learning and the types and effectiveness of Web 2.0 technologies used at the institutions. The R-Square (0.072), ANOVA ($p=0.947$) and Coefficient analysis for each independent variable (as in Table 59Table 60) shows that the independent variables do not have any direct influence on efficiency and competitive advantage of the institutions from a quantitative perspective. Studies by Hitt, Ireland and Lee (2000), Molina, Llore'ns-Montes and Ruiz-Moreno (2007), Lichtenthaler (2008), Kiessling, *et al.* (2009) and Lengnick-Hall and Griffith (2011) all confirm that the framework is conclusive in their studies. However, these were done in a corporate setting in a developed country and not a HE setting. This study explored the Kogut and Zander (1992) Knowledge Management Model from an African HE setting. Even though the quantitative results do not

prove the framework fitting, it is however further explored in the qualitative results which follow next.

5.13 Qualitative Analysis and Discussion

As per Ospina and Wagner (2004), quantitative methods in themselves can be limiting and insufficient in effectively explaining a study phenomenon, and therefore, qualitative research is used to satisfy this and provide explanations from a more in-depth perspective. Qualitative research also allows for new and empirical evidence to be discovered (Ospina and Wagner, 2004). A qualitative analysis was necessary to allow for rich and reliable data to be derived per institution. This interview schedule was a vital instrument in deriving rich data to satisfy the objectives of the study. Qualitative analysis software NVIVO 10 was used to discover patterns and trends.

5.14 Thematic Analysis of Qualitative Data- Identification of Themes

The aim of this study was to examine the influence of KM on institutional strategy development in the leading African institutions. This generated the relevant research question, research sub-questions and objective all shown in 5.2. The interview schedule that was used as the qualitative instrument hence provided rich and in-depth data. However, this data is meaningless without proper analysis. Therefore, by using NVIVO 10, inductive coding was done from which themes, also known as or ‘nodes’, emerged from the data collected. In order to derive meaningful and valuable insights to the data, thematic analysis was done in the process. Thematic analysis in itself consisted of various methods such as tree maps, tag clouds, cluster analysis. All of these tools contributed to identifying recurring themes and sub-themes.

5.14.1 Tag clouds and Cluster Analysis

Cluster Analysis, also known as word frequency analysis, is used to determine the words that are used most frequently based on certain parameters e.g. length, exact vs. less exact, etc. This then is used to generate the tag cloud.

Similarly, Figure 30 shows what the Tag cloud for this study had generated from the above Cluster Analysis.



Figure 30: Tag cloud generated from qualitative data

It is important to note that this Tag cloud omitted words that were less than 3 letters long, thereby improving validity. In addition, 'Web' (underlined) signifies 'Web 2.0'. Due to this being a qualitative process, it omitted number based variables such as '2.0'.

As one can clearly see that the most frequent used words included:

- Knowledge Management
- Strategy
- Learning
- Systems
- Web 2.0
- Information
- Institution
- University

These words contributed in formulating themes and subthemes.

5.14.2 Tree Map

The Tree Map follows the structure of a 'tree' with various branches that are all connected to the central trunk of the tree. Hence, a tree map is a diagram that shows hierarchical data as a set of nested rectangles of varying sizes. It gives a graphical representation that shows the different contexts in which words appear. The contexts are arranged as a tree with branches to expose recurring phrases and themes. Similar to Tag clouds, the words with larger font size indicates that the word was used more frequently. The Tree Map is one of the primary methods used in thematic analysis and plays a key role in generating the respective themes. The qualitative data for this study generated a total of 33 Tree Maps. Out of these 33 Tree Maps, the 9 most relevant and important maps were chosen. These were then used to underpin the main themes and sub-themes derived from the data. These relevant Tree Maps are described in Table 61.

Tree Map name	Description
Knowledge	This was by far the largest Tree Map generated from the qualitative data. It immediately connects to the word 'Management'. This shows that all data obtained centered on the concept of 'Knowledge Management'. This adds further validity to the data obtained. Some of the key phrases that linked to the words 'Knowledge Management' included, 'Knowledge Management and developing strategy', 'Dependent on Knowledge Management', 'Executive Support', 'Web 2.0', 'Knowledge Management adding value', Knowledge infrastructure and 'Better dissemination of knowledge', 'learning organisation' and many more.
Influence	Seeing that this study examine the influence of KM on institutional strategy, this tree map was therefore fitting to the context. Keys phrases revealed included 'good influence', positive influence', 'very positive and transformational', 'indirect influence', 'not very strong' and 'competitive advantage' and others.
Strategy	The key focus of the study was the influence of KM on institutional strategy. Therefore 'Strategy' becomes an important variable within this equation. The word 'strategy' generated a very large tree. Some of the branches showed phrases such as 'It is not fully fledged', 'It is very influential on strategy', 'I don't think that the institutional strategy', 'Knowledge Management is important' and 'Investing more in strategy'.
Executive Board Level	The word 'Board' is a significant one. Appended to the right is the word 'Executive' and to the left is 'Level'. This is important as one of the studies objectives is to establish if KM is in fact at Executive Level. Some of the phrases derived in this tree pertaining to 'executive board' include, 'Not at Executive Board level', 'it should be at board level', 'is currently not', 'ask for funding' and 'board for approval'.
	Another important word that was derived was 'Decision'. Appended to this are the words 'strategic' and 'making'. Hence 'Strategic Decision-making' should be a pivotal and on-going activity of any institution.

Decision	<p>Decisions range from operational, processes, academic, goals and objectives. Therefore strategic decision-making in almost any aspect of the institutions are important. Ideally knowledge should inform the process of strategic decision-making and therefore Knowledge Management plays a critical role in this. Some key phrases and words relating to this are:</p> <ul style="list-style-type: none"> - 'Provide reliable reporting' - 'Quicker Response time' - 'Knowledge Management reporting' - 'Utilise business intelligence for better decision-making' - 'For better and faster Management Decision-making' - 'inform our strategic decision-making' - 'better dissemination of knowledge' - 'being influential'
Systems	<p>The word 'Systems' generated a considerably large tree map and was primarily attached to it are the words 'Knowledge' and 'Management'. This proves to be a valid tree as Knowledge Management is driven by Knowledge Management Systems. Other keys phrases shown include, 'Business intelligence Systems', 'Web 2.0', 'Predictive systems', 'Early warning systems', 'Enrolment targeting', 'Not fully fledged', 'Knowledge that comes from' and 'from an operational point', 'need to be invested' and many more.</p>
Web 2.0	<p>One of the largest tree maps was generated for 'Web', which inevitably means Web 2.0. Web 2.0 is a key focus area of the study. As one can see from the tree, it generates a high presence in the qualitative data. Some interesting words and phrases are also generated such as, 'knowledge creation', 'enhancing e-Learning', 'research', 'the learning process', 'wikis', 'blogs', 'flipped classroom', 'learning resources' and 'strategies'.</p>

e-Learning	<p>Also a very large and meaningful tree was generated by the word 'Learning' which also had the word 'e-' attached to it. This implies e-Learning is a subset of Knowledge Management and also influenced by Web 2.0. This study also does examine the role of Web 2.0 in the creation, management, dissemination of e-Learning and is therefore an important tree-map. Some interesting words and phrases derived from this include, 'Web 2.0', 'big challenge', 'core business processes', 'spreading knowledge', 'be more accessible', 'neighbouring countries', 'methods of teaching' , 'large enrolments', 'it will improve learning' and 'distant learning' amongst many others.</p>
Value	<p>The concept of 'Value' was very important as one of the aims of the study was to find out if KM was adding value to the institution. The key word attached to 'Value' was 'Adding'. Some key phrases that surfaced in relation to 'Value' were:</p> <ul style="list-style-type: none"> - 'Knowledge Management holistically is adding value' - 'Web 2.0 is adding value' - 'Competitiveness' - 'Drives strategy' - 'Management should basically see the value' - 'it is definitely adding value'

Table 61: Key Tree Maps generated from Qualitative Results

5.15 Formulation of Themes

Based on all of the above analysis, the following primary themes were derived:

- ❖ Familiarity with KM
- ❖ Knowledge Management (this includes KM/BI systems)
- ❖ Web 2.0 and e-Learning Strategies
- ❖ Opportunities
- ❖ Challenges

Some of these themes also gave rise to sub-themes. These sub-themes were equally as important and allowed for deeper analysis of the qualitative results. Table 62 shows the sub-themes attached to the respective themes.

Themes	Primary Sub-themes
Familiarity with KM	
Knowledge Management	<ul style="list-style-type: none"> - Influence of KM on university institutional strategy - Level KM Systems exist at - KM /BI Information Systems currently in use - Examples - Motivation for KM use - The role of culture - Use of KM systems
Web 2.0 and e-Learning Strategies	<ul style="list-style-type: none"> - Absence - Benefits of e-Learning and Web 2.0 - Current Web 2.0 technologies used
Opportunities	
Challenges	<ul style="list-style-type: none"> - Finance - Lack of executive buy-in - Lack of integration of components - Lack of competency - No direct measures - Non-acceptance by users

Table 62: Themes and Sub-themes

The primary sub-themes are also broken down into further (secondary) sub-themes. These sub-themes will be expanded upon under the respective themes.

From this point onwards, each theme will be discussed in detail along with the words uttered by the various universities during the interview process. This in turn forms a support platform for the respective themes and sub-themes. Unlike quantitative analysis, this is more of a

inductive method of discussion and focuses more on building theory from the respective responses with minimal reference to theory. The university names have been omitted for confidentiality purposes. However, for ease of understanding of what each university said, Table 63 below shows the universities in the form of numbers and in which part of Africa they exist in.

University 1	South Africa
University 2	Outside of South Africa
University 3	South Africa
University 4	South Africa
University 5	Outside of South Africa
University 6	Outside of South Africa
University 7	South Africa
University 8	Outside of South Africa
University 9	South Africa
University10	Outside of South Africa
University 11	South Africa

Table 63: University respondents by number and location

5.16 Familiarity with KM

There was a difference in the definition of KM among the universities. Most of the universities interviewed were familiar with the term. However, some universities referred to it as Management Information or purely Business Intelligence.

University 10 which is a leading university conveyed,

“In the sense that business intelligence is more about – to me it's more about private businesses and universities are more in a different sphere and I would rather call that management information.”

This leads to an interesting point, whereby one could easily be mistaken that some of these leading universities in Africa are not using KM in itself, when in reality they are. However, it could just be under a different term, context or definition. This also relates to one of the

leading universities in South Africa (shown in Chapter 3) that did not wish to participate in this study claiming that they did not use KM. Therefore, it is highly possible that the university in question is using it but just not fully aware or knowledgeable about the actual concept of KM.

University 5 had a view that:

“Knowledge Management is more encompassing than business intelligence.”

This related to a detailed view by University 3 which is in the top 3 universities in South Africa. Their view of KM was that,

“We take that information, we feed it into this big pipe called knowledge management within the university, and we check where the university wants to go and how IT can support that. So, that's how we use it, and we use business intelligence to slice and dice the information and we put all these other points, or influences that come in, like your budget and all those other things.”

This was one of the few universities who viewed KM in line with the study whereby KM encompassed BI and other technologies. Business Intelligence is more about technical and analytical processing of data which then generates knowledge that feeds into KM. This also confirms that the KM umbrella encompasses BI.

5.17 Knowledge Management

This was the largest theme generated by the qualitative data and this is not surprising considering that this is the crux of the study. Along with this theme came various primary sub-themes that will also be discussed, together with a vast number of secondary sub-themes (child nodes). Due to the immense number of secondary sub-themes derived, it will be impossible to discuss them all in detail, therefore only the ones pertaining mainly to the aims of the study will be detailed. The themes gave rise to the subthemes of:

- Influence of KM on university institutional strategy
- Level KM Systems exist at
- Motivation for KM use

- Knowledge Management/Business Intelligence Information Systems currently in use
- Use of KM systems
- Examples
- The role of culture

5.17.1 Influence of KM on Institutional strategy of Universities

This was a key theme as it spoke directly to the research question of the study. Based on the analysis of the responses, there were 2 main sub-themes that were generated, that being:

- Positive influence
- Indirect influence

5.17.1.1 Positive Influence

The literature review abounds with studies that indicate that KM has a positive effect on institutional strategy in HE. These studies include Metaxiotis and Psarras (2003), Kende, Noszkay and Seres (2007), Cranfield and Taylor (2008), Chen, Huang and Cheng (2009), Krajcso (2009), Laal (2010), Omona, van der Weide and Lubega (2010) and Lubega, Omona and van der Weide (2011) amongst others. The literature review makes it clear that KM does indeed positively influence institutional strategy. Most of these studies were done in a developed country setting. However, the findings below reveal that KM is seen to have a positive influence on institutional strategy in a HE setting in Africa.

University 2 added, *“It does have a strong influence.”*

Similarly, University 6 conveyed,

“Actually knowledge management influence on the institutional strategy of the university – the influence is very good.”

Similarly University 8 relayed,

“I would say my opinion is that the influence is good. In the sense that although we are not

having a fully fledged knowledge management system, we are doing aspects of it to come up with strategic plans.”

University 1 gave a very detailed explanation of why they thought KM had a positive transformational influence on institutional strategy.

“At first the institution did not understand the real value/potential of Knowledge Management and Business Intelligence or why/how data could be transformed into meaningful knowledge reports via Knowledge Management. They just thought a ‘report’ is a ‘report’. However a report became useless if the data was not uniform, current, timely, and structured with relevant information. At that time, the university’s data was scattered which led to inconsistent data. Hence the transition to Knowledge and Business Intelligence based reports was a transformational strategy that ensured that all information came from one place (e.g. a central data repository).....Therefore, the influence on institutional strategy was a very positive and transformational influence whereby reports are no longer based on scattered and inconsistent data from multiple sources but a unified systematic process of data gathering and processing of that data via Knowledge Management systems.”

“The influence has been so positive at (University name omitted) that almost every department wants to implement a Knowledge Management system and requests are coming in very fast that we do not have the funding to roll it out to every department yet. However we are working on it.”

This shows that the KM has a positive influence at this university that they view KM strategically. It was also seen as a transformational strategy in regard to the centralisation and access to knowledge resources across the university.

Similarly, University 9 asserts that,

“It certainly is positive. We’ve introduced institutional scorecards at the highest level and our entire council deals with the performance of the institution via that scorecard. The impact is very high. These analytic reports, research reports, are tabled at all the senior executive management meetings, and a number of selected ones go on through to council for policy making.”

This shows that KM plays an influential role in the policy-making and performance of the university.

University 3, relayed that,

“I think from what knowledge management is, where it is a professional practice which improves the capability of the organisation's human resources, and it enhances their ability to share what they know, so it adds a lot of value and it drives the strategy as well.”

This confirmed a value added influence, and similarly, University 11, asserts that,

“it's fairly high, the focus on the aspects that we've got fairly mature relates to student and academic record. There is a lot of information that we put into that area, so we use that on a regular basis in our strategy going forward, looking at our vision and mission and how we are performing on that type of level. So, I believe it's actually pretty good.”

Finally, University 5 posited that,

“It should have a good influence, and at the moment I think it is beginning to have some good influence, however, there has not been a specific measurement about the quantum of good. Obviously it could be good research to actually determine the goodness or the extent of good. Clearly, I will say that it's having a positive influence on institutional strategy, definitely it is.”

This shows that even though it has not been quantitatively measured, the outcomes however indicate that it is having a strong influence.

Therefore, as one can see, these findings indicate that KM is seen to have a positive influence of institutional strategy at these leading African institutions. This can be broken down into KM being a positive influence because it:

- Adds value (University 3)
- Drives policy development (University 9)
- Enhances performance (University 9)
- Promotes transformational strategy in relation to centralised access to knowledge resources (University 1)
- Drives strategic plans (University 6)
- Brings about positive outcomes (University 5)

More detailed explanation and examples are shown further down the chapter. This generates

an empirical result from an African HE perspective. However, among all the positives there was one university that felt otherwise. This is shown below.

5.17.1.2 Indirect Influence

University 7 felt that it even though it had an influence, it was more an indirect influence.

“The role KM plays in strategy in our organisation is actually looking at past trends to inform targets, strategic targets, and then also closing the loop by then measuring progress against those targets.”

“I think it's an obvious advantage, but there is an indirect one I would say, at this stage.”

This finding indicates that there is a presence of KM and that it is being used in strategy development, but in a very indirect way. This relates to the possibility that KM has not fully matured to a point where it can have a direct influence.

Therefore, in consideration of all responses, this theme indicates that holistically KM does have a positive influence on institutional strategy. In addition, even though one institution reported an indirect influence, none of the institutions reported a negative influence.

5.17.2 Level at which Knowledge Management exists at institution

This is an important theme that speaks directly to whether KM is at Executive Level or not. It has been found that for KM to be effective, it should be ideally driven at an Executive Level or Executive Management level. Literatures that support this view include McKnight (2007), Cranfield and Taylor (2008), Laal (2010), Omona, van der Weide and Lubega (2010) and Lubega, Omona and van der Weide (2011). These studies argue that for KM to be realised as a strategic resource, it should ideally be driven at Executive Management level (Executive Level).

This theme is broken down into two subthemes. This includes,

1. Current level of KM at most of these leading African institutions
2. Level that it should ideally be

5.17.2.1 Current Level of Knowledge Management

The results show in aggregate that KM is currently not officially at Executive Level. Knowledge Management was only present at Executive Level at University 3.

As confirmed by University 3,

“It is part of strategy formulation holistically. In actual fact, here at (university name omitted) we have – knowledge management is represented at a set level (Executive Level). We have a DVC responsible for knowledge management.....so, it is part and parcel of the executive management, it is part and parcel of strategy formulation.”

This was the only university where KM was actually at Executive Level. Below are the responses from those universities where KM was not at Executive Level.

University 11 conveyed that,

“No, it's not there. You know, the issue is that you would expect to have a formal knowledge management structure on that type of level. We don't really have that. We've got elements that look at aspects like risk and that type of thing, but that's more specific to requirements of the institution. So with the employment of this knowledge management executive person, what is going to happen is that that person will focus on how knowledge will be managed, which will feed directly into the Executive Board level.”

It was shown that University 4 reported to the registrar of the institution.

“I don't report directly to the vice chancellor, I report to the registrar, who reports to the vice chancellor.”

This showed that KM did not sit at level of Vice Chancellor. University 10 made it very clear that KM was definitely not at Executive Level.

“Definitely not. Some say that the board should be involved in IT Governance and our board is not involved with IT Governance at all. But what I can tell you is that if the board is not involved with IT Governance a good reason is we don't have – I am trying to be diplomatic –

we don't have the board that we deserve.”

Similarly, University 7 shared a similar sentiment.

“Absolutely not, I don't think so. I don't think it's at executive management in terms of ...[indistinct-0.08.10] and vector level. All the knowledge that they have sits in printed files or on PCs or in terms of people's heads. So, I think it's actually sitting sadly in faculty at school level.”

This goes to show that KM was definitely not at Executive Level.

However, for some universities, as shown below, even though KM is not at Executive Level, it did receive a high degree of support from Executive Management which was in turn making KM successful. University 1 conveyed,

“As per reporting structure, Knowledge Management is currently not represented at Board level on its own. However it is very close to board level and fully supported by the Vice Chancellor and part of the executive strategy of where the institution is going. The Vice Chancellor didn't actually say that but implied it more or less. However, the Vice Chancellor did give his full support as he saw it as an opportunity and strategy to use Knowledge Management to measure the institution's strategies, objectives and goals. Therefore support from Executive Board Level was pivotal in driving Knowledge Management.”

Similarly, University 9 supported this with their view,

“As I say, at the moment we are covering from middle management up. We typically don't get involved with lower management and pure operations, but we target what we call middle management, and anything from a school director up, and as a I say, we are effective at council.... I have made a number of presentations to council on issues that we have analysed.”

University 4 also conveyed that even though KM is not at Executive Level, however the respondent was often asked to provide information for decision-making purposes to Executive Management.

“We have the senior management team that consists of five people who will invite me to present information to them that they require when they need it, but I don't meet with them on a weekly basis, but I do attend all the senate, council, institutional planning meetings, and have to be prepared to rush out the room and find data and information at the drop of a hat,

if need be.”

This shows that KM is supported at executive level at some of the universities despite not being at that level. However, the fact that it is not at Executive Level still induces limitations on KM potential. Therefore, as below, most of the respondents are in agreement that it should be ideally and formally placed at Executive Level as so the value of KM can be fully realised.

5.17.2.2 Ideal Level that Knowledge Management should be

Many of the universities convey that KM should ideally be at Executive Level. University 6 argued that,

“Yes, actually, to be effective in the utilisation of the knowledge management system, for me it should be at the top management level. The top management must own the knowledge management information and must approach the systems to the middle level and the other management council members.”

University 8 shared a similar sentiment.

“Of course, anything that you need to have properly implemented, should have top management support.....support will be more effective if it came from the top.”

University 10 shared,

“But at executive level, yes, I think it is important that knowledge management find its way to that level.”

A very interesting view came from University 5,

“So, those who were involved in the implementing are able to get it done faster and easily, but there have been attempts previously at operational level, but it wasn't that successful, because it didn't have too much of top management backing, the success achieved wasn't that much and people were at liberty as to what to do and what not to do. Therefore, ideally it should be driven at that level for assured success.”

University 1 asserted that,

“Going forward, I feel that it should be at Executive Board level and I am positive that it will be there someday, hopefully soon, whereby Knowledge Management can be reporting to board as other divisions such as finance, HR and research.”

These responses confirm that KM should ideally be at Executive Level.

Therefore, holistically, this entire finding indicates:

1. Knowledge Management is not at Executive Level at most of Africa’s leading universities. This produces challenges in regard to executive buy-in which is further discussed in the ‘challenges’ theme.
2. Knowledge Management should ideally be at Executive Level as conveyed by these top ranking individuals responsible for KM.

This also relates to organisational culture which is discussed further down.

5.17.3 Motivation for the use of Knowledge Management

As shown in the literature review, many HE institutions are motivated to use KM as a strategy to:

- improve decision-making (Chen, *et al.*, 2009; Laal, 2010)
- drive performance (Chen, *et al.*, 2009; Lubega, Omona and van der Weide, 2011)
- achieve goals and objectives (Laal, 2010)
- enhance quality (Cranfield and Taylor, 2008; Ghaffari, Rafeie and Ashtiani, 2012)
- promote productivity (Davis, 2002; Loh, *et al.*, 2003) and innovation (Metaxiotis and Psarras, 2003; Chen, *et al.*, 2009; Omona, van der Weide and Lubega, 2010)
- manage resources (Goyal and Rajan, 2012)
- create and disseminate knowledge to facilitate organisation learning (Metaxiotis and Psarras, 2003)

Increased competitiveness was also a key motivation (Chen, Huang and Cheng, 2009). It was therefore important and also interesting to establish if African universities shared the similar motivations to make use of KM. After an analysis of the qualitative responses, a significant amount of motivation factors were generated. The main motivations are hereby represented as sub-themes of the primary theme.

- Strategy development, implementation, and evaluation
- Achieving targets and meeting goals
- Support university process
- Improve service
- Informed and Improved decision-making
- International Benchmarking/Defining own path
- Increasing Competitiveness
- Increase transparency & Accountability
- Monitoring and Evaluation
- Reduce costs
- Understanding trends

5.17.3.1 Achieving Targets/Meeting goals

Only 4 universities from South Africa were motivated to use KM as a strategy to meet their goals and objectives and achieve their designated targets.

For University 1, KM was more about ‘measuring’ strategic objectives and goals. They hence gave detailed explanation on why it was seen in this light.

“Knowledge Management is brought in at the very beginning of any strategy development as an ‘informing tool’ as again it serves as a ‘reality check’ when formulating strategies for a given university cycle, whether it is 1 year or 4-5 years. The more information and knowledge you have at the onset, the more easier it is to realise which direction to go and ‘where not to go’. Furthermore, Knowledge Management and Business Intelligence systems are now being used as a way of monitoring strategies and objectives. In other words the goals, objectives and strategies are programmed into the system along with relevant details such as start and end dates, implementation responsibility, resources etc. these strategies and objectives are then flagged with appropriate colours whereby ‘green’ indicates that the strategy/objective was/were accomplished while red indicates that it is that strategies, goals and objectives are still pending.”

“Strategy is about the future and where you wish to be therefore Knowledge Management gives the institution a ‘reality check’ of where they are at present, emphasises the areas of improvement and indicates what needs to be done to meet their objectives and goals.... So from the business side, the main motivation was the ability to use Knowledge Management to measure strategies and objectives and goals.”

This is supported by University 7.

“The role KM plays in strategy in our organisation is actually looking at past trends to inform targets, strategic targets, and then also closing the loop by then measuring progress against those targets.”

The above two responses depict KM as a ‘measuring’ strategy for the university. University 3 also gave an interesting response,

“they (the university) look at what we produce as an output, because what we produce as a division informs the strategic planning of the – so, like I said, at the beginning of this year we have now started working on what we are calling the strategy for the next three years, which we are calling (university name omitted) Strategy 2016, which tells us this is what we want to achieve by the year 2016. So, that in itself, setting targets for the university, that in itself is very important, because it gives vision and direction for the university.”

This shows that KM informs the strategic plan of the university. Another South African university, University 11, conveyed that,

“Well, it definitely is improving in the basic targets that we are setting ourselves, because we can say – and we are talking about data that we have collected over periods of years, I am talking about a good 10 years now on that level.”

This finding reveals that KM is proving to be a strategic entity in achieving and measuring institutional goals, objective and targets. However, this also shows that only a few universities are building KM into their strategic objectives and goals.

5.17.3.2 Support University processes

Only two institutions from South Africa confirmed that KM was used to support university processes in relation to improve efficiency, operations and decision-making.

University 1 affirmed,

“It is also used for operational use in terms of using information to make positive and beneficial decisions relating to efficient operation at the university..... So at this point in time the knowledge derived from Business Intelligence systems is primarily used for better

decision-making regarding operations which in turn enhances operations, better strategy development and continuous monitoring of operational and academic processes.”

Similarly University 3 conveyed in response to the interviewer’s question,

Interviewer: *“Right, so improving processes at the university, and in other words making the university more responsive to change.”*

University 3: *“That is correct.”*

This confirms that KM is used strategically to support operations and processes in very few institutions. As mentioned earlier, these two universities are regarded as the highest academically ranked universities in South Africa and even in Africa. It is therefore interesting to note that they were fully harnessing the potential of KM to make better decision, strategy development and promote efficient operations at their institutions.

5.17.3.3 Improve Service

The above sub-theme (Support University Processes) is, in a way, related to this sub-theme. It has been shown that KM does contribute to the improvement of services in HE institutions, whether it is academic or operational (Kidwell, van der Linde and Johnson, 2000; Laal, 2010; Omona, van der Weide and Lubega, 2010; Lubega, Omona and van der Weide, 2011).

There are universities in Africa that feel that the strategic practice of KM is improving service delivery at the institution.

An interesting view came from University 6.

“Actually, the motivation comes from, as I told you before, the government want to improve the provision of services in each institution. When I say services, the provision of the learning services, the provision of the administration service and so forth. So, when we provide services it is expected to be fast, efficient and cost effective, so the motivation behind using this knowledge management into all the services is to the make service provision of the core business processes, efficient, cost effective and fast.”

This showed that KM is seen as a strategy to enhance service of the university. Similarly, University 11 felt that the strategic use of KM enabled a better academic experience.

“There are also other focuses, and these are more on the broad level of getting opinion on different levels from the students and staff complement, in terms of how we operate. That is also adding a bit more value to how we focus on things, it does affect things in terms of how we perceive problems out there. So, as an example, we can pick up that there are say problems with one lab because it has not been provisioned properly, and those types of things we can rectify in a particular way, so it adds value to the process of the academic experience.”

University 7 had a similar view,

“you are actually not wasting energy in terms of what you do, in terms of knowledge management, but you are constantly refine and reinforce what you are doing, to be able to do things better than you are doing it at the moment.”

This was backed by University 1,

“It is also used for operational use in terms of using information to make positive and beneficial decisions relating to efficient operation at the university.”

Holistically, this finding reveals that KM can be used as a strategy to enhance service delivery. The universities above that are utilising KM in this way are implying that it is working well. However, these are just 4 universities, 3 from South Africa and 1 from outside of South Africa. Other universities should consider this approach.

5.17.3.4 Informed and Improved decision-making

Improved decision-making is one of the key outputs of strategic KM practice (Kidwell, van der Linde and Johnson, 2000; Chen, *et al.*, 2009; Kebede 2010; Lubega, Omona and van der Weide, 2011). This finding enquires if the same is being experienced at the leading HE institutions in Africa.

University 2 affirmed that,

“I think it helps you make better decisions and it makes you analyse data that might be there but you don't quite understand.”

University 8 conveyed,

“Yes, it make it possible to effectively manage information. That's one. And also to speed up the decision-making process.....through knowledge management, we have captured the knowledge, we can process the knowledge, we can retrieve the knowledge much easier compared to if we didn't have such a system in place. So, it adds value to the organisation in terms of less waiting, faster decision-making, and allows the institution to act faster, should I say... and it has made the institution to be more competitive.”

This shows that faster and more informed decision-making is allowing the university to become more reactive and thereby also enhancing competitiveness. This is supported by University 1,

“The main motivation for investing in strong Knowledge Management and Business Intelligence systems is to make the university more agile in the sense that they can make decisions faster and roll out changes quicker.”

University 9 uses KM to make more evidence based decisions,

“certainly evidence based decision-making and strategic management based on evidence and analytics goes a long way in making the proper decision going forward.....a good example is our recent implementation of the re-admissions policy. Our research results have formulated the decision-making of how to implement that policy.”

University 5 from asserted that,

“The motivations are quite clear, ...you need to be able to have access to knowledge very quickly. And then of course ... have the knowledge in an organised fashion.....secondly like a said earlier, the positive impact is that it assists you to be able to take strategic decisions, you have the kind of knowledge you require to be able to effect decision-making quickly, rapidly.”

This related well to University 4:

“Well, it's so that you are not working in the dark, it's so that you actually have facts before your fingertips of what it is that's causing the trend or what it is that could affect the trend in the future.....It's so that you are not reacting too late to respond to the changing environment, that you are reacting in time, and that you are able to stay with your head above your water. It's quite sensible.”

These findings indicate that KM is being used to make informed and improved decision-making at many leading African institutions. It is also evident from the responses that it is not

just about the quality of the decision-making process, but also about how quickly decisions can be made based on the speed of knowledge delivery via KM systems practice. Therefore, the strategic use of KM ensures speedy delivery of knowledge at the ‘click of a button’, this also increases the responsiveness of the institution to the changing environment and thereby enhances competitiveness.

5.17.3.5 International Benchmarking/Defining own path

It was very interesting to see that some of the leading universities were using KM as a benchmarking strategy. However, even though they were benchmarking internationally, they were not interested in comparing themselves to KM standards of institutions from developed countries. Instead, they sought to use KM to define and maintain their own standard that was unique to Africa.

University 1 were striving to be the pioneers in Africa,

“In addition, the university learns its Business Intelligence and Knowledge Management from one of the leading institutions in the fields of Business Intelligence/Knowledge Management, that being (university name omitted). (University name omitted) is doing phenomenal things with Business Intelligence and Knowledge Management. However as much as we are following a first-world university, we remain strictly an Afropolitan university. We do not wish to be like first-world universities but more a world class AFRICAN university. We want to remain as the best in Africa but at the same time a touch-point into Africa for the rest of the world. Speaking of which we also have Business Intelligence systems which is used to monitor our Academic footprint both in Africa and in the world. This allows us to see where we are in terms of an African university. This ensures that even though we aspire to be a world-class university, we do not ‘fail’ in also being an ‘African’ university.”

This finding indicates that University 1 is the only university that is benchmarking its KM and Business Intelligence internationally against an institution from a developed country. However, even though it is following the standards of that institution, it remains ‘Afropolitan’, in other words, an ‘African university’. University 1 is also using KM and BI creatively and innovatively to monitor and measure the university’s national and international footprint.

University 4 conveyed that it was more about benchmarking in a local market taking into account the nature of students that attended the university.

“I think at some universities it might be, because a lot of the universities buy into this benchmarking measurement thing, and so they want to know where they stand in relation to the rest of the world. At (University name omitted) we don't buy into that, so for us I think it's more about comparing ourselves locally and in the national market, so that we are aware of where we stand and where our students are going to come from, where they are going to come from in the future, so it's more national and not measured internationally.”

University 9, the distance learning institution, conveyed that their KM systems were developed from scratch as they consider themselves unique.

“Well, we do a little bit of that, but we are very mindful that we are so different from other distance education institutions worldwide, and we are so different from any other contact institution, that a lot of this we have to generate from scratch.”

These findings showed that some HE institutions in Africa, namely South Africa, did not wish to compare themselves internationally, but instead implement and use KM from a uniquely African perspective taking into account the nature of its students and country. University 1 seems to be progressing well with this type of attitude and direction.

5.17.3.6 Increasing Competitiveness

The role of KM as a promoter of institutional competitiveness in HE has been highlighted by authors such Cranfield and Taylor (2008), Chen, Huang and Cheng (2009), Krajcsó (2009) and Lubega, Omona and van der Weide (2011) among others. Furthermore, this study utilises the Kogut and Zander (1992) Knowledge Management framework which emphasises KM as a key source of competitive advantage. Therefore, these findings prove to be interesting in relation to the framework and to ascertain if KM is leading to increased competitiveness in these leading institutions.

University 6 discussed whether KM was adding competitiveness to the institution,

“Yes, that is what we are aiming for. As I told you, we are the educational institution. Our main agenda is to have quality graduates from the university in all the programs including the distance learning programs. So, combining all those knowledge management applications with the web 2.0 technologies it will help us to achieve the mandate that is given by the government.”

University 2 implied that KM was adding value and competitiveness.

“It is adding value, but I think we need to do more analysis so that we can do more comparative analysis and accordingly, then it would work for our competitive status in the local or global market, but it is in an indirect way, by finding where your problems are, then you do improve that you competitive position.”

University 10 was very convinced about KM enhancing competitiveness at the institution.

“Definitely that is adding a lot for us, and it is also raising our profile internationally.”

“Your average European or American wants to find the same kind of infrastructure as what he had at home. So, that person wants to be – even when that person is in the bush he or she wants to be connected.”

“There I think I spoke more about one of strategic decisions that was to go for niche research areas. It is also for one good reason, is we cannot compete with big universities like UCT. UCT has got a billion plus research budget, and our research budget I think is about 10 million, so we cannot really compete with them in the same domain. We have a decision to go for applied research, and then within that research we also placed a lot of emphasis on niche research areas where we can be competitive. So knowledge management is allowing for niche research competitiveness.”

This response was very stimulating as it showed that a small university such as University 10 was using KM to inform the strategy of niche research, which then allowed them to compete with a much larger university and enhance competitiveness. This is also an example of how KM can inform an academic research strategy.

University 4 gave a realistic view on why KM was adding competitiveness to that institution.

“Absolutely. It starts in the primary school level, the kids are clicking buttons, so of course it attracts the students and it makes the university more competitive in – as you say in your question; local and global setting. You can't be an old fashioned university in this day and age, you just would die.”

University 1 not only implied that KM was adding to the institution's competitiveness but also gave an example of how it increased competitiveness.

“YES definitely, even though it is not easy to measure, but if we can use Knowledge Management to help students early in their career then we can change the future of the country. If we select the right students for the right courses then we will have less dropout rates. If we can provide Knowledge 24 hours a day with 24 hours access on campus (through Wi-Fi) then this can enhance student performance. This university is doing all of these including (University name omitted) pocket app for continuous knowledge distribution. This enhances student performances and contributes to attracting more students and increasing the throughput of students hence making us more competitive.”

This response was one of the most convincing responses regarding how KM was enhancing competitiveness both on a local and global scale. The above response from University 1 was well complemented by the following response from University 5.

“Yes, I will say that definitely, and I will give you an example. Over time, in fact, in the last two years the webometrics ranking of the university has improved steadily, and this had to do with the fact that we've been able to work out an effective way of harvesting knowledge resources from both students and staff, so that we have a higher web presence and higher online resources. The current webometrics ranking from AICU puts the University of (name omitted) as second within the country, and then an improved rating within Africa. So, I think to me that's a value and that actually making us more competitive locally and globally.”

In aggregate, these responses confirm that KM is adding value and competitiveness at the various leading universities in Africa. This will be further discussed in the next chapter when both qualitative and quantitative results are brought into the findings.

5.17.3.7 Monitoring and Evaluation

An interesting finding was generated by University 1, in that they were the only university using KM and BI to monitor and evaluate a decision once it been made and put into action.

“Before the use of Knowledge Management and Business Intelligence, the university would make decisions but was never able to monitor the impact of the decision. Now, with the use of Knowledge Management, decisions can be monitored and we can immediately see there are any adverse effect of that decision.”

This response is explicable on its own. It basically emphasises that before the practice of KM at the institution, it was hard to monitor the impact of any decision taken. However, through KM along with Business Intelligence, which is the analytical side of KM (see Familiarity with KM - 5.16), it is now possible to monitor the impact of decisions made. This means that

should a decision not be an ideal one or should it incur negative consequences, it can be addressed early and rectified accordingly. Again, this is possible through KM.

This is an empirical finding in the African HE setting, as no other study in Africa emphasises this.

5.17.3.8 Increased Transparency and Accountability

This was an uncommon, but positive finding. This finding showed that one of the main motivations for the use of KM was for the integral and responsible running of the institution.

This translates in good governance and as confirmed by University 6:

“and at the same time to encourage good governance and transparency. When I say transparency, if things are controlled through the knowledge management they will be transparent, which can avoid bad governance and it will help us to avoid corruption. So, motivation comes from the intention to provide fast service, cost effective, efficient and to promote transparency and good governance at the governmental institutions.”

This correlates and is supported by University 3:

“One of the primary use is governance. You remember that universities have to report to parliament, so BI there is used to report on our numbers on our FTE, on our output and so forth, and we also use BI for our own performance, in terms of the university output.”

Furthermore, the largest distance-learning institution, University 9, from South Africa conveyed along the similar lines,

“The motivation is to become more accountable, and we can only become accountable if we are making decisions on evidence and not on hearsay or on the collective wisdom.”

Hence, this also promotes good and informed decision-making as conveyed by University 6. Another university, University 5 also shed the following which supported the above two responses:

“Yes. ...the first I can say about that is, there is transparency, and the more knowledge required is available to those who need it, so there is nothing that is hidden..... for us here

the transparency is actually something that we relish, because knowledge that is required across board, it's readily available, everybody has it, because it's disseminated."

Therefore, it can be said that there are universities in Africa that utilise KM from an integral perspective as a means to make their institution more transparent and accountable. This translates into further good governance. This confirms another deep finding. Aside from the use of KM to gain competitiveness, manage resources, save time, improve efficiency, improve services and so on, some universities in Africa are actually using it for promoting transparency and accountability for the institution.

5.17.3.9 Reduce costs

The ripple effects of the 2009 recession are still present and as asserted by Naranjo-Gil and Hartmann (2007), organisations needed to revisit their strategies in terms of operational and cost efficiency to cope with both local and global challenges such as recession and other financial challenges. Furthermore, in an African context, Thiaw (2007) and Mwapachu (2010) emphasised that universities in Africa face various challenges with one of the main challenges being economic. Authors such as Kidwell, van der Linde and Johnson (2000), Grosbeck (2009), Laal (2010), Goyal and Rajan (2012) and Eduventures (2013) all highlight the use of KM, BI and Web 2.0 as a cost cutting strategy.. Therefore, it is interesting to establish if universities in Africa are also strategically utilising KM in the view of reducing costs and expenses and thereby combatting financial challenges as asserted by Thiaw (2007) and Mwapachu (2010).

Unfortunately, only four universities looked at KM as a means of cutting costs and expenses.

University 1 was one of them and they provided a detailed example.

"The main motivation was to start 'measuring' from both IT and business side. From the IT side, it was about making existing resources available. This talks to the business side whereby it can save the institution time and money acquiring new resources if existing resources are available and ready for use."

"in some instances, there may be 'hearsay' that all staff needs notebooks, but by conducting a survey immediately through Business Intelligence survey software, processing those responses and converting it into knowledge, the report may then indicate that only 60% of

staff need notebooks and not 100%. This saves the institution a substantial amount of money with a quick response time.”

This was an excellent example of utilisation of knowledge derived from KM systems to considerably reduce costs. Another strong example came from University 9:

“I think a good example would be the predictive analytics we've done to set the state of our student fees. That particular initiative involves many millions of Rands as a decision-making concept, and to base that on a set of predictive results is fairly significant.”

University 4 from South Africa conveyed,

“It is, because very often if you can present information at the click of a button, rather than have people sit for days calculating it, you can reduce your head count on staff, so it definitely has an impact on the staff headcount.”

And lastly, University 5 asserted:

“...and then of course the motivation is you actually want to use that organised knowledge to possibly be able to reduce costs of the use of resources.”

This finding shows that certain institutions in Africa are utilising KM as a cost reduction strategy. However, not many institutions are doing this. If other institutions in Africa could follow suit, then the rising costs of education could stabilise if not drop. This would help curb the financial challenges as asserted by Thiaw (2007) and Mwapachu (2010). This can also in turn lead to making education more affordable for students. As also shown in the frequency analysis, in 4.7.10, universities in Africa did not consider the use of e-Learning as a strategic means of making education more affordable for students. Therefore, this finding holistically indicates that KM is not being used strategically to reduce costs and make education more affordable for students.

5.17.3.10 Understanding trends

This finding relates more to the use of KM systems to analyse data and identify trends within the institution. This can relate to past trends that can inform current and future trends as well as and encompasses other trends such as students, performance, operational and others. The

actual KM and BI Information Systems used for this purpose is discussed in 5.17.5. However, this finding indicates that using KM systems to understand trends contributes to one of the main usage factor of KM in these African institutions.

University 1 conveyed,

“This is just one example of better and faster management decision-making. Furthermore, this allows a structured approach to dealing with historical information (going back into history) which is invaluable to identifying patterns and trends relating to the institution.”

Similarly, University 7 asserted their view along the same lines,

“Yes, because for all of this we interrogate our management information system to get data and to derive trends, and then in some cases taking those trends and putting it back into the management information system for future reference purposes.”

University 4 relayed more along the lines of student trends,

“I don't think it affects the student retention, but I think it helps to – because the retention depends on activity on the ground, not on the information that you have got in your data warehouse, but I think that it helps to explain things. So, if there is an enormous dropout in one year or growth, you can explain and understand where it's coming from, what caused it, by looking at the information about each student.”

University 9 relayed that it was impossible to monitor and keep track of trends relating to student enrolment, performance, retention and similar trends without proper KM Information Systems such as datawarehouses.

“Well, it's impossible without it, because there are lot of elements on our ERP systems that are not date stamped, that are overwritten, so if we don't capture them and store them with a date stamp, you lose that history..... Information is used at various levels, so we start off at probably the lowest effective level...I am talking more about knowledge here, which has been enhanced and added value to in some way. That kind of information starts at our college quality committees, so cohort analysis, trends of profiling etc.”

These findings show that KM Information Systems (KM systems), also referred to as BI systems, are playing a role in identifying various trends at the institutions. Some institutions are purely dependent on these systems such as University 9 and University 1. This serves a

strategic purpose by analysing past and current trends in order to inform future trends. This in turn allows institutions take strategic decisions in the present which have an impact on the future. Therefore, this shows that KM is vital when it comes to the process of trend analysis at institutions. As mentioned, the actual Information Systems aspect will be discussed under 5.17.5

5.17.3.11 Strategy development, implementation, and evaluation

This was a common motivational factor across most of the universities and this ties into the second theme which conveys that KM does have an influence on institutional strategy for those universities that are currently using KM effectively to inform the institutional strategy. However, this theme gives more detail on how KM supports strategy development.

University 6 conveyed:

“Look, there are strategic documents which is prepared in the framework of balanced scorecard, an educational tool, to prepare the strategy plan and also to implement that strategic plan, which is prepared for the strategic year, of one year, three years or five years.....Here in Ethiopia there is a ministry called ministry of education, which is the ...all higher education is accountable to this ministry. And it is this ministry who develops this business application which helps institutions to develop the strategic document, to evaluate the performance of the strategic document and also to implement the strategic documents. So, I am saying to you, even for the preparation of the strategic document for the implementation of the strategic document for the evaluation of the performance of the strategic document at the institutional level is dependent on knowledge management.”

This showed that KM is used in the 3-5 year strategic plan of the university which in turn is accountable to Ministry.

Similarly, University 1 relayed that,

“Knowledge Management is brought in at the very beginning of any strategy development as an ‘informing tool’ as again it serves as a ‘reality check’ when formulating strategies for a given university cycle, whether it is 1 year or 4-5 years. The more information and knowledge you have at the onset, the more easier it is to realise which direction to go and ‘where not to go’. Furthermore, Knowledge Management and Business Intelligence systems are now being used as a way of monitoring strategies and objectives.”

University 1 also looks at KM as a means informing 4-5 year strategies and also monitoring and measuring strategies at the same time. University 2 also conveyed the role KM in strategy development.

“to do the planning for future plans for the university as a whole.....and from there we come back with the strategies that we need to work on for the future for the university.”

“At the beginning we usually do some kind of surveys to understand how the community is thinking and the points where they feel that we might have problems, for example if we are looking at the quality of the education, then we do a lot of surveys with the faculty, with the students, with the parents, to find out more. And then from there we start looking at the business intelligence, to provide us with the information that could even back or refute whatever we get. Then we start planning after that.”

“The vice president and the president, yes, they consider is very important and actually is it requested whenever they have to make a decision that they go back to check the information available and how that would support or not support whatever they are deciding on.”

University 11 asserted that,

“Well, it definitely is improving in the basic targets that we are setting ourselves.... basically it's kind of a two-way thing. Because it is linked to strategy it makes it much easier, because if you find, for instance, that you want to focus a bit more attention on the research, and we've got the facts to prove that we need to put more effort there, then what we do is we say, "Okay, fine, in order to do it, and we have got targets that relate to it, it is easy for us to say because of these targets we need to implement it in areas much more seriously, so we can focus on an increased budget in areas of recruiting more research staff.", as an example.”

“There is a lot of information that we put into that area, so we use that on a regular basis in our strategy going forward, looking at our vision and mission and how we are performing on that type of level.”

Another university from outside South Africa stated that strategy could not be formulated without knowledge, and therefore KM became critical to the process.

“I would say knowledge management is used to provide information that can be used in the formulation of strategy, because strategy cannot be formulated without effective knowledge so whatever information that you get from the knowledge management system that we are having in place can be used now to formulate an informed strategy.”

University 9 affirmed that for them, strategy was now evidence based and therefore analytical KM and BI was needed for this.

“Indeed. It is now evidence based and a lot of metrics are involved in that evidence.”

University 5 conveyed that KM was used to process stakeholder information that was eventually fed into strategy development.

“Well, to a large extent yes, it does. Yes, to a very large extent it does. Like I said earlier, the external strategy development here is bottom up. And if it is bottom up it means you have to source your information from stakeholders, and then you need knowledge management to be able to do that, to sift and do all of the process required, and then of course to the effective dissemination.....secondly like a said earlier, the positive impact is that it assists you to be able to take strategic decisions, you have the kind of knowledge you require to be able to effect decision-making quickly, rapidly.”

Lastly, University 3 uses KM to benchmark against other international leaders in HE to inform their strategy going forward.

“Yes, a lot. What we are actually working at (university name omitted) is we are working on a strategy called the (university name omitted) strategy 2016. Based on our benchmarking results we look at the top 100, the top league universities in the world, your Yale, your Harvard, and see what is it that they are doing right, for example are they very research intensive, what is their post graduate and under graduate ratio? If they have got a very high post graduate ratio, that informs our strategic decisions that we are going to make. So, we actually identify that most top 100 research are very research intensive and they have got a very big ratio of post graduate students. So, what we are trying to do here at (university name omitted) is actually say, "Look, we are going to increase our post graduate intake and probably reduce.", so by 2022 we are trying to increase or post graduate ratio to about 40 per cent of all our students. So, yes, it does inform our strategic decisions that we make.”

In aggregate, as one may see, KM is being used towards strategy development by many leading universities in Africa. Each university uses it in a different way of informing strategy such as using KM to:

- Make evidence based strategies (University 9)
- Process stakeholder information to inform strategy (University 5)

- Formulate and measure strategy (University 1)
- Benchmark internationally and then use that information to inform strategy (University 3)
- Inform strategy in alignment with national education plan (University 6)

This is hence a conclusive finding that KM can be seen as an effective enabler of strategy development, implementation and evaluation.

5.17.4 Examples of strategic use of Knowledge Management to inform strategy

This section provides uniquely African Higher Education examples of how KM was/is used to inform strategy development. The literature review abounds with studies that show how strategies informed by KM in HE institutions promoted various benefits. This finding reveals if the same is true for those institutions in Africa that engage in KM strategically.

University 1 provided the most examples and this was a true reflection of strategic KM practice that in turn informed strategy at the university and generated numerous benefits.

Example one,

“There may be ‘hearsay’ that all staff needs notebooks, but by conducting a survey immediately through Business Intelligence survey software, processing those responses and converting it into knowledge, the report may then indicate that only 60% of staff need notebooks and not 100%. This saves the institution a substantial amount of money with a quick response time. This is just one example of better and faster management decision-making.”

This provided three benefits:

1. Which included faster and more accurate decision-making
2. Management of resources
3. Saving of a considerable amount of money

Another example by University 1 related to their enrolment process.

“The university strives for a fair admission policy whilst also attracting the best local and international students. At present we have a Knowledge Management system that performs a meticulous and on-going analysis of student intake. Prospective student information is stored on these systems when study offers are made. This includes various details such as race, gender, school performances, financial aid requirements, accommodation and other details. This is then available to all faculties in the form of structured knowledge reports and at the click of a button. Faculties then are able to know on a day to day basis whether they are meeting their targeted enrolment, e.g. X number student with financial aid, X number of student of certain race groups and disabilities etc.”

“When students apply to (University name omitted) and need to be placed. The Knowledge Management systems allow for proper placement of students. If the faculty that the student applied to is full or if the student did not meet necessary requirements, then the Knowledge Management systems would automatically acknowledge that and analyse the students eligibility for another faculty. If the student’s results matches or exceeds the second faculty’s requirement then the student details would then appear on that faculty’s statistics reflecting the student as an eligible candidate. So this definitely facilitates an effective enrolment process.”

This was a strong example of KM informing the enrolment strategy at the institution. This provided benefits such as:

1. Knowledge on demand regarding enrolment process
2. Better decision-making in regard to enrolments
3. Better placement of students within faculties
4. On-going monitoring and tracking of enrolment target

Example 3 showed a very innovative type of KM use,

“Another example of Knowledge Management in strategy is in relation to ICT staff, resource management and leave schedules during year-end leave at the Medical School campus computer laboratories. For the last 10 years, the medical school campus insisted that computer laboratories must be opened during the first month of the year. This made leave cycles difficult for IT staff as most of them took their annual leave during January due to December being a busy period for IT implementation for the following year. However, through proper monitoring of the laboratory activity through digital logs and activity reports per computer and transforming that into knowledge reports on usage of the labs, it was found that the laboratories were in fact empty for January. This meant that little to no IT staff was needed at those laboratories during that month. Furthermore, those laboratories did not need

as many resources (ink cartridges, paper etc.) during that month and those resources could be saved for that month.”

This exemplified that strategic use of KM in resource monitoring and management. This provided the main benefit of effective resource management and control which was broken down into the following,

- More informed use of laboratories and resources
- Effective management of human capital/resources
- Saving of resources such as ink and paper which in turn leads to saving of money

This related to example 3 whereby,

“Another example quoted from an operational point of view was the availability of computer laboratories whereby through the use of Knowledge Management and Business Intelligence systems, students are able to easily identify which labs are open and how full they are based on number of seats available.”

This again showed proper resource management.

Example 4 was also a good example and related to accommodation and residence affairs.

“An example of the university of (name omitted) strategy to provide housing for students who are on financial aid. A student may have a loan that only covers tuition but not accommodation and hence that student needs to get first preference for accommodation should he/she need it. The institution has now implemented a Knowledge Management system that provides that mandatory information and by using that information, and having it on demand, this prevents long waiting periods for such students. Before the use of Knowledge Management in this area, waiting periods used to go up to two or three weeks but now waiting period is down to just 2 or 3 days. Therefore information derived from Knowledge Management systems supports the overall strategy for this area.”

“We can immediately see if there is an under-subscription of beds provided to students who require accommodation or has the right population group been given the required amount of beds. One of the university’s policies is to give preferences to students on financial aid when it comes to allocating a bed. Therefore, with the use Knowledge Management and Business Intelligence, it allows for the policies to be monitored immediately. This again talks to the motivation of being agile and having information on demand to make better and faster decisions. Decisions are not just about being better but also faster/quicker response time and this is possible through Knowledge Management and Business Intelligence.”

This again highlights how KM is enhancing strategy even from an operational perspective related toward ensuring proper placement of underprivileged students in residence. This brought following benefits,

- Faster and better decision-making
- Minimal waiting time (2-3 days)
- Proper placement of students, especially financially needy students, based on analysis of student information

Example 5 was related more to Executive Level and how Executive Management made decisions about future strategies based on knowledge derived from KM Systems.

“Knowledge enables executive board to think about future strategies. Example. We analyse research activity e.g. time spent on systems used by researchers. We then use our Knowledge Management systems to analyse this data and provides statistics on research activity. Based on this we then noticed a sudden growth of new researchers. So as much as we spend time and resources on current researchers, we now use the statistics to focus more on new and upcoming researchers. This becomes strategies to nurture young and upcoming researchers and direct them to becoming leaders in their fields which will in turn continue to maintain the university of (name omitted) as a research leader. This order comes from the Vice Chancellor himself based on the results derived from the Knowledge Management Systems.”

This showed how KM was informing the research strategy of the institution. The last example is related to the use of Web 2.0 based e-Learning to promote a flipped classroom’ strategy.

“This ‘flipped classroom’ approach was also tested with 400 third year students and it worked well whereby they only came to class a few times for practical exercises and problem solving while most of their studying was done at home. This ‘flipped classroom’ approach through Web 2.0 also led to a lot of real-estate (space) came back to the University and this space could be used for other things/ faculties etc.”

This showed that a Web 2.0 based KM approach has led to the proper management of space resources at the university which could be used for other purposes.

Holistically, University 1 showed the greatest use of strategic KM from all of the universities sampled. This was both at an operation and at Executive Level. In summary, key benefits generated included,

- Better, faster and more accurate decision-making
- Saving of Time
- Proper management/use of resources
- Proper management/use of human capital/resources
- Knowledge on demand
- Better and faster enrolment process
- Better placement of students within faculties
- Proper placement of students, especially financially needy students, in residence with minimal waiting time (2-3 days)
- Informing future academic research strategies at executive level

University 2 gave an excellent example of how KM was used to inform Executive Management regarding why certain objectives were not met and the reason why.

“Well, recently, because of the turbulence that has been happening within the country, we have used knowledge management extensively to find out how the unrest in the country has affected some of the objectives not being met at the university, and with that we came to the conclusion, for example, that you would find the number of international students, how this has been affected, and accordingly there is ripple effect, for example, in the student housing.”

“Also in certain majors that were mainly demanded for by international students, like in our case it would be our big Islamic studies, Egyptology. These kinds of majors are more demanded by international students than local students, so looking at the business intelligence in general, it tells you which majors have been affected and which operating expenses or revenue generating areas have been affected, and it all boils back to one cause, which is the unrest in the country.”

As shown, this depicted the value of KM in establishing the problem areas and the cause thereof. Unrest in the country was shown to be the main cause of how certain popular courses were not being demanded by international students. This in turn would be able to inform an immediate remedial strategy.

Another example was the ability to predict courses on demand using KM.

“We use historical information from students registrations in previous semesters and we use own equations to calculate our expectations for the demand for certain courses in the next semester. With that we can come up with the demand for certain courses, and if we have enough room for all the students that would like to register for that course, or if we need to create another section.”

This allows for a student to have a problem free academic experience without any course overlaps and also ensuring that students graduate on time. This type of approach has in turn contributed to a dropout rate of zero as conveyed by the respondent.

Therefore, University 2 has reaped benefits such as,

- Successful co-ordination of courses on demand
- Evidence based knowledge on problems experience due to unrest in country
- Better and faster decision-making
- Ability to respond quickly to challenges

University 7 provided two very strong examples. The first one related to obtaining funding toward the ICT infrastructure for teaching and learning.

“We recently had – in order to obtain funding for the expansion of our ICT infrastructure for teaching and learning we had to go to the board to ask for strategic funding to invest in this initiative over the next three years, and as part of that application one needs to provide a measure of what returns can be expected in terms of this investment. So, that is the difficult question, so I had the job of trying to make that more quantitative and put a measure there or some feedback in that regard.”

“So, I looked at the retention rate of our students; the opposite of the retention rate is dropout, so how many students are we losing in what years, so obviously either they go; we don't get the subsidy for their actual completion or enrolments going further and we don't get their study fees. So, I started there and analysed the data from the management information system and made some calculations; okay, what does that cost us? So, that's opportunity cost; if we can keep them here we will earn more money. And then I built a model in Excel to actually say that the ICT infrastructure can improve our retention rate of students with say 1 percent or 2 percent, its variable you can select. What will the financial end result be over the next five years; you can do that for five years. So, then I provided that model to the vice

rector of teaching and learning and he then used that in his application, after I explained the model to him. So, there is certain modelling part in Excel and so on, but without the knowledge of the institution I couldn't come up with such a thing.”

This was an excellent example of how KM informed a funding model for ICT in teaching and learning. It was through the strategic use of KM that the respondent was able to build a model that could conclusively prove that a proposed ICT infrastructure could improve retention rate of students by 1 - 2 per cent. This formed the motivation to acquire the funding. Furthermore, the respondent confirms that the infrastructure will in fact improve teaching and learning and contribute to improved retention rate.

The second example related more to enrolment similar to University 1.

“Like all tertiary institutions we need to increase our diversity in terms of gender and race, so that's a big challenge for our university. So, that goes into the enrolment planning process, that's one of the challenges there. But in order to set targets you first need to know how things have changed up till now, over the last ten years say. So, if you look at that per student type; so first time entry students, post graduate students and so on, and you look at the gender and race breakdown of such enrolled students in the past per faculty, you can then get an idea of how things tended to develop up to now, and then use that information to inform your strategy, to identify faculties that are more natural or suited targets to grow diversity than others, and then set targets for those faculties in consultation with the deans, which goes into the enrolment planning process, enrolment management process, where students are then sourced. So, I think that is an important component of our strategy, but you can't just pull targets out of a hat, you have to base it on actual facts and trends.”

This shows that KM is being used to promote fair and diverse enrolments at the institution. As conveyed, enrolments are a critical factor for the institution and cannot be done without facts and figures. Therefore, strategic KM enables an effective enrolment strategy that is based on facts and trends.

Similarly to University 1, University 9 provided some key of examples.

Example 1:

“The most recent is our implementation of the re-admissions policy. The implementation of that was done on the hour scenario generation and scenario planning of what the impact was going to be, so we changed our implementation strategy midstream, based on the results that

our analytics produced.”

Example 2:

“The other is informing our recent enrolment plan, which went through to the Department of Higher Education. We have established that the interventions that we have put in place are going to change our student load substantially, which is going to have a huge impact on our subsidy submissions in the future. Even if we don't increase numbers we are going to increase FTEs. That notion I was able to table at council at the highest level in order for them to make a decision on that, and in fact two days ago I had to take that through to the Department of Higher Education to explain to them how it's going to work, because they were not really understanding what the impact was going to be.”

Example 3:

“I think a good example would be the predictive analytics we've done to set the state of our student fees. That particular initiative involves many millions of rands as a decision-making concept, and to base that on a set of predictive results is fairly significant.”

This shows that University 9 is strategically using KM in the areas of:

- Executive decision-making
- Re-admission policy development
- Student enrolment
- Full time equivalents
- Prediction of student fees (amounts to millions of Rands)

Lastly, University 3 also used KM and BI to monitor student intake, grants and rate their funders.

“it is used to monitor our intake, it is used to monitor our grants, and also when we rate the funders”

University 3 also gave some strong examples of how they used KM and BI to strategic position of the university in terms of ranking and research. To avoid repetition, these examples are shown in 5.17.5.5. These examples showed that KM and BI were being used strategically to:

- Promote the academic position/ranking of the university in the world

- Promote decision-making in relation to academic position and ranking
- Monitor Research output

5.17.5 Knowledge Management/Business Intelligence Information Systems currently in use

Knowledge Management Information Systems, which are also synonymous with BI systems, make up a mandatory part of KM. These Information Systems make up the technological aspect of KM (Omona, van der Weide and Lubega, 2010). These systems become critical for generating the knowledge necessary to inform strategy at various levels, including institutional strategy. This has been shown by various authors such as Delavari, Phon-Amnuaisuk and Beikzadeh (2008), Sahay and Mehta (2010), Sharman (2010), Goyal and Rajan (2012), Mamta (2012) and King (2013). This theme therefore focuses on the type of KM and BI Information Systems that are currently being used at these leading African institutions and how it is being used. At the end of this section, we will be able to establish if these universities in Africa are making strong use of KM Information Systems.

The qualitative results generated the following systems that seem to be present across these universities.

- Databases
- Data Warehouse
- Dashboards
- Predictive Systems
- Business Intelligence
- Score Cards

5.17.5.1 Databases

Organisational databases were the most common type of system across all universities. This is also confirmed in the quantitative results (4.7.3). This is not an uncommon finding as databases are known to be standard storage platforms for data around the world.

5.17.5.2 Data warehouses

Similar to 5.17.5.1 above, data warehouses were also one of the most common KM Information System used across these universities in Africa. Data warehouses date back to more than a decade ago, and as asserted by Weber and Weber (2000) data warehouses can allow for timely access of knowledge. Furthermore, Ariyachandra and Watson (2010) argued that data warehouses were more than just a data storage facility, but a specialised data repository that is used to support decision-making.

As conveyed by University 6,

“We have that large business application database the development and the implementation of those big business applications that are under development are backed up in a data warehouse.”

This shows that data warehouses are used as a backup of critical university applications. This is supported by University 10,

“But for management information we mainly make use of our ITS and on data warehouse that is linked to ITS.....and then we have got a dedicated warehouse in which information then is stored for long term.”

“Because we also identify schools, and also target some schools to get some student. It really is something that is quite broadly used and it's mainly used by our registrar.”

This shows that apart from storage, data warehouses are effectively used in the student enrolment process of the university.

University 7 conveyed that Data warehouses dealt more with the structured information and data.

“We also have a system called sun scholar, where all student thesis and dissertations and publications are stored, but I think that is more repository at this stage and not – so, you can search it and you can query it as research, if you use that. So, that deals with the unstructured information part, whereas the data warehouses deals with the structured information part.”

University 9 used data warehouses as a means of centralising data from different sources.

“Our role is then to tap into the various systems and we bring them into a central warehousing area which we manage, and over that we put various reporting structures, starting from the very basic, where we have analysts and senior analysts which will tap into the raw data and use it for research purposes. We then have another layer which is aggregated or transformed data, which would then feed another automated reporting layer via our portal, so there is a whole range of metrics and reports that can be run from the information portal. We have then added value to that by putting over the top of that a business intelligence suite, which adds to the complexity of that reporting layer and has role based access to a range of instruments, including sensitive data like IPMS, our performance scorecard, or the institution performance scorecards of particular portfolios.”

This concurred with Mannino, Hong and Choi (2008) whereby data warehouse acted as central data repositories for all data that that may come from various sources and this is then cleaned, archived and integrated with other systems to support decision-making according to management requirements. This also shows that University 9 goes beyond just using data warehouses as a storage facility.

Finally, and similarly to University 9, University 3 was using data warehouses as a means to source internal data and use that towards benchmarking against other institutions for competitive ranking purposes.

“What we do is we source our internal data from our data warehouse, and what we are always trying to do is to actually compare ourselves with other institutions to actually determine how we are doing. So, we bench ourselves, for example with local universities, the top five research in terms of universities in South Africa, and we also benchmark ourselves with probably the top 100 universities in the world.”

This finding, in aggregate, showed that data warehouses were being used by many of these leading institutions. The main purpose for the use of data warehouse was for storage. However, only 2 universities, University 3 and University 9 were making added and more innovative use of data warehouses and this included:

- Use of data warehouses for national and international benchmarking (University 3)
- Use of data warehouses for integrating data and driving other systems such as performance scorecards and others (University 9)

5.17.5.3 Dashboards

Digital dashboards are powerful KM/BI Information Systems and mainly used at institutions in developed countries. Sharman (2010) showed how operational use of dashboards could relate to using dashboards to display actual costs/income vs. budgeted cost/income for the department. Relating more to academic uses, dashboards could provide visual description of enrolment and dropout status, faculty based statistics as well as students' performances that were below a certain criteria and needed improvement. It could also be used to forecast future enrolment and financial data for the department (Sharman, 2010). Harel and Sitko (2003) asserted that digital dashboards could professionalise HE institutions by enabling executives to make better decisions based on accurate and real-time knowledge. Benefits of dashboards are listed in the literature review in detail.

However, only 3 institutions effectively used digital dashboards. These were University 1, University 3, and University 9. All of them were from South Africa.

University 1 conveyed,

“The main systems used at University of (Name Omitted) are Digital Dashboards.”

“We also use digital dashboards because a picture paints a thousand words and that's what digital dashboards do. They provide graphs and pictures as performance indicators. This is also a form of information. Example, we have dashboards that provide graphical information on the consumption of electricity in the data centre and from that we can see that we are running very close to ambient temperatures. This can then be used as a future strategy for electricity consumption because for every watt of electricity used to power up the data centre, you need another watt for cooling. This is how current information can drive future strategy and that is what Knowledge Management and Business Intelligence is about.”

This shows that University 1 uses digital dashboards to inform future strategy. Similarly, University 3 gave another good example of how they were using dashboards.

“Like they say, a dashboard basically, it's a measure at a point in time, to say for example, when we were doing the registrations we had targets, and those targets, the only way to know where we are with registrations, we have to use the dashboards to say how many have we given provisional offers, how many accepted, where are we with registrations; are we over, are we under, especially with the MBA program, where a limited numbers and Health

Sciences as well where we have limited numbers, and the quality of applicants, rating all the applicants and grouping them and targeting some applicants. So, we use these different dashboards for those kind of things.”

Lastly, University 9 used various dashboards in different areas.

“The dashboards are in a number of formats, so we have college dashboards on all elements of student metrics. We have separate dashboards for research activity and research findings, we have got separate dashboards for elements of staff and employment equity planning. We have also then converted a range of those into portfolio specific scorecards.”

These findings confirm that dashboards are of great importance to these 3 leading institutions and it plays a key role in generation of necessary knowledge to inform strategy. This therefore also concurs with the views of Harel and Sitko (2003), Sahay and Mehta (2010) and Sharman (2010). However, again, only 3 universities were investing in these types of KM Information Systems. It also shows that only universities in South Africa were using these systems. Perhaps other universities need to follow suit of these standards in KM Information Systems.

5.17.5.4 Predictive systems

Building from dashboards come another powerful Information System known as Predictive systems. These systems are built using the concept of predictive analytics (King, 2013) and its main function is to ‘predict’ future trends in various areas using current and historical data. These systems are therefore invaluable in developing future strategies (Eduventures, 2013; King, 2013).

There were 5 institutions in total from all that were interviewed that used Predictive systems. These were used in various areas including academic and support operations including financial processes.

University 2 conveyed,

“We use historical information from students registrations in previous semesters and we use own equations to calculate our expectations for the demand for certain courses in the next semester. With that we can come up with the demand for certain courses, and if we have

enough room for all the students that would like to register for that course, or if we need to create another section. We also find out if the timings that are provided for the courses overlap with other courses that we assume would be demanded for by the same students, for example through the student information system you can find information about a certain student, which courses he needs to graduate, and accordingly these courses will be demanded. If that student has two semesters to graduate, then are you expecting that between the next semester and the one after, he will be requesting these courses, and accordingly you need to make sure that you don't have an overlap between the courses that he is requiring, so that he can be able to register for them and graduate on time. So, we do some predictions on demand, or our expected demand of the courses, and accordingly we find out areas where we think we might have problems.”

“Well, for us in Egypt we don't worry that much about dropout rates, because it's almost non-existent.”

This was an excellent finding as it showed how predictive analytics were used to predict demands on certain courses as well as student performance. The respondent also confirmed that it was working so well to a point where dropout rates have become almost non-existent.

Similar to University 2, University 10 relayed that predictive analytics was playing a key role in student performance monitoring.

“So, thanks to that information we did build an early warning signal that informs us about possible student failures, and then the students are being identified and then they are being coached or they are being helped.”

University 1 utilised a Web 2.0 based predictive system to monitor and track weak and/or poor performing students

“It also makes it easier to identify weak students through tracking. This is done by monitoring and checking e.g.

- if a specific student has viewed the video lecture*
- has done his/her homework*
- Does the student ask questions or communicate with lecturer/fellow students?*

These early warning signs make it easier to prevent weak performances and address poor performing students before they get worse. So Web 2.0 systems also act as Early-warning systems in identifying potential learning problems.”

University 7 not only used Predictive analytics for student performance monitoring, but also for space and subsidy predictions.

“Our division, in terms of planning, deals with forecasting student numbers of different types of students to inform space usage in future, and also to calculate or estimate the State subsidy, because obviously subsidies is earned by student numbers and graduates and so on.....Yes, because for all of this we interrogate our management information system to get data and to derive trends, and then in some cases taking those trends and putting it back into the management information system for future reference purposes.”

University 9 made the most effective use of predictive systems in many areas of the institution.

“We have got a number of areas where we do predictions. The two biggest impact ones are we do predictions at module level. We predict everything about a module; enrolments, cancellations, exams results, exam marks, attrition, everything, and we project those three years rolling – a rolling three year figure every year. That information gets fed into our financial costing system, which then draws on that to make decisions about the fees for setting fees the following year.....The other areas where we do predictions is in qualification, registrations and cancellations for the purposes of enrolment planning. And then the real exciting one is we have a predictive model which allows us at registration, before the student even starts, we have a 72 percent confidence of establishing whether that student is going to pass their first exam or not.”

“I think a good example would be the predictive analytics we've done to set the state of our student fees. That particular initiative involves many millions of Rands as a decision-making concept, and to base that on a set of predictive results is fairly significant.”

This was definitely the most powerful example of the use of predictive analytics. University 9 confirmed that their predictive systems are so strong that it could predict at a confidence level of 72% of whether a student would pass their first exam or not. No other university in Africa uses predictive analytics in this ways. They also used predictive systems in the prediction of student fees which was very important considering that it involved money that kept the university operational.

This finding holistically shows that a limited number of leading universities in Africa are using predictive analytics. Of these 5 universities only University 1, 7 and University 9 and

seems to be making the most effective use of it, the latter being the more effective. In aggregate, the main uses across these 5 universities for predictive systems included,

- Prediction of courses on demand (University 2)
- Prediction of dropout rates (University 2)
- Early warning systems for weak students(University 1)
- Prediction of student performances (University 1, 2, 7, 9, 10)
- Prediction of Space Subsidies (University 7)
- Forecasting student numbers (University 9)
- Prediction of student fees (University 9)

5.17.5.5 Business Intelligence

There are some universities that referred to KM Information Systems as BI systems. University 3 was one such university that referred to it as BI and used it very strategically.

“We use knowledge management in terms of the three cycles that you know, which is technology, people and processes, to say with the information that we have gathered from BI...how do we manipulate the resources we have and the capabilities we have to drive the university in becoming the top 100 university in the world.....Well, if I take business intelligence, for example, the University of (name omitted) is inspired to be in the top 100. So, that alone, you need some business intelligence to gather all the factors that can influence that positioning, so we use business intelligence.”

This showed that BI systems were used to inform the university in regard to their academic position in the world and therefore assist them in making decisions and taking action to promote their academic ranking. This related to University 1 who use BI systems to monitor and track their academic footprint in Africa and globally.

“We also have Business Intelligence systems which is used to monitor our Academic footprint both in Africa and in the world. This allows us to see where we are in terms of on African university.”

University 3 also used BI to monitor research output

“At a higher level, I think most of the examples that we have, especially it's looking at – in

terms of business intelligence, it's looking at all the indicators that are used to evaluate universities in terms of rankings, if I am talking at that level. So, to say the number of A rated scientists, because we use business intelligence for those as well; the number of research outputs, so we do simulations via business intelligence, which we have a department responsible for BI and all the simulations.”

Another example provided by University 3 in regard to research output,

“On research we are looking at research data, we use what they call ‘insights’. I don't know if you've heard of ‘insights’?... WeboFind’ So, we use those, and I would like to think that it is more of big data, because of the volumes of data that is involved.....We use what they call – it's mostly bibliometric analysis. We look at things like the number of documents that are produced, time sighted, and also we use our local in-house data warehouse. And there third party tools that we use, things like higher education management information systems, to look at data from other institutions.”

This was an interesting finding relating to the enhancement of research output at University 3. Therefore, this finding indicates only two universities are using BI to position themselves from a ranking perspective. Furthermore, only one university, University 3, is using BI to monitor their research output and standing.

5.17.5.6 Scorecards

Only one university used ‘performance scorecards’ that being University 9. Scorecards are used to measure performance of an institution based on KPI's.

“Scorecarding is one aspect of institutional intelligence. Well, score carding is one aspect of institutional intelligence. Look, ours as a system is still fairly new, so we are still growing that in terms of development, but that hasn't held us back in terms of disseminating this.....We found more success with score cards as opposed to dashboards, because they are even more succinct in their message, so they are giving you a trend of a common currency, a score over time, as opposed to a plethora of analytics. What you find these days in complex institutions is your dashboards can just get overwhelming, there is just too much to show. The more towards score carding helps a lot in that.”

This shows that only one university is taking KM Information Systems to the next level and experimenting with new technology such as scorecards which is mainly used in developed countries. This university is the largest distance learning university on the continent and scorecards are proving to be vital in monitoring of the performance of the university. This

therefore makes University 9 one of the leading universities in the adoption of world-class KM Information Systems.

Holistically, the findings in this entire theme indicates that not many of these leading institutions are utilising powerful KM Information Systems. The most common systems include databases and data warehouses. This is also confirmed by the quantitative frequency analysis in chapter 4. Only a few universities from South Africa made effective use of,

- Dashboards (University 1, 3, 9)
- Scorecards (University 9)
- Predictive analytics (University 1,2,3,7,9)
- Specialised BI systems for international benchmarking and ranking (University 1,3)

Therefore, in aggregate, University 1, 3 and 9 seem to be the leaders in strategic KM Information Systems in Africa.

5.17.6 Main areas of usage of KM Information Systems

The use of KM Information Systems is divided in two areas in most universities, being academic and operational. As asserted by Laal (2010), by implementing KM practices in HE, the nature of the institution changes and in turn leads to better decision-making, reduced costs and promotes better quality of both academic and administrative services. These findings indicate the main areas where KM Information Systems are used in the Africa HE setting.

5.17.6.1 Administrative Operation Improvements

Most of the institutions utilised KM Information Systems from an operational perspective. This can be confirmed by University 1, 2, 4, 5, 6, 7, 8, 9, 10 and 11. This constitutes most of the universities. Below is what some of them had relayed.

University 6 conveyed that KM Information Systems were used mainly in procurement, budgeting and finance.

“Look, now we are developing the procurement to manage those procurement for administration and inventory control management systems,.....We have integrated business budget and finance system which will give you information on demand about our expenses,

our pure expenses, our revenue levels, our capital budget, our current budget, and so forth. And the same is true for the student information system. Now, almost latest argument is that we have a knowledge management system for the university registrar. Then that information will give you detailed statistics about students like enrolment, gender, disability, course selection, dropouts and so forth.”

This concurred with University 8 in regard to KM Information Systems supporting finance and operations.

“Yes, for example when it comes to finance, you can have reports which might indicate the items which are consuming most of the funds, and probably it might show why that has been the case, and then the management can decide what do to about that.... or it might inform whats needs to be done, budgeting, from a financial and operational perspective for the next academic year.”

Similarly, University 5 supported the views of the preceding 2 universities,

“So, there is a monitoring system, a financial monitoring system that monitors how much has been extended besides what has been budgeted. This is used to ensure that no arm of the university exceeds the budgeted commitment. That's operational and also a bit strategic.”

University 6 was also using KM Information Systems for improving response time and central access is certain services. An example is hereby provided.

“Look, as I told you, our university has 18 campus, 18 branches and there are dispersed 100 kilometres from the main campus. So, before the usage this intelligence system, if you lose your ID, you have to go in those 18 campuses to replace your ID thinking that you will borrow a book from other campuses. Now, with the knowledge management systems, then you can have the student identity card with digital signature from one window with access to all campuses. So you don't have to go to a specific campus for a card. Look the difference. You can finish the process of replacing a lost identity card within a day, but before it will take you more than a week or 15 days to finish.”

This shows that utilising KM Information Systems in these processes allow for:

- Knowledge on demand regarding the financial status of the university such as revenue income, expenses, capital budget and other financial information.
- Analysis into which items were consuming for more money.
- Better decisions on financial and operational aspects.

- Faster and more centralised access card retrieval which saves time and logistical inconvenience.

University 2 used KM for supply chain purposes and equipment maintenance.

“SCM, supply chain; operational, from the point of view of maintenance contracts, evaluating whether certain functions need to be outsourced better than having them internally. This is the main thing, I think, that we do.”

“Yes, we've seen a big difference. Less waiting time..... Maybe internally in the IT operations inside IT, by doing some analysis on how much we spent in maintenance of certain equipment, as opposed to a maintenance contract, and accordingly the decision whether to keep the contract or to change the hardware itself and replace it.”

“Sometime when you change the equipment and you get three years warranty with it, it is a lot cheaper than actually paying for maintenance, so we did some analysis and highlighted certain equipment where we found it would be a lot better for us to change equipment itself.”

As one can see, this promoted benefits such as cost effectiveness in the on-going maintenance of equipment as well time effectiveness.

University 11 found that KM Information Systems was informing the quality of services across the university.

“There is a lot of information now that we are utilising on the quality side, where we are gather information as to how we are performing on the quality level. We have got a fairly significant quality management activity across the full institution that has been linked to our strategy.”

University 4 relayed that a significant amount of operational and finance reports were generated from KM Information Systems which was used for strategic planning.

“Well, they are used to a manage the entire administration of the university, so all of the information about students and finances is sitting in our institutional database, and then people can access that information in various formats, depending on their needs. So, if you are a dean you have a set of standard reports that you can access by yourself, and if you are not a dean or an HOD, you have got another set of reports, and if you require anything outside of your standard set of reports, you email the data management unit, who then provide the information for you, depending on what it is going to be used for, so obviously

there is some restrictions on personal information and stuff, but we are allowed to distribute the information that is going to be used for strategic planning.”

University 7 on the other hand used KM Information Systems to generate and disseminate reports on various types of information such as student, enrolment, finance, HR, bursaries and loans.

“Definitely operational, so it's getting information about students, to make certain operational decisions in faculties; determining enrolment targets, getting the contact details of all your post graduate students because you want to send them an email, so there's a huge organisational perspective or component to it. But then in my world, in my division, it's more we are not looking at the individual records as such, it's more about the aggregations of faculties and certain types of students. So, we do take information from different databases and combine it to get a more enriched view. We combine different information entities, say the tie between finance and research.....I would say they are mainly used to generate and distribute management information on topics like student, finance, HR, qualifications awarded specifically about student enrolments, student information and bursaries and loans awarded, and so on. So, that I would say is the main purpose, and then you use that information to investigate certain areas or combine different types of information entities to answer certain queries.”

University 1 gave a broad response that related more to strategic decision-making at operational level,

“So at this point in time the knowledge derived from Business Intelligence systems is primarily used for better decision-making regarding operations which in turn enhances operations, better strategy development and continuous monitoring of operational and academic processes.”

This related to university 9, who also gave an example.

“Yes, it is, because we also have instances where the operational aspects are addressed by our research and our information, and a good example is our recent implementation of the re-admissions policy. Our research results have formulated the decision-making of how to implement that policy.”

These were two very strategic examples of how KM Systems informed strategic decision-making at operational level.

Overall, this shows that a considerable amount of leading universities in Africa were utilising KM systems for operational improvements. This can be summarised into the following areas,

- Finance
- Administration
- Human Resources
- Operations
- Enrolments
- Student information

Strategic decision-making in relation to operations was also a key benefit from the effective utilisation of KM.

5.17.6.2 Academic Operation Improvements

On the academic operations side of the universities, KM Information Systems are mainly used for the proper co-ordination of academic services.

University 6 utilised KM Information Systems for their library services.

“As I told you, let's say for example the library information system or the library knowledge management system, it uses or manage the services of the library – you know the services of the library are borrowing the books and providing the digital libraries and hard copy library for the students books. So, that knowledge management library system is used.”

University 2 found that KM Information Systems improved the co-ordination of their courses on demand,

“So, our main concern is providing the courses that students are demanding, because this is the problem; we used to have a lot of waiting line for certain courses, and so we are trying to resolve the issue by providing the courses needed on time.”

This showed that the KM Information Systems enhanced the timeous delivery of courses on demand.

University 11 relayed a very detailed explanation of how KM Information Systems were

strategically utilised in the areas of academic course monitoring, student performance monitoring and quality of the academic programmes in general. Regarding academic course monitoring,

“The main thing is for areas of the academic type input; information about how we are performing academically on a broad, detailed type level.....So, we have built up a lot of data which links to every particular department, right up to the elemental level. So, that information is actually being utilised very, very seriously to focus attention on which courses aren't doing to so well, as an example, which courses we have to redirect to maybe recruit more strongly in some areas.”

When it came to student performance monitoring,

“We are developing now a better early warning system, where we are using our e-learning environment on that level to assist us in focusing attention on students at risk, for instance. So, there is lots of those elements cropping up at the moment, so I really believe it's been doing a very positive job.”

“What we do is we have regular strategic or institutional planning meetings, and a very strong component of it is to take specific areas of academic performance on a broader level, and deal with it, and that is drilled down right up to departmental level, is possible.”

This shows that KM Information Systems are improving the academic monitoring of students at University 11. Similarly when it came to the quality management of academic programmes, KM Information Systems were proving to be valuable for the institution.

“There are elements where it is used in a slightly different way; there is a lot of link between what we call our quality environment and knowledge management in a certain way, but a lot ties into the academic programme.”

“So, the focus on the aspects that we've got fairly mature relates to student and academic record. There is a lot of information that we put into that area, so we use that on a regular basis in our strategy going forward, looking at our vision and mission and how we are performing on that type of level. So, I believe it's actually pretty good.”

This shows that KM Information Systems are proving to be a pivotal asset in the academic planning and strategy side for the university and this has led to:

- better decision-making based on academic processes
- Effective Student performance monitoring
- Effective quality management of academic programmes

Similarly, for University 5, the academic monitoring and reporting process to national entities is being facilitated by these Knowledge Management Information Systems

“Because we are a public university and we relate to the regulatory body, the national regulatory body, the quality assurance body, the national university's commission. So, periodically we are expected to generate statistical summaries on enrolment, on gender balancing, both for faculty and students, and then on science/art ratio. We have systems that do that, and then it produces summaries which disseminated to ...stakeholders especially to government agencies that do the quality assurance.”

University 10 also conveyed the use of KM systems to report academic trends such as pass rates and graduation rates to government and other entities.

“It's about the collection and analysis of statistics. So, mainly collection and analysis of statistics, that are in turn being fed through to stakeholders, which means the government, some private and public enterprises, and of course management of institution. It's all about reporting; pass rate and graduation rates.”

It also created a means of research into why students were failing certain courses, thereby becoming an academic monitoring strategy as well. This expedited an early warning system that can aid in preventing failure in certain courses.

“It is also for us to identify and then I go towards institutional research. It is also for us to identify possible problem areas. For example, during, I think it was graduation, our pass rate analysis, we discovered that in some courses students would very quickly fail, in other words, after three, four months or even less, we could already detect that some students would fail, because we could trace – we could determine and we could see a pattern, and we know the pattern is that a student will pass his first test, second test, and then the marks go down, then you know you have a problem. So, thanks to that information we did build an early warning signal that informs us about possible student failures, and then the students are being identified and then they are being coached or they are being helped.”

University 3 also used KM Information Systems for academic monitoring purposes.

“We have programs where academic programs monitor students who are at risk and they assess them and so forth.”

Lastly, University 9 innovatively uses KM Information Systems to facilitate institutional research as well as monitor academic research.

“Well, we recognise two areas of research, one being institutional, which is a lot of information that I have been referring to. Our academic research component is also impacted upon by this information, via similar aspects like performance score carding and the analysis of our post grad students and the outputs.”

These findings confirm that the main use of KM Information Systems within the academic operations of the universities included academic monitoring which involved,

- Monitoring to student performances
- Quality of academic programmes
- Development of early warning systems

This also contributed to the generation of academic reports in some universities that was used for submission to national and governmental entities.

Holistically, there is more use of KM Information systems in the administrative side of the university operations as opposed to the academic side of operations.

5.17.7 The Role of Culture

It has been shown that organisational culture is pivotal for the success of Information Systems and KM in any organisation (Park, Ribeire and Schulte, 2004; Leidner and Kayworth, 2006). Furthermore, this study applies the Schein (1985) framework of organisational culture. These findings below confirm that organisation culture does play a role on KM implementation and success. Therefore, these findings concur with other studies that also test and apply Schein (1985) framework such as Park, Ribeire and Schulte (2004), Alavi, Kayworth and Leidner (2006), Leidner and Kayworth (2006), Iivari and Huisman (2007) and Omerzel, *et al.* (2011) . This further shows the importance of culture for IS and KM success.

University 7 argues regarding organisational culture and KM,

“Absolutely, yes, because knowledge management needs energy. You can't do it – it can't happen by itself, and if people don't understand the benefits of knowledge management and make that part of their day-to-day doings without even thinking about it – so, if it is not taken up in the culture I don't think it can ever be successful. And if you don't want to improve and you don't want to learn, that's also in your culture, I think. I don't think knowledge management will be handy or useful to you. So, I think that's a very important part of such a – it's an important construct in such a model.”

“That is happening at the moment at some faculties or some modules, but it is happening. And I think it's about culture again; you need to be familiar with these things as a lecturer, to be comfortable in seeing the benefits of that. It is the younger generation lecturers that are actually using this.”

This was a key finding in relation to organisational culture. This particular university was not entirely leading in KM and the respondent believed it was because of the lack of culture and therefore culture needed to be changed accordingly as expressed above. Furthermore, faculties that are changing their culture towards KM adoption and implementation are showing signs of improvement.

University 1 shared some important sentiments as well regarding organisational culture and also relating that to management support.

“Organisational culture in the form of Management support also plays a very important role in Knowledge Management strategy..... However, the Vice Chancellor did give his full support as he saw it as an opportunity and strategy to use Knowledge Management to measure the institution's strategies, objectives and goals. Therefore support from Executive Board Level was pivotal in driving Knowledge Management.”

This shows that a strong culture starting from Executive Management is important for KM success. Similarly, University 9, being the distance learning university also conveyed along the similar lines.

“Very, very definitely. Change management is the biggest obstacle of any business intelligence or organisational intelligence structure, so you have to gain the confidence of your audience, whether that be at middle management or even senior management, before it becomes effective. And there is only one way to do that, and that is success breeds success,

so if you show with evidence a successful project, you take along your middle and top management with you.”

University 3 also revealed a strong and positive culture towards KM,

“Oh, yes, yes, yes. And I think that is reflected in where knowledge management as a discipline in the university has been positioned. So definitely. It is represented all the way from set level (Executive Level) downwards. I think certainly it is the organisational culture and the drive to say, do they see a need for knowledge management. If they do then they will allocate resources, because that's what – especially from the system side. And then from the effective use of these as well it goes back to organisational culture and where the representation of knowledge management is. If it is at executive level, you will get funding and knowledge management will form part of the strategic initiatives within the organisation, and hence they will get funding, they will get people to work, and the output coming out of that as well will be used, because it's represented there, it's a function.”

As mentioned earlier, University 3 was one of two universities where KM was at Executive Level and therefore attributed this to organisational culture. The views of University 1, University 3, University 7 and University 9 are all in support of one another. Therefore, this theme clearly outlines that a positive organisational culture mainly in the form of management support is pivotal for KM to thrive and that organisational culture does play a pivotal role in KM success.

5.18 Web 2.0 and e-Learning Strategies

As depicted in the literature review, e-Learning is an important subset of KM. Maier and Schmidt (2007) affirmed that KM and e-Learning were both approaches that contributed to the improved construction, preservation, integration, transfer and use of knowledge. Furthermore, as argued by Kende, Noszkay and Seres (2007), knowledge production and dissemination and the e-Learning systems that support them are of great importance as e-Learning takes a prominent place in the renewal of knowledge. Building on e-Learning comes the phenomenon of Web 2.0 technology which is an advancement of e-Learning. As mentioned under 5.10.2, prior to Web 2.0, e-Learning was more of an online ‘read-only’ text based learning platform. Hence Web 2.0 has transformed e-Learning in to an interactive learning platform (Birdsall, 2007; Kesim and Agaoglu, 2007; Nugultham, 2012).

An abundance of studies show how Web 2.0 is being used effectively to advance e-Learning and spread knowledge especially developed countries. These studies include Williams, Karousou and Mackness (2011), Bennett *et al.* (2012), Eales-Reynolds, *et al.* (2012) and Silvia and Beatriz (2012). There also seems to be a surge of Web 2.0 activity occurring in other developing countries. Studies by Usluel and Mazman (2009), Kose (2010) and Forkosh-Baruch and Hershkovitz (2012) among the many highlight this.

The findings in this specific theme reveal some interesting trends about the status of Web 2.0 and e-Learning in the African context. This theme is broken down into further mandatory sub-themes that give a bird's-eye view of the current happenings in the Web 2.0 and e-Learning realm of African HE. These sub-themes include:

- Current Web 2.0 technologies used
- Benefits of e-Learning and Web 2.0
- Absence

5.18.1 Current Web 2.0 Technologies used

All of the institutions selected for the study did have an e-Learning platform. This is confirmed by the following responses.

University 1:

“But lets take e-Learning first. We got a traditional Sakei interface which is an effective Web 2.0 system for teaching and learning and collaboration tool.”

University 5:

“For the e-learning we actually transitioned from an e-learning system, where students had to aggregate at locations on campus, to a stage where students today could access lecture resources with their mobile phones.”

University 10:

“In the case of e-learning we have an institutional e-learning committee that comprises many constituencies here at the polytechnic. We've got the distance education component, we've got the centre for teaching and learning, and then we've got my department, IT, and all three are basically involved and all develop policies, and these policies were eventually approved by our board, our council.”

University 11:

“So, where we have had success and definitely some improvement, a lot of the e-learning activities are being put onto our e-learning package in a more organised way, which shows that there is an improvement in how we are dealing with some of these tools, and it is adding value to that whole process.”

These were just some of the example of successful e-Learning initiatives. It would be too lengthy to list responses from all the universities. However, even though all of the institutions did engage in e-Learning practice, many of them did not utilise Web 2.0 as an effective strategy for e-Learning.

There were a variety of Web 2.0 technologies present at some of these universities, however, not many of them were used as an official teaching and learning tool. Some of the Web 2.0 technologies used included,

- Facebook
- 2nd Life
- Moodle
- Open Resource Education
- SharePoint
- Twitter
- Wikis/Blogs
- Podcasting
- YouTube
- Pocket App

However, not all universities used them. Below a more detailed explanation of which universities used what Web 2.0 technologies is given

5.18.1.1 Facebook

University 2 used it mainly unofficially as a communications tool to communicate with the community.

“Unofficially we also have the AUC Facebook and Twitter, and mainly it's the communication office who use that to communicate with the community, but not on a formal basis.”

Similarly, University 4 used it as a message delivery platform.

“We use it to contact students more than to enhance their learning experience.”

However, University 7 showed more effective use of Facebook directed more towards pedagogy,

“Certain lecturers then have a Facebook page for a certain module, and where students then can pose questions and help each other in terms of responding to that.”

Similarly, University 1 had a similar view but more interesting view,

“Seven years ago, we said that Facebook needed to be open to everybody as this contributes to sharing of knowledge.”

This was equally complimented by University 9's use of Facebook.

“We also use additional facilities like Facebook, where particular modules have their own Facebook pages and presence and students use that in conjunction with the other social media to interact with peers firstly, and secondly with tutors and academics.”

University 3 also used Facebook as a Web 2.0 strategy for educational use,

“Last week we configured a server for a course in business networking as part of business management and they will be using Facebook to analyse the networking. So, students will go to their own social networks, analyse their own friendship and friends of friends of friends, and they will use those networking theories and so forth. So, we are using social networks to try and learn the principles that work on social networks, and reapply those ones in business management.”

As one can see, only 4 universities used Facebook effectively as an educational tool. This shows that Facebook is not being used effectively across most of the universities in aggregate.

5.18.1.2 Twitter

Only 2 universities, University 2 and University 4, used twitter and this was more for contact purposes rather than pedagogical purposes. Again, this depicts ineffective use.

5.18.1.3 Moodle

Moodle seems to be the most popular Web 2.0 type of technology used in the creation and dissemination of knowledge. University 2, 4, 6, 7, 11 confirm that Moodle is their primary educational Web 2.0 tool.

University 11:

“at the moment, the content management system called Moodle, we are using Moodle for learning for the education purposes at the university level.”

University 2: *“We have blackboard and we have Moodle.”*

University 10:

“Moodle is currently one of our mostly used platforms for learning purposes.”

University 4:

“There is a Moodle e-learning student system, where the lecturers can put the information, the notes, the information the students require to read up on before and after the lecture, and we also use very limited at the moment but definitely growing, there are a few lecturers who are recording their lectures and then the students can replay them again through the podcasting and the e-learning system.”

University 7:

“We are using Moodle as an e-learning platform since last year. We had other technologies previously.”

This finding shows that Moodle is a common Web 2.0 educational platform across multiple universities in Africa.

5.18.1.4 SharePoint

SharePoint is being used, but not at its fullest potential. Here is what some of the universities had to say.

University 2 conveyed that,

“We use it for the website and for the faculty website andnot for teaching and research.”

Similarly, University 4 conveyed that,

“Yes, we do. We don't use it in the administration of the university and the senior management of the university, but some departments do use it.”

University 7 made a point that,

“We have SharePoint, but SharePoint is just a vehicle”... Because now we just use SharePoint as a repository and that's not the best use of SharePoint.”

These findings convey that SharePoint may not be at its peak or maturity in some of the leading HE institutions in Africa.

5.18.1.5 Wiki and Blogs

University 6 was using wikis and blogs mainly in their architecture department

“Yes. We are using web 2.0 like wikis, blogs and podcasting in only one of our institution called Ethiopia institute architecture and building construction and property development, because there are architects and they are charting their understanding into the wikis forums. An instructor will put some agenda on the wikis, so they are expected to do what their opinion is on the wikis and on the blogs, but at the university level we are trying to use the model.”

This was an interesting and similarly University 9 being a distance-learning university also made effective usage of wikis and blogs,

“We have got a range of initiatives. The first one is the extension of our learner management systems, which is all online and has its own facilities of, to a certain extent blogging, and dissemination of information, not only in a what we call behind glass scenario, but fully

online as well.”

This shows that blogs are seen as a successful Web 2.0 tool in the dissemination of knowledge.

This is also supported by University 7, whereby wikis and blogs are used to collaborate and spread knowledge in a certain area.

“Also in faculties, I know wikis and blogs are used in some departments and faculties, to have out of class discussions about certain topics. Another example is where in order to write better, students can submit or write something on a blog, and then a language expert of a certain centre will then review it and give feedback on that. So, that's interesting uses of wikis and blogs at our university. There may be even more that I don't know about.”

The above universities that are strategically utilising wikis and blogs shows that it is enhancing the creation, spread and dissemination of knowledge. However, despite these positive findings, this showed that only a few universities were using wikis and blogs whilst the rest were not using this type of Web 2.0 strategically or effectively.

University 2 had a not so convincing response to whether wiki's blogs were used.

“Some faculties use them for certain courses with the students, but I wouldn't call it a formal way of communicating or dissemination of knowledge.”

Similarly, University 11 conveyed,

“Blogs are used in a very limited way. They are used in a way where students can link to specific areas of interest on through the webpage and – it's more on that type of level, so there is some general interest activities and they actually communicate on that level, similarly with staff, but very sporadic, to be honest.”

University 10 also used blogs in a minimal way,

“We've only got internal blogs on our intranet.”

University 4 also seemed to have minimal use of wikis and blogs,

“It's not a favourite tool, but as I say, there are some academics who are favouring the new technologies.”

This again shows that wikis and blogs are not being used educationally to enhance knowledge creation and dissemination. There are some institutions that are using it effectively and reaping benefits but this is also equalled by many institutions that are not.

5.18.1.6 Podcasting

The results show that podcasting was only being used effectively by 5 African universities, with 4 of them being from South Africa.

University 6 was using podcasting technology mainly in their architecture department as shown in 5.18.1.5.

University 4, used Podcasting in their journalism department.

“We do have a journalism course, and that journalism department is very proactive in podcasting for e-learning we have got podcasting,..... and many other students are watching podcasts as part of their research, instead of reading the paper, they are watching a podcast.”

It was also conveyed by University 4 that their journalism department is one of the best in the country and feels that podcasting is a contributor to that.

University 1, has over 60 podcasting sites and have now taken podcasting to the next stage, that being video-casting.

“We also have open content where all lecture material is readily available to students. We have an abundance of podcasting sites and have now gone further into videocasting. A lot of classrooms are fitted with video recording systems and these video recorded lectures are then available almost immediately onto the open content learning site.”

Similarly, University 3 made exceptional use of podcasting.

“Yes, yes, yes. What we are doing at the moment as well, in some of our lecture venues we have podcast facilities. I know of the two new labs – sorry, classrooms – actually, it is like a venue with so many classrooms in there, we had podcast. And those ones get saved into the learning management system and we are using SAKEI, and students can go and get the

podcasts, so yes.”

University 9 also had a strong podcasting platform:

“Yes, we’ve got two types of facilities in terms of podcasting. I am not sure what the correct terminology for the second one is, but it’s just a bigger better version of the original podcast. We use that a lot where there is specific technical issues that need to be corresponded to the students, so we do the sciences and the physical sciences and the natural sciences, and a lot of those areas use podcastings to draw onto particular technical aspects.”

The above results show that podcasting is only being used by 5 of the chosen leading universities, and most effectively used by 3 high ranked universities in Africa that being University 1, 3 and 9. However, it also reveals that there are a number of universities that are not using it as these were the only responses received from all universities interviewed.

5.18.1.7 YouTube

University 6 conveyed that YouTube is being used as a Web 2.0 technology for the purposes of learning.

“At the university level students are using YouTube to download the course material, the instructor may use YouTube to download instructor materials.”

Similarly, University 8 has similar uses of YouTube,

“Hence if we could grab something that has been uploaded on e.g. YouTube that corresponds to the topic that was taught in class, then that video might be downloaded and shown across the class or demonstration.”

University 5 used YouTube along the similar lines.

“Aside from that, we are also – the university website has an online facility through YouTube, for students to be able to do quite some things. It has chatting facilities too, and all these currently are available.”

These finding show that YouTube is a popular Web 2.0 platform used by some institutions. These institutions also convey that it is helping the learning process by promoting interactive learning and allows students to utilise relevant videos that are related to their course of study.

5.18.1.8 Open Educational Resources

One specific university, University 9, which was a distance learning institution, was moving into Open Educational Resources (OER).

“And then we are now more recently moving into the realm of OERs and what that constitutes in terms of fully open resources for students.”

5.18.1.9 Second Life

University 2 was the only university that utilised Second Life.

University 2:

“It is currently being used in academia. There are plans to use it for performing “dangerous” experiments that could not be done in the labs. There are also plans to use it also for communications (Public relations and marketing).”

Second Life is a ‘virtual world’ type of application that is also built on Web 2.0. This was an interesting finding especially considering the way in which it is being used at the institution. None of the other universities that participated in this study utilised this resource as a learning tool. Second life is also free and available to anyone who has access to the internet.

5.18.1.10 Pocket App

University 1 was the only university utilising a ‘pocket app’ which was based on Web 2.0 technology and compatible with almost any mobile pocket device. This is further shown in 5.18.2.7.

“We also have the “(university name omitted) app” called “(university name omitted) in your pocket” which not only provides access to lecture content and coursework but also data on the buses running etc. this alone contributes to spreading of knowledge. Student adoption has been great. The pocket app and we have had a 95% usage of that app among first years alone.”

This was a key finding regarding Web 2.0 and showed how an institution could use Web 2.0 creatively. It was also showing tremendous success based on student adoption.

Overall, the findings of this sub-theme indicates that only a few universities are engaging in proper and effective use of Web 2.0 for the creation, management and dissemination of knowledge. In other words, very few universities are using Web 2.0 for pedagogical purposes. Even though there are some very powerful Web 2.0 technologies being used by some of these universities, most of the universities are not using them. Some universities may also have Web 2.0 technologies, but not using it to its fullest potential. This also indicates that those universities that are using Web 2.0 effectively to create and disseminate knowledge seem to be the leaders in HE or leaders in a specific area. Overall, however, this indicates a deficiency in the effective use of Web 2.0 in teaching and learning in African HE.

5.18.2 Benefits of Web 2.0

As shown in the literature review, studies by Marshall, *et al.* (2003), Casanova, Moreira and Costa (2011), Boling, *et al.* (2012) and Xiangqian and Fuqing (2012) amongst others reveal how the strategic use of e-Learning adds value to HE institutions. Furthermore, Brown and Adler (2008), Vratulis and Dobson (2008), Kose (2010), Bennett, *et al.* (2012) and Eales-Reynolds, *et al.* (2012) and others highlight the benefits of Web 2.0 in Higher Education. All of these studies show how Web 2.0 has become the new standard in e-Learning and web based pedagogy. Grosseck (2009) showed a detailed list of benefits listed in Chapter 2 (2.21). The results from this study also generated findings pertaining to the type of benefits experienced by those universities in Africa that are making use of Web 2.0.

Firstly University 1 conveyed that Web 2.0 is now the norm at the institution when it comes to knowledge creation, dissemination and learning.

“It is actually a norm now rather than a strategy. It was a strategy a few years ago for University of (name omitted) but now it is a norm. It infact has led to more specialised Web 2.0 strategies. At present University of (name omitted) is the first institution in the country that is moving into the ‘cloud’ environment. We are hence building a (name omitted) Cloud. We are also in collaboration with two other universities to build a university cloud in South Africa. This cloud will be focused on Teaching, Learning and Research. Furthermore, with the adoption of Web 2.0 at the University, the executive Management is now injecting more money into Web 2.0 systems for Teaching, learning and research as opposed to other application systems.”

Generally, the analysis thus far reveals a clear relationship between the rank of the university and their use of Web 2.0 technologies. Web 2.0 is also promoting organisational learning.

The rest of the benefits found in this study pertaining to e-Learning and Web 2.0 are listed in the sub-headings below along with responses from respective universities that show evidence of practice.

5.18.2.1 Web 2.0 as a Communication channel

Grosbeck (2009) asserted that Web 2.0 enhanced communications and collaboration within the university and outside. University 7 also confirms this.

“It's also a mechanism of notifying students about changes in timetables or whatever. So, it's a communication channel.”

5.18.2.2 Web 2.0 for Improved Interactivity-- Gives voice to previously voiceless and improving involvement

Interactivity is one of the core benefits of Web 2.0. This has been highlighted by various authors including Fernandez, Simo and Sallan (2009), Kose (2010) and Loureiro, Messias and Barbas (2012). Furthermore, Maharaj (2010) emphasised how podcasting which is a powerful Web 2.0 technology provides a ‘multi-modal learning environment’, whereby students can become active participants in creating learning content. Findings from this study relay similar findings.

University 4 conveyed that Web 2.0 usage in e-Learning has enhanced interactivity at their institution especially for students who are afraid of speaking out.

“And we have also noticed as the demographics and the shape and size of the university has changed since 1994, but there is a tendency, especially – and it is not a racist comment at all, but from African females, they don't like to speak in open forums, so if they have got question they actually prefer to write it on the content management system, than to actually speak up in the classroom situation. So, It pulls the quieter student out from the classroom, and then it gives them a voice and allows them to speak and to ask questions.”

Similarly, University 7 asserted that

“we also use certain web 2.0 technologies to encourage student participation, like I mentioned about the wikis and blogs, but also in class we have a project called a clicker system, that actually uses cellphone technology to get a quick poll in class about a certain question without being identified to the lecturer. So, that includes student participation in class, where they normally just sat and stared, they now actually participate and the lecturer can gauge their level of knowledge about a certain topic, for instance.”

“One benefit that immediately stands out for me is you can more easily get students to participate in class, which is a problem. So, the mere fact that that can happen, so you can actually deliver knowledge at a better rate, because of student participation, it's a conversation then and not just a lecture. That's one thing.”

University 1 put forward their experience with Web 2.0 as a pedagogical tool when it came to interactivity,

“Yes, Web 2.0 is definitely enhancing the learning process. What we have seen so far is that there is:

- Better communication among students*
- Easier for students to talk to lecturers/tutors/mentors*
- More interactive and improved learning”*

This confirms that Web 2.0 is definitely enhancing interactivity and better communication at the institutions that are using it effectively. By providing a student with the opportunity to interact better with lecturers, tutors and learning content, it in turn contributes to improved knowledge creation and dissemination. As conveyed by University 1, it also enhances the learning process as well.

5.18.2.3 Using Web 2.0 to identify poor performing students

A key finding highlighted by University 1 was the identification of weak or underperforming students which they found was possible through Web 2.0 technology.

“It also makes it easier to identify weak students through tracking. This is done by monitoring and checking

- if a specific student has viewed the video lecture*
- has done his/her homework*
- Does the student ask questions or communicate with lecturer/fellow students?*

These early warning signs make it easier to prevent weak performances and address poor performing students before they get worse. So Web 2.0 systems also act as Early-warning systems in identifying potential learning problems.”

Hence, Web 2.0 becomes not only a teaching and learning tool, but also a tool to effectively monitor and track students’ performance. As mentioned, this can serve as an early warning system to identify students with possible learning problems and difficulties. This is a key finding in the African HE setting and one of empirical nature.

5.18.2.4 Improved Learning and Blended Learning

The literature review abounds with studies that underline how Web 2.0 based e-Learning enhances the learning process in HE institutions. This includes factors such as interactivity, collaboration, real-time responses, flexibility, blended learning, lifelong learning among others (Williams, Karousou and Mackness, 2011; Bennett, *et al.*, 2012; Eales-Reynolds, *et al.*, 2012; Loureiro, Messias and Barbas, 2012; Silvia and Beatriz, 2012). These are all happening namely in developed countries, however, these findings reveal the ways in which Web 2.0 is enhancing the learning process in the African HE Setting.

University 2 conveyed that it is,

“interactive” and “student friendly” and based on this, are now “evaluating the possibility of having blended learning.”

“it is also improving the teaching and learning process for those that are utilizing it and of course it opens up channels of communication.”

University 8 shared,

“It helps when it comes to having an interactive animation or a demonstration for certain aspects that have been taught in class. The theory that was given to the student in the case might not be enough, and traditionally, it might mean that the lecturer had to produce an animation of what has been explained in the theory that took time and effort..... hence if we could grab something that has been uploaded on eg. YouTube that corresponds to the topic that was taught in class, then that video might be downloaded and shown across the class or demonstration or whatever that it might be which then improves the understanding to the students. So Web 2.0 makes this possible, easier and save time.”

“And with reference to e-learning, first of all it improves the access to knowledge, because now we don't have to be in a class. You can attend a course from wherever you are. So, it improves the access to knowledge as far as web 2.0 is concerned.”

“Furthermore, better collaboration among students and lecturers with students, more interactivity and more easy access to knowledge and to learning content.”

University 4 also had similar views,

“I think for me personally, it is contributing to the dissemination of knowledge”

“we have got podcasting, where the journalism students are - and many other students are watching podcasts as part of their research, instead of reading the paper, they are watching a podcast.”

University 7 conveyed,

“One benefit that immediately stands out for me is you can more easily get students to participate in class, which is a problem. So, the mere fact that that can happen, so you can actually deliver knowledge at a better rate, because of student participation, it's a conversation then and not just a lecture.”

The most strategic use of Web 2.0 came from University 1 whom are taking Web 2.0 to another level in education and hence making them the leader in Web 2.0 utilisation in pedagogy.

“We can't live without it.”

“using it to promote a flipped class room effect and thereby saving time and real-estate”

“We also have the “(university name omitted) app” called ‘(university name omitted) in your pocket’ which not only provides access to lecture content and coursework but also data on the busses running etc. this alone contributes to spreading of knowledge. Student adoption has been great. The pocket app and we have had a 95% usage of that app among first years alone.”

“Better communication among students.”

“More interactive learning.”

“1400 seats per day saving due to flipped classroom.”

“Students performance increased in courses that use more web 2.0 compared against same course done a few years ago with traditional teaching.”

Holistically, all of the above responses indicate that for those universities that are utilising Web 2.0 for the creation and dissemination of knowledge, it is improving and enhancing the learning process. Web 2.0 has enhanced the learning process for those that use it. The above responses holistically convey that Web 2.0 has enhanced the learning process namely in the following ways:

- Better collaboration
- More interactivity with learning content/instructors
- More effective creation, spreading and dissemination of knowledge
- Improved students’ performance (University 1)
- Saves time and resources
- Better access to learning content
- Promoting a flipped classroom effect

University 1 again showed the most effective use of Web 2.0 utilisation and are also the first university in Africa to be using Web 2.0 in research. This is another empirical finding of the study.

5.18.2.5 Flipped Classroom through Web 2.0

Web 2.0 also seems to be promoting a ‘flipped classroom’ effect in some of Africa’s leading HE institutions.

University 1, 4 and 7 confirms this. University 1 conveyed,

“The online system has a variety of subsystems that drew learning content from various sources from University of (name omitted) repositories, partner universities, Vimeo etc. which was integrated to form one system. This made knowledge easily available to the students and hence this expedited the ‘flipped classroom’ at University. This ‘flipped classroom’ approach was also tested with 400 third year students and it worked well whereby they only came to class a few times for practical exercises and problem solving while most of their studying was done at home. This ‘flipped classroom’ approach through

web 2.0 also led to a lot of real-estate (space) came back to the University and this space could be used for other things/ faculties etc.”

Similarly, University 4 conveyed,

“Students actually attend the lectures now for the deeper and more thorough understanding of the questions. So, instead of superficially being just taught, speaking from the front of a lecture theatre, the students that are coming to the class already empowered with information, which they can then interrogate and analyse at a deeper level.”

“The modern student doesn't want to sit and listen to a boring old grey man in a suit telling them something at the front of the class, they want interactive learning, they want to click a button. It starts in the primary school level, the kids are clicking buttons, so of course it attracts the students and it makes the university more competitive in – as you say in your question; local and global setting. You can't be an old fashioned university in this day and age, you just would die.”

This indicated that the ‘flipped classroom’ effect also enhances competitiveness.

University 7 contributed saying that,

“I think that's pertinent is because you can place materials and podcasts and so on, on the e-learning platform, students can prepare for class, and come prepared, and then you can focus your time in class, the eye-to-eye contact on the value add, and not on delivering the content; they already have that, but discussing it and arguing about it and refining it, the understanding about it. So, that's a tremendous benefit, I think. Secondly, the more effective use of time in classrooms. And thirdly, just the more effective spread of information and knowledge to students and staff, causing less wasted time.”

These 3 institutions were the only 3 that seemed to be applying the ‘flipped classroom’ approach. This was again possible through Web 2.0 and brought benefits such as:

- Time Saving
- Improved learning due to deeper understanding on Learning content
- Resource saving such as space and assets
- Increased competitiveness
- Better interaction as opposed to passive absorption

This concurs with the benefits listed by Centre for Digital Education (2012) in regard to how

the ‘Flipped Classroom’ is becoming a strategic learning enabler through the use of Web 2.0.

5.18.2.6 Breaking the distance and geographical borders through e-Learning and Web 2.0

One of the key attributes of e-Learning is its ability to go beyond physical distance at the click of button. E-Learning and Web 2.0 have enabled education to be available to anyone who has access to a computer and internet irrespective of time, space and location. This is supported by various authors such as Mason and Rennie (2004), Fernandez, Simo and Sallan (2009), Usluel and Mazman (2009) and Boling, *et al.* (2012).

Similarly, the results of this study show that some universities are using e-Learning as an effective strategy to break geographical borders and conquer distance to disseminate knowledge and learning to students.

University 6 conveyed,

“the purpose of our e-learning system, one, as you say, it is to bridge the distance....our neighbouring countries, like Somalia or Sudan want to have collaboration with Ethiopia even for distance education. We are thinking that we will support this educational collaboration using these knowledge management systems, and systems like video conferencing. So, we are believing that we will use the video conferencing system to reach those people, to make education accessible for them, and also that we are thinking we must give quality education at the same time.”

University 1 contributed by saying that,

“We use this to make learning data available. It pulls content from various sources which include YouTube, Academic Earth, Khan academy or a repository at the university and this system brings them together and integrates them. After this, the next phase is taking that knowledge to the students.”

They also highlight their latest “pocket app” (see 5.18.2.7) which takes the campus to the student.

This relates to Boling, *et al.* (2012) whereby a good e-Learning strategy focuses on ‘bringing the campus to the students’ and this type of strategy would be able to provide a sense of community to students in Higher Education.

University 9 conveyed that Web 2.0 was enhancing the learning process despite being a distance education institution.

“We feel it is enhancing the learning process at your institution. Our research has shown that in our situation, having full access to the internet with a device that is your own 24/7 increases your chances of passing significantly, so we are moving in that direction, not because it's a trend worldwide, but because that is going to translate into success for our students. And in fact, those same research results were used to make the decision that we will embark on placing a device in every students' hands at the cost of the university, to make sure that they have dedicated device and dedicated connectivity from wherever they are.”

This relates to the similar concept used by University 1.

Hence, these results show that at least 3 African universities were looking at Web 2.0 based e-Learning as a strategy to go beyond geographical borders. This further contributes to the effective creation, management and dissemination of knowledge whilst also adding to the competitiveness of the institution.

5.18.2.7 Increased Competitiveness

University 1 conveyed that Web 2.0 technologies contributed to enhancing competitiveness of the institution and this was namely due to their latest Web 2.0 innovation, the (university name omitted) Pocket App

“We also have the “(university name omitted) app” called ‘(university name omitted) in your pocket’ which not only provides access to lecture content and coursework but also data on the busses running etc. this alone contributes to spreading of knowledge. Student adoption has been great. The pocket app and we have had a 95% usage of that app among first years alone.”.... “University of (name omitted) is doing all of these including (university name omitted) pocket app for continuous knowledge distribution. This enhances student performances and contributes to attracting more students and increasing the throughput of students hence making us more competitive.”

This has been well adopted by students and also attracting students to the university which in turn enhances competitiveness. This is also an empirical finding relating to strategic use Web 2.0 technology in African HE .

5.18.2.8 Promotion of Academic Research

University 1 was the only university that was strategically utilising Web 2.0 to promote academic research with their latest ‘LawMesh’ innovation.

“In terms of using Web 2.0 for research, this was tried and tested with the Law faculty. We built something called ‘LawMesh’ which is a research collaboration tool. The entire faculty can use this tool to collaborate with anyone else in the world. It also allows users to pull data in from anywhere in the world. This was built as an e-Research landing site to show researchers (from this university and other universities) what research is available and what research tools, machines, instruments and support is available to them as researchers. This is also used for the sharing of research knowledge and all of the above can now be in one place to promote effective research through collaboration and knowledge sharing. We are actually using Web 2.0 to promote a research culture that is no longer “my research is mine” but more along the lines of “My research is of universal importance”.”

University 1 again showed the most effective use of Web 2.0 utilisation and are also the first university in Africa to be using Web 2.0 in research. This is another empirical finding of the study.

5.18.3 Absence of Web 2.0 and MOOCs

The preceding sub-theme showed how some of Africa’s leading institutions are using Web 2.0 strategically and how it is producing numerous benefits. However, this does not seem to be the case for a considerable number of institutions who in this sample don’t seem to be using Web 2.0 effectively if at all. Holistically (all universities in aggregate), it shows that a number of universities in Africa are not utilising Web 2.0 strategically in their KM practice. Therefore, there is a high degree of absence of Web 2.0 in most of the universities.

This sub-theme gives a detailed understanding of why this is the case. It also addresses why there is a current absence of MOOCs in Africa. Responses from some of Africa’s leading universities are hereby presented.

5.18.3.1 Absence of Web 2.0 technologies

University 2 had this to say about their use of Web 2.0 for as a pedagogical tool,

“We do, but it is not campus wide, but some faculties do.”

“For e-learning we currently do not do distance learning. We have some tools that we use, but we don't have an e-learning curriculum”

Similarly, University 11 expressed minimal usage of Web 2.0 technology such as blogs,

“Blogs are used in a very limited way. We find that a lot is to do with improving on quality more than actually anything else, but there are interest groups that are being used for those types of facilities at the moment, but they are not very big, I have got to admit.”

University 11 also had minimal usage of podcasting,

“It is used, but it's not a big thing at the moment. It's being used in some of the areas, it's being used together with our e-learning package in some specific cases, but it is not an institution wide activity.”

University 6 also did not use podcasting.

“For our institution it is better to say we didn't use those podcasting.”

University 6 also did not use Web 2.0 based collaborative tools,

“At the institutional level, no, but people who have affinity to those technologies are using it for the management system of the processes between teacher and instructor at an institutional level ...most of the time we are using email”

This in itself indicated poor usage of Web 2.0. University 10 had the least adoption of Web 2.0.

“Online collaboration systems like SharePoint and Dropbox, then I am not in favour because I believe strongly in internal cloud and I don't believe at all in external cloud, so that is why Dropbox I avoid it like this.”

“Okay, for wiki and for blogs, we've got some blogs already, we've got internal blogs on our intranet. It is not used for teaching purposes. It's mainly for staff members; academic staff and admin staff, but with all students having access to it. Most our academics are not ready

to use those things.”

“I may sound a bit old fashioned, but to me social media is a waste of time, that is only equalled by test cricket. We are one of the few universities in the world that block Facebook and Twitter during office hours.”

A significant number of universities in the sample (primarily those universities outside South Africa) were not making effective use of Web 2.0 in the classroom. It was important to delve deeper into the reasons behind this.

5.18.3.2 Reasons for absence of Web 2.0

University 2 conveyed that,

“faculties using it in classrooms, or the communications office just communicating through the (University name omitted) Facebook site, or Twitter. So we do use it, but it's not the formal way”

University 11 conveyed that *“We haven't dealt with it on the level where we should actually really implement it properly.”*

University 10 gave the most feedback regarding this.

“Videocasting, not so much unfortunately because of budgetary constraints. Somehow the budget was cut and then we couldn't go so much further. Therefore, for podcasting and videocasting, I would say budgetary constraints count for 60 percent of the problem, and 40 percent is a lack of skill.”

“We tried about five, six years ago to have some podcasting system in place; what happened was nobody was really interested”

“For Web 2.0 tools like wikis, blogs or podcasting, or anything of that sort, we would need to have a strong buy in from our academics.”

“it comes down to organisational culture and organisational resistance.”

“Online collaboration systems like SharePoint and Dropbox, then I am not in favour because I believe strongly in internal cloud and I don't believe at all in external cloud, so that is why Dropbox I avoid it like this.”

“And I will tell you why. It's partly because of bandwidth consumption, but it is also because Facebook and Twitter will be effectively used for academic purposes, 5 to 10 percent of the time, and the rest will be to waste everybody's time.”

At this specific university, it seemed that lack of finances and skills were a key barrier to proper Web 2.0 implementation. Furthermore, lack of interest for certain types of Web 2.0 technology such as podcasting was also a challenge. Internal beliefs also negatively affected the effective implementation and use of Social Media type technology and this can relate to organisational culture at the institution.

Overall, as one can see there are a number of factors that hinder the effective and strategic use of Web 2.0 as a learning tool. The above responses can be summarised as:

- Lack of Finances
- Lack of Skill
- Organisational Culture and Resistance
- Internal beliefs about Web 2.0
- Lack of interest

The latter three points above are reflective of the organisational culture of an institution. If the institution does not realise the value in Web 2.0, then it will not be seen as a strategic entity and benefits will not be reaped. Other African universities are well into the strategic utilisation of Web 2.0 and it is providing significant benefits (see 5.18.2). This finding is therefore also in support of Schein's Organisational Culture (1985) framework showing that organisational culture plays a role in Web 2.0 adoption.

5.18.3.3 Absence of MOOCs

Apart from Web 2.0 technologies mentioned above, there was also an absence of MOOCs across all the universities. The responses to MOOCs were varied as to why these universities were not using them.

University 6 conveyed,

“No, there is not any idea or thinking of that, because now the emphasis or the idea is having our own e-learning platform, then we will upload our electronic courses, the instructors will be asked to develop the electronic courses and we will upload those electronic courses onto the university's electronic learning system, and students may upload their assignments and their exams and so forth. This is the emphasis, not for open course, but for the internal use.”

Similarly, University 8 stated,

“We are not part of MOOCs butbut we do offer our own online courses as part of our e-Learning.”

University 4 did not use MOOCs and were still doing their research about it,

“It's very early for us to make a comment on that. We are not using them extensively at the moment and we are still doing quite a lot of homework to see whether or not it would be useful, bearing in mind that Rhodes is traditionally a contact university...”

Ironically, even University 1, which has very strong KM strategy, did not use MOOCs.

Therefore, these findings show that currently, the leading universities in Africa are falling behind in the adoption of MOOCs. It was therefore also important to ascertain the reasons behind this.

5.18.3.4 Reason for Absence of MOOCs

University 1 which leads in KM and Web 2.0 usage had the following response to why they didn't use MOOCs

“MOOCs are great but we also feel that it won't last. It won't die but it won't last. This is because MOOCs are free and who bears the cost of the qualification given that is meant to be accredited. Once a qualification is accredited then a monetary value is assigned to it ...so who bears the cost.” We are considering running a MOOC but have not made a final decision yet because of a number of factors. For one it would be too expensive for the University to run a MOOC which is supposed to be free. Also we already are meeting and exceeding our local and international student's needs. We have the most amounts of international students in South Africa so the question is.... is there a real need to run MOOCs at this University.”

University 6 mentioned that,

“now the emphasis or the idea is having our own e-learning platform...”

Similarly university 8 conveyed,

“We are not part of MOOCs butbut we do offer our own online courses as part of our e-Learning....”

University 4 asserts that it is being researched,

“We are not using them extensively at the moment and we are still doing quite a lot of homework to see whether or not it would be useful”

Therefore, the responses above from many of these leading universities convey that the main reasons for not using MOOCs are:

- MOOCs might not last: MOOCs are free and this then becomes questionable on how long it will last.
- Cost- MOOCs could lead to becoming an expensive liability to the university hosting it. The question arises of who bears the cost of offering accredited qualification free of charge via MOOCs. As shown in 5.19 below, financial constraints are one of main challenges to African HE.
- Ownership – it can be interpreted from the results that some universities are hesitant to allow their learning content to be available on a platform that is open to the world. Some universities in Africa feel more comfortable having their own e-Learning platforms that is within their control and discretion. Therefore, this is also a factor on why MOOCs are not being pursued.
- More research needed- MOOCs are a fairly recent happening and as with anything that is not fully known or understood, it is only natural to research more about the subject before investing or engaging in it. Some institutions are therefore following this approach. In other words, they are approaching MOOC’s with caution and

researching more about MOOCs before taking a final stand on it.

This showed that leading African universities were neither utilising nor contemplating the use of MOOCs. However, universities in Africa need to realise that Africa alone houses some of the poorest nations and countries in the world and therefore MOOCs could be the answer to providing large-scale and cost-effective education, and in turn empowering Africans all over the continent.

5.19 Challenges hindering KM success in African Higher Education

Numerous authors including Metaxiotis and Psarras (2003), Kende, Noszkay and Seres (2007), Cranfield and Taylor (2008) and Laal (2010) and Lubega, Omona and van der Weide (2011) show how HE institutions in developed countries are utilising KM to drive institutional value and attain higher degrees of productivity, quality, innovation and competitiveness by using KM. Chen, Huang and Cheng (2009) even showed how KM enhances institutional performance from a competitive perspective. Holistically, these studies show that KM is positively influencing institutional strategy. Omona, van der Weide and Lubega (2010) also found that KM should be integrated into institutional processes and objectives in order to work strategically which could then ensure both institutional and KM success.

Based on these studies, one can easily convey that developed countries are making excellent use of KM which in turn has resulted in a variety of benefits for these universities. This could naturally stem the question of why universities in developing countries are not doing the same or finding it harder to do. As much as that is a positive question, these findings show that there are some challenges that exist for universities in developing countries, in this case in Africa that may not necessarily exist for those in developed countries. These challenges become barriers to KM in HE.

This study showed that there are some leading universities in Africa that are making strategic use of KM such as Universities 1, 2, 3 and 9. However, could there be challenges as to why other universities are not following in a similar fashion. Therefore, this theme becomes a critical one in this regard

This theme of ‘Challenges’ generated the following sub-themes which inevitably are the actual challenges that are drawn from the responses and that are unique to an African HE setting. These include:

- Finance
- Lack of executive buy-in
- Lack of integration of components
- Lack of competency
- No direct measures
- Non-acceptance by users

5.19.1 Finance

Interestingly, a study by Nyerere, Gravenir and Mse (2012) in an African context showed how finance was one of the main constraints that affected the successful deployment of a KM based learning strategy in Kenya. Similarly, Thiaw (2007) and Mwapachu (2010) highlighted various challenges faced by universities in Africa, of which finance was one.. Hence, the challenge of finance for African universities seems to also be confirmed by findings from this study.

University 10 made a realistic statement regarding the challenge of finance.

“Everybody speaks about IT, but when it's time to fund it, it's not actually funded to the extent that enthusiasm from everyone at the institution would – you see what I mean? There is a lot of enthusiasm towards IT, but when it's time to allocate funds or to budget accordingly, I always get about half of what I am budgeting for, and this is why I would say that the enthusiasm for that is huge, but when it's time to deliver the goods, then unfortunately the money is not really available. So, that's why I am sitting in a kind of difficult situation; on one hand trying to push for me, and at the same time having to do more with less.”

“I would say budgetary constraints count for 60 percent of the problem, and 40 percent is a lack of skill.”

University 7, had a similar view in relation to Web 2.0 technologies,

“there's such initiative on the way, but it's not progressing that well in terms of getting funding...”

The same university also made a monetary related comment on why they could not pursue MOOCs.

“at this stage we don't have any active plans to pursue MOOCs. And also the cost concerning MOOCs, that is not little.”

As one can see, financial constraints do act as barriers to proper KM implementation, utilisation and even exploration. It is almost impossible to want to implement a world-class KM system if funding won't allow it. Hence, this can lead to universities in Africa to be unable to implement powerful KM Systems which can be used to enable effective KM strategy.

5.19.2 Lack of Executive buy-in

It was shown by Cranfield and Taylor (2008) that Management support was critical for driving KM strategy and for the success of KM implementation. Similarly, McKnight (2007) asserted that for KM to be regarded as a strategic resource, it has to be realised and driven at a managerial or leadership level. Omona, van der Weide and Lubega (2010) and Lubega, Omona and van der Weide (2011), found that leadership is a constituent part of KM and that this type of leadership should also be focused on overcoming resistance to change and breaking barriers to KM across the organisation and at executive level.

However, this does not seem to be the case in some of Africa's leading universities. University 10 asserted that,

“No, it's not there. You know, the issue is that you would expect to have a formal knowledge management structure on that type of level. We don't really have that. We've got elements that look at aspects like risk and that type of thing, but that's more specific to requirements of the institution. So with the employment of this knowledge management executive person, what is going to happen is that that person will focus on how knowledge will be managed, which will feed directly into the Executive Board level.”

“Some say that the board should be involved in IT Governance and our board is not involved with IT Governance at all. But what I can tell you is that if the board is not involved with IT Governance a good reason is we don't have – I am trying to be diplomatic – we don't have the board that we deserve.”

Similarly, University 7 asserted that in relation to KM:

“Absolutely not, I don't think so. I don't think it's at executive management in terms of ...[indistinct-0.08.10] and vector level. All the knowledge that they have sits in printed files or on PCs or in terms of people's heads. So, I think it's actually sitting sadly in faculty at school level.”

In order for KM to thrive and its potential to be realised, it needs to be supported at executive level and get executive level buy-in.

There were however a few of the universities sampled in this study who indicated that even though KM is not hierarchically at board level, they did get ample support. These universities seemed to be the ones leading in KM within the African context. These included University 1, 2, 3, 5, 6 and 9. However, for the rest of the universities, it was evident that a lack of support from Executive Management often hindered the strategic use of KM and its influence on institutional strategy development. This finding therefore also supports one of the aims of the study by conveying that KM is not at Executive Level.

5.19.3 Lack of integration of components

Integration of KM across an institution has been highlighted by various authors. Kamara, Anumba and Carrillo (2002) stressed that an integrated approach to KM in turn ensured consistency in KM related activities across an organisation. Similarly, Kende, Noszkay and Seres (2007) affirmed that the utilisation of knowledge could become a new valuable asset that could be applied for the enrichment of HE and for the direct integration of innovative knowledge. This meant that knowledge could become more valuable when integrated. Lubega, Omona and van der Weide (2011) also show that integration is one of the key factors for the development of both successful KM and KM Information Systems in HE. However, this does not seem to be the case in some of these leading institutions.

University 6 conveyed,

“We have separate intelligent information systems for the library, for the library, for the registrar, for the budget and finance system, but yet we didn't integrate them now.”

Similarly, University 11 conveyed,

“Our library system also has a fair amount of information relating to how usage is happening on that type of level, but that again is not integrated into this kind of environment that you're talking about. So, integration is a bit problem at the moment. Where we are sitting is we have got a lot of information around, but the linking of information is a bit of a problem.”

“The key is at the moment if we want information we say “oh well let’s look at that information”, which is not the way you should be working. You should say, “Hang on, let's look broadly at what information will assist us going forward in the long term. How can we get this information in a very organised way, through maybe a big data exercise or areas of taking information from different areas and integrate it a very organised way.”

University 2 also had similar obstacles,

“There is, but there are obstacles, and mainly it is in the different definitions of the same field, for example you might have a different definition that is adopted from one department to the other, so if you say the number of students registered at the university for a department, it will be all the students; for another department it would mean only the graduates; for a third one they would not include the non-degree. So, this is the part that we are really working on, is trying to find a common data definition, and we have a committee for that right now, and we are trying to harmonise it along, so that when we produce a report, it understands the same from one department to the other.”

The above 3 respondents confirm the problem of no proper integration of information and knowledge that is occurring in an African Higher Education Setting. This could also relate to organisational culture (Schein, 1985) whereby there is no unified KM culture across the various departments within the institutions.

5.19.4 Lack of competency/ability to see value

The leadership and management of an institution must be knowledgeable about the potential of KM. As asserted by McKnight (2007), without a strong directive, KM cannot be harnessed and used strategically. For KM to be regarded as a strategic resource, it has to be realised and driven at managerial or leadership level. However, some of the main challenges experienced by African universities include lack of competency or ignorance to the value of KM stemming from Executive Management level.

University 10 comments,

“Because from the strategy point of view, you are absolutely right, but we know what's happening in Southern Africa with boards that are not exactly made of the highest calibre individuals. Somehow it could be an issue that could be too challenging for some of them, because they don't really see the value of knowledge and of knowledge management. So, that's why it's better to keep it the way it is now, at executive committee level, in other words, within the institution, not really at board level, and it doesn't have to go up, because what would they do with it anyway?”

“I remember it was about five, six years ago, I did submit institutional survey policy to our board for approval, and the board members looked at each other when they heard the word institutional research, and then the more clued up board member said, "How does it compare with academic research?" So, you see what I mean?”

University 9 also shared their experience,

“We are not at the stage now where if I develop a new simulation model I can roll it out to everybody tomorrow and everybody is happy and we use it.”

This finding highlights what was said by Cranfield and Taylor (2008), Omona, van der Weide and Lubega (2010), Lubega, Omona and van der Weide (2011) whereby leadership is critical to drive KM and that leadership should also be focused on overcoming resistance to change and breaking barriers to KM across the organisation and at executive level. Unfortunately this does not seem to be happening in some of Africa's leading institutions.

Apart from just Executive Management, there also seems to be resistance from employees. There seems to be a high degree of resistance to KM and Web 2.0 from an academic perspective.

As conveyed by University 10,

“The culture is one thing, but also the level of academics. We don't always have academics who are fully literate in the knowledge management sense, in other words, for some of them to make basic IT operations, like operating a laptop, is already proving quite a challenge for some of them. So, to go one step further, which is making effective use of knowledge management, that is a big challenge for some of them.”

Similarly, University 7 conveys

“That is happening at the moment at some faculties or some modules, but it is happening. And I think it's about culture again; you need to be familiar with these things as a lecturer, to be comfortable in seeing the benefits of that. It is the younger generation lecturers that are actually using this.”

This shows that resistance by academic staff is also a key factor in the deployment of relevant KM systems and strategy especially from a pedagogical perspective. This would include Web 2.0 and e-Learning tools. Grosseck (2009) showed that one of the key hindrances to adoption of Web 2.0 in the classroom was the resistance by teachers and educators and if these factors could be explored, then it could create a way to enhance the adoption process. Academics needed to embrace technology and with that the new technology based paradigms such as KM and Web 2.0. As conveyed by Blake (2009) and Maharaj (2010) that teachers/academics need to acknowledge that Web 2.0 and e-Learning will not replace them or their job, but should be looked at as an effective complement to traditional teaching methods.

5.19.5 No Direct Measures

There seems to be a lack of measurement of the impact of KM, e-Learning and Web 2.0 practices at the institution. In other words, the findings show that some universities in Africa are finding it difficult to physically measure if KM has a positive or even negative effect on academia or operations at the institution. Measurement is important as this acts as an indicator of whether KM and its sub-sets such as Web 2.0 are working or not. For example, Chen, Huang and Cheng (2009) developed the ANP model to measure KM performance at universities from a competitive perspective. Similarly, Ozkan and Koseler (2009) proposed the HELAM model to measure e-Learning quality.

It should be noted that University 1 was the only university that seemed to measure the impact of KM both at operational and academic level and it was showing a very positive impact for the institution. However, some universities were completely uninformed about the measurement of KM. One such university was University 9, who was unsure on whether Web 2.0 based e-Learning has led to an improvement in student performances.

“It will be too early to say that, because basically we have done pilot studies in terms of rolling it out, so we haven't got 80 percent of the share there yet.”

University 3 shared a similar view,

“Well, I wouldn't – because, you see, that is research part, I wouldn't be able to have that correlation, but what we do have is that, through social media, lecturers are available at Wits, using different platforms, like Twitter, and students can contact them. Whether they learn out of that, I wouldn't be able to know.”

University 5 shared a view about KM in general in and its impact on the institution,

“It should have a good influence, and at the moment I think it is beginning to have some good influence, however, there has not been a specific measurement about the quantum of good.”

“That would be a matter of conjecture because there is no study that I have been able to determine that will be a nice study to really find out if there has been an improvement in student performance. I think what is obvious is that students are able to access learning resources more easily. Whether that translates to better performance, that could be a different story entirely, I wouldn't be able to say.”

These responses show that even though the institutions think that KM is having a positive influence on the institution, there is no direct measurement for it. Therefore, these universities need to be cognisant of the fact that measurement is important and they need to start measuring as currently being done by University 1.

5.19.6 Non-acceptance by users

This was an important aspect to investigate as technology and systems are only as good as the user's acceptance and use of it. Without user acceptance, almost any technology will fail. As asserted by Tanlamai (2007), as much as organisations may invest in IS and technology, poor and non-strategic use of IS can hinder its real potential. Furthermore, IS becomes a wasted resource when used for mundane tasks instead of being utilised strategically. This finding shows that non-acceptance of KM in itself does exist in leading African universities. This again relates to organisational culture, and Alavi, Kayworth and Leidner (2006) with reference to Schein (1985) highlighted how organisational culture impacted KM strategy. Furthermore, an interesting finding came from Cranfield and Taylor (2008) when they found that academics and administrative personnel each had their own culture in terms of knowledge acquisition and sharing.

As conveyed by University 6,

“There are people who see that knowledge business intelligence system as a threat; they are thinking it will replace them. So, there are some resistance from the some people that use those applications.”

University 2 also has a similar view,

“Some of the faculties are very traditional and it is difficult to push them to use new technologies.”

This shows that staff resistance and non-acceptance is prevalent even in an African HE setting and that proper use of KM systems and technologies are dependent on the people that use them. This relates to preceding views by Blake (2009), Grosseck (2009) and Maharaj (2010) whereby staff resistance is a factor that can negatively influence the deployment of relevant KM strategy. This can include KM systems as well. In addition, all staff need to know that technology should be seen as a strategic enabler and not as a threat. As also found by Cranfield and Taylor (2008), both academic and support staff need to understand the benefits of KM before adopting it. Perhaps this needs to also be applied to these universities in Africa.

5.20 Opportunities

On the other side of challenges comes the promise of opportunities. The findings revealed that despite the challenges experienced, many of these leading African universities are looking into opportunities to explore KM and its potential. An important view came from Laal (2010) which concurred with Milam (2001), when he posited that universities should, through education, service and research, seek opportunities to apply KM practices which can effectively support their vision and mission. Shams, Rad and Hooshmand (2009) argued that knowledge also gained economic value when used to solve problems, explore opportunities and make decisions that improved organisational performance. This concurred with Yang and Maxwell (2011) and Lubega, Omona and van der Weide (2011). Similarly, Metaxiotis and Psarras (2003) underlined the crucial role of KM in HE and affirmed that HE institutions should seek every opportunity to strategically apply KM to their practices and this was not

only to enhance the institution, but to also promote a learning organisation. It was therefore interesting to see that universities in Africa were aligning themselves with these views.

5.20.1 Opportunities for KM Systems

University 2 related to the implementation of OLAP which is a powerful KM data analysis tool.

“It is planned. It is in our plan, but we haven't implemented it yet.”

Similarly, University 4 commented on the implementation of institutional intelligence systems,

“We don't have one. We are busy developing one at the moment – well, we are busy researching one.”

This shows that even though most of the leading African universities are deficient in KM Information Systems that are used by universities in developed countries, the opportunity to implement these types of systems does exist.

It is important to understand that research plays critical role at most universities. The literature review shows that studies by Loh, *et al.* (2003), Metaxiotis and Psarras (2003), Chandarasupsang, *et al.* (2006), Delavari, Phon-Amnuaisuk and Beikzadeh (2008), Sahay and Mehta (2010) and others highlight the role of KM Information Systems academia and research and how it leads to the holistic enhancement of academic and research standards and output. However, in this study, University 1 was the only university who revealed the opportunity to utilise KM and BI in academic research.

“However, we are now asking questions on if Knowledge Management and Business Intelligence is so useful in enhancing operations and enrolment then why is it not being used in research.”

“You must have a clear understanding on where Knowledge Management and Business Intelligence is being used, Business or research, and right now it is mainly being used in the business side of this university.....but it is a question that is being asked and came up at the e-Research conference in Australia last year whereby if intelligence systems can be used in shopping and so many other aspects in business then why can't it be used in

research....hence it something that will be looked at in the future.”

This was an important finding. It shows that atleast one leading university in Africa is tapping into unchartered areas of possible taking KM and BI into the academic research realm. Perhaps other universities will follow suit and then KM and BI can be integrated into academic research activity across the continent of Africa.

5.20.2 Opportunities for Web 2.0

Web 2.0 has become a norm in many universities in developed countries. There was only university in Africa, that being University 1, that confidently conveyed that Web 2.0 is now the norm and a “*way of life*” for them. University 3 also seems mature in the area of Web 2.0. However, both the quantitative and qualitative results showed that Web 2.0 does not seem to be effectively in the e-Learning realm used in most of the other leading universities targeted in this study.

Nevertheless, even though Web 2.0 may not be at its maturity yet, this finding indicates that the potential and opportunities to utilise Web 2.0 pedagogically is currently being evaluated. University 6 from North Africa conveyed their intended opportunities in relation to Web 2.0 and e-Learning not just for their institution but also for neighbouring countries.

“Yes, we have not yet utilised those technologies at its fullest, but we are thinking that we need to go that way. We are now at the information epoch... so it improves the learning and teaching process ... we definitely think that it will.”

“I mean the remote areas of the country, including the neighbouring countries of Ethiopia, like Somalia and Sudan. Even for that purpose we are not promoting open course content but we are promoting the students will register to use the e-learning platform.”

University 6 felt that if they could explore more opportunities in the areas of Web 2.0 based e-Learning, then it would improves the learning process at the institution and in neighbouring countries that studies at their institutions.

University 11 was also deficient in Web 2.0 technologies but their response indicated that there was an earnest intention to pursue the area

“It's being used in some of the areas, it's being used together with our e-learning package in some specific cases, but it is not an institution wide activity. So, we identify that these are the areas that we need to assist the process with over time, but again it has got to do with this whole knowledge management strategy going forward, you know? We haven't dealt with it on the level where we should actually really implement it properly.”

“There are activities going on, where we are researching ways of using such technologies in certain elements, and some have drawn some success, but again it's a case of taking that information and using that for strategic activity, and actually making a more serious attempt at this type of thing. So, I don't think it's being used more than in kind of a pseudo strategic level.”

“So, from a broader point of view it's helping, but in terms of the learning process itself, again a lot of work is still to be done in developing some of those aspects.”

University 3 on the other had a strong Web 2.0 practice, but modestly admitted that there were still opportunities for growth.

“Well, I think it is used to an extent, but it is not fulfilling the role as such, because we still know that, especially African universities at the moment are still deemed as – what is the right word? It's face, it starts with a face, it's face what? Meaning people have to attend.”

“If we look at it at the moment, all 23 universities, except UNISA, are face to face universities, meaning students have to sign a register. That's working against web 2.0, because web 2.0 – it says any time, any space, anywhere, you know those ...” [laughs].

“There is no doubt about that, and in actually fact, even us as such, we are not there yet, but at least we are on the right path.”

These finding shows that African universities are currently evaluating the potential of Web 2.0 and can possibly augur that Web 2.0 may soon become the norm even in Africa as similar to University 1 and other developed countries.

5.20.3 Opportunities for MOOCs

The literature review reveals in detail the global game-changing effect of MOOCs (see 2.22). However, the quantitative and qualitative analysis showed that African universities were falling behind in the use of MOOCs. They were further not opting to join MOOCs. However,

as much as that may be the case, this qualitative findings show that the potential and opportunity to explore and implement MOOCs are visible.

University 2 commented on the possibly of MOOCs at the institution.

“I am pushing for MOOCs.... Right now we still don't have any, but I am pushing for MOOCs. It is part of the committee that we have for blended learning, but I am pushing more for MOOCs as a way of communicating with the world, especially related to “XYZ” courses (name of course omitted due to identification of university). I think that the University should have MOOCs for (course name omitted) and it would be a chance for people to evaluate if this is a subject that they would like to come and study at (omitted university name) or not, so if you take a course online for free in (Course)then you might be more fascinated and want to come to the university to study more and see (the Country) then and understand more about ...”

This concurs with the view from Weigel (2013) in the sense that MOOCs are renowned as the democratiser of opportunities for education. Similarly, University 3 from South Africa asserted the pending opportunity for them to join MOOCs when asked if African universities should look at being part of MOOCs,

“Definitely, as long as it's economically viable, and as long as people can learn, because that's all that matters for me.”

University 11 showed a similar enthusiasm at the opportunity to follow MOOCs.

“My opinion is quite simple, I believe it's something we address seriously. We have had a lot of interest from academics in this area. We know that some of the academics that actually already use it, mainly as support for their existing course material, so that they actually get people to register in these environments, so that they can gain knowledge, so that they can at the end of the day do better in the actual course itself. It's a not a subject which has been explored as well as it should be yet. It is subject of interest within the institution. I am really keen that we start refocusing serious attention on it, because I do believe the impact is going to be quite great if a lot of academics actually start using it properly.”

University 10 was equally enthused,

“That is why I understand that some universities maybe protective about their programmes, about their curriculum, but I think the world is moving towards open net, and I think we should join that propaganda and start offering more and more courses even on line. What about certificate courses that we could offer online, and then if someone wants to graduate,

then that person must attend our exams and pay a fee and viola. So, I think in the next five to ten years we will be there..... Knowledge is universal to me, and universities must actually join that movement of opening themselves.”

This shows that even though African universities are currently falling behind in the embracing of MOOCs, however, the enthusiasm to join MOOCs is there. Therefore, this finding reveals that African universities could very well become a serious player in the universal game of MOOCs in the near future.

5.20.4 Opportunities for further strategic use of KM

University 7 did not have a very influential KM strategy and neither was KM directly influencing institutional strategy. However, this important finding shows that the respondent did intend to look at driving KM to a strategic level and creating a learning organisation through that.

“not a very influential one but I would say the motivation or rationale would be – going forward, of getting one, is to become a learning organisation, because I think knowledge management is actually the momentum that actually creates a learning organisation, or the process that helps to make the organisation a learning organization....., where you actually have that loop from passive knowledge to explicit knowledge, to shared knowledge, and that closing the loop again in terms of sharing that, getting new insights, making that explicit and so forth. That is what I understand as a learning organisation. So, you are actually not wasting energy in terms of what you do, in terms of knowledge management, but you are constantly refine and reinforce what you are doing, to be able to do things better than you are doing it at the moment. So, I would say that should be the main driver behind such ...”[intervention]

This finding indicates from a realistic perspective that even KM practitioners such as the respondent believed that by seeking more opportunities to explore and implement KM at the institution, it would promote a learning organisation. This in turn became a motivation for future opportunities for KM at the institution and thus is an important finding.

Finally, University 2 conveyed how they would be doing more analysis on KM to monitor and enhance the competitive status of the university.

“It is adding value, but I think we need to do more analysis so that we can do more comparative analysis and accordingly, then it would work for our competitive status in the local or global market, but it is in an indirect way, by finding where your problems are, then

you do improve that you competitive position.”

This shows the opportunity for more comparative analysis on KM to improve the competitive status of the institution on both a local and global market.

5.21 Summary

This chapter presented the quantitative as well as the qualitative analysis and discussion, therefore making it the most informative and detailed chapter of the entire study. This also contributed to the significant length of the chapter. Relevant quantitative analyses were done on quantitative data which included chi-square, correlations and regression analysis which then produced the quantitative results. These were then supported by valid arguments and discussions and backed by supporting literature and theories. Regression analysis was also performed on the results in relation to the constructs of the relevant theoretical frameworks. The qualitative analysis was equally exhaustive, as in-depth analysis was done on the qualitative data which included tag clouds, Tree Maps, cluster analysis and thematic analysis which all lead to the building of relevant themes. The themes and sub-themes generated by the qualitative analysis not only contributed to satisfy the objectives and research questions of the study, but also provided other discoveries from the qualitative data. Therefore, this made the study an inductive study as well. Therefore, the qualitative analysis also served as a valid means to support or refute findings from the quantitative analysis. Due to this chapter being very rich and exhaustive with analysis and discussions of both quantitative and qualitative data, the investigator sees it fitting to highlight the findings of the study in the next chapter. The next chapter will therefore present the findings of the study in a structured way with relevant references to discussion and arguments made in this chapter. Furthermore, the quantitative and qualitative results will be brought together and tied in to further support the findings. Findings will be presented in relation to the study objectives, research questions and frameworks as well as the other discoveries' made through the inductive nature of the qualitative analysis.

CHAPTER SIX

Key Findings, Conclusion and Recommendations

6.1 Introduction

The previous chapter presented a detailed analysis and discussion with links to relevant theory and findings from other related studies. This chapter outlines the key findings derived from the previous chapter. It shows what the results are really conveying regarding Knowledge Management (KM) in the African Higher Education context. It summarises the research findings in regard to the research problem and ascertains if the problem has been addressed and if the objectives have been fulfilled. It further provides the necessary recommendations, limitations and direction for further research and draws the study to a close.

6.2 Problem statement, Research question, sub-questions and objectives of the study

For the purposes of recapitulation and ease of understanding, the problem statement, research question, sub-questions objectives of the study are hereby reiterated.

6.2.1 Problem Statement overview

Chapter 1 introduced the research problem of the study and which emphasised that whilst the role of KM as a strategic intervention in Higher Education (HE) in developed countries has been studied extensively, the same was not true for developing economies found in Africa. This study therefore aimed to address this gap. It has been proven mainly in developed countries that Higher Educational institutions can attain higher levels of quality, innovation, functionality and competitiveness by using KM strategically. It was therefore important to ascertain if HE institutions in Africa were doing the same and utilising KM effectively to inform strategy development, drive institutional value and enhance productivity, efficiency, innovation and competitiveness. The background to the problem as detailed in Chapter 1 further demonstrated the need for the study. Based on this, the research question, sub-questions and objectives were formulated.

6.2.2 Research Question and sub-questions

How do Knowledge Management practices influence institutional strategy at leading African Universities?

This generated the following research sub-questions:

1. What is the role of KM in strategy formulation at the institution?
2. How is KM
 - (i) Adding value to the institution at a continental level?
 - (ii) Adding value to the institution at a global level?
 - (iii) Promoting competitiveness at a continental level?
 - (iv) Promoting competitiveness at a global level?
3. What is the role of web 2.0 technologies
 - (i) in the creation of e-Learning?
 - (ii) in the management of e-Learning?
 - (iii) in the dissemination of e-Learning?
4. What is the role of web 2.0 technologies
 - (i) in the creation of knowledge?
 - (ii) in the management of knowledge?
 - (iii) in the dissemination of knowledge?
5. Where is KM represented within organisational structure of the institution?

6.2.3 Objectives

- To investigate whether Knowledge Management is contributing to overall institutional value
- To investigate whether knowledge gathered through various Knowledge Management Information Systems is being used to contribute towards institutional strategy
- To examine the role of Web 2.0 as an e-Learning strategy
- To examine the role of Web 2.0 as a Knowledge Management strategy

- To establish whether Knowledge Management is contributing to strategy development at Executive Level

6.3 Main Findings relating to the Research Problem

6.3.1 The role of Knowledge Management

The findings from both the quantitative and qualitative analysis indicate that KM is being used to inform strategy formulation at the institutions and knowledge generated from the respective KM and Business Intelligence (BI) Information Systems is part of this process. The actual role of KM itself serves more of an ‘informative’ role promoting ‘knowledge on demand’, thereby placing it prominently in the decision-making process that facilitates strategy development at the universities. Therefore, KM plays a key role in promoting knowledge-based and evidence-based strategies. The qualitative findings elaborate how most of the universities concur that KM plays a key role in informed and improved decision-making. Furthermore, it is shown that one of the main benefits of KM is the ability to have knowledge on demand for better decision-making to improve overall institutional strategy.

However, the predominant use of KM across most of the universities was limited to improved decision-making, strategy formulation and institutional policy development in the following operational areas:

- Institutional operations and processes
- Finance and Budgeting (income/expense)
- Administration
- Student academic trends such as registration, enrolment, performance, retention and dropout rates
- Student information

Evidently, there is a severe deficiency of effective KM use and KM-based strategy formulation in the following areas:

- Academic Teaching and Learning
- Research

- Reducing institutional costs

There is therefore a need for more strategic KM practice in these areas. The few institutions that did utilise KM in these areas did derive benefits such as enhanced academic and research activity and increased competitiveness. These institutions were also co-incidentally the institutions that are the highest ranked in Africa. This suggests that institutions in Africa should look at adopting KM practices in the areas of academia and research.

Some key correlations in Chapter 5 include:

- A strong positive correlation between the level of importance given to KM Information Systems and the use of these systems to increase the monitoring and improvement of academic and research methods, standards and output.
- A positive relationship between the provision of KM Information Systems to facilitate academic research and the use of knowledge gathered from KM systems to monitor and improve academic and research methods, standards and output.
- A positive relationship between the provision of KM Information Systems to facilitate academic research and the improvement of academic research activity.

While these results cannot be extrapolated into the African higher education population as a whole, they do provide encouragement for other institutions to follow suit.

KM and BI Information Systems are also mainly limited to the support and operational areas of the institutions. Overall results show that the most common KM and BI systems used in African HE included databases and data warehouses. Beyond this basic use, the more sophisticated and powerful type of KM and BI Information Systems in these leading African HE institutions are lacking. These systems include digital dashboards, performance scorecards, data-mining, OLAP and predictive systems, which are mainly used at HE institutions in developed countries. These types of systems were used by only a few of the leading universities in Africa.

- Dashboards (University 1, 3, 9)
- Scorecards (University 9)
- Predictive analytics (University 1, 2, 3, 7, 9)

- Specialised BI systems for international benchmarking and ranking (University 1, 3)

University 1, 2 and 3 are regarded as the leading institutions in Africa with University 9 being the largest. University 1 and 3 are regarded as the highest ranked in South Africa and Africa, whilst University 2 being highest ranked outside of South Africa. These universities were among the few making strong use of these specialised systems. Furthermore, the use of these types of systems was also producing strategic benefits as shown in Chapter 5.

6.3.2 Knowledge Management and the Adding of Value and Competitiveness

The qualitative analysis shows that KM is adding value to the institutions. However, this applies mainly to those universities who were utilising KM effectively and strategically. To be clear, the term ‘adding value’ is classified as anything that is contributing to improving the institution both from an operational and pedagogical perspective.

Table 64 is derived from the findings which summarise how the five universities who are strategically using KM are deriving benefits which they regard as value adding.

University	Benefits/Value
University 1	<ul style="list-style-type: none"> - Ability to measure strategy - Faster and more accurate decision-making - More effective management and use of resources - Saving of money - Saving of Time - Knowledge on demand for added responsiveness of the institution - Better placement of students within faculties - Better and faster enrolment process - On-going monitoring and tracking of enrolment target - Effective management of human capital/resources - Proper placement of students, especially financially needy students - Minimal waiting times (2-3 days) (e.g. residences)
University 2	<ul style="list-style-type: none"> - Better and faster decision-making - Successful co-ordination of courses on demand - Evidence based knowledge on problems experienced due to unrest in

	<p>country</p> <ul style="list-style-type: none"> - Ability to respond quickly to challenges - Effective resources management - On-going student performance monitoring (zero dropout rate)
University 3	<ul style="list-style-type: none"> - Enrolment process improvement - Accurately Monitor grants - Effectively Rate funders - Promote the academic position/ranking of the university in the world - Benchmarking - Promote decision-making in relation to academic position and ranking - Monitor Research output
University 7	<ul style="list-style-type: none"> - KM informed a funding model for ICT in teaching and learning. It was through the strategic use of KM that the respondent was able to build a model that could conclusively prove that a proposed ICT infrastructure could improve retention rate of students with 1 - 2 per cent - KM is being used to promote fair and diverse enrolments at the institution and enables an effective enrolment strategy that is based on facts, trends and evidence
University 9	<ul style="list-style-type: none"> - Better decision-making at Executive Level - Positively informing re-admission policy development - Enhancement of enrolment process - Informing Full time equivalents - Prediction of student fees (amounts to millions of rands)

Table 64: KM adding value

Therefore, as one may see, for those universities above that are using KM effectively, it clearly shows that KM is adding value. The results indicate that KM is adding value more on a local scale for most universities; however, for University 1 and 3, it is also adding value on a global scale. This was because University 1 and 3 are making strategic use of KM to inform their academic and research strategies. Academia and research are the most common measure of quality across universities around the world (Times Higher Education, 2014).

This study has also revealed that those institutions that were making effective use of KM, which included BI and Web 2.0, realised added competitiveness. One of the main motivations for the use of KM was the concept of increasing competitiveness and this was confirmed by 6 of the universities who were strategically leveraging KM. They each gave a detailed reason on why it promoted competitiveness. This included factors such as the use of KM to:

- Raise international profile
- Inform research strategy
- Promote 'Flipped Classroom' via Web 2.0
- Attract students via Web 2.0 based mobile pocket application technology
- Continuously provide knowledge to students
- Monitor academic footprint in Africa and the world
- Benchmark locally and internationally

Three leading institutions confirmed that KM was adding competitiveness on a global scale. This was mainly because they utilised KM to inform their research strategy, and benchmark and monitor their academic position on an international scale. This again shows that the use of KM to inform academic and research strategies leads to increased competitiveness on a local and global scale as academia and research are the most common measures of excellence across universities globally.

University 3 is the only university that is using KM and BI to inform their research strategy and to benchmark their academic and research output and standards, nationally and internationally. Similarly, University 1 uses KM and BI to monitor their academic footprint in Africa and the world. This shows that University 1 and 3 are utilising KM to promote their presence on a global scale from an academic and research perspective, which is in turn enhancing institutional competitiveness. Furthermore, University 10 was convinced that KM enhanced competitiveness at the institution and raised their profile internationally. This showed that KM was promoting competitiveness at a global level for 3 institutions. In relation to Web 2.0 based KM, 3 universities conveyed that the 'Flipped Classroom' approach did contribute to increased competitiveness. In addition, University 1 confidently posited that their Web 2.0 'Pocket App' innovation had made the institution more attractive to students and had increased competitiveness.

This confirms that KM does increase competitiveness when used effectively. It also contributes to adding competitiveness on a global scale as confirmed by University 1, 3 and 10.

6.3.3 Knowledge Management in relation to Web 2.0 and e-Learning

All of the leading institutions selected for the study did have an e-Learning platform. However, most of them did not utilise Web 2.0 as a strategic enabler of e-Learning. This was confirmed by the quantitative and qualitative results. There is a deficiency in the integration of various Web 2.0 technologies into the e-Learning platform of the majority of the universities sampled. The most common e-Learning platform across most of the universities is Moodle. Not many universities utilised other Web 2.0 technologies such as wikis, blogs, social media, podcasting and videocasting and others, to promote e-Learning. The reasons for the deficit of these types of technologies can be attributed to various factors which are summarised as:

- Lack of finances
- Lack of skill
- Organisational culture and resistance
- Internal beliefs about Web 2.0
- Lack of interest by staff

These seem to be the main factors hindering effective Web 2.0 implementation and usage as a learning tool in an African HE setting.

However, there were a few leading institutions that are making strategic use of Web 2.0 technologies in their e-Learning platform. This included University 1 which showed the most effective use of Web 2.0. Other universities included University 2, 3, 4, 7 and 9. As mentioned, University 1, 2 and 3 were the leading universities in Africa, whilst University 9 being the largest in terms of registered students. University 1 was also the only university that was effectively integrating Web 2.0 into academic research. For these leading universities, Web 2.0 was playing an important and strategic role in advancing their e-Learning platform. As shown in Chapter 5, some of the benefits from the effective use of Web 2.0 by these universities included:

- Improved interactivity and participation (University 1, 4, 7)
- Improved learning (University 1, 2)
- Ability to identify weak students/Early warning system (University 1)
- Improved collaboration and communication (University 1, 2, 4, 7)
- Promoting a 'Flipped Classroom' effect (University 1, 4, 7)
- Improved students' performance (University 1)
- Better access to learning content ((University 1, 2, 3, 4, 7, 9)
- Breaking geographical borders (University 1, 9)
- Increased competitiveness (University 1)
- Promotion of Academic Research (University 1)

This study finds that Web 2.0 is not being widely used in leading African HE institutions as an e-Learning strategy. However, for those that are utilising it effectively and strategically such as the universities above, it is proving to have an influential role on the creation, management and dissemination of e-Learning. This is also producing many benefits as listed above. It is therefore advisable that other universities in Africa should follow suit.

In essence, integrating Web 2.0 into e-Learning can enhance the learning process as a whole. Furthermore, there is a positive correlation between the use of Web 2.0 technologies in the creation of knowledge and the use of e-Learning to make the institution a better knowledge provider to students. In addition, there is a positive correlation between the use of Web 2.0 to enhance academic teaching and learning at the institution and the enhancement of overall efficiency, academic research activity and competitiveness.

Apart from the use of Web 2.0 as an e-Learning strategy, the study further found that Web 2.0 was not being used as a KM strategy. As shown in this study, Web 2.0 technology is not being effectively used in the creation, transfer and dissemination of knowledge across most of the universities. However, for those that are using Web 2.0 as an effective KM strategy, it is serving a critical role and providing key benefits.

Universities 1, 3, 4, 7 and 9 are using Web 2.0 as a means of knowledge creation and dissemination. This included the use of wikis, blogs, YouTube, Facebook and podcasting for learning purposes, thereby promoting knowledge creation, access and distribution. Apart

from just learning content, University 1 has also developed and utilised their unique ‘Pocket App’ built on Web 2.0 technology for the sole purpose of spreading knowledge which went beyond just learning content. It further provides a strategic means of distributing relevant institutional information to students, which ranges from operational and academic to student information. This was proving to be well received by students, making the institution more attractive to study at and further enhancing its competitiveness.

University 1 also used Web 2.0 as a means to monitor student performance, thus creating an early warning system to make academic staff ‘knowledgeable’ of student performance by the identification of weak students. Furthermore, University 3 used a Web 2.0 data analysis system known as ‘WeboFind’ to inform and enhance their research output and status in the world. This also promoted international competitiveness. Similarly, University 1 utilised Web 2.0 strategically to develop their interactive research landing site known as ‘LawMesh’. Based on these tools, key benefits were derived by these universities in relation to the use of Web 2.0 as a KM strategy which included:

- Increased competitiveness (University 1, 3)
- Early warning system making staff knowledgeable of weak students (University 1)
- Better access to learning content thus promoting knowledge creation and distribution (University 1, 2, 3, 4, 7, 9)
- Promotion of academic research and research output (University 1,3)
- Holistically making institution a better knowledge provider (University 1)

Furthermore, it was shown that there is a strong positive relationship between the frequency of use of Web 2.0 in the creation of knowledge and the enhancement of academic teaching and learning at the institution as well as making the institution a better knowledge provider to students. Similarly, there is a strong relationship between the frequency of use of Web 2.0 in the creation of knowledge and the use of KM systems to enhance academic research activity at the institution. Furthermore, the use of Web 2.0 to make the institution a better knowledge provider to students is positively correlated with the use of KM systems and practices for improved overall efficiency, enhanced academic research activity and increased competitiveness.

On the other hand, it is evident that Web 2.0 and KM are not being used effectively by most universities as an e-Learning strategy. Knowledge Management and e-Learning are both approaches that contribute to the improved construction, preservation, integration, transfer and use of knowledge. By not using Web 2.0 effectively for the creation and dissemination of learning content hinders the successful creation and dissemination of knowledge.

The use of Web 2.0 technologies as a KM strategy encompass Massive Open Online Courses (MOOCs), which are becoming a global knowledge arena for the creation and dissemination of knowledge to people around the world. However, none of the leading African universities are utilising MOOCs as a means of creating and spreading knowledge. Furthermore, neither are universities in Africa opting to join MOOCs and make their knowledge available to both Africa and the world. The reasons for the absence of MOOCs were examined across the various universities and this can be summarised as follows:

- Indefinite lifespan of MOOCs
- Cost of running MOOCs
- Ownership of MOOCs
- More research needed on MOOCs

As Africa is a developing continent which houses some of the poorest nations in the world, it is dependent on education and knowledge. MOOCs present a cost effective and efficient strategy to address Africa's access to the bleeding edge of knowledge, without placing severe demands on infrastructural, economic, human resource, and financial resources. Access to MOOCs can empower Africa's citizens which can in turn contribute to building Africa's economy and lead to increased job opportunities and the alleviation of poverty.

While Web 2.0 is not being used widely as an effective KM strategy to promote the creation, management and dissemination of knowledge, those institutions that are utilising it are confident that it has enhanced competitiveness and made the institution a better and more effective knowledge provider. This indicates that from an African HE context, Web 2.0, if used strategically and effectively, does play an important role in the creation, management and dissemination of knowledge and does yield strategic benefits resulting in it being a key entity in KM strategy.

6.3.4 Knowledge Management portfolios and Executive Level

The study found that KM is represented at a senior level in the support sector, but not formally at Executive level at most of these leading African HE institutions. Respondents that were responsible for KM implementation were mainly found at director level. However, these directors were not on the Executive Management and instead reported to members of the executive. Only one institution had a Deputy Vice-Chancellor of KM. In addition, at some universities with strong and strategic KM practice, even though KM is not officially at Executive level, it is given a high level of support from Executive Management. Lastly, the study found that KM should ideally be at Executive Level and viewed in the same light as other resources such as Finance and Human Resources. This would in turn ensure that the full potential of KM is realised.

6.4 Findings relating to the Theoretical Frameworks

In Chapter 5, it was shown how quantitative results of the study were applied to the frameworks used to underpin the study through regression analysis. This section reinforces what was found in the regression analysis for each framework, but at the same time also applies the findings of the qualitative data especially with regards to the frameworks.

6.4.1 Organisational Learning Framework

This framework has been tested and applied mainly in developed countries and has shown that data that is collected from the organisations' environment and transformed into knowledge, would lead to better decision-making and facilitate organisational learning. Therefore, this study applied the results of the quantitative analysis to the constructs of the model to evaluate if the outcome would be the same for firstly, HE institutions and secondly in an African (developing continent) context. The results showed that if HE institutions in Africa effectively scan the HE environment and collect relevant information on the environment and then transform that into knowledge, via KM systems, it will contribute to better decision-making in relation to redefining institutional strategy and improving pedagogical practices for the institution. This in turn would promote organisational learning. Therefore, the regression analysis indicates that the Organisational Learning framework can be used to predict the trajectory of African universities if they engage with KM strategically. It reinforces that that KM is a facilitator of organisational learning.

6.4.2 Organisation Culture Theory Framework

As shown in Chapter 5, the Schein (1985) Organisational Culture Theory framework was not conclusive in the African HE setting. However, it was shown that only the ‘espoused values’ construct was applicable relative to the strategic use of Web 2.0 in relation to ranking and competitiveness. In essence, if African HE institutions make Web 2.0 part of their institutional culture and maintain a positive belief in its potential, then Web 2.0 can be effectively used for the enhancement of academic teaching and learning. This includes the ability of the institution to become a better knowledge provider to students. This would contribute to the improved academic ranking of the institution, which in turn is linked to competitiveness. The strategic use of Web 2.0 in teaching and learning and the creation and dissemination of knowledge does contribute to the competitiveness of the institution. University 1, 4 and 7 confirmed that the advent of the ‘Flipped Classroom’, through the effective use of Web 2.0, has led to the institutions becoming more competitive. Furthermore, University 1 confirmed that the creative and effective use of Web 2.0 technologies, via their latest Web 2.0 innovation (‘Pocket App’) contributed to enhancing competitiveness of the institution.

However, more importantly, organisational culture plays the most important role in the overall influence of KM on institutional strategy. This theme clearly confirms that organisational culture, mainly in the form of Executive Management support, plays a critical role in the success of KM at these top 20 leading African institutions. This is further validated by the views of the leading universities such as University 1, University 3, University 7, and University 9. This study reveals that understanding organisational culture is critical for the successful implementation and adoption of KM at the leading African universities. Schein’s Organisational Culture Framework (1985) can thus play an important role in understanding and guiding the implementation of KM at African universities in general.

A visual description of this can therefore be seen in Figure 31.

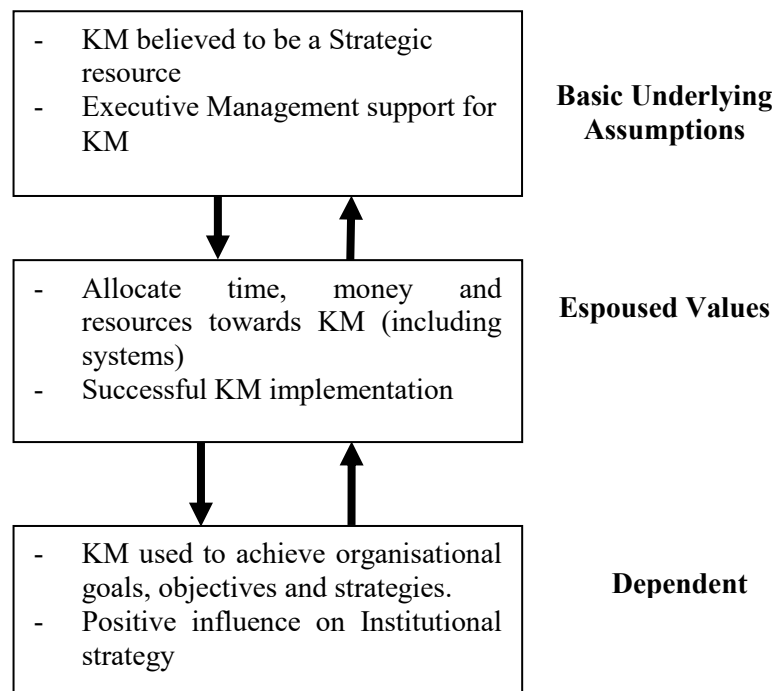


Figure 31: Application of Qualitative results in relation to Organisational Culture Theory

6.4.3 Kogut and Zander Knowledge Management Framework

The Kogut and Zander (1992) Knowledge Management framework postulates that strategic and effective KM practice leads to efficient firms and competitive advantage. An application of this framework did not provide any conclusive findings when subject to the quantitative data.

This could be for many reasons:

- Limited sample size and therefore skewed results.
- Responses based on human judgement which is subject to error.
- First test performed in developing countries.
- Lack of quantitative evidence of strategic KM practice at these institutions.

Delving deeper into this via interviews showed that the effective practice of KM in Higher Education in Africa did lead to efficient firms and competitive advantage.

6.4.3.1 Competitive Advantage

Sixty four per cent of the universities interviewed agreed that KM has led to their intuitions becoming more competitive. ‘Increased Competitiveness’ was one of the main motivations for having strong KM practices.

In addition, Web 2.0 which is a pivotal constituent of KM has also been viewed as an enhancer of competitiveness for those universities that are utilising it effectively. The ‘Flipped Classroom’ approach was cited as a key driver of increased competitiveness. Furthermore, University 1 was confident that their latest Web 2.0 based ‘Pocket App’ innovation contributed to attracting students and making the institution more competitive.

6.4.3.2 Increased Efficiency

Leading universities confirmed that KM was used strategically to support university processes which in turn led to improved efficiency, operations and decision-making. In addition, many universities confirmed that the effective use of KM has led to faster, informed and improved decision-making. It was evident that KM not only enhanced the quality of the decision-making process, but also sped it up. This in turn promoted the efficiency of the institution, which not only included efficiency in operations, but also made the institution more responsive to change.

It is clear from the investigations carried out that the strategic use of KM does positively contribute to efficiency and competitiveness in some of Africa’s leading HE institutions, consistent with the prediction of the Kogut and Zander Knowledge Management framework (1992). These findings should encourage African HE institutions to embrace KM as a strategic intervention.

A visual description is portrayed in Figure 32.

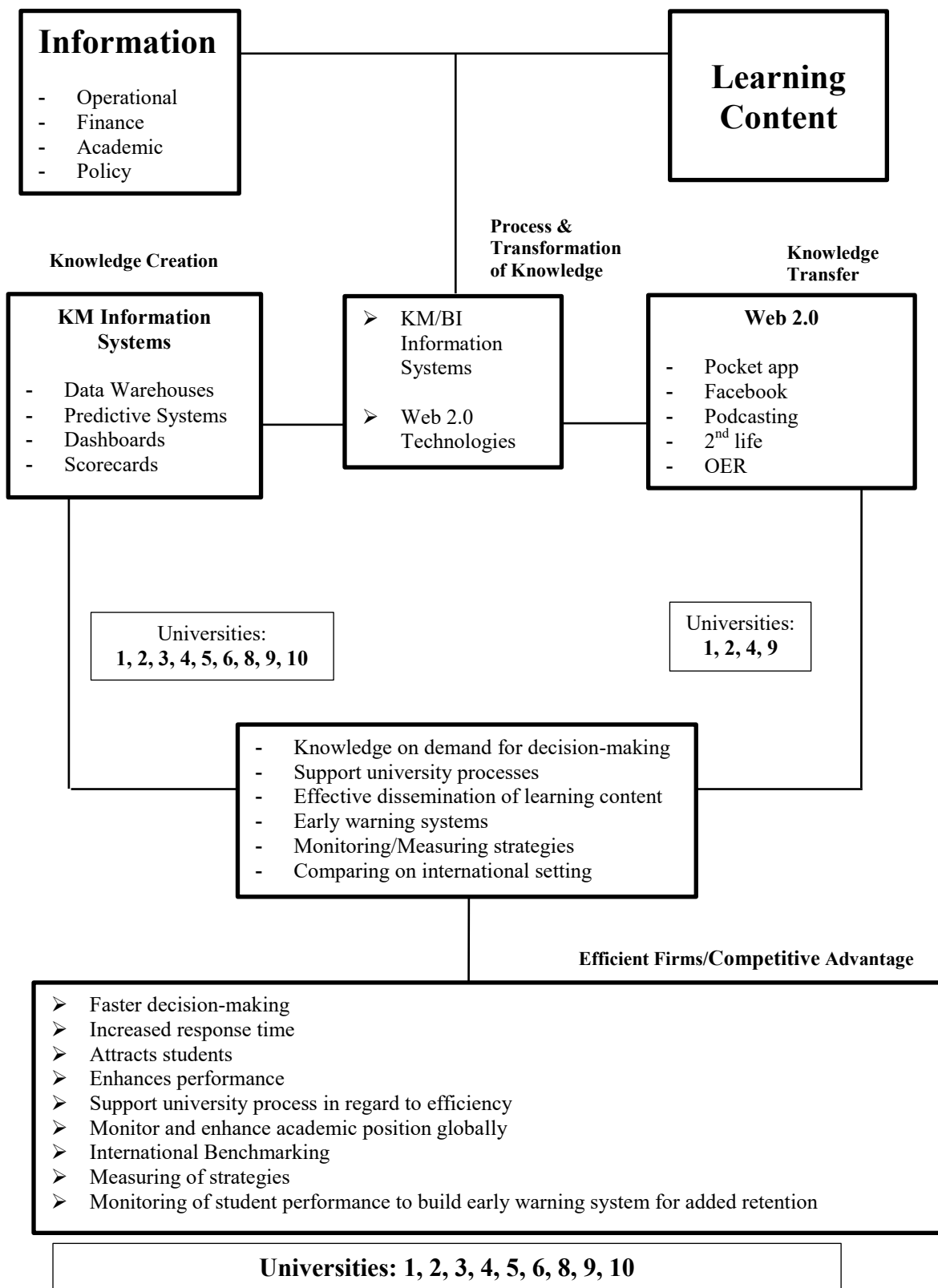


Figure 32: Application of Qualitative results to Kogut and Zander (1992) Knowledge Management framework

6.5 What the findings are saying regarding the current status of KM in Leading African Institutions

From a broad perspective, it is evident that even though KM and BI do play an informing role in strategy development. The majority of leading universities in Africa are not utilising KM and BI as strategically as they should be or as compared to institutions in developed countries. Powerful and specialised KM and BI Information Systems such as dashboards, performance scorecards, data-mining, OLAP and predictive systems are not prevalent in these institutions. In addition, Web 2.0 is not seen as an effective e-Learning and KM strategy at most of these institutions. The sampled African universities are not utilising MOOCs as an effective Web 2.0 based enabler of knowledge and neither are they opting to join MOOCs. Furthermore, KM portfolios are not at Executive Level. Consequently, it may be argued that KM remains at the early stages of maturity at these institutions.

However, it is also evident that there are certain leading universities that are making substantial and strategic use of KM, BI and Web 2.0 (including KM and BI Information Systems) and these happen to be the ones that are, not coincidentally, the higher ranked institutions in Africa. The investigator therefore argues that KM should be one of the primary foci for universities in Africa, using as an example the leading African university which uses KM and BI strategically to measure the impact of any decision taken at the institution. This university also made the most effective use of Web 2.0 to a point where Web 2.0 has become a 'way of life'. They are also the only university using Web 2.0 to enhance research activity. Another of the top ranked African universities in South Africa strategically utilises KM and BI to inform their academic research strategies and to inform their academic position globally. The specialised and advanced KM and BI Information systems such as dashboards, Predictive Systems, Scorecards and others were mainly used by 3 of the highly ranked universities (from South Africa). Furthermore, those institutions that are strategically utilising Web 2.0 as an e-Learning and KM strategy are mainly those that are regarded as the leading institutions in Africa and Web 2.0 plays an important and enabling role as an effective platform for e-Learning and knowledge creation and dissemination.

Those institutions that also excel in specific areas seem to be the ones that have a strong and strategic KM practice. For example, the two leading universities in South Africa are the only ones to utilise KM and BI in Academic and Research activity. This is in turn adding value

and enhancing competitiveness at a local and global level. The institutions that are excelling in competitiveness (mainly from South Africa) are the ones that incorporate Web 2.0 as part of their institutional culture and academic and research strategy. In addition, these institutions appear to have the full support from their Executive Management in relation to KM. It is more than evident that the strategic use of KM does have a positive influence on the top ranked universities in Africa.

However, the results show that only a handful of these universities (less than 50% of the sample) are utilising KM at a 'very strategic level'. The question to ask is that if the top 20 leading universities in Africa are not utilising KM strategically, then the chances of KM being used strategically by the rest of the universities in Africa, that are not in the top 20, are very slim.

One of the key findings in Chapter 5 related to the barriers to successful KM implementation and utilisation in the sampled universities. The primary challenges to effective KM implementation and use in an African HE setting were shown, in this study, to be:

- Finance
- Lack of executive buy-in
- Lack of integration of components
- Lack of competency
- No direct measures of KM success
- Non-acceptance by users

Of these factors, finance seems to be a primary barrier to the successful implementation of KM inclusive of BI and Web 2.0. The lack of executive buy-in which is translated to the lack of Executive support is a major cause of this. This in turn relates to the point that KM is not formally present at Executive Level and, therefore, does not achieve the necessary support, funding, integration and acceptance at most of these leading universities. This can all be attributed to the overall concept of 'organisational culture'. It has been shown that organisational culture does play a major role in the success of KM at these leading institutions. However, only a few of the institutions maintained a positive culture towards KM which allowed KM to thrive. This study showed conclusively that culture influences

KM, and if it is driven by top management, the culture filtered down and the necessary finance, resources and support were mobilised.

However, the majority of the universities did not seem to have strong culture towards KM. This is a primary barrier as to why KM is not maturing at these universities. This can also be extrapolated to the rest of Africa's universities. It is therefore imperative for leading institutions in Africa to strongly align their organisations' culture towards KM in order to derive similar benefits as those institutions that are already doing so. This needs to start at Executive Management level in order to filter down to the rest of the institution.

In light of this, the value of KM is not presently being realised across most of Africa's top 20 leading institutions. Universities in Africa need to realise that they should look within themselves and harness their knowledge resources just as their counterparts from developed countries are doing. This can in turn expedite continuous improvement, add value and improve quality. Effective KM will enable universities in Africa to overcome challenges presented by developing economies. Again, this needs to start at Executive Management level.

African HE institutions do not feature amongst the top 100 universities in the world. Academic and research output is a key contributor to becoming in the top 100 listing (Times Higher Education, 2014). It is evident that universities in developed countries are integrating KM into Academic and Research activity and this has enhanced research output. However, this study shows that most of the top 20 African universities are not using KM and BI to enhance academic and research activity and output. There are many correlations made in this study that show the direct and positive relationship between strategic KM Systems and practices and the enhancement of academic and research activity. This can potentially enhance research output and in turn contribute to placing African universities in the top 100 global academic listing. This is further supported by the evidence that the 2 highest ranked universities in Africa (from South Africa) are in fact strategically integrating KM and BI into their academic and research models and standards.

Lastly, universities in developed countries are effectively using KM and BI to develop strategy and continuously identify new ways of operating. However, unlike universities in developed countries, Africa is a developing continent and universities in Africa face their

own unique challenges in this regard. These include mainly financial, economic, geographical, infrastructural and other challenges as shown by various authors and the qualitative results of this study. Therefore, KM should be seen as a strategy to overcome these challenges. This study shows various correlations that reflect how the strategic and effective use of KM, e-Learning, and Web 2.0 can allow these African universities to positively progress and improve in relation to the challenges faced. For example, there was a strong positive correlation between the use of e-Learning to break geographical barriers in terms of teaching and learning and the use of e-Learning to make education more affordable for students. In addition, interesting correlations on how Web 2.0 could add value and competitive advantage was shown. There was also a positively significant relationship between the use of KM systems and practices for improved overall efficiency and the use of KM systems and practices adding to competitiveness of the institution. Similarly, there was positive correlation that exists between the use of KM and BI to identify new methods/ways of operating and the use of KM and BI systems and practices to promote continuous learning at the institutions. All of these findings, which are also supported by the qualitative report, show the need for African universities to start realising the value of KM and to utilise it in identifying new and innovative methods of operating. This can lead to opportunities for African universities to overcome these challenges and discover and develop new strategies, process and operations as a means to combat these challenges.

Overall, the investigator argues again, that KM is directly related to the improvement of African universities. African universities can attain similar levels of productivity, quality, efficiency, innovation and competitiveness as universities in developed countries through the proper and strategic use of KM and Web 2.0. It has been shown in detail how the highest ranked universities in Africa also possess a strong and strategic KM practice supported by specialised and powerful KM Information Systems inclusive of Web 2.0. They also made strong use of KM, BI and Web 2.0 in academic teaching, learning and research. Based on this, the study shows that KM, if used strategically across the institution, can positively influence the way decision-making and strategy formulation is conducted. Strategy development facilitates process improvements which can add value and competitiveness on a local and a global scale. In addition, this can lead to more agility and responsiveness. All of this has a positive bearing on overall institutional strategy. The study also finds that KM does promote a 'learning organisation'. Therefore, African universities can achieve the levels of those in developed countries without following standard trajectories, but instead utilising KM

strategically which can help equip African universities to become internationally competitive and relevant. The study puts forward this argument thus also providing a convincing answer to the problem statement underpinning this study.

6.6 Has the study fulfilled its Objectives

In closing, it is important to evaluate if the objectives of this research have been fulfilled.

Objective 1: To investigate whether Knowledge Management is contributing to overall institutional value

The study confirms that KM is adding value to the institutions mainly at an operational level. It is also promoting competitiveness on a local scale. For those universities that are effectively using KM in academia and research, it is adding value by informing academic and research strategies and hence promoting competitiveness at local and international level.

Objective 2: To investigate whether knowledge gathered through various Knowledge Management Information Systems is being used to contribute towards institutional strategy

The study confirms that knowledge gathered from KM Information Systems are used to contribute towards institutional strategy. However, KM-informed strategy development is limited mainly to operational and support areas as opposed to the areas of academia and research. Furthermore, the most common KM Information Systems used in these leading African HE institutions are databases and data-warehouses. The more sophisticated and powerful type of KM Information systems such as dashboards, performance scorecards, data-mining, OLAP and predictive systems are not used extensively. The few institutions that did utilise these powerful and specialised KM Information Systems derived several benefits.

Objective 3: To examine the role of Web 2.0 as an e-Learning strategy

The study confirms that Web 2.0 does not have a substantial role in e-Learning across most of the universities. However, for those institutions that are strategically using Web 2.0 in e-Learning, it provides a strategic, influential and enhancing role and yields significant benefits. This is in turn enhancing e-Learning.

Objective 4: To examine the role of Web 2.0 as a Knowledge Management strategy

The study confirms that Web 2.0 does not have a significant role in KM strategy across most of the universities. However, for those institutions that are successfully using Web 2.0 as a KM strategy, it contributes to the effective creation and spread of knowledge, thereby generating various benefits that include increased competitiveness. It also makes the institution a better knowledge provider to staff and students.

Objective 5: To establish whether Knowledge Management is contributing to strategy development at Executive level

The study confirms that KM is not officially at Executive Level. However, it is achieving support from Executive Management and is also contributing to strategy development at Executive Level. However, for the potential of KM to be fully realised, it should ideally be present at the Executive Level.

6.7 Recommendations made by this study

The study provides the following recommendations to address the problem statement. These are listed in the sections below.

6.7.1 Knowledge Management to be at Executive Level

Knowledge Management is not officially present at the Executive level in most of the sampled institutions. The study recommends that for KM to become a strategic resource at African HE institutions, it should ideally be placed at Executive level. This will ensure that KM is officially driven and supported by top management in order to ensure its potential is realised. Furthermore, this will also help address the challenges that hinder the successful implementation and adoption of strategic KM. The support for KM initiatives at this level will encourage a positive institutional culture in relation to KM and BI and will contribute to its success.

6.7.2 Knowledge Management Strategy

It was evident from the sampled universities that a KM informed strategy functioned primarily at an operational level. Two universities that used KM to inform their academic and research strategies derived benefits that added value to these critical areas and increased institutional competitiveness on a local and global scale. Therefore, the study recommends that KM should be used more effectively in the areas of academic teaching, learning and research in order to inform academic and research strategies and enhance competitiveness. For this to be possible, it needs to start at Executive Management level such as the Vice-Chancellor and then filter down into academic and research departments (Deans and Heads of Schools) within the institution. Policies and protocols should be introduced or revised to take into account the aspect of KM from a strategic and systematic perspective. Key activities such as academic workshops, presentations and conferences need to encompass and realise the potential of KM in academic teaching, learning and research.

Administrative and operational departments within the respective academic Colleges should also be aligned to KM policies, protocols and systems. Further to this, necessary technological KM and BI platforms should be invested in and implemented as some universities (shown in this study) are already doing. This will include necessary KM based technology hardware and software platforms (detailed in the next point). Relevant training will also have to be provided in relation to these systems. Improved academic and research activity and output through KM can also attract more funding that can alleviate funding constraints that are faced by African institutions.

6.7.3 Knowledge Management Information Systems

The more sophisticated and specialised type of KM systems such as dashboards, OLAP and performance scorecards were seldom used by the sampled universities. For the few universities that did use these types of systems, it was shown to play a strategic and enabling role by generating pertinent knowledge that informed strategic decision-making and effectively contributed towards institutional strategy development. Furthermore, two universities utilised KM and BI Information Systems in academia and research which in turn informed their academic and research strategies and yielded strategic benefits.

This study recommends that universities in Africa should invest more in specialised KM and BI Information Systems and integrate them into the operational, academic and research areas of the university. These will act as strategic and technological generator of knowledge that can be used to inform decision-making in both operational and academic areas leading to knowledge-based strategy development. Challenges, specifically financial, hindering the successful implementation of KM and KM Information Systems should be addressed at Executive Level. The benefits of having these types of systems in key areas of the institution should be clearly demonstrated in relation to the expenses that will be incurred to obtain and maintain them. This study clearly shows that those institutions that utilised the more specialised KM and BI systems and those that used KM and BI in key areas such as academic teaching, learning and research were higher up in the ranking scale as opposed to those that did not. Therefore, this also shows that whilst it is recommendable for universities in Africa to adopt KM and BI systems such as those in developed countries, they could also look within their own continent and benchmark or follow suit of local highly ranked universities that are investing and implementing KM and BI systems that are of international standard. This will also allow other universities to learn the strategies, ideas and processes required in order to adopt similar systems and the strategically utilise them. Furthermore, the institutions' Information and Communication Technology Division/Departments (ICT) would also have to play a key role in this and be knowledgeable on the various KM and BI systems available and what they can offer. The ICT department would then have to be at the forefront of this process.

6.7.4 Web 2.0

The study found that Web 2.0 was not being used widely, either as an e-Learning strategy or as a KM strategy across most of the universities. However, there were a few universities that did make effective use of Web 2.0 as a strategic agent in e-Learning and this yielded significant benefits that added value to online education and pedagogy. It also promoted competitiveness in some institutions. Furthermore, the two highest ranked universities effectively used Web 2.0 as a KM strategy to promote knowledge holistically across their institutions and to inform their research strategies.

It is therefore recommended that universities in Africa should be embracing Web 2.0 as a strategic means of conducting e-Learning and also as a pivotal part of overall KM strategy.

This will ensure that they derive the same benefits as those institutions that are currently utilising it effectively as shown in the study. The challenges highlighted in this study hindering the progress of Web 2.0 should be addressed with urgency. These challenges were namely, lack of finances, lack of skill, organisational culture and resistance, internal beliefs about Web 2.0 and a lack of interest. Once again all of these challenges need to be addressed at an Executive level. This pertains mainly to the first challenge of finance. Those universities who were leading in KM and Web 2.0 were also those that had high levels of support from Executive Management. However, the respondents of those leading institutions acted as strategic drivers of KM and Web 2.0 and approached Executive Management with strong motivations and reports. Therefore, other universities should learn from this and detail the need, requirements and benefits which should also be supported by ample and relevant research on the subject. Upon obtaining the relevant financial support, the next phase is to address the lack of skills. The appropriate IT staff would then need to be trained specifically on Web 2.0 as they will be critical in the roll out of Web 2.0 based platforms. In the event of staff shortages, if any, specialised services may need to be outsourced. Users of the Web 2.0 platforms will also need to be trained accordingly. Organisational culture and staff resistance, as well as the beliefs about Web 2.0, is a very important area that also needs to be addressed before actual implementation and utilisation of Web 2.0.

6.7.5 Organisational Culture

Organisational culture is a key factor in the successful implementation and adoption of strategic KM. Presently, organisational culture does not seem to be strong enough at the majority of these leading institutions in relation to KM. This could be a primary barrier to successful KM maturity. Organisational culture needs to be aligned to KM at the institutions for its potential to be realised and valued. This needs to be expedited by Executive Management so that the KM orientated culture can properly filter down into various academic and administrative departments and hence be aligned across the institution. Therefore, key empowerment activities would need to be facilitated and be inclusive of all academic, administrative and operational staff within the institution. The primary ways of doing this would include knowledge exchange platforms such as KM workshops, conferences, presentations, forums and institution-wide KM initiatives. These will help combat challenges related to staff resistance, beliefs and lack of interest.

6.7.6 Massive Open Online Courses

Universities in Africa are not utilising MOOCs as a means of knowledge creation and distribution and neither are they opting to join MOOCs to become a continental and global knowledge provider. The study recommends that African universities should address the reasons that are hindering them from joining this worldwide knowledge phenomenon. This includes concerns related to indefinite lifespan of MOOCs, cost of running MOOCs, ownership of MOOCs and the need for more research needed on MOOCs. It is evident that as MOOCs are a new phenomenon and it can be speculative to make any concrete recommendations at this point. A starting point for the adoption of MOOCs would be to first make contact and forge a relationship with some of the key universities that are currently driving MOOCs. Should African universities succeed in adopting a MOOC culture, it can make them more competitive globally and continentally. It will further assist in empowering and educating people in Africa and contribute to its growth.

Knowledge Management can be a primary factor in driving these leading African institutions to achieve the status of their international counterparts. The study makes it evident that those institutions that do make strategic use of KM, BI and Web 2.0 in key areas of the institution are in fact the highest ranking institutions in Africa. This includes the use of specialised and powerful KM and BI systems. This shows that instead of following standard trajectories, universities in Africa should look at bootstrapping through the innovative and strategic use of KM. Finally, it is clear from the evidence presented that KM and BI are key drivers of success in HE. African universities in general are advised to take the lead from their successful continental counterparts and embrace KM and BI strategically.

6.8 Limitations

Almost any study is subject to limitations. Some of the key limitations of this study are:

6.8.1 Sample Size/Top 20 universities in Africa

The sample size of the study was limited as the universities surveyed in the study were only the top 20 universities in Africa and therefore results of the study need to be used with caution when related to other African universities.

6.8.2 Applicability to non-English language universities

African is a multi-ethnic and multi-cultural continent. Primarily English speaking universities formed the top 20. These recommendations may not be applicable to non-English language institutions.

6.8.3 Relatively new study

This study is possibly the first of its kind in Africa and was therefore unable to be supported by other studies of a similar nature from an African context. This can also apply to the application of some of the frameworks such as the Kogut and Zander Knowledge Management Model which showed inconclusiveness as this type of application has not been done before in Africa. Many studies, in developed countries, that use the framework have obtained conclusive results and were easily supported by other studies, also from a developed context. Therefore, by being a study that is relatively new in an African context, it makes it more difficult to be supported by other studies relative to Africa.

6.8.4 Human element

Results of the study are based on human judgment and beliefs which often change in time. Any study that relies on human judgment, response and beliefs can have direct influence on statistical results which in turn influence the results of study holistically.

6.9 Directions for future researchers

Possible future research studies that could stem from the current study include:

1. The quantitative measurement of institutional competitiveness through the use of Knowledge Management and Business Intelligence Information Systems.
2. The measurement of success derived through effective practice of Knowledge Management in African universities.
3. The strategic use of Knowledge Management and Business Intelligence systems in academic teaching, learning and research in African universities.
4. The use of Web 2.0 as a strategic means of making education more affordable to students in Africa.
5. The measurement of student performances in relation to Web 2.0 based e-Learning.
6. Testing the Kogut and Zander Knowledge Management model in African Higher Education.

7. A similar study using researchers and respondents from faculties and other direct users of Knowledge Management and Business Intelligence systems to examine the effectiveness of the KM and BI implementation.
8. A similar study using a case study methodology.
9. A study similar to this across BRICS nations.

6.10 Conclusion

This chapter drew the study to a close. It highlighted the findings in relation to Knowledge Management in an African Higher Education context. The study showed that Knowledge Management does influence institutional strategy. It played an informing role in providing knowledge on demand for strategic decision-making which led to strategy formulation. However, Knowledge Management was primarily used in strategy formulation at operational and support areas of the institutions as opposed to academia and research. In addition, the use of Knowledge Management Information Systems was also primarily limited to operational areas of the institutions as opposed to academia and research. There was also a lack of sophisticated and powerful Knowledge Management Information Systems that existed in most of Africa's leading institutions. The study also showed that Web 2.0 is not being utilised as both an e-Learning and Knowledge Management strategy. African universities are also falling behind in the adoption and utilisation of Massive Open Online Courses (MOOCs). Knowledge Management is currently not at Executive level in at most of these leading institutions. However, the study showed that effective and strategic practice of Knowledge Management including Knowledge Management Information Systems and Web 2.0 does add value to the institutions. If Knowledge Management, including specialised Knowledge Management Information Systems, is effectively used to inform strategies in academia and research then it will promote institutional competitiveness. Furthermore, the strategic use of Web 2.0 as an e-Learning strategy and as a Knowledge Management strategy does yield significant benefits and increases competitiveness. In relation to these findings, this chapter clearly conveyed how those African universities sampled in this study that are making strong and strategic use of Knowledge Management and Web 2.0 are in fact the highest ranked universities in Africa. Limitations to the study were documented and recommendations were outlined. Lastly future studies that could stem from this study were listed to inform future researchers.

Bibliography

4 International College and Universities, 2013. *Universities in Africa*. [online] Available at: <<http://www.4icu.org/Africa/>> [Accessed 15 January 2013].

Abdelaziz, M., Kamel, S.S., Karam, O. and Abdelrahman, A., 2011. Evaluation of E-Learning Program Versus Traditional Lecture Instruction for Undergraduate Nursing Students in a Faculty of Nursing. *Teaching and Learning in Nursing* (2011), pp. 50–58. Available at: <<http://www.jtln.org>> [Accessed: 26 March 2013].

Addis Ababa University, 2013. *About us*. [online] Available at: <<http://www.aau.edu.et/index.php/about-aau/historical-background>> [Accessed: 18 October 2013].

Africa.com. Top 10 Universities in Greater Africa, 2013. [online] Available at: <<http://www.africa.com/blog/the-top-10-universities-in-africa-part-i/>> [Accessed 15 January 2013].

Africa.com-Top 10 Universities in South Africa, 2013. [online] Available at: <<http://www.africa.com/blog/top-10-universities-in-south-africa/>> [Accessed 15 January 2013].

Ajzen, I. and Fishbein, M., 1975. *Belief, attitude, intention and behavior: an introduction to theory and research*. Addison-Wesley: Reading MA.

Allameh, M., Zamani, M. and Davoodi, S.M.R., 2011. The Relationship between Organizational Culture and Knowledge Management (A Case Study: Isfahan University). *Procedia Computer Science* (2011), 3, pp. 1224–1236. Available at <<http://www.sciencedirect.com>> [Accessed: 25 February 2013].

Allan, H.T., O’Driscoll, M., Simpson, V. and Shawe, J., 2012. Teachers' views of using e-learning for non-traditional students in higher education across three disciplines [nursing, chemistry and management] at a time of massification and increased diversity in higher education. *Nurse Education Today*. Available at: www.elsevier.com/nedt [Accessed: 18 March 2013].

Alavi, M., Kayworth T.R. and Leidner, D.E., 2006. An Empirical Examination of the Influence of Organizational Culture on Knowledge Management Practices. *Journal of Management Information Systems / Winter 2005–6*, 22(3), pp. 191–224.

Allen, K. and Longbrake, J., 2012. *MIT and Harvard announce edX*. [online] MIT Media Relations. Available at: <<http://web.mit.edu/press/2012/mit-harvard-edx-announcement.html>> [Accessed 22 March 2013].

Alexander, B., 2005. Podcasting and the Liberal Arts. *The Newsletter of the National Institute for Technology and Liberal Education*, 4(3). Available at: <http://newsletter.nitle.org/v4_n3_summer2005/podcasting.php> [Accessed: 18 October 2013].

Alexander, B., 2006. Web 2.0: A new way of innovation for teaching and learning. *Educause Review*, 41(2), pp. 32–44. Available at: <<http://www.educause.edu/ero/article/web-20-new-wave-innovation-teaching-and-learning>> [Accessed: 22 March 2013].

Alexopoulos, E. and Theodoulidis, B., 2003. The generic information business model. *International Journal of Information Management*, 23(4), pp. 323–336. Available at <<http://www.sciencedirect.com>> [Accessed: 25 February 2013].

Alias, N., Zazaleena, Z., Ismail, N.Z., and Aziz, M.N.A., 2012. E-Learning Successful Elements for Higher Learning Institution in Malaysia. The 3rd International Conference on e-Learning ICEL 2011, Bandung, Indonesia. *Procedia - Social and Behavioral Sciences*, 67, pp. 484 – 489. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].

Allison, C., Miller, A., Oliver, I., Michaelson, R. and Tiropanis, T., 2012. The Web in Education. *Computer Networks*, 56, pp. 3811–3824. Available at: <<http://www.elsevier.com/locate/comnet>> [Accessed: 22 March 2013].

Alkhalaf, S., Drew, S., Al Ghamdi, R. and Alfarraj, O., 2012. E-Learning system on higher education institutions in KSA: attitudes and perceptions of faculty members. *Procedia - Social and Behavioral Sciences*, 47, pp. 1199 – 1205. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].

Alonso, F., López, G., Manrique, D. and Viñes, J.M., 2005. An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of Educational Technology*, 36(2), pp. 217-235. Available at: <<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8535.2005.00454.x/abstract>> [Accessed: 18 March 2013].

Al-Siraihi Al-Harbi, K., 2011. e-Learning in the Saudi tertiary education: Potential and challenges. *Applied Computing and Informatics*, 9(1), pp 31–46. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].

American University of Cairo., 2013. *About AUC*. [online] Available at: <<http://www.aucegypt.edu/about/Pages/default.aspx>> [Accessed 18 October 2013].

Aranganathan, P. and Lakshmi, J., 2010. *Knowledge Management in Indian Information Technology (IT) Organizations in Teaching Jobs*. [online] Available at: <http://www.indianmba.com/Faculty_Column/FC1137/fc1137.html> [Accessed 20 October 2012].

Argyris, C. and Schön, S., 1978. *Organizational Learning: A theory of Action Perspective*. Reading: Addison-Wesley.

Argyris, C. and Schön, S., 1996. *Organizational Learning II: Theory, Method, and Practice*. Reading: Addison-Wesley.

Ariyachandra, T. and Watson, H., 2012. Key organizational factors in data warehouse architecture selection. *Decision Support Systems*, 49, pp. 200–212. Available at: <<http://www.elsevier.com/locate/dss>> [Accessed: 14 September 2013].

Augar, N., Raitman, R. and Zhou, W., 2004. *Teaching and learning online with wikis* [online] Available at: <<http://ascilite.org.au/conferences/perth04/procs/augar.html>> [Accessed: 18 March 2013].

Avgerou, C. and McGrath, K., 2007. Power, Rationality, and the Art of Living through Socio-Technical Change, *MIS Quarterly*, 12(2), pp. 295-315. Available at: <<http://eprints.lse.ac.uk/2353/>> [Accessed: 18 March 2013].

Azma, F. and Mostafapour, M.A., 2012. Business intelligence as a key strategy for development organizations. *Procedia Technology*, pp. 102 – 106. Available at <<http://www.sciencedirect.com>> [Accessed: 25 October 2013].

Barroero, T., Motta, G., Pignatelli, G., Bochicchio, M., Longo, A. and Raffone, A., 2010. Aligning IT Service Levels and Business Performance: A Case Study. *2010 IEEE International Conference on Services Computing*, pp. 570- 577.

Barth, M. and Rieckmann, M., 2012. Academic staff development as a catalyst for Curriculum change towards education for sustainable development: an output perspective. *Journal of Cleaner Production*, 26, pp. 28-36. Available at: <<http://www.elsevier.com/locate/jclepro>> [Accessed: 27 March 2013].

Bartlett-Bragg, A., 2006. *Reflections on pedagogy: Reframing practice to foster informal learning with social software*. Available at: <<http://www.dream.sdu.dk/uploads/files/Anne%20Bartlett-Bragg.pdf>> [Accessed: 27 March 2013].

Becker, R. and Jockivirta, L., 2007. *Online learning in Universities: selected data from the 2006 observatory study.*, London: The Observatory on Borderless Higher Education.

Beckman, T.J., 1999. *The current state of knowledge management. Knowledge Management handbook*. New York: CRC Press LLC. pp. 11-22.

Bennett, S., Bishop, A., Dalgarno, B., Waycott, J. and Kennedy, G., 2012. Implementing Web 2.0 Technologies in Higher Education: A Collective Case Study. *Computers and Education*, 59, pp. 524–534. Available at: <<http://www.elsevier.com/locate/compedu>> [Accessed: 19 March 2013].

Bermejo, S., 2005. Cooperative electronic learning in virtual laboratories through Forums. *IEEE Transactions on Education*, 48(1), pp.140 – 149.

Bettis-Outland, H., 2012. Decision-Making's Impact on Organizational Learning and Information Overload. *Journal of Business Research*, 65(6), pp. 814–820. Available at: <<http://www.sciencedirect.com>> [Accessed 26 March 2013].

Better Evaluation, 2013. *Sharing information to improve evaluation*. [online] Available at: <<http://betterevaluation.org/evaluation-options/wordtree>> [Accessed: 31 May 2014].

Bhatt, G.D. and Zaveri, J., 2002. The enabling role of decision support systems in organizational learning. *Decision Support Systems*, [e-journal] 32, pp. 297– 309. Available at: <<http://www.elsevier.com/locate/dsw>> [Accessed 27 March 2013].

Birdsall, W.F., 2007. Web 2.0 as a Social Movement. *Webology*, [e-journal] 4(2). Available at: <<http://www.webology.ir/2007/v4n2/a40.html>> [Accessed 8 April 2013].

Blake, H., 2009. *Staff perceptions of e-learning for teaching delivery in healthcare. Faculty of Medicine & Health Sciences.* [online] Available at: <<http://www.nottingham.ac.uk/pesl/resources/elearning/staffper143/>> [Accessed 18 March 2013].

Boisnier, A. and Chatman, J.A., 2002. *The Role of Subcultures in Agile Organizations.* University of California, Berkeley: Haas School of Business.

Boisot, M., 1987. *Information and Organizations: The Manager as Anthropologist.* London: Fontana/Collins.

Boling, E.C., Hough, M., Krinsky, H., Saleem, H. and Stevens M., 2012. Cutting the distance in distance education: Perspectives on what promotes positive, online learning experiences. *Internet and Higher Education*, 15(2), pp. 118–126. Available at: <<http://www.sciencedirect.com>> [Accessed 25 March 2013].

Bonk, C.J., Lee, M.M., Kim, N. and Lin, M.F.G., 2009. The tensions of transformation in three cross-institutional wikibook projects. *Internet and Higher Education*, 12(3-4), pp. 126–135. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Bontis, N., Crossan, M.M. and Hulland, J., 2002. Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies*, 39(4) pp. 437–469. Available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=313496> [Accessed: 28 March 2013]

Brandtzaeg, P.B. and Heim, J., 2007. Initial context, user and social requirements for the Citizen Media applications: Participation and motivations in off- and online communities. *Citizen Media Project.*

Brijs, B. and Lecomte, P., 2006. Acceptance Criteria for the Introduction of E-Learning in a Work Environment. *6th AEEE Association of European Economics Education Conference.* Ghent, Belgium.

Available at: <http://www.linguafrancaconsulting.eu/docs/AEEE_Paper_24_08_2006.pdf> [Accessed: 25 March 2013].

Brown, S.A., 2012. Seeing Web 2.0 in context: A study of academic perceptions. *Internet and Higher Education*, 15(1), pp. 50–57. Available at: <<http://www.sciencedirect.com>> [Accessed: 19 March 2013].

Brown, J.S. and Adler, R.P., 2008. Minds on fire: Open education, the long tail, and learning 2.0. *EDUCAUSE Review*, 43(1), pp. 16–32. Available at: <http://connect.educause.edu/Library/EDUCAUSE+Review/MindsonFireOpenEducation/45823> [Accessed: 25 March 2013].

Brown, J.S. and Duguid, P., 2000. *The Social Life of Information.* Boston: Harvard Business School Press.

- Cameron, K.S. and Quinn, R.E., 1999. *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework*. Massachusetts: Addison-Wesley.
- Cape Higher Education Consortium, 2013. *Cape Peninsula University of Technology*. [online] Available at: <<http://www.chec.ac.za/cput1.html>> [Accessed 18 October 2013].
- Cape Peninsula University of Technology, 2013. *Facts and stats*. [online] Available at: <<https://heda.cput.ac.za/indicatordashboard/default.aspx>> [Accessed 18 October 2013].
- Caplan, D., 2004. The development of online courses. *Theory and practice of online learning*. [online] Available through: Athabasca, Canada: Creative Commons: Athabasca University Website. Available at: <http://cde.athabascau.ca/online_book/ch7.html> [Accessed 25 March 2013].
- Carmichael, P. and Burchmore, H., 2010. Social software and academic practice: Postgraduate students as co-designers of Web 2.0 tools. *Internet and Higher Education*, 13(4), pp. 233–241. Available at: <<http://www.sciencedirect.com>> [Accessed: 23 March 2013].
- Casanova, D., Moreira, A. and Costa, N., 2011. Technology Enhanced Learning in Higher Education: results from the design of a quality evaluation framework. *Procedia - Social and Behavioral Sciences*, 29, pp. 893 – 902. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].
- Cebeci, Z. and Tekdal, M., 2006. Using Podcasts as Audio Learning Objects. *Interdisciplinary Journal of Knowledge and Learning Objects*, 2, pp. 7-57.
- Cepeda, G. and Vera, D., 2007. Dynamic capabilities and operational capabilities: A knowledge management perspective. *Journal of Business Research*, 60(5), pp. 426–437. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].
- Cetina, K.K., 2005. Complex global microstructures. *Theory, Culture and Society*, 22(5), pp. 213-234. Available at: <<http://tcs.sagepub.com/content/22/5/213.abstract>> [Accessed: 25/03/2013].
- Chan, A. and Lee, M., 2005. An MP3 a day keeps the worries away - Exploring the use of podcasting to address preconceptions and alleviate pre-class anxiety amongst undergraduate information technology students. *Student Experience Conference, Charles Sturt University*. [online] Available at: <<http://www.csu.edu.au/division/studserv/sec/papers/chan.pdf>> [Accessed 18 October 2013].
- Chandarasupsang, T., Harnpornchai, N., Chakpitak, N. and Dahal, K., 2006. Enhancing University Research Activities with Knowledge Management. *The International conference on Software Knowledge Information Management and Applications (SKIMA)*. [online] Available at: <<http://eastwest.inf.brad.ac.uk/document/publication/Chanarasupsang-skima.pdf>> [Accessed 16 March 2013].
- Chen, D.Q., Mocker, M., Preston, D.S. and Teubner, A., 2010. Information systems strategy: reconceptualization, measurement, and Implications. *MIS Quarterly*, (34)2.

Chen, M., Huang, M. and Cheng, Y., 2009. Measuring knowledge management performance using a competitive perspective: An empirical study. *Expert Systems with Applications*, 36(4), pp. 8449–8459. Available at: <<http://www.sciencedirect.com>> [Accessed: 11 October 2012].

Citroen, C.L., 2011. The role of information in strategic decision-making, *C&C Information Management. International Journal of Information Management, Zoetermeer, The Netherlands*. [online] Available at: <www.elsevier.com/locate/ijinfomgt> [Accessed 28 February 2013].

Corne, D., Dhaenens, C. and Jourdan, L., 2012. Synergies between operations research and data mining: The emerging use of multi-objective approaches. *European Journal of Operational Research*, 221, pp. 469–479. Available at: <<http://www.elsevier.com/locate/ejor>> [Accessed: 20/05/2013].

Cranfield, D.J. and Taylor, J., 2008. Knowledge Management and Higher Education: A UK case study. *The Electronic Journal of Knowledge Management*, 6(2), pp. 85 – 100. Available at: <<http://www.ejkm.com>> [Accessed: 20 October 2012].

Cress, U. and Kimmerle, J., 2006. Information exchange with shared database as a social dilemma: The effect of metaknowledge, bonus systems, and costs. *Communication Research*, 33(5), 370–390. Available at: <<http://crx.sagepub.com/content/33/5/370.full.pdf>> [Accessed: 25/03/2013].

Coukos-Semmel, E.D., 2006. Knowledge Management: Process and Strategies used in United States Research Universities. *Proquest Dissertation*, UMI Number 304178.

Czerniewicz, L. and Brown, C., 2009. A study of the relationship between institutional policy, organisational culture and e-learning use in four South African universities. *Computers and Education*, 53, pp. 121–131. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Dale, C., 2007. Strategies for Using Podcasting to Support Student Learning. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 6(1).

Daniel, J (Sir)., 2012. *Making Sense of MOOCs: Musings in a Maze of Myth, Paradox and Possibility*. Korea National Open University. Available at: <<http://jime.open.ac.uk/article/2012-18/html?>> [Accessed: 26 March 2013].

Das, A., Panigrahi, G., Banerjee, D.K. and Basu, K., 2011. An approach to propose a model for e-Learning content up-gradation for increasing GER of higher education in West Bengal. *Procedia - Social and Behavioral Sciences*, 28. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].

Dasgupta, M., Sahay, A. and Gupta, R.K., 2009. The Role of Knowledge Management in Innovation. *Journal of Information & Knowledge Management*, 8(4), pp. 317- 330.

Dastan, I., Mesut, C. and Naralan, A., 2011. The Effects of Information Technology Supported Education On Strategic Decision Making: An Empirical Study. Proceedings of 7th International Strategic Management Conference. *Procedia - Social and Behavioral Sciences*, 24, pp. 1134–1142. Available at: <<http://www.sciencedirect.com>> [Accessed: 15 March 2013].

Data Analysis Australia., 2009. What Are You Really Measuring? *Reliability and Validity in Questionnaire Design*. [online] Available at: <<http://www.daa.com.au/analytical-ideas/questionnaire-validity>> [Accessed 31 March 2013].

Davenport, T.H. and Prusak, L., 2000. The Pragmatics of Knowledge Management. *Working Knowledge: How Organizations Manage What They Know*. Boston: Harvard Business School Press.

Davis, A., 2004. *The Development of Online Courses Theory and practice of online learning*. Athabasca: Creative Commons, Athabasca University.

Davis, F.D., 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), pp. 319-340. Available at: <<http://www.jstor.org/stable/249008>> [Accessed: 21 March 2013].

Davis, G.B., 2000. Information Systems Conceptual Foundations: Looking Backward and Forward. Organizational and Social Perspectives on Information Technology. The International Federation for Information Processing, 41, pp. 61-82.

Davis, M., 2002. *Using business intelligence for competitive advantage*. CRM Today.

Delavari, N., Phon-Amnuaisuk, S. and Beikzadeh, M.R., 2008. Data Mining Application in Higher Learning. *Informatics in Education Institutions*, 7(1), pp. 31–54.

Desai, M., Hart, J. and Richards, T., 2009. E-learning: Paradigm shift in education. *Education*, 129(2), pp. 327–334.

Ding, Q., Akoorie, M.E.M. and Pavlovich, K., 2009. A Critical Review of Three Theoretical Approaches on Knowledge Transfer in Cooperative Alliances. *International Journal of Business and Management*, 4(1). Available at: <<http://www.ccsenet.org/journal.html>> [Accessed: 25/03/2013].

Donnelly, K.M. and Berge, Z.L., 2006. Podcasting: Co-opting MP3 players for education and training purposes. *Online Journal of Distance Learning Administration*, 9(3).

Duderstadt, J., 2000. *A university for the 21st century*. Ann Arbor: University Michigan Press.

Eales-Reynolds, L.J., Gillham, D., Grech, C., Clarke, C. and Cornell, J., 2012. A study of the development of critical thinking skills using an innovative Web 2.0 tool. *Nurse Education Today*, 32(7), pp. 752–756. Available at: <<http://www.sciencedirect.com>> [Accessed: 22 March 2013].

Ebner, M., Lienhardt, C., Rohs, M. and Meyer, I., 2010. Microblogs in Higher Education – A

chance to facilitate informal and process-oriented learning? *Computers and Education*, 55, pp. 92–100. Available at: <<http://www.elsevier.com/locate/compedu>> [Accessed: 19 March 2013].

Economics Intelligence Unit., 2008. *The future of Higher Education: How technology will shape learning*. [online] Available at: <[http://www.nmc.org/pdf/Future-of-Higher-Ed-\(NMC\).pdf](http://www.nmc.org/pdf/Future-of-Higher-Ed-(NMC).pdf)> [Accessed: 12 January 2013].

Centre for Digital Education., 2012. *The Flipped Classroom: Increasing Instructional Effectiveness in Higher Education with Blended Learning Technology*. [online] Available at: <<http://echo360.com/sites/default/files/Flipped%20Classroom%20Brief.pdf>> [Accessed: 18 October 2013].

Eckersen, W.W., 2007. Predictive Analytics: Extending the Value of Your Data Warehousing Investment. *TDWI Best Practices Report*, First Quarter 2007. Available at: <<http://www.teradata.com/t/assets/0/206/308/35d4edc6-3408-4cbd-8946-a803e49d8288.pdf>> [Accessed: 19 March 2013].

EDUCAUSE., 2011. 7 Things You Should Know About...MOOCS. *EDUCAUSE*. [online] Available at: <<http://net.educause.edu/ir/library/pdf/eli7078.pdf>> [Accessed 26 March 2013].

EDUCAUSE., 2012. 7 Things You Should Know About...Flipped Classrooms. *EDUCAUSE*. [online] Available at: <<http://net.educause.edu/ir/library/pdf/eli7081.pdf>> [Accessed 3 September 2013].

Eduventures., 2013. *Predictive Analytics in Higher Education*. [online] Available at: <<http://www.eduventures.com/2013/02/predictive-analytics-in-higher-education/>> [Accessed 10 December 2013].

EdX Universities., 2013. *edX*. [online] Available at: <<https://www.edx.org/>> [Accessed 3 April 2013].

Eftekharzade, S.F. and Mohammadi, B., 2011. The Presentation of a Suitable Model for Creating Knowledge Management in Educational Institutes (Higher Education). *Procedia - Social and Behavioral Sciences*, 29, pp. 1001 – 101. Available at: <<http://www.sciencedirect.com>> [Accessed: 12 March 2013].

Ehlers, U., 2004. Quality in E-Learning from the Learners Perspective. *European Journal of Vocational Training*. [online] Available at: <<http://www.eurodl.org/?article=101>> [Accessed 18 March 2013].

El-Deghaidy, H. and Nouby, A., 2008. Effectiveness of a blended e-learning cooperative approach in an Egyptian teacher education programme. *Computers and Education*, 51, pp. 988–1006. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Elbashir, M.Z., Collier, P.A. and Michael, D.J., 2008. Measuring the effects of business intelligence systems: The relationship between business process and organizational performance. *International Journal of Accounting Information Systems*, 9, pp. 135–153.

Emerald Insight., 2013. Available at: <<http://www.emeraldinsight.com/>> [Accessed: 13 May 2013].

Engstrom, M. and Jewett, D., 2005. Collaborative learning the wiki way. *TechTrends*, 49(6), pp. 12–68. Available at: <<http://link.springer.com/article/10.1007%2FBFB02763725#page-1>> [Accessed: 15 March 2013].

Ertmer, P.A., Newby, T.J., Yu, J.H., Liu, W., Tomory, A., Lee, Y.M, Sendurur, E. and Sendurur, P., 2011. Facilitating students' global perspectives: Collaborating with international partners using Web 2.0 technologies. *Internet and Higher Education*, 4(4), pp. 251–261. Available at: <<http://www.sciencedirect.com>> [Accessed: 23 March 2013].

Evans, C., 2008. The effectiveness of m-learning in the form of podcast revision lectures in Higher Education. *Computers and Education*, 50(2), pp. 491–498. [online] Available at: <<http://www.sciencedirect.com>> [Accessed 23 March 2013].

Evgeniou, E. and Loizou, P., 2012. The Theoretical Base of E-Learning and Its Role in Surgical Education. *Journal of Surgical Education*, 69(5), pp. 665–669. Available at: <<http://www.sciencedirect.com>> [Accessed: 23 March 2013].

Farrell, M.A. and Oczkowski, E., 2002. Are market orientation and learning orientation necessary for superior organizational performance? *Journal of Market-Focused Management*, 5, pp. 197–217. Available at: <<http://link.springer.com/article/10.1023%2FA%3A1022990622706#page-1>> [Accessed: 18 March 2013].

Fernandez, V., Simo, P. and Sallan, J.M., 2009, Podcasting: A new technological tool to facilitate good practice in Higher Education. *Computers & Education*, 53, 385–392. Available at: <<http://www.elsevier.com/locate/compedu>>. [Accessed: 19 February 2011].

Fini, A., 2009. The Technological Dimension of a Massive Open Online Course: The Case of the CCK08 Course Tools. *International Review of Research in Open and Distance Learning*, 10(5), ISSN: 1492-3831.

Firestone, J.M., 2001. Key Issues in Knowledge Management. Knowledge and Innovation. *Journal of the KMCI*, 1(3). Available at: <<https://www.kmci.org/papers/firestoneissueskIv1n3.pdf>> [Accessed: 18 March 2013]

Forkosh-Baruch, A. and Hershkovitz, A., 2012. A case study of Israeli higher-education Institutes sharing scholarly information with the community via social networks. *Internet and Higher Education*, 15(1), pp. 58–68. Available at: <<http://www.sciencedirect.com>> [Accessed: 23 March 2013].

Frid, R., 2003. *A Common KM Framework for The Government Of Canada: Frid Framework for Enterprise Knowledge Management*, Canadian Institute of Knowledge Management, Ontario.

Friedman, T.L., 2013. *The Professors' Big Stage*. *New York Times*. [online] Available at: <http://www.nytimes.com/2013/03/06/opinion/friedman-the-professors-big-stage.html?_r=1&> [Accessed 22 March 2013].

Garcia-Morales, V.J., Llorens-Montes, F.J. and Verdu-Jover, A.J., 2007. Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs. *Technovation*, 27(9), pp. 547–568. Available at: <<http://www.sciencedirect.com>> [Accessed: 27 March 2013].

Garcia-Morales, V.J., Lopez-Martin, F.J. and Llamas-Sanchez, R., 2006. Strategic factors and barriers for promoting educational organizational learning. *Teaching and Teacher Education*, 22(4), pp. 478–502. Available at: <<http://www.sciencedirect.com>> [Accessed: 27 March 2013].

Garrison, D.R. and Cleveland-Innes, M., 2003. Critical factors in student satisfaction and success: Facilitating student role adjustment in online communities of inquiry. *Paper presented to the Sloan Consortium Asynchronous Learning Network Invitational Workshop*, Boston, MA.

Garrison, D.R. and Kanuka, H., 2004. Blended learning: Uncovering its Transformative Potential in Higher Education. *Internet and Higher Education*, 7(2), pp. 95–105. Available at: <<http://www.sciencedirect.com>> [Accessed: 23 March 2013].

Ghaffari, H., Rafeie, M. and Ashtiani, A.C., 2012. Quality Open Higher Education via Knowledge Management. *Journal of Basic and Applied Scientific Research*, ISSN 2090-4304. TextRoad Publication. Available at: <[http://www.textroad.com/pdf/JPASR/J.%20Basic.%20Appl.%20Sci.%20Res.,%202\(2\)1787-1792,%202012.pdf](http://www.textroad.com/pdf/JPASR/J.%20Basic.%20Appl.%20Sci.%20Res.,%202(2)1787-1792,%202012.pdf)> [Accessed: 21 March 2013].

Graham, C.R., Woodfield, W. and Harrison, J.B., 2012. A framework for institutional adoption and implementation of blended learning in higher education. *Internet and Higher Education*, 18, pp. 4–14. INTHIG-00489. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Goldstein, J.A., 2009. The status of emergence. *Journal of Philosophy*, 39(18), pp. 486-93.

Google Scholar., 2013. Available at: <<http://scholar.google.co.za/>> [Accessed 13 May 2013].

Gottschalk, P., 2006. Stages of knowledge management systems in police investigations. *Knowledge-Based Systems*, 19(6), pp. 381–387. Available at: <<http://www.sciencedirect.com>> [Accessed: 20 October 2012].

Goyal, M. and Rajan, V., 2012. Applications of Data Mining in Higher Education. *International Journal of Computer Science Issues*, 9(2).

Gregory, B.T., Harris, S.G., Armenakis, A.A. and Shook, C.L., 2009. Organizational culture and effectiveness: A study of values, attitudes, and organizational outcomes. *Journal of Business Research*, 62(7), pp. 673–679. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 February 2013].

Grineski, S., 1999. Questioning the Role of Technology in Higher Education: Why is this the Road Less Travelled? *Internet and Higher Education*, 2(1), pp. 45-54. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 February 2013].

Grosbeck, G., 2009. To use or not to use web 2.0 in higher education? World Conference on Educational Sciences 2009. *Procedia Social and Behavioral Sciences*, 1(1), pp. 478–482. Available at: <<http://www.sciencedirect.com>> [Accessed: 19 March 2013].

Gupta, S., Bostrom, P. and Huber, M., 2010. End-User Training Methods: What We Know, Need to Know. *The Database for Advances in Information Systems*, 41(4). Available at: <<http://dl.acm.org/citation.cfm?id=1899641>> [Accessed: 17 March 2013].

Halic, O., Lee, D., Paulus, T. and Spence, M., 2010. To blog or not to blog: Student perceptions of blog effectiveness for learning in a college-level course. *Internet and Higher Education*, 13(4), pp. 206–213. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 February 2013].

Hamidi, F., Meshkat, M., Rezaee, M. and Jafari, M., 2011. Information Technology in Education, *Procedia Computer Science*, pp. 369–373. Available at: <<http://www.sciencedirect.com>> [Accessed 10 October 2012].

Harel, E.C. and Sitko, T.D., (2003). Digital Dashboards: Driving Higher Education Decisions. *EDUCAUSE- Center for Applied Research. Research Bulletin*, (19). Available at: <<http://www.educause.edu/ecar/>> [Accessed: 10 December 2013].

Hargadon, S., 2008. *Web 2.0 is the future of education*. Available at: <<http://www.stevehargadon.com/2008/03/web-20-is-future-ofeducation.html>> [Accessed: 16 March 2013].

Harvey, L., 2004. Analytic Quality Glossary. *Quality Research International*. [online] Available at: <<http://www.qualityresearchinternational.com/glossary>> [Accessed 16 March 2013].

Haslinda, A. and Sarinah, A., 2009. A Review of Knowledge Management Models. *The Journal of International Social Research*, 2(9). Available at: <http://www.sosyalarastirmalar.com/cilt2/sayi9pdf/haslinda_sarinah.pdf> [Accessed: 16 March 2013].

Hedlund, G. and Nonaka, I., 1993. *Models of Knowledge Management in the West and Japan*. Stockholm School of Economics, Institute of International Business, 91-99 of RP, ISSN 0280-1167.

Hemmi, A., Bayne, S. and Land, R., 2009. The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning*, 25(1), pp. 19–30. Available at: <<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2729.2008.00306.x/abstract>> [Accessed: 26 March 2013].

Hendriks, P.H.J., 2001. Many rivers to cross: from ICT to knowledge management Systems. *Journal of Information Technology*, 16(2), pp.57-72.

Hitt, M.A., Ireland, R.D. and Lee, H., 2000. Technological learning, Knowledge Management, firm growth and performance: an introductory essay. *Journal of Engineering*

nd Technology Management, 17, pp. 231–246. Available at: <<http://www.elsevier.com/locate/jengtecman>> [Accessed: 25 March 2013].

Holmes, B. and Gardner, J., 2006. *e-Learning: Concepts and Practice*. London: SAGE.

Hong, D., Suh, E. and Koo, C., 2011. Developing strategies for overcoming barriers to knowledge sharing based on conversational knowledge management: A case study of a financial company. *Expert Systems with Applications*, 38 (12), pp. 14417-14427. Available at: <<http://www.sciencedirect.com/>> [Accessed: 30 June 2014].

Hsu, K.C. and Li, M., 2011. Techniques for finding similarity knowledge in OLAP reports. *Expert Systems with Applications*, 38, pp. 3743–3756. Available at: <<http://www.elsevier.com/locate/eswa>> [Accessed: 16 October 2013].

Hughes, A., 1997. Information strategy - threat or opportunity? *Librarian Career Development*, 5(2), pp. 60–66.

Huijser, H., Bedford, T. and Bull, D., 2008. Open Course Ware, Global Access and the Right to Education: Real access or marketing ploy? *International Review of Research in Open and Distance Learning*, 9(1), pp. 1–13. Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/446/1002>> [Accessed: 21 March 2013].

Huang, M., 2012. Key User Knowledge, Attitude and IT Performance: The Moderating Effect of Organizational Culture. *Procedia Engineering*, 29, pp. 1824-1829. Available at: <<http://www.sciencedirect.com>> [Accessed: 12 March 2013].

Hung, R.Y.Y., Lien, B.Y., Yang, B., Wud, C.M. and Kuo, Y.M., 2011. Impact of TQM and organizational learning on innovation performance in the high-tech industry. *International Business Review*, 20(2), pp. 213–225. Available at: <<http://www.sciencedirect.com>> [Accessed: 27 March 2013].

IBM., 2010. *Real World Predictive Analytics: Putting Analysis into Action for Visible Results*. [online] Available at: <<http://public.dhe.ibm.com/common/ssi/ecm/en/ytw03112usen/YTW03112USEN.PDF>> [Accessed: 16 October 2013].

IBM., 2014. *IBM big data and information management*. [online] Available at: <<http://www-01.ibm.com/software/data/bigdata/>> [Accessed: 25 June 2014].

Ibrahim, F., Edgar, D. and Reid, V., 2009. Assessing the Role of Knowledge Management in Adding Value: Moving Towards a Comprehensive Framework. *Journal of Information and Knowledge Management*, 8(4), pp. 275-286.

IS Theories Website., 2013. *IS Theories*. [online] Available at: <http://istheory.byu.edu/wiki/Main_Page> [Accessed 4 January 2013].

Iivari, J. and Huisman, M., 2007. The Relationship Between Organizational Culture and the Deployment of Systems Development Methodologies. *MIS Quarterly*, 31(1), pp. 35-58.

Janhonen, M. and Johanson, J.E., 2011. Role of knowledge conversion and social networks in team performance. *International Journal of Information Management*, 3(3), pp. 217–225. Available at: <<http://www.elsevier.com/locate/ijinfomgt>> [Accessed: 25 March 2013].

Jackson, S., 2011. Organizational culture and information systems adoption: A three-perspective approach. *Information and Organization*, 21(2), pp. 57–83. Available at: <<http://www.elsevier.com/locate/infoandorg>> [Accessed: 26 March 2013].

Janz, B.D. and Prasarnphanich, P., 2003. Understanding the Antecedents of Effective Knowledge Management: The Importance of a Knowledge-Centered Culture. *Decision Sciences*, 34(2). Available at: <<http://onlinelibrary.wiley.com/doi/10.1111/1540-5915.02328/pdf>> [Accessed: 26 March 2013].

Jiménez-Jiménez, D. and Cegarra-Navarro, J.G., 2006. The performance effect of organizational learning and market orientation. *Industrial Marketing Management*, 36(6), pp. 694–708. Available at: <<http://www.sciencedirect.com>> [Accessed: 27 March 2013].

Johnson, A. and Lederer, A., 2010. CEO/CIO mutual understanding, strategic alignment and the contribution of IS to the organization. *Information and Management*, 47(3), pp. 138–149. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Johnson, B. and Christensen, L., 2008. Educational research: Quantitative, qualitative, and mixed approaches. London: Sage Publications.

Jones, M.C., Cline, M. and Ryan, S., 2006. Exploring knowledge sharing in ERP implementation: an organizational culture framework. *Decision Support Systems*. 41(2), pp. 411 – 434. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Kalaiselvi, K. and Uma, G.V., 2010. Integrated Knowledge Management Approach for Academic improvement in Ubiquitous Computing. *International Journal of Computer Applications* (0975 – 8887), 11(3).

Kamara, J.M., Anumba, C.J. and Carrillo, P.M., 2002. A CLEVER approach to selecting a knowledge management strategy. *International Journal of Project Management*, 20(3), pp. 205–211. Available at: <<http://www.sciencedirect.com>> [Accessed: 13 October 2012].

Kamel-Boulos, M.N., Maramba, I. and Wheeler, S., 2006. Wikis, blogs and podcasts: A new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education*, 6(41), pp. 1–8. Available at: <<http://www.biomedcentral.com/1472-6920/6/41>> [Accessed: 20 March 2013].

Kebede, G., 2010. Knowledge Management: An information science perspective. *International Journal of Information Management*, 30(5), pp. 416–424. Available at: <<http://www.elsevier.com/locate/ijinfomgt>> [Accessed: 01 March 2013].

Kende, G., Noszkay, E. and Seres, G., 2007. Role of the knowledge management in modern higher education – the e-learning, 6(4), pp. 559–573.

Kesim, E. and Agaoglu, E., 2007. A paradigm shift in distance education: Web 2.0 and social software. *Turkish Online Journal of Distance Education*, 8(3). Available at: <http://tojde.anadolu.edu.tr/tojde27/pdf/article_4.pdf> [Accessed: 10 March 2013].

Kidwell, J.J., van der Linde, K.M. and Johnson, S.L., 2000. Applying corporate Knowledge Management practices in higher education. *Journal of EDUCAUSE Quarterly*, (4), pp. 28-33. Available at: <<http://net.educause.edu/ir/library/pdf/EQM0044.pdf>> [Accessed: 12 March 2013].

Kiessling, T.S., Richey, R.G., Meng, J. and Dabic, M., 2009. Exploring Knowledge Management to organizational performance outcomes in a transitional economy. *Journal of World Business*, 44(4), pp. 421–433. Available at: <<http://www.elsevier.com/locate/jwb>> [Accessed: 25 March 2013].

King, A., 2013. *Higher Education Turns to Predictive Analytics*. Available at: <http://the-modeling-agency.com/higher-education-turns-predictive-analytics/> [Accessed: 10 December 2013].

Kogut, B. and Zander, U., 1992. Knowledge of the Firm, Combinative Capabilities and the Replication of Technology. *Organization Science*, 3(3), pp. 383-97.

Kogut, B. and Zander, U., 1993. Knowledge of the Firm and the Evolutionary Theory of the Multinational Corporation. *Journal of International Business Studies*, 24(4), pp. 625-646.

Koohang, A. and Harman, K., 2005. Open source: A metaphor for e-learning. *Informing Science Journal*, 8. Available at: <<http://inform.nu/Articles/Vol8/v8p075-086Kooh.pdf>> [Accessed: 15 March 2013].

Kop, R., Fournier, H. and Fai-Mak, J.S., 2011. A Pedagogy of Abundance or a Pedagogy to Support Human Beings? Participant Support on Massive Open Online Courses. *National Research Council of Canada*, 12(7). Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/1041/2025>> [Accessed: 02 March 2013].

Kose, U., 2010. A blended learning model supported with Web 2.0 technologies. *Procedia Social and Behavioral Sciences*, 2(2), pp. 2794–2802. Available at: <<http://www.sciencedirect.com>> [Accessed: 22 March 2013].

Krajeso, Z., 2009. Idea Exchange in Translation Studies. *EduLearn09 Proceedings*, pp. 2989-2995. Barcelona, Spain, 6-8 July, 2009.

Kreider-Eash, E., 2006. Podcasting 101 for k-12 librarians. *Computers in Libraries*, 26(4), pp. 16 - 20.

Kuntoro, R.D. and Al-H awamdeh, S., 2003. E-Learning in Higher Educational Institutions in Indonesia. *Journal of Information and Knowledge Management*, 2(4), pp. 361- 374. Available at: <<http://www.worldscientific.com>> [Accessed: 27 March 2013].

Laal, M., 2010. Knowledge management in higher education. *Procedia Computer Science*, pp. 3544–549. Available at: <<http://www.elsevier.com/locate/procedia>> [Accessed: 20 October 2012].

Laru, J., Naykki, P. and Jarvela., 2012. Supporting small-group learning using multiple Web 2.0 tools: A case study in the higher education context. *Internet and Higher Education*, 15(1), pp. 29–38. Available at: <<http://www.sciencedirect.com>> [Accessed: 23 March 2013].

Lee, T. and Lee, J., 2006. Quality assurance of web based e-learning for statistical education. *COMPSTAT: Proceedings in Computational Statistics: 17th Symposium*, Rome.

Leem, J. and Lim, B., 2007. The Current Status of e-Learning and Strategies to Enhance Educational Competitiveness in Korean Higher Education. *International Review of Research in Open and Distance Learning*, 8(1). Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/380/763>> [Accessed: 13 March 2013].

Leidner, D.E. and Kayworth, T., 2006. A Review of Culture In Information Systems Research: Toward A Theory of Information Technology Culture Conflict, *MIS Quarterly*, 30(2), pp. 357-399. Available at: <http://users.jyu.fi/~japawlow/culture_misq.pdf> [Accessed: 18 March 2013].

Lengnick-Hall, C.A, and Griffith, R.J., 2011. Evidence-based versus tinkerable knowledge as strategic assets: A new perspective on the interplay between innovation and application. *Journal of Engineering and Technology Management*, 28(3), pp. 147–167. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Liao, S., Fei, W. and Liu, C., 2008. Relationships between knowledge inertia, organizational learning and organization innovation. *Technovation*, 28(4), pp. 183–195. Available at: <<http://www.sciencedirect.com>> [Accessed: 27 March 2013].

Liaw, S. and Huang, H., 2007. Developing a Collaborative e-Learning System Based on Users' Perceptions. *Lecture Notes in Computer Science*, 4402, pp. 751-759.

Lichtenthaler, U., 2008. Relative capacity: Retaining knowledge outside a firm's Boundaries. *Journal of Engineering and Technology Management*, 25(3), pp. 200–212. Available at: <<http://www.elsevier.com/locate/jengtecman>> [Accessed: 25 March 2013].

Lichtman, M., 2006. *Qualitative research in education: A user's guide*. London: Sage Publications.

Lim, K.Y.T., 2006. *Now hear this – exploring podcasting as a tool in geography education*. [online] Available at <<http://www.researchgate.net/>> [Accessed 25 March 2013].

Lincoln, Y. and Guba, E., 2000. Paradigmatic Controversies, Contradictions, and Emerging Confluences in Denzin, N and Lincoln, Y (ed.). *Handbook of Qualitative Research*. London: Sage Publications.

Lind, D.A., Marchal, W.G. and Wathen, S.A., 2010. *Statistical Techniques in Business and Economics*. 14th ed. New York: Mcgraw-Hill Irwin.

Loh, B., Tang, A., Menkhoff, T., Chay, Y. and Evers, H.D., 2003. *Applying Knowledge Management in University Research*. Research Collection Lee Kong Chian School of Business (Open Access), Paper 1918. [online] Available at: <http://ink.library.smu.edu.sg/lkcsb_research/1918> [Accessed 25 March 2013].

López-Nicolás, C. and Merono-Cerdán, A.L., 2011. Strategic knowledge management, innovation and performance. *International Journal of Information Management*, 31(6), pp. 502–509. Available at: <<http://www.sciencedirect.com>> [Accessed: 15 October 2012].

Loureiro, A., Messias, I. and Barbas, M., 2012. Embracing Web 2.0 & 3.0 tools to support lifelong learning – Let learners connect. *Procedia - Social and Behavioral Sciences*, 46, pp. 532 – 537. Available at: <<http://www.sciencedirect.com>> [Accessed: 22 March 2013].

Lubega, T.J., Omona, W. and Van der Weide, T., 2011. Knowledge Management Technologies and Higher Education Processes: Approach to Integration for Performance Improvement. *International Journal of Computing and ICT Research*, 5(Special Issue), pp 55-68. Available at: <<http://ijcir.org/specialissue2011/article7.pdf>> [Accessed: 10 October 2012].

Lwoga, E., 2012. Making learning and Web 2.0 technologies work for higher learning institutions in Africa. *Campus-Wide Information Systems*, 29(2), pp. 90-107.

Maag, M., 2006. iPod, uPod? An emerging mobile learning tool in nursing education and student' satisfaction. *Proceedings of the annual conference of the Australasian society for computers in learning in tertiary education*. Sydney, Australia. Available at: <http://www.ascilite.org.au/conferences/sydney06/proceeding/pdf_papers/p92.pdf> [Accessed: 21 March 2013].

Maharaj, M.S., 2010. We are still teaching the way we were a 100 years ago, *UKZNDABA Newsletter*, 7(10).[online] Available at: <<http://www.ukzn.ac.za/publications/ukzndaba.aspx>> [Accessed 5 November 2012].

Maier, R. and Schmidt, A., 2007. Characterizing Knowledge Maturing, A Conceptual Process Model for Integrating E-Learning and Knowledge Management, *Martin-Luther-University*. [online] Available at: <http://publications.andreas.schmidt.name/Maier_Schmidt_KnowledgeMaturing_WM07.pdf> [Accessed 21 March 2013].

Mak, S.F.J., Williams, R. and Mackness, J., 2010. Blogs and forums as communication and learning tools in a MOOC. *Proceedings of the Seventh International Conference on Networked Learning (2010)*. Available at: <<http://www.lancs.ac.uk/fss/organisations/netlc/past/nlc2010/abstracts/PDFs/Mak.pdf>> [Accessed: 19 March 2013].

Mamta, B., 2012. Institutional Knowledge to Institutional Intelligence: A Data Mining Enabled Knowledge Management Approach. *International Journal of Computational Engineering Research*, 2(5).

Mannino, M., Hong, S.N. and Choi, I.J., 2008, Efficiency evaluation of data warehouse operations. *Decision Support Systems*, 44, pp. 883–898. Available at: <<http://www.sciencedirect.com>> [Accessed: 9 May 2013].

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C. and Byers, A.H., 2011. *Big data: The next frontier for innovation, competition, and productivity*. McKinsey Global Institute.

Maria, F., 2005. Improving the utilization of external strategic information. *Master of Science Thesis*. Tampere University of Technology.

Marshall, B., Zhang, Y., Chen, H., Lally, A., Shen, R., Fox, E. and Cassel, L.N., 2003. Convergence of Knowledge Management and E-Learning: the GetSmart Experience. *Proceedings of the 2003 Joint Conference on Digital Libraries (JCDL'03)* 0-7695-1939-3/03.

Marshall, C.C. and Bly, S., 2004. Sharing encountered information: Digital libraries get a social life. *Paper presented at the International Conference on Digital Libraries, Proceedings of the 4th ACM/IEEE-CS joint conference on Digital Libraries*, Tuscon, AZ. Available at: <<http://research.microsoft.com/pubs/72883/p038-marshall.pdf>> [Accessed: 19 March 2013].

Mason, R. and Rennie, F., 2004. Broadband: A solution for rural e-Learning? *International Review of Research in Open and Distance Learning*, 5(1). Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/173/255>> [Accessed: 19 March 2013].

Massa, S. and Testa, S., 2009. A knowledge management approach to organizational competitive advantage: Evidence from the food sector. *European Management Journal*, 27(2), pp. 129– 141. Available at: <<http://www.sciencedirect.com>> [Accessed: 9 October 2012].

Mavodza, J. and Ngulube, P., 2012. Knowledge management practices at an institution of higher learning. *South African Journal of Information Management*, 14(1). [online]. Available at: <<http://www.sajim.co.za/index.php/SAJIM/article/view/496>> [Accessed 28 February 2013].

McAuley, A., Stewart, B., Siemens, G. and Cormier, D., 2010. *The MOOC Model for Digital Practice*. University of Prince Edward. Available at: <http://www.elearnspace.org/Articles/MOOC_Final.pdf> [Accessed: 19 March 2013].

Mchombu, K.J., 2007. Harnessing knowledge management for Africa's transition to the 21st century. *Information Development 2007*, 23-25. Sage Publications. Available at: <<http://idv.sagepub.com/content/23/1/25.full.pdf+html>> [Accessed: 19 March 2013].

McKnight, S., 2007. *A Futuristic View of Knowledge and Information Management*. [online] Available at: <<http://www.ub.edu/bid/19mcknig.htm>> [Accessed 01 March 2013].

McLoughlin, C. and Lee, M.J.W., 2007. Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era. *ICT: Providing choices for learners and learning*. Proceedings Ascilite, Singapore. Available at:

<<http://www.ascilite.org.au/conferences/singapore07/procs/mcloughlin.pdf>> [Accessed: 01 March 2013].

Meng, P., 2005. *Podcasting and Vodcasting: A white paper*. [online] Available at: <http://edmarketing.apple.com/adcinstitute/wp-content/Missouri_Podcasting_White_Paper.pdf> [Accessed: 20 February 2013].

Metaxiotis, K. and Psarras, J., 2003. Applying Knowledge Management in Higher Education: The Creation of a Learning Organisation. *Journal of Information and Knowledge Management*, 2(4), pp. 353-359.

Metaxiotis, K., Ergazakis, E., Samouilidis, E. and Psarras, J., 2003. Decision support through knowledge management: The role of the artificial intelligence. *International Journal of Computer Applications in Technology*, 11(5), pp. 216 - 221 Available at: [<http://www.emeraldinsight.com/doi/full/10.1108/09685220310500126>> [Accessed: 18 February 2013].

Milam, J.H., 2001. *Knowledge Management for Higher Education*. ERIC Clearinghouse on Higher Education, Washington DC, USA.

Molina, L.M., Llore´ns-Montes, J. and Ruiz-Moreno, A., 2007. Relationship between quality management practices and knowledge transfer. *Journal of Operations Management*, 25(3), pp. 682–701. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Morrison, J., 2011. *The Changing Landscape of American and Malaysian Higher Education*. Available at: <<http://horizon.unc.edu/projects/presentations/HiED%20in%20transition.pdf>> [Accessed: 15 January 2013].

Mitra, S., 2010. *The child-driven education*. TED presentation, [online] Available at: <http://www.ted.com/talks/lang/eng/sugata_mitra_the_child_driven_education.html> [Accessed 15 January 2013].

Mitra, S. and Arora, P., 2010. Afterthoughts. *British Journal of Educational Technology*, 41(5), pp. 703-705. Available at: <http://repub.eur.nl/res/pub/25814/Final%20Draft_Afterthoughts_2010.pdf> [Accessed: 15 January 2013].

Murugesan, S., 2007. Understanding Web 2.0. *IT Professional*, 9(4), pp. 34-41.

Mwapachu, J.V., 2010. Challenges Facing African and Tanzanian Universities, *Society for International Development 1011-6370/10*, 53(4), pp. 486–490. Available at <<http://www.sidint.org/development/>> [Accessed: 5 October 2012].

Nagel, L. and Kotzé, T.G., 2010. Supersizing e-learning: What a CoI survey reveals about teaching presence in a large online class. *Internet and Higher Education*, 13, pp. 45–51. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Naranjo-Gil, D. and Hartmann, F., 2007. How CEOs use management information systems for strategy implementation in hospitals. *Health Policy*, 81(2), pp. 29–41. Available at <<http://www.sciencedirect.com>> [Accessed: 25 February 2013].

Ndubisi, N., 2006. Factors of online learning adoption: a comparative juxtaposition of the theory of planned behaviour and the technology acceptance model. *International Journal on e-Learning*, 5(4), pp. 571–591. Available at <<http://editlib.org/p/6173/>> [Accessed: 25 March 2013].

Nilsen, O., 2008. *Between the Tacit and the Explicit: ICT as a facilitator for knowledge creation and learning in physiotherapy education*. Faculty of Medicine- Department of clinical medicine, Tromso University, Norway. [online] Available at: <<<http://www.ub.uit.no/munin/bitstream/10037/1672/1/thesis.pdf>>> [Accessed: 15 March 2013].

Nonaka, I., 1994. A dynamic theory of organisational knowledge creation. *Organisation Science*, 5(1), pp. 14–37.

Norberg, A., Dziuban, C.D. and Moskal, P.D., 2011. A time-based blended learning model. *On the Horizon*, 19(3). Available at: <<http://www.emeraldinsight.com/journals.htm?articleid=1947845>> [Accessed: 22 February 2013].

Nugultham, K., 2012. Using Web 2.0 for Innovation and Information Technology in Education Course. *Procedia - Social and Behavioral Sciences*, 46, pp. 4607 – 4610. Available at: <<http://www.sciencedirect.com>> [Accessed: 19 March 2013].

Nyerere, J.K.A., Gravenir, F.Q. and Mse, G.S., 2012. Delivery of Open, Distance, and E-Learning in Kenya. *International Review of Research in Open Learning*, 13(3). Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/1120>> [Accessed: 15 March 2013].

Omerzel, D.G., Biloslavo, R. and Trnavčević, A., 2011. Knowledge Management and organisational culture in higher education institutions. *Journal for East European Management Studies*, 16 (2), pp. 111-139.

Omona, W., van der Weide, T. and Lubega, J., 2010. Using ICT to enhance Knowledge Management in higher education: A conceptual framework and research agenda. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 6(4), pp.83-101.

Omosho, M.P., 2009. *Strategic Use of Information*. [online] Available at: <http://www.cicsworld.org/blogs/moomotosho/2009/06/strategic_use_of_information.html> [Accessed 28 February 2013].

Oosterlinck, A. and Leuven, K.U., 2002. Knowledge management in post-secondary education: Universities. [online] Available at: <<http://www.oecd.org/innovation/research/2074921.pdf>> [Accessed 25 January 2013].

Ospina, S. and Wagner, R.F., 2004. *Qualitative Research*. Encyclopedia of Leadership. London: SAGE Publications.

Ozkan, S. and Koseler, R., 2009. Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. *Computers and Education*, 53(4), pp. 1285–1296. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Pamfilie, R., Onete, B., Maiorescu, I. and Plesea, D., 2012. E-learning as an alternative solution for sustainable lifelong education. *Procedia - Social and Behavioral Sciences*, 46, pp. 4026 – 4030. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].

Packham, G., Jones, P., Miller, C. and Thomas, B., 2004. E-learning and retention: key factors influencing student withdrawal. *Education + Training*, 46(6-7), pp. 335 – 342.

Park, H., Ribeire, V. and Schulte, W., 2004. Critical attributes of organizational culture that promote knowledge management implementation success. *Journal of Knowledge Management*, 7(5), pp. 55-66.

Parker, K.R. and Chao, J.T., 2007. Wiki as a teaching tool. *Interdisciplinary Journal of Knowledge and Learning Objects*, 3, pp. 57–72. Available at: <<http://www.ijklo.org/Volume3/IJKLOv3p057-072Parker284.pdf>> [Accessed: 15 March 2013].

Patrides, L. and Nodine, T., 2003. *Knowledge Management in Education: Defining the Landscape*. California: Institute for the Study of Knowledge Management in Education. [online] Available at: <<http://iskme.path.net/kmeducation.pdf>> [Accessed 15 March 2013].

Peck, C.A., Galluccia, C., Sloan, T. and Lippincott, A., 2009. Organizational learning and program renewal in teacher education: A socio-cultural theory of learning, innovation and change. *Educational Research Review*, 4(1), pp. 16–25. Available at: <<http://www.sciencedirect.com>> [Accessed: 27/03/2013].

Pemberton, J.D. and Stonehouse, G.H., 2000. Organizational learning and knowledge assets – an essential partnership. *Learning Organization*, 7(4), pp. 184-94. Available at: <<http://www.emeraldinsight.com/journals.htm?articleid=882596>> [Accessed: 27 March 2013].

Pentland, A., 2009. The Water-Cooler Effect. Reality Mining- Using technology to measure the rhythms of daily human interaction. *Psychology Today*. [online] Available at: <<http://www.psychologytoday.com/blog/reality-mining/200911/the-water-cooler-effect>> [Accessed: 30 June 2014].

Pettenati, M.C. and Ranieri, M., 2006. Informal learning theories and tools to support knowledge management in distributed CoPs. *Paper presented at the Innovative Approaches for Learning and Knowledge Sharing, EC-TEL. Workshop Proceeding*. [online] Available at: <<http://ceur-ws.org/Vol-213/paper47.pdf>> [Accessed 28 March 2013].

Petter, C., Reich, K. and Scheuermann, F., 2005. Analysis of Tools Supporting Communities of Practice. *Work and Learn Together*. [online] Available at: <http://pdf.aminer.org/000/258/889/websites_wikis_weblogs_communities_of_practice_and_knowledge.pdf> [Accessed 28 March 2013].

Pfefferle, P.I., Van den Stock, E., Nauerth, A. and E-learning assistant-project group 1., 2010. The Leonardo-Da-Vinci pilot project “e-learning-assistant” – Situation-based learning in Nursing Education. *Nurse Education Today*, 30(5), pp. 411–419. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Phang, C.W., Kankanhalli, A. and Ang, C., 2008. Investigating organizational learning in eGovernment projects: A multi-theoretic approach. *Journal of Strategic Information Systems*, 17(2), pp. 99–123. Available at: <<http://www.sciencedirect.com>> [Accessed: 27 March 2013].

Piccoli, G., Ahmad, R. and Ives, B., 2006. Knowledge management in academia: A proposed framework. *Journal of Information Technology and Management*, 1(4), pp. 229-245. Available at: <<http://link.springer.com/article/10.1023%2FA%3A1019129226227#>> [Accessed: 25 March 2013].

Pircher, R. and Pausits, A., 2011. Information and Knowledge Management at Higher Education Institutions. *Management Information Systems*. 6(2), pp. 008-016. Available at: <http://www.ef.uns.ac.rs/mis/archive-pdf/2011%20-%20No2/02_Pircher,%20Pausits.pdf> [Accessed: 28 March 2013].

Pityana, B., 2009. Open and distance learning in the developing world: Trends, progress and challenges. *Keynote speech at the 2009 23rd ICDE World Conference*, Maastricht, Netherlands. [online] Available at: <<http://www.unisa.ac.za/contents/about/principle/docs/ICDEMAastricht250609.pdf>> [Accessed 28 March 2013].

Plesea, D.A., Onete, B. and Maioreescu, I., 2011. A Multimedia Solution for Distance Learning of Practical Skills in Commodity Science. *Proceedings of the 7th International Scientific Conference*, Bucharest, 2, pp. 549-552. [online] Available at: <http://adlunap.ro/eLSE_publications/papers/2011/1680_1.pdf> [Accessed: 18 March 2013].

Polytechnic of Namibia., 2013. *About us*. [online] Available at: <http://www.polytechnic.edu.na/about_us/about.php> [Accessed 18 October 2013].

Porter, M., 1980. *Competitive Strategy*. New York: The Free Press, Prentice Hall.

Prat, N., Comyn-Wattiau, I. and Akoka, J., 2011. Combining objects with rules to represent aggregation knowledge in data warehouse and OLAP systems. *Data and Knowledge Engineering*, 70, pp. 732–752. Available at: <<http://www.elsevier.com/locate/datak>> [Accessed: 18 September 2013].

Psarras, J., 2006. Analysing the value of knowledge management leading to innovation. *International Journal of Knowledge Management Studies*, 1(1-2), pp. 79–89.

Pundak, D., Herscovitz, O. and Schacham, M., 2010. Attitudes to face to face and e-Learning instructors towards ‘active learning’. *European Journal of Open Distance and E-Learning*, 2(12), pp. 12–23. Available at: <http://www.eurodl.org/materials/contrib/2010/Pundak_Herscovitz_Shacham.htm>

[Accessed: 20 March 2013].

Ramakrishnan, P., Yahyaa, Y.B., Hasrola, M.N.H. and Aziz, A.A., 2012. Blended Learning: A Suitable Framework for E-Learning in Higher Education. *Procedia - Social and Behavioral Sciences*, 67, pp. 513 – 526. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Ranjan, J., 2008. Knowledge Management in Business Schools. *Journal of Information and Knowledge Management*, 7(1),pp. 55–62.

Razavi, M.N. and Iverson, L., 2006. A grounded theory of information sharing behaviour in a personal learning space. *Proceedings of the 2006 Conference on Computer Supported Cooperative Work*. pp. 459-468. New York, USA. [online] Available at: <<http://dl.acm.org/citation.cfm?id=1180946>> [Accessed 11 March 2013].

Rhodes University., 2013. *Why choose Rhodes*. [online] Available at: <<http://www.ru.ac.za/rhodes/introducingrhodes/whychooserrhodes/>> [Accessed: 18 October 2013].

Ross, B. and Gage, K., 2006. Global perspectives on blended learning: Insight from WebCT and our customers in Higher Education. *Handbook of blended learning: Global perspectives*, pp. 155-168. San FranciscoCA: Pfeiffer Publishing.

Rouse, M., 2010. *Performance Scorecard*. *Search Business Analytics*. [online] Available at: <<http://searchbusinessanalytics.techtarget.com/definition/performance-scorecard>> [Accessed 10 January 2014].

Rowley, J., 2000. Is higher education ready for knowledge management?. *International Journal of Educational Management*, 14(7), pp. 325 – 333.

Rumizen, M.C., 2002. The complete idiot's guide to knowledge management. *CWL Publishing Enterprises*, Irvington Way Madison.

Sahay, A. and Mehta, K., 2010. Assisting Higher Education in Assessing, Predicting, and Managing Issues Related to Student Success: A Web-based Software using Data Mining and Quality Function Deployment. *Academic and Business Research Institute Conference*, Las Vegas, 2010. Available at: <<http://www.aabri.com/LV2010Manuscripts/LV10127.pdf>> [Accessed: 25 March 2013].

SAS., 2014. *Big Data - What it is and why it matters*. [online] Available at: <http://www.sas.com/en_us/insights/big-data/what-is-big-data.html> [Accessed: 25 June 2014].

Schein, E., 1985. *Organizational Culture and Leadership*. San Francisco, CA: Jossey-Bass.

Schein, E., 1990. Organizational culture. *American Psychologist*, 45(2),pp. 109-119.

Schroeder, A., Minocha, S. and Schneider, C., 2010. The strengths, weaknesses, opportunities and threats of using social software in higher and further education teaching and learning. *Journal of Computer Assisted Learning*, 26(3), pp. 159–174. Available at:

<<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2729.2010.00347.x/abstract>> [Accessed: 16 March 2013].

Schwartz, L., Clark, S., Cossarin, M. and Rudolph, J., 2004. Educational wikis: Features and selection criteria. *International Review of Research in Open and Distance Learning*, 5(1). Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/163/244>> [Accessed: 16 March 2013].

Science Direct., 2013. Available at: <<http://www.sciencedirect.com>> [Accessed: 13 May 2013].

Sekaran, U. and Bougie, R., 2010. *Research Methods for Business: A skill building Approach*, 5th ed. Wiley Publication. United Kingdom.

Serrat, O., 2009. *A Primer on Organizational Culture. Knowledge Solutions*, 68. [online] Available at: <<http://digitalcommons.ilr.cornell.edu/>> [Accessed 16 March 2013].

Shams, G., Rad, A.M. and Hooshmand, A., 2009, Knowledge Management Practices in Higher Education Institutes: A Different Approach. *Proceedings of EduLearn '09 Conference*, Barcelona, Spain.

Shao, Z., Feng, Y. and Liu, L., 2012. The mediating effect of organizational culture and knowledge sharing on transformational leadership and Enterprise Resource Planning systems success: An empirical study in China. *Computers in Human Behavior*, 28(6), pp. 2400–2413. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013]

Sharman, D., 2010. An Introduction to Business Intelligence for Higher Education. Collegiate Project Services. [online] Available at: <<http://www.collegiateproject.com/articles/An%20Introduction%20to%20Business%20Intelligence.pdf>> [Accessed 17 November 2013].

Shedroff, N., 2009. Experience design 1.1: A manifesto for the design of experiences. *Experience Design Books*. ISBN: 9780982233900. [online] Available at: <<http://www.experiencedesignbooks.com/EXP1.1/>> [Accessed 17 March 2013].

Shirky, C., 2003. Social software and the politics of groups. *Networks, economics and culture mailing list*. [online] Available at: <http://shirky.com/writings/herecomeseverybody/group_politics.html> [Accessed 11 March 2013].

Silvia, R.D. and Beatriz, A., 2012. Collaborative environments, a way to improve quality in Higher Education. *Procedia - Social and Behavioral Sciences*, 46, pp. 875 – 884. Available at: <<http://www.sciencedirect.com>> [Accessed: 22 March 2013].

Singh, A., 2010. Knowledge based expert systems in organization of higher learning. *Proceedings of the International Conference and Workshop on Emerging Trends in Technology*, pp. 571-574. New York.

Siragusa, L., Dixon, K.C. and Dixon, R., 2007. Designing quality e-learning environments in Higher Education. *Proceedings Ascilite Singapore 2007*. [online] Available at:

<<http://www.ascilite.org.au/conferences/singapore07/procs/siragusa.pdf>> [Accessed 18 March 2013].

Skerlavaj, M., Stemberger, M.I., Skrinjar, R. and Dimovski, V., 2007. Organizational learning culture—the missing link between business process change and organizational performance. *International Journal of Production Economics*, 106(2), pp. 346–367. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Skira, D.J., 2006. The 2005 word of the year: Podcast. *Nursing Education Perspectives*, 27(1), pp. 54–55.

Solomon, E.A., 2012. MIT & Harvard join forces for edX. *The Tech Online Editions*. [online] Available at: <<http://tech.mit.edu/V132/N23/edx.html>> [Accessed 22 March 2013].

South African Journal of Information Management., 2013. [online] Available at: <<http://www.sajim.co.za>> [Accessed 13 May 2013].

Stankosky, M., 2005. Advances in Knowledge Management: University Research toward an Academic discipline. *Creating the Discipline of Knowledge Management*. Washington: Elsevier Butterworth-Heinemann.

Stellenbosch University., 2013. *About us*. [online] Available at: <<http://www.sun.ac.za/english/about/Pages/about-us.aspx>> [Accessed 18 October 2013].

Tanlamai, U., 2007. *Convergent Business Strategies and Information System Alignments: Lessons from Thai Hospitals and Hotels*. Chulalongkorn University. Thailand

Thiaw, I., 2007. Challenges Facing the University in Africa. *Social dynamics: A Journal of African studies*, 33(1), pp. 232–237.

Times Higher Education., 2014. *Rankings methodology*. [online] Available at: <<http://www.timeshighereducation.co.uk/world-university-rankings/2013/reputation-ranking/methodologyandwww.timeshighereducation.co.uk/world-university-rankings/2012-13/world-ranking>> [Accessed 10 January 2014].

Tippins, M.J. and Sohi, R.S., 2003. IT competency and firm performance: Is organizational learning a missing link. *Strategic Management Journal*, 24(8), pp. 745–761. Available at: <<http://onlinelibrary.wiley.com/doi/10.1002/smj.337/pdf>> [Accessed: 15 January 2013].

Tomsic, A. and Suthers, D., 2005. Effects of a Discussion Tool on Collaborative Learning and Social Network Structure within an Organization. *Proceedings of the 38th Annual Hawaii International Conference on System Sciences (HICSS'05)*. [online] Available at: <<http://lilt.ics.hawaii.edu/papers/2005/Tomsic-Suthers-HICSS-2005.pdf>> [Accessed 3 March 2013].

Top 100 Universities In Africa 2013., 2013. *List of Top 100 Universities in Africa 2013*. [online] Available at: <<http://www.studyabroaduniversities.com/UniversityList.aspx?Query=Top-100-Universities-in-Africa&QueryId=127>> [Accessed 15 January 2013].

Tsui, L., Chapman, S.A., Schnirer, L. and Stewart, S., 2006., *A Handbook on Knowledge Sharing: Strategies and Recommendations for Researchers, Policymakers, and Service Providers*. Community-University Partnership for the Study of Children, Youth, and Families (CUP).

University of KwaZulu-Natal Libraries., 2013. *University of KwaZulu-Natal*. [online] Available at: <<http://library.ukzn.ac.za/Homepage.aspx>> [Accessed 13 May 2013].

University of Botswana., 2013. *Fact and figures*. [online] Available at: <<http://www.ub.bw/content/id/2186/pid/1965//Facts-and-Figures/#>> [Accessed 18 October 2013].

University of Cape Town., 2013. *About the university: statistics*. [online] Available at: <<http://www.uct.ac.za/about/intro/statistics/>> [Accessed 18 October 2013].

University of Dar es Salaam., 2013. *Background*. [online] Available at: <<https://udsm.ac.tz/?q=background>> [Accessed 18 October 2013].

University of Ghana., 2013. *About UG*. [online] Available at: <<http://www.ug.edu.gh/index1.php?linkid=243&sublinkid=72>> [Accessed 18 October 2013].

University of Johannesburg., 2013. *About UJ*. [online] Available at: <www.uj.ac.za/EN/AboutUJ/Pages/default.aspx> [Accessed 18 October 2013].

University of Lagos., 2013. *About us*. [online] Available at: <<http://www.unilag.edu.ng/pages.php?page=our-history>> [Accessed 18 October 2013].

University of South Africa., 2013. *About*. [online] Available at: <<http://www.unisa.ac.za/Default.asp?Cmd=ViewContent&ContentID=3>> [Accessed 18 October 2013].

University of Western Cape., 2013. *About UWC*. [online] Available at: <<http://www.uwc.ac.za/Pages/About-UWC.aspx>> [Accessed 18 October 2013].

University of Witwatersrand., 2013. *About Wits university*. [online] Available at: <<http://www.wits.ac.za/aboutwits/12512/aboutwits.html>> [Accessed 18 October 2013].

Unwin, T., Kleessen, B., Hollow, D., Williams, J.B., Oloo, L.M., Alwala, J., Mutimucuo, I., Eduardo, F. and Muianga, X., 2010. Digital learning management systems in Africa: myths and realities. *Open Learning*, 25(1), pp. 5-23.

Usluel, Y.K. and Mazman, S.G., 2009. Adoption of Web 2.0 tools in distance education. *Procedia- Social and Behavioral Sciences*, 1(1), pp. 818–823. [online] Available at: <<http://www.sciencedirect.com>>> [Accessed 19 March 2013].

Vance, M., 2011. Environmental Scanning in Higher Education Research. *Research & Marketing Strategies*. [online] Available At:

<<http://rmsbunkerblog.wordpress.com/2011/10/07/environmental-scanning-in-higher-education-research/>> [Accessed 25 January 2014].

Venkatesh, V. and Davis, F.D., 2000. A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), pp. 186-204. Available at: <<http://www.jstor.org/stable/2634758>> [Accessed: 05 March 2013].

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D., 2003. User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), pp. 425-478. Available at: <<http://www.jstor.org/stable/2634758>> [Accessed: 05 March 2013].

Von Krogh, G., 2012. How does social software change knowledge management? Toward a strategic research agenda. *Journal of Strategic Information Systems*, 21(2), pp. 154-164. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Vratulis, V. and Dobson, T., 2008. Social negotiations in a wiki environment: A case study with pre-service teachers. *Educational Media International*, 45(4), pp. 285–294. Available at: <<http://www.tandfonline.com/doi/abs/10.1080/09523980802571531>> [Accessed: 1 March 2013].

Wang, X., Yang, B. and McLean, G.N., 2007. Influence of demographic factors and ownership type upon organizational learning culture in Chinese enterprises. *International Journal of Training and Development*, 11(3), pp. 154-165. Available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1009876> [Accessed: 10 March 2013].

Weber, R.P. and Weber, J.E., 2000. *The use and value of data warehousing in Higher Education*. [online] Available at: <<http://www.mountainplains.org/articles/2000/general/mpa15.html>> [Accessed 10 December 2013].

Webopedia., 2014. *Big Data*. [online] Available at: <http://www.webopedia.com/TERM/B/big_data.html> [Accessed: 25 June 2014].

Weigel, M., 2013. *MOOCs and online learning*. [online] Available at: <<http://journalistsresource.org/studies/society/education/moocs-online-learning-research-roundup#>> [Accessed 2 March 2013].

Wheeler, S., 2009. Learning space mashups: Combining web 2.0 tools to create collaborative and reflective learning spaces. *Future Internet*, 1(1), pp. 3–13. Available at: <<http://www.mdpi.com/1999-5903/1/1/3>> [Accessed: 12 March 2013].

Wikipedia., 2013. *American University of Cairo*. [online] Available at: <http://en.wikipedia.org/wiki/American_University_in_Cairo> [Accessed: 18 October 2013].

Wikipedia., 2013. *Cape Peninsula University of Technology*. [online] Available at: <http://en.wikipedia.org/wiki/Cape_Peninsula_University_of_Technology> [Accessed: 18 October 2013].

Wikipedia., 2013. *Massive Open Online Courses*. [online] Available at: <http://en.wikipedia.org/wiki/Massive_open_online_course> [Accessed: 18 October 2013].

- Wikipedia., 2013. *Polytechnic of Namibia*. [online] Available at: <http://en.wikipedia.org/wiki/Polytechnic_of_Namibia> [Accessed: 18 October 2013].
- Wikipedia., 2013. *Rhodes University*. [online] Available at: <http://en.wikipedia.org/wiki/Rhodes_University> [Accessed: 18 October 2013].
- Wikipedia., 2013. *University of Ghana*. [online] Available at: <http://en.wikipedia.org/wiki/University_of_Ghana> [Accessed: 18 October 2013].
- Wikipedia., 2013. *University of South Africa*. [online] Available at: <http://en.wikipedia.org/wiki/University_of_South_Africa> [Accessed: 18 October 2013].
- Willem, A. and Buelens, M., 2007. Knowledge sharing in public sector organizations: The effect of organizational characteristics on interdepartmental knowledge sharing. *Journal of Public Administration Research and Theory*, 17(4), pp. 581–606. Available at: <http://jpart.oxfordjournals.org/content/17/4/581.abstract> [Accessed: 12 March 2013].
- William, N. and Amin, G., 2006. Higher Education in Sudan and Knowledge Management Applications. *Information and Communication Technologies*, 1(1), pp.60- 5. Available at: <http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=1684345&tag=1> [Accessed: 22 March 2013].
- Williams, C., 2002. Learning on-line: A review of recent literature in a rapidly expanding field. *Journal of Further and Higher Education*, 26(3), pp. 263–272. Available at: <<http://www.tandfonline.com/doi/abs/10.1080/03098770220149620>> [Accessed: 18 March 2013].
- Williams, R., Karousou, R. and Mackness, J., 2011. Emergent Learning and Learning Ecologies in Web 2.0. *International Review of Research in Open and Distance Learning*, 12(3). Available at: <<http://www.irrodl.org/index.php/irrodl/article/view/883>> [Accessed: 18 March 2013].
- Wu, E. and Phillips, P., 2012. Financial Markets in Motion: Visualising stock price and news interactions during the 2008 global financial crisis. *Procedia - Computer Science*, 1, pp. 1765–1773. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].
- Xiangqian, L. and Fuqing, G., 2012. Development-Driven E-learning Education Model and Application in Teaching Information Technology. *International Conference on Future Computer Supported Education*, 2, pp. 854-858. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].
- Yang, J.T., 2007. Knowledge sharing: Investigating appropriate leadership roles and collaborative culture. *Tourism Management*, 28(2), pp. 530-543. Available at: <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].
- Yang, C.W., Fang, S.C. and Lin, J.L., 2010. Organisational knowledge creation strategies: A conceptual framework. *International Journal of Information Management*, 30(3), pp. 231–238. Available at: <<http://www.sciencedirect.com>> [Accessed: 25 March 2013].

Yang, T.M. and Maxwell, T.A., 2011. Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors. *Government Information Quarterly*. [online] Available at: <www.elsevier.com/locate/govinf> [Accessed: 25 February 2013].

Yordanova, K., 2007. Integration of Knowledge management and E-learning – common features. *International Conference on Computer Systems and Technologies*. Sofia, Bulgaria. [online] Available at: <<http://ecet.ecs.ru.acad.bg/cst07/Docs/cp/sIV/IV.25.pdf>> [Accessed: 15 March 2013].

Zahay, D.L. and Peltier, J., 2007. Interactive strategy formation: Organizational and Entrepreneurial factors related to effective customer information systems practices in B2B firms. *Industrial Marketing Management*, 37(2), pp. 191–205. Available at <<http://www.sciencedirect.com>> [Accessed: 25 February 2013].

Zazaleena, Z., 2005. Electronic Reservation for Hotel Services. *Degree Thesis*. University of Technology, MARA. [online] Available at: <<http://eprints.uitm.edu.my/1017>> [Accessed 16 March 2013].

Zazaleena, Z., Alias, N., Aziz, M.N.A. and Ismail, N.Z., 2011. E-Learning Awareness in a Higher Learning Institution in Malaysia. *Procedia - Social and Behavioral Sciences*, 67, pp. 621 – 625. Available at <<http://www.sciencedirect.com>> [Accessed: 18 March 2013].

Zhang, J., Dawes, S. and Sarkis, J., 2005. Exploring stakeholders' expectations of the benefits and barriers of e-Government knowledge sharing. *Journal of Enterprise Information Management*, 18(5), pp. 548–567.

Zheng, W., Yang, B. and McLean, G.N., 2010. Linking organizational culture, structure, strategy and organizational effectiveness: Mediating role of knowledge management. *Journal of Business Research*, 63(7), pp. 763–771. Available at: <<http://www.sciencedirect.com>> [Accessed: 26 March 2013].

Appendix 1- Ethical Clearance



4 July 2013

Mr Sachin Suknunan 209510952
Graduate School of Business and Leadership
Westville Campus

Protocol reference number: HSS/0544/013D
Project title: The Strategic Role of Knowledge Management in African Universities

Dear Mr Suknunan

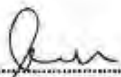
Expedited Approval

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

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

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

Yours faithfully


.....
Dr S Singh (Deputy Chair)

/px

cc Supervisor: Professor Manoj S Maharaj
cc Academic Leader Research: Dr SA Bodhanya
cc Post Graduate Administrator: Mrs Wendy Clarke

Professor S Collings (Chair)
Humanities & Social Sc Research Ethics Committee
Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban, 4000, South Africa.

Telephone: +27 (0)31 260 3587/8350 Facsimile: +27 (0)31 260 4609 Email: ximbop@ukzn.ac.za / snymanm@ukzn.ac.za

Funding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

INSPIRING GREATNESS



Appendix 2- Informed Consent Letter

Informed Consent Letter

UNIVERSITY OF KWAZULU-NATAL
SCHOOL

Dear Respondent,

Doctor of Business Administration (DBA) Research Project

Researcher: Sachin Suknunan (+2731- 260 7057 / 078 170 4497)

Supervisor: Professor Manoj S Maharaj (+2731- 260 8003 / 083 786 6034)

Research Office: Ms P Ximba (+2731-260 3587)

I, **Sachin Suknunan**, am a DBA student at the **Graduate School of Business and Leadership**, of the University of KwaZulu Natal (UKZN). You are invited to participate in a research project entitled: **The Strategic Role of Knowledge Management in African Universities**. Through your participation I hope to understand the role of Knowledge Management and Business Intelligence in the formulation/driving of strategy at the various universities in Africa. I also wish to examine how Knowledge Management is adding value to the institutions and promoting institutional competitiveness. Furthermore, the aspect of e-Learning and the role of web 2.0 technologies in the creation, management and dissemination of information and e-Learning will be looked at as well as the position of Knowledge Management within the organisational structure of the institutions. The results of the questionnaire and interview are intended to contribute to me fulfilling my objectives of the study as well as answering the research questions intended in the study.

Kindly note that your participation in this project is voluntary and you may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey/focus group. Confidentiality and

anonymity of records identifying you as a participant will be maintained by the **Graduate School of Business and Leadership, UKZN**.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me or my supervisor at the numbers listed above.

The survey should take you about 15 minutes to complete. I hope you will take the time to complete this survey.

Sincerely,

Sachin Suknunan (Principal Investigator)

Investigator's signature _____ Date _____

This page is to be retained by participant

**UNIVERSITY OF KWAZULU-NATAL
SCHOOL**

Doctor of Business Administration (DBA) Research Project

Researcher: Sachin Suknunan (+2731- 260 7057 / 078 170 4497)

Supervisor: Professor Manoj S Maharaj (+2731- 260 8003 / 083 786 6034)

Research Office: Ms P Ximba (+2731-260 3587)

CONSENT

I..... (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT

DATE

.....

.....

.....

University Stamp

This page is to be retained by researcher

Appendix 3 - Questionnaire

UNIVERSITY OF KWAZULU-NATAL GRADUATE SCHOOL OF BUSINESS & LEADERSHIP

Doctor of Business Administration (DBA) Research Project

Researcher: Sachin Suknunan (+2731- 260 7057 / 078 170 4497)

Supervisor: Professor Manoj S Maharaj (+2731- 260 8003 / 083 786 6034)

Research Office: Ms P Ximba (+2731-260 3587)

Title: The Strategic Role of Knowledge Management in African Universities

Dear Colleague,

Thank you once again for agreeing to participate in my study,

As per our earlier communications, I am investigating the role of Knowledge Management and Business Intelligence in Higher Education institutions (Universities) in Africa. The information and ratings that you provide me via this questionnaire will greatly assist me in achieving the objectives of my study and help to identify the role of Knowledge Management in African Higher Education.

The questionnaire should only take 15 to 20 minutes to complete. In this questionnaire, you are asked to indicate what is true for you, so there are no “right” or “wrong” answers to any question. Kindly make sure that you do not skip any questions. I have obtained the necessary Ethical Clearance from my Institution (Ethical Clearance number: HSS/0544/013D) and hence integrity, confidentiality and all ethical considerations are guaranteed.

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact [Sachin Suknunan] at [+2778 1704497] or by email at suknunan@ukzn.ac.za. Alternatively you may contact my thesis supervisor, Prof. Manoj Maharaj at maharajms@ukzn.ac.za.

Thank you for participating.

Sachin Suknunan (Principal Investigator)

Section A

1. Name of Institution:

2. How long have you been at this Institution?

Up to 4 years		More than 4 years but up to 8 years		More than 8 years but up to 12 years		More than 12 years	
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3. What best describes your current title at this institution?

<input type="checkbox"/>	Executive Director / Dean (Academic)
<input type="checkbox"/>	Executive Director/ Dean (Support)
<input type="checkbox"/>	CIO
<input type="checkbox"/>	Director
<input type="checkbox"/>	Manager
<input type="checkbox"/>	Other, state: _____

4. How long have you had the above role in Question 3 at the institution?

Up to 4 years		More than 4 years but up to 8 years		More than 8 years but up to 12 years		More than 12 years	
---------------	--	-------------------------------------	--	--------------------------------------	--	--------------------	--

5. Who do you report to?

<input type="checkbox"/>	Vice Chancellor
<input type="checkbox"/>	Deputy Vice Chancellor (Research)
<input type="checkbox"/>	Deputy Vice Chancellor (Teaching and Learning)
<input type="checkbox"/>	Deputy Vice Chancellor (Other)
<input type="checkbox"/>	Executive Dean
<input type="checkbox"/>	CIO

<input type="checkbox"/>	CFO
<input type="checkbox"/>	IT director
<input type="checkbox"/>	Operations / Facilities Manager
<input type="checkbox"/>	Other, state: _____

6. Gender

Male	<input type="checkbox"/>	Female	<input type="checkbox"/>
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7. Age

Less than 30	<input type="checkbox"/>	Older than 30 but less than 40	<input type="checkbox"/>	Older than 40 but less than 50	<input type="checkbox"/>	Older than 50 but less than 60	<input type="checkbox"/>	Older than 60	<input type="checkbox"/>
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8. Nationality

<input type="text"/>

Section B - This Section focuses on the actual research

1. How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?

Daily	Weekly	Monthly	Quarterly	Yearly	Not at all
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(Branched Question) If answer= not at all, then it skips to question 3.

2. The data/information collected (as per question 1) is used by your Division/Department as a means of:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
Monitoring and keeping abreast of other university's standards and practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving processes and operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving technological practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Improving pedagogical practices					
Redefining Institutional strategy					

3. Knowledge Management is regarded as something that adds value to your Division/Department.

Strongly Agree		Agree		Disagree		Strongly Disagree	
----------------	--	-------	--	----------	--	-------------------	--

4. How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?

Weekly	Monthly	Quarterly	Bi-annually	Yearly	Not at all
--------	---------	-----------	-------------	--------	------------

5. Knowledge Management and Business Intelligence is used by your institution to:
(You may tick more than one option)

Improve institutional processes and operations	
Reduce institutional costs and expenses	
Identify new methods/ways of operating	
Analyse student trends such as registration, enrollment, performance, retention and dropout rates	
Improve decision making	
Monitoring Human Resources and development (Competitive remuneration, Qualifications, Abilities, Skills)	
Management resources (Money, People, Assets, Equipment)	
Monitor and improve academic methods, standards and output	
Monitor and improve research methods, standards and output	
Monitor and improve pedagogical/instructive/ teaching methods	
Align to first world standards	
Predict future trends of the institution in terms of Students, Staff and Resources (Money, Assets)	
Not used	
Other, state	

6. Transforming data into knowledge for better decision-making is important to your Division/Department.

Strongly agree		Agree		Disagree		Strongly Disagree	
----------------	--	-------	--	----------	--	-------------------	--

7. How important are Knowledge Management Information Systems for transforming data into knowledge in your Division/Department?

Very Important		Important		Somewhat Important		Not Important	
----------------	--	-----------	--	--------------------	--	---------------	--

8. What types of Knowledge Management information systems are used at your Division/Department and how often are they used? On a rating of (1= Least frequently used going up to 5 = most frequently used), Select the one/s most applicable to your institution.

	1	2	3	4	5
Organisational Databases					
Data Mining Systems					
Data Warehouses					
Digital Dashboards					
OLAP (online analytical processing) systems					
Predictive systems					
Institutional Intelligence Systems					
Other					

8.1 If you chose “other” in the preceding question, then please what type of Knowledge Management systems is used at your institution?

--

9. The knowledge gathered from the Knowledge Management systems (selected in Q8) is being used to:

	Strongly agree	Agree	Disagree	Strong Disagree	Don't know
Improve decision making					
Provide reliable reporting for executive management/board meetings					
Redefine processes and operations					
Identify new methods/ways of operating					
Analyse student trends such as registration, enrollment, performance, retention and dropout rates					
Monitor and improve academic and research methods, standards and output					

10. Does your Division/Department provide Knowledge Management systems that facilitate academic research?

Yes		No		Don't Know	
-----	--	----	--	------------	--

11. Is Research output (Publications, Journals, Dissertations etc.) stored in electronic knowledge repositories at your institution?

Yes		No		Don't Know	
-----	--	----	--	------------	--

(Branched Question) If answer = no/don't know then it skips to Question 14

12. How would you rate the accessibility of the above knowledge repositories to all students and staff at the university?

	Very Easy	Easy	Difficult	Very Difficult
Students				
Staff				

13. Has the usage of knowledge repositories increased at the institution relative to one year ago?

Significantly increased		Increased		More or less the same		Not increased		Don't Know	
-------------------------	--	-----------	--	-----------------------	--	---------------	--	------------	--

14. Does your institution use e-Learning as a pedagogical tool?

Yes		No		Don't Know	
-----	--	----	--	------------	--

(Branched Question, If answer = no/don't know then it skips to Q16)

15. On a rating of (1= Least important and 5 = most important), the main reason/s for the use of e-Learning at your institution is to:

(You may tick more than one option)

	1	2	3	4	5
Improve academic teaching and learning at the institution					
Break geographical barriers in terms of teaching and learning					
Create an interactive online university environment/experience					
Make the institution a more effective knowledge provider to students					
Make education more affordable for students					

16. On a scale of (1= Least effective and 5 = most effective), rate the effectiveness of Web 2.0 technologies used at your institution.

(Tick the one/s most applicable to your institution)

	1	2	3	4	5
Wiki					
Blogs					
Podcasting					
Content management Systems (CMS)					
Online Collaboration Systems (e.g. Sharepoint, Dropbox)					
Social Media (e.g. Twitter, Facebook, Google +, Youtube)					
Videocasting (e.g. YouTube)					
Other					

16.1 If you chose “other” in the preceding question, then please state the type of Web 2.0 technology/ies used at your institution.

17. To what degree does your institution make use of Massive Open Online Courses (MOOCs)

Very High		High		Moderate		Low		Does not use MOOC		I do not know what this is	
-----------	--	------	--	----------	--	-----	--	-------------------	--	----------------------------	--

18. What is your opinion regarding MOOCs?

Excellent pedagogical invention		Nice... it is definitely a game changer		No comment		It is only for the rich countries		I am not impressed		I do not know what this is	
---------------------------------	--	---	--	------------	--	-----------------------------------	--	--------------------	--	----------------------------	--

19. How often is Web 2.0 technologies (Social Media, Podcasting, Wiki's, Blogs) used by your institution when it comes to:

	Very Highly used	Highly used	Average	Low use	Don't Know
Creation of knowledge					
Transfer of Knowledge					
Dissemination of Knowledge					

20. Your Division/Department has made better decisions based on knowledge gathered through Knowledge Management practice.

Strongly agree	Agree	Disagree	Strongly Disagree	Don't Know

21. The use of e-Learning has

	Strongly agree	Agree	Disagree	Strongly Disagree	Don't Know
Enhanced academic teaching and learning at your institution					
Made your institution a better knowledge provider to students					

22. The use of Web 2.0 (Social Media, Podcasting, Wiki's, Blogs) has

	Strongly agree	Agree	Disagree	Strongly Disagree	Don't Know
Enhanced academic teaching and learning at your institution					
Made your institution a better knowledge provider to students					

23. The use of Knowledge Management systems and practices at your institution has

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Improved overall efficiency					
Enhanced academic research activity					
Led to your institution becoming more competitive					
Provided a means of continuous learning					



Appendix 4 - Interview Schedule

INTERVIEW SCHEDULE

**UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP**

Doctor of Business Administration (DBA) Research Project

Researcher: Sachin Suknunan (+2731- 260 7057)

Supervisor: Professor Manoj S Maharaj (+2731- 260 8003)

Research Office: Ms P Ximba (+2731-260 3587)

The Strategic Role of Knowledge Management in African Universities

Thank you for agreeing to participate in this research. Please be assured that any information provided will be held in the strictest confidence. With your permission, I will record the interview and will submit a transcript for your approval afterwards. If you request that the information you provide should not be attributed to you, your wishes will be respected. Data collected for the purpose of research will not be used for any other purpose without obtaining your permission for any alternative or additional use.

This research focuses on the strategic role of Knowledge Management in African universities. The research will investigate role of Knowledge Management in the formulation/driving of strategy at the various universities in Africa. It will also examine how Knowledge Management is adding value to the institutions and promoting institutional competitiveness. Furthermore, the aspect of e-Learning and the role of web 2.0 technologies in the creation, management and dissemination of information and e-Learning will be examined as well as the position of Knowledge Management within the organisational structure of the institutions. Hence your response will be of great value to me fulfilling the objectives of this study.

The primary research question of the study is:

- How do Knowledge Management practices influence Institutional Strategy at leading African Universities?

Research Sub- Questions:

- What is the role of Knowledge Management in strategy formulation at the institution?
- How is Knowledge Management
 - (v) Adding value to the institution at a continental level?
 - (vi) Adding value to the institution at a global level?
 - (vii) Promoting competitiveness at a continental level?
 - (viii) Promoting competitiveness at a global level?
- What is the role of Web 2.0 technologies
 - (i) in the creation of e-Learning?
 - (ii) in the management of e-Learning?
 - (iii) in the dissemination of e-Learning?
- What is the role of Web 2.0 technologies
 - (iv) in the creation of knowledge?
 - (v) in the management of knowledge?
 - (vi) in the dissemination of knowledge?
- Where is Knowledge Management represented within organisational structure of the institution?

The role of Knowledge Management from a strategy development perspective in Higher Education has not been conclusively researched in Africa. Considerable amount of Knowledge Management research and strategic Knowledge Management practice exists in first-world countries and more importantly, other developing countries. This is showing considerable benefits for the Higher Education realm in those countries. Hence, this needs to be examined from an African perspective. I am hoping to use this as a means of

empowerment regarding the potential of utilising Knowledge Management as a platform for effective strategy development in Higher Education in Africa.

Your participation in this research is appreciated.

Sachin Suknunan

suknunan@ukzn.ac.za

+2778 170 4497

+2731 260 7057

DEMOGRAPHICS

Please summarise your own background and experience in IT in your current and in other previous positions / organizations

1. Job description

<input type="checkbox"/>	CIO
<input type="checkbox"/>	Executive Director
<input type="checkbox"/>	Director
<input type="checkbox"/>	Manager
<input type="checkbox"/>	Other, state: _____

2. Your main functional role/s (tick applicable role/s), and number of years in that role/s?

Role/s	No. of years
Strategy Development / Planning and Executing	
Management Information/Knowledge Management/ Business Intelligence	
Software and Applications Development	
User and Client Support	
Academic Computing	
IT Infrastructure / Networking / Hardware	
Other : _____	

Interview Questions

Question 1

Can you explain to me the role of Knowledge Management in strategy formulation at your institution?

Possible Follow-Up Questions

- How exactly is Knowledge Management used in Strategy formulation?
- Where exactly does it fit/contribute to strategy formulation (at which part of the strategy development does it come in e.g. initial, planning, intermediate, final phase)?
- Is strategy formulation strongly dependant on the knowledge/information acquired via Knowledge Management?
- Can you provide an example of how Knowledge Management was used in the development of a specific strategy?

Objective of Question

To get a bird's eye view of Knowledge Management in strategy formulation

Question 2

What was the motivation behind having such a strong Knowledge Management strategy at your institution?

Objective of Question

Get a good idea of the motivation involved in developing strong Knowledge Management strategy.

Question 3

At what level is Knowledge Management represented at your institution?

- What do you feel about it?
- Is it just right, or would you have it different? why?

Objective of Question

Identify if Knowledge Management sits at board level for those institutions that reflect strong Knowledge Management.

Question 4

Can you provide a list and description of the various Knowledge Management Systems?, and how they are used?

Objective of Question

Acquire a detailed view of the various Knowledge Management systems at the institutions.

Question 5

What processes / resources go into acquiring powerful Knowledge Management systems?

Objective of Question

Establish what goes into the actual process of acquiring/developing strong Knowledge Management systems.

Question 6

How does the institution use the information/knowledge derived from Knowledge Management systems to make strategic decisions. Has this shown positive impact. Can you provide examples?

Objective of Question

Looking at effectiveness of Knowledge Management along the lines of using the knowledge to make informed decisions that have yielded substantial benefits.

Question 7

Can you explain the role of web 2.0 technologies in the creation, management and dissemination of

- 1. Knowledge**
- 2. e-Learning?**

at your institution?

Objective of Question

Acquire a detailed view of the use of Web 2.0 at the institution and its impact.

Question 8

How are Web 2.0 technologies enhancing the learning process of the institution?

Objective of Question

This builds from the previous question in doing a deep-dive into their effectiveness.

Question 9

What technologies are being used in the area of e-Learning? E.g. (MOOC, podcasting etc.)

Objective of Question

A deep-dive into E-learning, emerging technologies and MOOC etc.

Question 10

How has Knowledge Management and Web 2.0 contributed to adding value to the institution and how has it made it more competitive in a local and global setting?

Objective of Question

A look at Knowledge Management in terms of adding value and enhancing organisational competitiveness.

Question 11

What would you convey to all universities in the Africa with regards to using and investing in knowledge management?

Objective of Question

Gather the views from those who are practicing Knowledge Management at a strong and strategic level and how to spread this to other African universities.

Appendix 5 - Gatekeeper's Letters

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የኢንፎርሜሽንና ኮምፒዩተር ቴክኖሎጂ ቢሮ



Addis Ababa University
Information and
Communication Technology
Office

Date: June 21, 2013

Ref. No. ICT/197/2013

To Whom It May Concern

Re: Confirmation Letter

Title: Mr./MSc.

Name and Surname: Yosef Shiferaw

Position/Designation: Director, ICT

Institution: Addis Ababa University

I hereby confirm that I am willing to participate in the Doctoral Research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's (209510952) Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be confidential and used solely for the purposes of this research and for no other purposes.

Faithfully,

Yosef Shiferaw



Email: ict@aau.edu.et

Website: www.aau.edu.et

Tel. +251(0)111223875/71

መልስ ሲጻፉ ጥያቄውን ይጠቅሙ
In replying, please quote our reference number

ፖስታ
P.O.Box 1176



UNIVERSITY OF LAGOS
CENTRE FOR INFORMATION TECHNOLOGY AND SYSTEMS (CITS)
Akoka, Yaba, Lagos. Nigeria.

Professor C. O. Uwadia
Director

DL: 01-7346830

G.S.M: 0802 336 7333
e-mail: couwadia@unilag.edu.ng
couwadia@yahoo.com
<http://www.unilag.edu.ng>

June 25, 2013

To Whom It May Concern

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952): The Strategic Role of Knowledge Management in African Universities

Title: Professor

Name and Surname: Charles Onuwa UWADIA

Position/Designation: Director, Centre for Information Technology and Systems

Institution: University of Lagos

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully

Professor Charles Onuwa UWADIA



To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title: Mr.

Name and Surname: Paul Arthur Tennant

Position/Designation: Senior Director: Computer and Telecommunication Services

Institution: Cape Peninsula University of Technology

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,



Paul Tennant

19/8/2013

Date

P O Box 1906 Bellville 7535 South Africa
086 123 2788

UNIVERSITY OF DAR ES SALAAM

The Deputy Vice Chancellor (Administration)

Office of the ICT Manager

P.O. Box 35091

Dar es Salaam.

TANZANIA



Tel: +255-22-2410500-8 Ext. 2096

Fax: +255-22-2410753/114/029

E-mail: charles@udsm.ac.tz

Website: www.udsm.ac.tz

Mobile: 0713 455585

To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title: Dr.

Name and Surname: (Full Name and Surname) Charles N. Tarimo

Position/Designation: (Your current position/designation): ICT Manager

Institution: University of Dar es Salaam

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Charles N. Tarimo'.

Dr. Charles N. Tarimo

(Name)

July 11, 2013

(Date)

To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title:

Name and Surname: Nagwa Nazir Nicola

Position/Designation: Chief Technology Officer

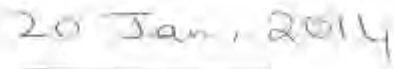
Institution: The American University in Cairo

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal, and that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,



Nagwa Nazir Nicola



Date



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY
jou kennisvenoot • your knowledge partner

19 June 2013

To Whom It May Concern

**CONFIRMATION LETTER: DOCTORAL RESEARCH OF SACHIN SUKNUNAN (209510952);
THE STRATEGIC ROLE OF KNOWLEDGE MANAGEMENT IN AFRICAN UNIVERSITIES**

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr Suknunan's Doctorate of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully

Helmi Dreijer
Senior Director
Information Technology



UNIVERSITY OF GHANA
UNIVERSITY OF GHANA COMPUTING SYSTEMS

P.O. BOX LG25 LEGON,
ACCRA, GHANA

TEL: 233-21-514430,
233-21-500381/
502255-8 Ext 3071

*In case of reply
please quote
My Ref No.
Your Ref No. ...*

To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title: Dr.

Name and Surname: Sam Somuah

Position/Designation: Chief Information Technology Officer (CITO)

Institution: University of Ghana

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

Dr. Sam Somuah

Chief Information Technology Officer (CITO)

(Interim)

University of Ghana Computing Systems (UGCS)

University of Ghana - Legon

Mobile: +233-244-326533

Email: ssomuah@ug.edu.gh

(Name)

Date



POLYTECHNIC OF NAMIBIA
BUREAU OF COMPUTER SERVICES

Private Bag 13388, 13 Storch Street, Windhoek, NAMIBIA
Tel: (264-61) 207-2256 Fax: (264-61) 207-2261 e-mail: bcs@polytechnic.edu.na

Windhoek, Wednesday 12 June 2013

To Whom It May Concern

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title:

Name and Surname: Laurent Evrard

Position/Designation: Director, Bureau of Computer Services

Institution: Polytechnic of Namibia

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

Laurent Evrard

University of KwaZulu-Natal
University Road
Westville
Private Bag X 54001
Durban
4000

23 May 2013

To Whom It May Concern

S SUKNUNAN (209510952) PHD RESEARCH

This is to certify that I, Natalie Ripley, Director of Data Management Unit at Rhodes University grant Sachin Suknunan (209510952) permission to use my responses to his questionnaire solely for the purpose of conducting research for his studies towards a Doctor of Business Administration at the University of KwaZulu-Natal.

Yours ...



.....
Mrs Natalie Ripley



Office of the Deputy Vice Chancellor (Finance & Administration)

Department of Information Technology

Corner of Notwane and Mobuto Road,
Gaborone, Botswana

Pvt Bag 0022
Gaborone,
Botswana

Tel: [267] 365 2323
Fax: [267] 390 1594

To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title: Mr.

Name and Surname: Ratsela Mooketsi

Position/Designation: Director of Information Technology

Institution: University of Botswana

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

Ratsela Mooketsi

19 June 2013



**I B Janse Van Rensburg
Executive Director: ICTS**

Room 317, ICTS City Mall
No. 7 Main Road, Mowbray, 7700
Private Bag X3
Rondebosch, 7701
Tel: +27 (0) 21 650 4079 Fax: +27 (0) 21 650 4910
E-mail: sakkie.jansevanrensburg@uct.ac.za
Internet: www.uct.ac.za and www.icts.uct.ac.za



19 June 2013

To Whom It May Concern,

**RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952),
The Strategic Role of Knowledge Management in African Universities**

Title: Mr
Name and Surname: I B Janse van Rensburg
Position/Designation: Executive Director, ICTS
Institution: University of Cape Town

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

**Sakkie Janse van Rensburg
Executive Director**



To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952). The Strategic Role of Knowledge Management in African Universities

Title: Mr.

Name and Surname: Andile Swartbooi

Position/Designation: Executive Director – Information and Communications Systems

Institution: University of Johannesburg

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

A Swartbooi


Sign
(Name)

18 July 2013
Date

Information & Communication Systems



To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209 510 952), The Strategic Role of Knowledge Management in African Universities

Title: Mr.

Name and Surname: Anil Pillay

Position/Designation: (Your current position/designation)

Institution: University of KwaZulu-Natal

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

Anil Pillay

19/06/2013

Date

To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title: Mr.

Name and Surname: Glen Barnes

Position/Designation: Acting Executive Director: Institutional Statistics & Analysis

Institution: University of South Africa

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,



G Barnes

9 Sep 2013_

Date





UNIVERSITY of the
WESTERN CAPE

INFORMATION AND COMMUNICATION SERVICES

Private Bag x 17, Bellville 7535
South Africa
Tel: + 27 (0) 21 959 2644
Fax: +27 (0) 21 959 1576
Email: rhassan@uwc.ac.za
Website: www.uwc.ac.za

27 June 2014

To Whom It May Concern,

RE: Confirmation Letter - Doctoral Research - Sachin Suknunan (209510952), The Strategic Role of Knowledge Management in African Universities

Title: Mr.

Name and Surname: Roger R Fester

Position/Designation: Head: Procurement & Vendor Management

Institution: University of Western Cape

I hereby confirm that I am willing to participate in the research study entitled "The Strategic Role of Knowledge Management in African Universities", being conducted as part of Mr. Suknunan's Doctor of Business Administration Studies at the University of KwaZulu-Natal. I understand that the data collected will be used solely for the purposes of this research and for no other purpose.

Yours faithfully,

Sign
(Name)

Date

A place of quality,
a place to grow, from hope
to action through knowledge.

To whom it may concern

This letter serves as confirmation that I (Xolani Hadebe – Acting Director from Wits University) have agreed to participate in a study that will be examining the role of Knowledge Management (KM) as a driver of strategy in higher education in Africa. The aims of my study will primarily be:

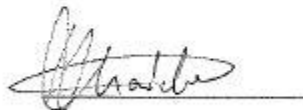
- To investigate whether knowledge gathered through various KM/IT systems is being used to develop/contribute towards institutional strategy
- To critically examine the role Web 2.0 as a KM and e-Learning strategy
- To investigate whether knowledge management is contributing to overall institutional value

The study will be conducted by:

Name : Sachin
Surname : Suknunan
Student Number : 209510952
Proposed Qualification : Doctor of Business Administration
University : University of KwaZulu-Natal

Kind regards

Xolani Hadebe



13/06/2013

Acting Director

Computer & Network Services

University of Witwatersrand

Tel : +2711 717 1662

Cell : 083 275 0807

Email : xolani.hadebe@wits.ac.za

Address: Senate House (SH1078), WITS, Jorissen St, Braamfontein

Appendix 6 - Statistical Data

Reliabilities

Section	Number of Items	Cronbach's Alpha
B2	5 of 5	0.652
B8	7 of 7	0.725
B9.6	4 of 6	0.654
B15	5 of 5	0.729
B16	7 of 7	0.609
B19	3 of 3	0.679
B21	2 of 2	0.878
B22	2 of 2	0.583
B23	4 of 4	0.575

Examples of Frequency Tables

How long have you been at this Institution?

		Percent
Valid	Up to 4 years	26.7
	More than 4 years but up to 8 years	13.3
	More than 12 years	60.0
	Total	100.0

What best describes your current title at this institution?

		Percent
Valid	Executive Director/ Dean (Support)	6.7
	CIO	20.0
	Director	33.3
	Manager	13.3
	Director-Institutional Planning	6.7
	Director-Data Management	6.7
	Director-Institutional Intelligence and Statistics	6.7
	Chief Technology Officer	6.7
	Total	100.0

Gender

		Percent
Valid	Male	86.7
	Female	13.3
	Total	100.0

How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?

	Percent
Daily	20.0
Weekly	13.3
Monthly	13.3
Valid Quarterly	26.7
Yearly	20.0
Not at all	6.7
Total	100.0

Knowledge Management is regarded as something that adds value to your Division/Department

	Percent
Valid Strongly Agree	73.3
Agree	26.7
Total	100.0

How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?

	Percent
Weekly	6.7
Monthly	20.0
Quarterly	20.0
Valid Bi-annually	13.3
Yearly	13.3
Not at all	26.7
Total	100.0

Transforming data into knowledge for better decision-making is important to your Division/Department

	Percent
Valid Strongly Agree	86.7
Agree	13.3
Total	100.0

How important are Knowledge Management Information Systems for transforming data into knowledge in your

Division/Department?

		Percent
Valid	Very Important	66.7
	Important	20.0
	Somewhat Important	13.3
	Total	100.0

Does your Division/Department provide Knowledge Management systems that facilitate academic research?

		Percent
Valid	Yes	33.3
	Don't Know	6.7
	No	60.0
	Total	100.0

Does your institution use e-Learning as a pedagogical tool?

		Percent
Valid	Yes	86.7
	No	13.3
	Total	100.0

To what degree does your institution make use of Massive Open Online Courses (MOOCs)?

		Percent
Valid	Very High	6.7
	Moderate	6.7
	Low	26.7
	Does not use MOOC	60.0
	Total	100.0

What is your opinion regarding MOOCs?

		Percent
Valid	Excellent pedagogical invention	26.7
	Nice... it is definitely a game changer	46.7
	No comment	26.7
	Total	100.0

Your Division/Department has made better decisions based on knowledge gathered through Knowledge Management practice

		Percent
Valid	Strongly Agree	20.0
	Agree	80.0
	Total	100.0

Pearson Chi-Square Tests

		Name of Institution	How long have you been at this Institution?	Current title	How long have you had the above role?	Who do you report to?	Gender	Age	Nationality
How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?	Chi-square	75.000	17.118	41.000	18.125	63.125	3.462	7.524	39.688
	df	70	10	35	15	50	5	10	35
	Sig.	0.32	0.072	0.224	0.256	0.101	0.629	0.675	0.269
Monitoring and keeping abreast of other university's standards and practices	Chi-square	28.000	1.313	13.154	4.515	22.692	.321	1.417	14.219
	df	26	4	14	6	18	2	4	12
	Sig.	0.358	0.859	0.514	0.607	0.203	0.852	0.841	0.287
Improving processes and operations	Chi-square	12.000	1.333	6.667	4.000	8.444	.800	2.044	12.000
	df	11	2	6	3	8	1	2	5
	Sig.	0.364	0.513	0.353	0.261	0.391	0.371	0.36	.035*
Improving technological practices	Chi-square	12.000	4.286	8.914	2.057	7.200	.069	4.457	6.122
	df	11	2	6	3	8	1	2	5
	Sig.	0.364	0.117	0.178	0.561	0.515	0.793	0.108	0.294
Improving pedagogical practices	Chi-square	22.000	.917	12.833	4.685	22.000	5.025	6.111	11.815
	df	20	4	10	6	14	2	4	10
	Sig.	0.341	0.922	0.233	0.585	0.079	0.081	0.191	0.298
Redefining Institutional strategy	Chi-square	24.000	6.250	9.000	6.375	13.583	1.200	2.433	12.429
	df	22	4	12	6	16	2	4	10
	Sig.	0.347	0.181	0.703	0.383	0.63	0.549	0.657	0.257
Knowledge Management is regarded as something that adds value to your Division/Department	Chi-square	15.000	.653	8.864	.938	9.034	.839	.195	5.412
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.721	0.263	0.816	0.529	0.36	0.907	0.61

How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?	Chi-square	75.000	9.132	41.208	15.750	59.167	6.346	11.095	33.594
	df	70	10	35	15	50	5	10	35
	Sig.	0.32	0.52	0.217	0.399	0.176	0.274	0.35	0.536
Transforming data into knowledge for better decision-making is important to your Division/Department	Chi-square	15.000	.817	2.308	1.587	10.673	.355	2.308	2.019
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.665	0.941	0.662	0.384	0.551	0.315	0.959
How important are Knowledge Management Information Systems for transforming data into knowledge in your Division/Department?	Chi-square	30.000	1.681	22.417	8.600	22.417	2.885	8.486	16.813
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.794	0.07	0.197	0.318	0.236	0.075	0.266
Organisational Databases	Chi-square	30.000	3.526	17.077	17.077	19.231	.355	5.385	15.865
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.474	0.252	.009*	0.507	0.837	0.25	0.322
Data Mining Systems	Chi-square	44.000	9.735	18.883	6.600	25.300	1.320	6.050	16.657
	df	40	8	20	8	28	4	8	16
	Sig.	0.306	0.284	0.529	0.58	0.611	0.858	0.642	0.408
Data Warehouses	Chi-square	36.000	7.786	14.571	6.514	28.286	.779	4.486	18.536
	df	33	6	18	6	24	3	6	12
	Sig.	0.33	0.254	0.691	0.368	0.248	0.854	0.611	0.1
Digital Dashboards	Chi-square	30.000	2.194	24.167	5.069	22.500	10.000	7.847	8.095
	df	27	6	15	6	21	3	6	9
	Sig.	0.314	0.901	0.062	0.535	0.371	.019*	0.25	0.525
OLAP (online analytical processing) systems	Chi-square	52.000	11.452	26.867	11.375	48.750	6.598	9.750	35.286
	df	48	8	24	12	32	4	8	24
	Sig.	0.321	0.177	0.311	0.497	.029*	0.159	0.283	0.064
Predictive systems	Chi-square	33.000	4.583	23.719	5.844	33.000	5.118	6.875	12.179
	df	30	6	18	6	24	3	6	12
	Sig.	0.323	0.598	0.164	0.441	0.104	0.163	0.333	0.431

Institutional Intelligence Systems	Chi-square	33.000	6.142	18.013	4.904	30.525	1.925	8.754	5.225
	df	30	6	18	6	24	3	6	9
	Sig.	0.323	0.408	0.455	0.556	0.168	0.588	0.188	0.814
Other	Chi-square	12.000	8.000	8.000	8.000	12.000		8.000	8.000
	df	9	6	6	6	9		6	6
	Sig.	0.213	0.238	0.238	0.238	0.213		0.238	0.238
Other 1	Chi-square	6.000	6.000	3.000	6.000	6.000		3.000	6.000
	df	4	4	2	4	4		2	4
	Sig.	0.199	0.199	0.223	0.199	0.199		0.223	0.199
Improve decision making	Chi-square	15.000	.375	4.350	.825	12.000	1.154	2.743	8.250
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.829	0.739	0.843	0.285	0.283	0.254	0.311
Provide reliable reporting for executive management/board meetings	Chi-square	15.000	.938	10.909	2.727	15.000	.839	1.071	7.330
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.626	0.143	0.436	0.132	0.36	0.585	0.395
Redefine processes and operations	Chi-square	14.000	.525	8.120	2.730	8.283	.933	2.333	6.650
	df	13	2	7	3	9	1	2	6
	Sig.	0.374	0.769	0.322	0.435	0.506	0.334	0.311	0.354
Identify new methods/ways of operating	Chi-square	12.000	.545	1.527	12.000	3.273	.218	1.091	12.000
	df	11	2	6	3	8	1	2	5
	Sig.	0.364	0.761	0.958	.007*	0.916	0.64	0.58	.035*
Analyse student trends such as registration, enrolment, performance, retention and dropout rates	Chi-square	15.000	.590	2.708	2.500	11.875	.577	7.500	9.531
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.744	0.911	0.475	0.294	0.448	.024*	0.217
Monitor and improve academic and research methods, standards and output	Chi-square	42.000	3.938	27.440	10.290	29.167	1.342	9.942	15.838
	df	39	6	21	9	27	3	6	18
	Sig.	0.342	0.685	0.157	0.328	0.353	0.719	0.127	0.604

Does your Division/Department provide Knowledge Management systems that facilitate academic research?	Chi-square	30.000	8.167	18.956	8.900	16.222	1.538	6.032	9.250
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.086	0.167	0.179	0.703	0.463	0.197	0.815
Is Research output (Publications, Journals, Dissertations etc.) stored in electronic knowledge repositories at your institution?	Chi-square	15.000	6.964	2.143	2.946	15.000	.165	4.286	15.000
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	.031*	0.952	0.4	0.132	0.685	0.117	.036*
How would you rate the accessibility of the above knowledge repositories to all students at the university?	Chi-square	14.000	.616	8.556	2.022	9.917	2.431	4.200	1.750
	df	13	2	7	3	9	1	2	6
	Sig.	0.374	0.735	0.286	0.568	0.357	0.119	0.122	0.941
How would you rate the accessibility of the above knowledge repositories to all staff at the university?	Chi-square	26.000	6.500	16.370	6.548	17.333	1.051	2.696	3.611
	df	24	4	14	4	18	2	4	10
	Sig.	0.353	0.165	0.291	0.162	0.5	0.591	0.61	0.963
Has the usage of knowledge repositories increased at the institution relative to one year ago?	Chi-square	28.000	4.822	14.078	11.013	17.733	2.022	1.860	11.900
	df	26	4	14	6	18	2	4	12
	Sig.	0.358	0.306	0.444	0.088	0.473	0.364	0.761	0.454
Does your institution use e-Learning as a pedagogical tool?	Chi-square	15.000	2.981	8.077	6.346	15.000	2.685	2.308	7.428
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.225	0.326	0.096	0.132	0.101	0.315	0.386
Improve academic teaching and learning at the institution	Chi-square	13.000	.517	13.000	3.782	13.000	5.958	2.575	6.416
	df	12	2	6	3	8	1	2	6
	Sig.	0.369	0.772	.043*	0.286	0.112	.015*	0.276	0.378
Break geographical barriers in terms of teaching and learning	Chi-square	36.000	3.429	12.000	4.800	24.250		6.500	14.571
	df	33	6	15	9	21		6	15
	Sig.	0.33	0.753	0.679	0.851	0.281		0.37	0.483
Create an interactive online university environment/experience	Chi-square	24.000	1.304	9.500	5.275	13.333		3.792	16.143
	df	22	4	10	6	14		4	10
	Sig.	0.347	0.861	0.485	0.509	0.5		0.435	0.096

Make the institution a more effective knowledge provider to students	Chi-square	26.000	3.047	15.031	2.763	11.375	.677	2.844	6.500
	df	24	4	12	6	16	2	4	12
	Sig.	0.353	0.55	0.24	0.838	0.786	0.713	0.584	0.889
Make education more affordable for students	Chi-square	48.000	8.571	18.667	15.200	33.333		5.500	18.857
	df	44	8	20	12	28		8	20
	Sig.	0.314	0.38	0.544	0.231	0.224		0.703	0.531
Wiki	Chi-square	42.000	5.406	21.700	6.732	27.456	2.022	2.823	18.754
	df	39	6	21	9	30	3	6	18
	Sig.	0.342	0.493	0.417	0.665	0.599	0.568	0.831	0.407
Blogs	Chi-square	56.000	6.300	21.840	10.290	51.800	3.792	17.740	24.200
	df	52	8	24	12	36	4	8	28
	Sig.	0.327	0.614	0.589	0.591	.043*	0.435	.023*	0.671
Podcasting	Chi-square	39.000	3.476	22.533	8.125	25.819	1.477	5.507	22.615
	df	36	6	21	9	27	3	6	15
	Sig.	0.336	0.747	0.369	0.522	0.529	0.688	0.481	0.093
Content management Systems (CMS)	Chi-square	42.000	6.679	21.529	5.973	28.389	5.833	3.134	20.333
	df	39	6	21	9	27	3	6	21
	Sig.	0.342	0.352	0.427	0.743	0.391	0.12	0.792	0.5
Online Collaboration Systems (e.g. Sharepoint, Dropbox)	Chi-square	60.000	12.103	23.417	11.625	53.571	3.255	8.041	30.670
	df	56	8	28	12	40	4	8	28
	Sig.	0.333	0.147	0.712	0.476	0.074	0.516	0.429	0.332
Social Media (e.g. Twitter, Facebook, Google +, Youtube)	Chi-square	45.000	4.688	16.313	4.688	25.625	.938	8.000	21.094
	df	42	6	21	9	30	3	6	21
	Sig.	0.347	0.584	0.752	0.861	0.694	0.816	0.238	0.453
Videocasting (e.g. YouTube)	Chi-square	39.000	6.548	17.803	8.580	27.444	1.093	5.720	23.771
	df	36	6	18	9	24	3	6	18
	Sig.	0.336	0.365	0.469	0.477	0.284	0.779	0.455	0.163

Other	Chi-square	3.000	.750	3.000	.750	3.000		3.000	3.000
	df	2	1	2	1	2		2	2
	Sig.	0.223	0.386	0.223	0.386	0.223		0.223	0.223
To what degree does your institution make use of Massive Open Online Courses (MOOCs)?	Chi-square	45.000	12.292	23.792	11.750	30.347	1.538	5.984	23.125
	df	42	6	21	9	30	3	6	21
	Sig.	0.347	0.056	0.303	0.228	0.448	0.673	0.425	0.337
What is your opinion regarding MOOCs?	Chi-square	30.000	11.548	12.250	7.045	20.625	1.092	11.255	17.076
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	.021*	0.586	0.317	0.419	0.579	.024*	0.252
Creation of knowledge	Chi-square	30.000	1.896	9.700	3.938	26.500	.721	5.700	6.844
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.755	0.784	0.685	0.15	0.697	0.223	0.941
Transfer of Knowledge	Chi-square	30.000	2.688	15.333	3.125	17.262	3.462	.946	10.045
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.611	0.356	0.793	0.636	0.177	0.918	0.759
Dissemination of Knowledge	Chi-square	45.000	3.849	24.333	18.589	29.583	7.788	4.231	22.902
	df	42	6	21	9	30	3	6	21
	Sig.	0.347	0.697	0.277	.029*	0.487	0.051	0.645	0.349
Your Division/Department has made better decisions based on knowledge gathered through Knowledge Management practice	Chi-square	15.000	.590	7.708	2.813	11.875	1.298	1.071	5.625
	df	14	2	7	3	10	1	2	7
	Sig.	0.378	0.744	0.359	0.421	0.294	0.255	0.585	0.584
Enhanced academic teaching and learning at your institution	Chi-square	30.000	5.574	21.289	3.633	26.889	7.308	5.556	7.917
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.233	0.094	0.726	0.138	.026*	0.235	0.894
Made your institution a better knowledge provider to students	Chi-square	30.000	1.476	23.583	6.094	30.000	7.788	2.333	8.359
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.831	0.051	0.413	0.07	.020*	0.675	0.87

Enhanced academic teaching and learning at your institution	Chi-square	28.000	2.463	8.353	5.063	17.733	.933	1.406	6.933
	df	26	4	14	6	20	2	4	14
	Sig.	0.358	0.651	0.87	0.536	0.605	0.627	0.843	0.937
Made your institution a better knowledge provider to students	Chi-square	28.000	3.217	13.745	7.509	17.818	.636	3.939	16.182
	df	26	4	14	6	20	2	4	14
	Sig.	0.358	0.522	0.469	0.276	0.599	0.727	0.414	0.302
Improved overall efficiency	Chi-square	45.000	8.826	37.909	10.500	32.386	.839	7.857	4.773
	df	42	6	21	9	30	3	6	21
	Sig.	0.347	0.184	.013*	0.312	0.35	0.84	0.249	1
Enhanced academic research activity	Chi-square	30.000	5.000	8.200	8.138	26.500	.721	8.200	8.438
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.287	0.879	0.228	0.15	0.697	0.085	0.865
Led to your institution becoming more competitive	Chi-square	30.000	5.660	23.000	8.250	17.500	.577	3.095	3.281
	df	28	4	14	6	20	2	4	14
	Sig.	0.363	0.226	0.06	0.22	0.62	0.749	0.542	0.998
Provided a means of continuous learning	Chi-square	45.000	4.640	14.455	18.273	20.909	.839	4.766	18.068
	df	42	6	21	9	30	3	6	21
	Sig.	0.347	0.591	0.849	.032*	0.891	0.84	0.574	0.645

Correlations

		How often does your Division/Department scan the Higher Education environment and collect information/data to gain insight?	Redefining Institutional strategy	How often are you required to make institutional presentations on Knowledge Management and Business Intelligence?	Identify new methods/ways of operating
Provide reliable reporting for executive management/board meetings	Correlation Coefficient	.480	-.168	.675**	
	Sig. (2-tailed)	.070	.603	.006	
	N	15	12	15	
Redefine processes and operations	Correlation Coefficient	-.020	.700*	.159	
	Sig. (2-tailed)	.946	.016	.586	
	N	14	11	14	
Identify new methods/ways of operating	Correlation Coefficient	-.090	.574	.089	1.000
	Sig. (2-tailed)	.781	.083	.784	
	N	12	10	12	12
Analyse student trends such as registration, enrolment, performance, retention and dropout rates	Correlation Coefficient	.530*	.078	.236	.135
	Sig. (2-tailed)	.042	.810	.398	.676
	N	15	12	15	12
Monitor and improve academic and research methods, standards and output	Correlation Coefficient	.347	.702*	.354	.369
	Sig. (2-tailed)	.224	.016	.214	.237
	N	14	11	14	12
Does your Division/Department provide Knowledge Management systems that facilitate academic research?	Correlation Coefficient	.277	.398	.307	.398
	Sig. (2-tailed)	.317	.200	.266	.200
	N	15	12	15	12
Make the institution a more effective knowledge provider to students	Correlation Coefficient	-.034	-.261	-.108	.133
	Sig. (2-tailed)	.912	.466	.726	.715
	N	13	10	13	10

Make education more affordable for students	Correlation Coefficient	-0.346	-0.464	-0.250	0.070
	Sig. (2-tailed)	.270	.208	.434	.857
	N	12	9	12	9
Podcasting	Correlation Coefficient	-0.303	.321	-0.267	.452
	Sig. (2-tailed)	.315	.336	.377	.140
	N	13	11	13	12
Enhanced academic teaching and learning at your institution	Correlation Coefficient	-0.634*	-0.063	-0.042	.210
	Sig. (2-tailed)	.011	.845	.882	.513
	N	15	12	15	12
Made your institution a better knowledge provider to students	Correlation Coefficient	-0.369	-0.229	.233	-.194
	Sig. (2-tailed)	.176	.474	.404	.545
	N	15	12	15	12
Enhanced academic teaching and learning at your institution	Correlation Coefficient	.120	.151	.106	-.064
	Sig. (2-tailed)	.684	.657	.718	.852
	N	14	11	14	11
Made your institution a better knowledge provider to students	Correlation Coefficient	.319	-.124	.593*	-.064
	Sig. (2-tailed)	.266	.717	.025	.852
	N	14	11	14	11
Improved overall efficiency	Correlation Coefficient	.081	-0.066	.229	-.057
	Sig. (2-tailed)	.775	.838	.412	.859
	N	15	12	15	12
Enhanced academic research activity	Correlation Coefficient	.159	.121	.474	.149
	Sig. (2-tailed)	.571	.707	.074	.643
	N	15	12	15	12
Led to your institution becoming more competitive	Correlation Coefficient	.223	-.156	.128	-.057
	Sig. (2-tailed)	.425	.629	.650	.859
	N	15	12	15	12
Provided a means of continuous learning	Correlation Coefficient	-.047	.662*	-0.025	.631*
	Sig. (2-tailed)	.869	.019	.931	.028
	N	15	12	15	12

		Monitor and improve academic and research methods, standards and output	Does your Division/Department provide Knowledge Management systems that facilitate academic research?	Has the usage of knowledge repositories increased at the institution relative to one year ago?	Does your institution use e-Learning as a pedagogical tool?	Break geographical barriers in terms of teaching and learning
Provide reliable reporting for executive management/board meetings	Correlation Coefficient Sig. (2-tailed) N					
Redefine processes and operations	Correlation Coefficient Sig. (2-tailed) N					
Identify new methods/ways of operating	Correlation Coefficient Sig. (2-tailed) N					
Analyse student trends such as registration, enrolment, performance, retention and dropout rates	Correlation Coefficient Sig. (2-tailed) N					
Monitor and improve academic and research methods, standards and output	Correlation Coefficient Sig. (2-tailed) N	1.000				
		14				
Does your Division/Department provide Knowledge Management systems that facilitate academic research?	Correlation Coefficient Sig. (2-tailed) N	.641*	1.000			
		.014				
		14	15			
Make the institution a more effective knowledge provider to students	Correlation Coefficient Sig. (2-tailed) N	-.443	-.150	-.312		.571
		.149	.625	.299		.053
		12	13	13	13	12
Make education more affordable for students	Correlation Coefficient Sig. (2-tailed) N	-.583	-.367	-.332		.749**
		.060	.240	.292		.005
		11	12	12	12	12

Podcasting	Correlation Coefficient	-.331	-.038	.062	.089	.311
	Sig. (2-tailed)	.269	.902	.848	.774	.381
	N	13	13	12	13	10
Enhanced academic teaching and learning at your institution	Correlation Coefficient	-.314	.110	-.022	.577*	-.244
	Sig. (2-tailed)	.274	.698	.940	.024	.444
	N	14	15	14	15	12
Made your institution a better knowledge provider to students	Correlation Coefficient	-.148	.160	-.321	.486	-.146
	Sig. (2-tailed)	.614	.568	.263	.066	.651
	N	14	15	14	15	12
Enhanced academic teaching and learning at your institution	Correlation Coefficient	0.000	.227	.426	.128	-.551
	Sig. (2-tailed)	1.000	.435	.147	.663	.079
	N	13	14	13	14	11
Made your institution a better knowledge provider to students	Correlation Coefficient	.215	.398	.242	.071	-.122
	Sig. (2-tailed)	.480	.159	.425	.810	.720
	N	13	14	13	14	11
Improved overall efficiency	Correlation Coefficient	-.074	.448	.338	0.000	-.269
	Sig. (2-tailed)	.802	.094	.237	1.000	.398
	N	14	15	14	15	12
Enhanced academic research activity	Correlation Coefficient	.332	.555*	-.081	.219	-.338
	Sig. (2-tailed)	.246	.032	.784	.433	.282
	N	14	15	14	15	12
Led to your institution becoming more competitive	Correlation Coefficient	-.151	.405	.238	.065	-.132
	Sig. (2-tailed)	.607	.135	.412	.818	.683
	N	14	15	14	15	12
Provided a means of continuous learning	Correlation Coefficient	.445	.493	.698**	-.117	-.843**
	Sig. (2-tailed)	.111	.062	.006	.679	.001
	N	14	15	14	15	12

		Make the institution a more effective knowledge provider to students	Make education more affordable for students	Wiki	Social Media (e.g. Twitter, Facebook, Google +, Youtube)	Videocasting (e.g. YouTube)
Provide reliable reporting for executive management/board meetings	Correlation Coefficient Sig. (2-tailed) N					
Redefine processes and operations	Correlation Coefficient Sig. (2-tailed) N					
Identify new methods/ways of operating	Correlation Coefficient Sig. (2-tailed) N					
Analyse student trends such as registration, enrolment, performance, retention and dropout rates	Correlation Coefficient Sig. (2-tailed) N					
Monitor and improve academic and research methods, standards and output	Correlation Coefficient Sig. (2-tailed) N					
Does your Division/Department provide Knowledge Management systems that facilitate academic research?	Correlation Coefficient Sig. (2-tailed) N					
Make the institution a more effective knowledge provider to students	Correlation Coefficient Sig. (2-tailed) N	1.000				
		13				
Make education more affordable for students	Correlation Coefficient Sig. (2-tailed) N	.702*	1.000			
		.011				
		12	12			

Podcasting	Correlation Coefficient	.448	.723*	.180		
	Sig. (2-tailed)	.167	.018	.557		
	N	11	10	13		
Enhanced academic teaching and learning at your institution	Correlation Coefficient	-.233	.131	-.138	-.267	-.384
	Sig. (2-tailed)	.444	.685	.638	.336	.195
	N	13	12	14	15	13
Made your institution a better knowledge provider to students	Correlation Coefficient	-.431	-.276	.014	-.337	-.188
	Sig. (2-tailed)	.142	.386	.962	.220	.539
	N	13	12	14	15	13
Enhanced academic teaching and learning at your institution	Correlation Coefficient	-.580*	-.528	-.320	-.542*	-.494
	Sig. (2-tailed)	.048	.095	.287	.045	.103
	N	12	11	13	14	12
Made your institution a better knowledge provider to students	Correlation Coefficient	-.223	-.227	-.239	-.273	.095
	Sig. (2-tailed)	.486	.501	.432	.344	.769
	N	12	11	13	14	12
Improved overall efficiency	Correlation Coefficient	.023	.026	-.138	-.212	-.286
	Sig. (2-tailed)	.939	.937	.639	.449	.344
	N	13	12	14	15	13
Enhanced academic research activity	Correlation Coefficient	-.365	-.602*	-.360	-.519*	-.156
	Sig. (2-tailed)	.220	.038	.206	.048	.611
	N	13	12	14	15	13
Led to your institution becoming more competitive	Correlation Coefficient	.058	.057	-.233	-.282	-.286
	Sig. (2-tailed)	.850	.861	.423	.308	.344
	N	13	12	14	15	13
Provided a means of continuous learning	Correlation Coefficient	-.346	-.414	-.587*	-.407	-.597*
	Sig. (2-tailed)	.248	.181	.027	.132	.031
	N	13	12	14	15	13

		Creation of knowledge	Enhanced academic teaching and learning at your institution	Made your institution a better knowledge provider to students	Improved overall efficiency
Provide reliable reporting for executive management/board meetings	Correlation Coefficient Sig. (2-tailed) N				
Redefine processes and operations	Correlation Coefficient Sig. (2-tailed) N				
Identify new methods/ways of operating	Correlation Coefficient Sig. (2-tailed) N				
Analyse student trends such as registration, enrolment, performance, retention and dropout rates	Correlation Coefficient Sig. (2-tailed) N				
Monitor and improve academic and research methods, standards and output	Correlation Coefficient Sig. (2-tailed) N				
Does your Division/Department provide Knowledge Management systems that facilitate academic research?	Correlation Coefficient Sig. (2-tailed) N				
Make the institution a more effective knowledge provider to students	Correlation Coefficient Sig. (2-tailed) N				
Make education more affordable for students	Correlation Coefficient Sig. (2-tailed) N				

Podcasting	Correlation Coefficient				
	Sig. (2-tailed)				
	N				
Enhanced academic teaching and learning at your institution	Correlation Coefficient	.500			
	Sig. (2-tailed)	.058			
	N	15			
Made your institution a better knowledge provider to students	Correlation Coefficient	.613 [*]			
	Sig. (2-tailed)	.015			
	N	15			
Enhanced academic teaching and learning at your institution	Correlation Coefficient	.585 [*]	1.000		
	Sig. (2-tailed)	.028			
	N	14	14		
Made your institution a better knowledge provider to students	Correlation Coefficient	.595 [*]	.599 [*]	1.000	
	Sig. (2-tailed)	.025	.024		
	N	14	14	14	
Improved overall efficiency	Correlation Coefficient	.430	.543 [*]	.600 [*]	1.000
	Sig. (2-tailed)	.109	.045	.023	
	N	15	14	14	15
Enhanced academic research activity	Correlation Coefficient	.745 ^{**}	.585 [*]	.595 [*]	.198
	Sig. (2-tailed)	.001	.028	.025	.480
	N	15	14	14	15
Led to your institution becoming more competitive	Correlation Coefficient	.307	.599 [*]	.692 ^{**}	.897 ^{**}
	Sig. (2-tailed)	.266	.024	.006	.000
	N	15	14	14	15
Provided a means of continuous learning	Correlation Coefficient	.379	.331	.030	.230
	Sig. (2-tailed)	.163	.248	.919	.409
	N	15	14	14	15