UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

A KNOWLEDGE MANAGEMENT MODEL FOR THE PUBLIC SECTOR CASE: TEACHERS SERVICE COMMISSION (TSC)

BY

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Submitted in partial fulfilment of the requirements of the Master of Science Degree Information Systems

DECLARATION

I the undersigned, declare that this project is my original work and has never been presented to any other University for academic credit.

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This project has been submitted in partial fulfilment of the requirements of the Master of Science in Information Systems of the University of Nairobi with my approval as the University Supervisor.

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ABSTRACT

This study analyses existing Knowledge Management frameworks and assesses components necessary to develop and sustain an effective KM in organizations in the Public Sector. There is a wide array of knowledge content that depends on specific functions of government. The Public Sector can leverage efficiencies across all public services through accessing the right information for making informed decisions and eliminate duplication of effort.

Teachers Service Commission (TSC) has been mandated by the Kenya Constitution to carry out the Teacher Management function for all public educational institutions. Smooth information flow and communication is crucial for effective decision making. Inadequate information access due to information storage challenges is a major problem that hampers proper service delivery at all levels within the TSC. The objective of this study was to recommend a knowledge-oriented organizational model for TSC, which would efficiently manage its intellectual and knowledge assets and improve information flow.

The methodology used, which was qualitative research, was done from document review sourced from primary and secondary sources as well as similar organization best practice in Knowledge Management. The Common KADS model was used to analyze the knowledge structure by distinguishing specific knowledge types and roles. The real needs of the Commission as a case study within the Public Sector were gathered through a knowledge mapping exercise. The analytical methods used included grounded theory, thematic narrative, participant observation (ethnography) and content analysis.

Results from findings revealed that information access, process based knowledge (organization memory), structured knowledge sharing forums, clear rewarding mechanisms, mentoring practice and commitment towards knowledge creation were ranked highly among managers for effective decision making. The study therefore proposes a KM relational framework/ model integrated with the decision making framework as an implementation strategy. This will ensure an 'embedded knowledge sharing culture' within TSC and the Public Sector for improved service delivery.

DEDICATION

TO MY DAD AND MOM

MR. STANLEY NJAGI & MRS. POLLY NJAGI

ACKNOWLEDGEMENT

First I would like to express my gratitude to Almighty God for the gift of life and enabling me to complete this project.

I would like to thank my supervisor, Mr. S. Ruhiu, for his patient and careful guidance. I appreciate Panel 4 assessment team who spent valuable time and effort towards achievement of the highest standard. I also wish to thank School of Computing and Informatics (SCI) non teaching staff for continous support throughout my training period.

I can never forget my parents, who have kept their faith in me all the way, and my brothers as well as their families for the moral support they have accorded me. My nieces and nephews have continually given me hope through this time. I would like to thank my colleagues and friends for persistent encouragement they provided.

The opportunity that has been provided to me by the Teachers Service Commission (TSC) is greatly valued, and I am thankful for it. I am greatful to my boss Mr. Mwarucha for unwavering support and to management for providing the much needed data needed to justify a clear roadmap for Knowledge Management in the Commission. Special thanks also go to my friend, Julia G. for the invaluable technical advice and N. Kinyua for professional editing.

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TSC – Teachers Service Commission

KADS - Knowledge Acquisition and Documentation Structuring

UML - Unified Modelling Language

ISO - International Organization for Standardization

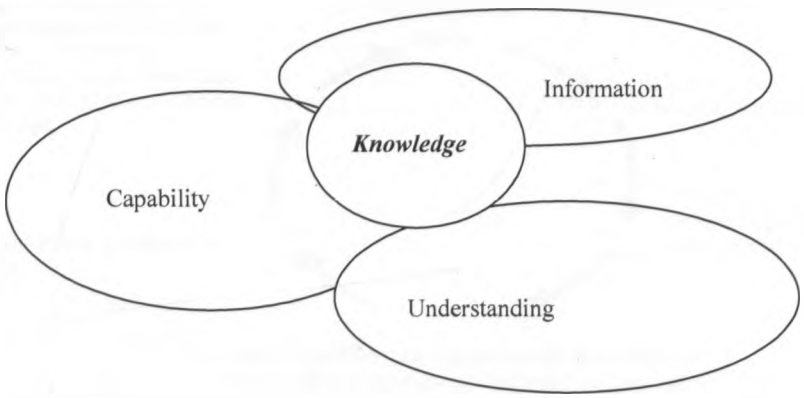
CHAPTER ONE
INTRODUCTION

Knowledge can be defined as understanding gained through experience or study (knowhow). Knowledge is one of an organization's most valuable assets. Knowledge provides a level of predictability that usually stems from the recognition of patterns in order to take positive action. It drives and influences decisions. It fuels innovation. Knowledge Management (KM) concept comprises tools, techniques and strategies to retain, analyze, organize and share expertise, thus helps harness the infinite asset of shared knowledge.

1.1 Background to the Problem

Information can be defined as summarization of data which has been given meaning by way of context. Knowledge is information combined with understanding and capability, as shown in figure 1;

Figure 1: A Venn diagram showing the relationship between information and knowledge



Knowledge held tacitly by individuals becomes difficult to share. Each individual has their own knowledge and expertise which they are protective over as there are no clear mechanisms to motivate and encourage them to share and reuse knowledge as well as generate new knowledge that could add value to the organization.

An immense and ever-increasing wealth of knowledge is scattered about the world today; knowledge that would probably suffice to solve all the mighty difficulties of our age, but it is dispersed and unorganized. We need a sort of mental clearing house for the

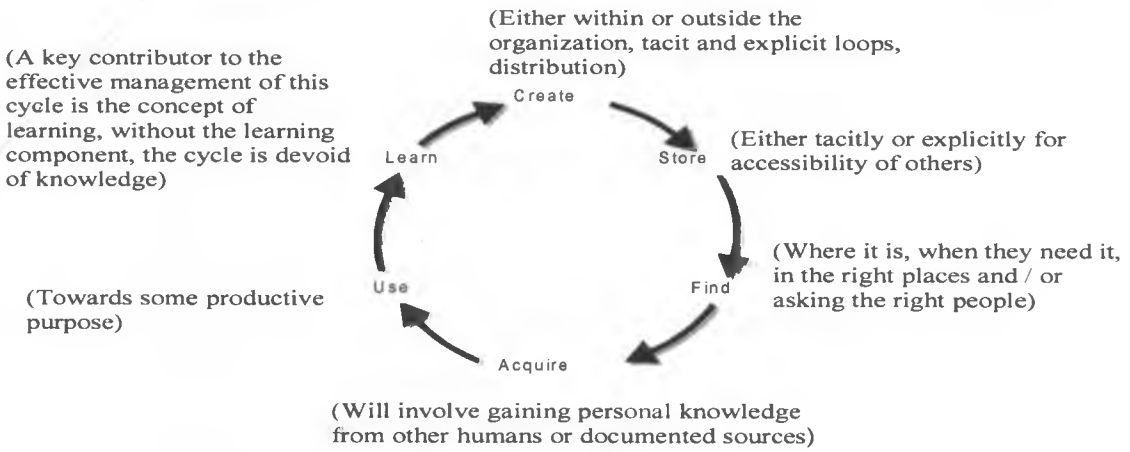
mind: a depot where knowledge and ideas are received, sorted, summarized, digested, clarified and compared.

H.G. Wells, in "The Brain: Organization of the Modern World", 1940

Many organizations are now implementing knowledge bases as a strategy for making more of their employees' tacit knowledge (personal knowledge embedded in individual experience) become explicit (documented tacit knowledge). Knowledge bases (repository) are digital bases that attempt to capture almost every imaginable explicit intellectual asset that an organization possesses. They provide a rich source of research material for problem solving, a powerful archive for organizational best practices, and a shared forum for competitive intelligence.

The knowledge life cycle uses an integrated approach in identifying, capturing, retrieving, sharing/protecting, and evaluating an organization's information assets elaborated in the Figure 2:

Figure 2: Knowledge Life Cycle



1.1.1 Categories of Knowledge Management (KM) Practices

The first category is knowledge capturing and acquisition. This involves mechanisms that organizations use to import external knowledge into the organization by collaborations and acquisition deals through process of creating, generating, developing, building and constructing knowledge internally thus derive new useful insights and ideas. Knowledge available from short-term memory (declarative) is important in the early stages of knowledge capture. Organizations need to develop ways of capturing its internal knowledge, devise systems to identify people's expertise and develop ways of sharing it to

avoid knowledge loss. Knowledge sharing is the second category, which can be explicit through individual/unit communication or implicit through norms and routines. This eliminates/reduces duplication of efforts and form basis for problem solving and decision making.

The third one, which is knowledge application, describes methods and mechanisms that an organization adopts to use available knowledge to improve its processes, products and services and organizational performance thus making it "more active and relevant for the organization in creating values" (Bhatt, 2001). Knowledge creation, which is the fourth category, focuses on development of new skills, new products, better ideas and more efficient processes. (Probst, Raub & Romhardt, 2000). This refers to internal activities an organization undertakes to encourage development of new ideas through innovation that can help improve processes and products/services.

1.1.2 The Teachers Service Commission (TSC)

Teachers Sevice Commission was established in 1967 by an Act of Parliament, Cap. 212 of the Laws of Kenya. The Kenya Constitution has mandated TSC to carry out the Teacher Management (TM) function for all public educational institutions. The TM function involves conducting the following roles.

1. Register trained teachers
2. Recruit and employ registered teachers
3. Assign teachers employed by the Commission for service in any public institutions
4. Promote and transfer teachers
5. Exercise disciplinary control over teachers
6. Terminate the employment of teachers.
7. Review the standards of education and training of persons entering the teaching service
8. Review the demand for and supply of teachers
9. Advise the national government on matters relating to the teaching profession

These services coupled with the explosion of Information Communication Technology (ICT) feeds teachers' and other stakeholders' thirst for knowledge engendering a growing awareness of the right to information. In turn a greater need for efficiency and effective communication with stakeholders at the headquarters and TSC units has emerged.

1.2 Statement of the Problem

Smooth information flow and communication is crucial for effective decision making. Currently, a lot of TSC information is collected, stored and processed using documents, disparate Information Systems and in organization practices internalized by employees. Organizational turnover has also created challenges in the form of knowledge retention and knowledge access. Inadequate information access due to information storage challenges is a major problem that hampers proper service delivery at all levels within the TSC.

1.3 Rationale

Teachers Service Commission (TSC) amasses a great deal of confidential information about its employees, management and financial transactions. As per the requirements of the Kenya Constitution, the Commission plans to decentralize most of its functions and services to the Counties. Feedback of right information to the headquarters will be important for decision-making. 'Effective Service for Quality Teaching', as a vision for Teachers Service Commission (TSC), can only be achieved if adequate and correct information is accessed at the right time and the right place.

Knowledge Management (KM), therefore, becomes important to TSC as a strategic effort to address some of the above challenges and lead towards increased effectiveness, efficiency and productivity by leveraging information and knowledge embedded in people, documents, processes and organization practices.

1.4 Significance of the Study

This study developed a framework that will assist organizations in the Public Sector in application of KM best practices in line with values like "efficiency, effectiveness and productivity" in service delivery. Managers will know knowledge-intensive tasks within the overall business process. The study also provided a KM model that leverages on information and knowledge available in the Teachers Service Commission thus avoid duplication and improve information access.

1.5 Objectives of the Study

The study seeks to accomplish the following objectives.

(i) To undertake an in-depth literature review on current Information Management practices in the Public Sector with an aim of contextualizing a suitable KM framework.

(ii) To conduct knowledge mapping exercise at the TSC with a view of addressing the real information access needs.

(iii) To determine the major knowledge-intensive activities undertaken by the organization.

(iv) To develop a suitable KM Model for the Public Sector that leverages available information and knowledge.

1.6 Research Questions

(i) How do existing KM strategies inform the recommended Knowledge Management framework?

(ii) What are the current Information Management practices at the TSC and major knowledge-intensive activities undertaken by the organization?

(iii) What knowledge-oriented model can be recommended?

(iv) What activities, tools and techniques comprise Knowledge Management according to best practice?

(v) How can the proposed Knowledge Management strategy enhance the decision making process, improve information flow and reduce duplication?

1.7 Assumptions and Limitations of Study

The study assumed that Information Management is practiced to some extent in the Public Sector specifically TSC and that available information is digital. The study targeted organizations in the Public Sector and narrowed down to Teachers Service Commission (TSC) headquarters and secretariat staff, mostly management. The study was limited to the core services offered by TSC within its Teacher Management function. Potential negative factors e.g. inadequate computer availability could limit selection of a suitable KM approach.

1.8 Definition of Key Terms

Data: raw facts and figures which are processed into information

Information: summarization of data which has been given meaning by way of context

Knowledge: information combined with understanding and capability in the minds of people

Explicit knowledge: knowledge that has been documented or articulated into formal language (codified) in order to be more easily transferred among individuals. Knowledge in the common domain within organizational systems and can easily be acquired, measured and ascertained. Example: policies, procedural guides, white papers, reports, designs, strategies, goals, missions and core competencies of the organization & IT infrastructure.

Tacit knowledge: personal knowledge embedded in individual experience and involving intangible factors such as personal belief, perspective and values i.e. knowledge held in peoples' minds.

Implicit Knowledge can be defined as Knowledge that has not yet been "put together" either by expression, concept development, assumptions that lead to principles, or through analysis of facts or theory.

Infinite assets: knowledge possessed by employees in an organization

Knowledge Management (KM): tools, techniques and strategies to retain, analyze, organize and share expertise

Knowledge base: digital database of explicit corporate organization intellectual assets; also known as repository.

Best practices: techniques believed to constitute a paradigm of excellence in a particular field

CommonKADS: Knowledge Acquisition and Documentation Structuring (KADS) is a structured way of developing knowledge-based systems (expert systems).

Collaboration: a human social skill that enables us to work as teams to achieve more than could be accomplished alone

Context: that which surrounds and gives meaning to a situation or event

Corroborate: to strengthen, support or confirm with other evidence

System: a group of interacting, interrelated or interdependent components working together as a unit

Workflow: step-by-step process and progress of work

Information overload: a state where the individual is no longer able to effectively process the amount of information to which he or she is exposed

Document management system (DMS): technology designed to facilitate the capture, storage, and sharing of electronic documents

Version control: used to keep track of document revisions

Social capital: ability to communicate with others from both inside and outside an organization for information, advice and solutions

Social network: differ from technological networks in that they derive more strength from adaptation rather than optimization

Heuristic: a rule of thumb based on years of experience

Communities of Practice: a group that forms and functions together to share information and knowledge about a common area, issue or topic.

CHAPTER TWO

LITERATURE REVIEW AND THEORY

A framework is a structure, set of assumptions, concepts, values that constitute a way of viewing reality. The following is a summary of background information reviewed that also forms the conceptual framework for the study.

2.1 The Concept of Knowledge Management

Basically, knowledge can be categorized as explicit and tacit knowledge. Explicit knowledge is documented, articulated into formal language (coded), formally expressible and easily communicable; whereas, Tacit knowledge is the cumulative store of experiences, mental maps, insights, acumen, expertise, know-how, trade secrets, skills set, understanding and learning that an organization has as well as organizational culture embedded in the past and present experiences of its people, processes and values (Turban and Aronson 2001). It is expressed through action used by employees to perform their work and achieved during socialization, face-to-face meetings etc. Implicit Knowledge can be defined as Knowledge that has not yet been "put together" either by expression, concept development, assumptions that lead to principles, or through analysis of facts or theory.

2.2 Concept of Knowledge Management in Public Sector

The Public Sector is a part of the state that deals with the production, delivery and allocation of goods and services by and for the government or its citizens, whether national, regional, and local/municipal. Under the Kenya Constitution, Teachers Service Commission (TSC) is an autonomous body within the public service with the exclusive mandate to carry out the Teacher Management function for all public educational institutions.

For the purpose of this study, Misra's 2007 cited in Jain (2009) approach is adopted, who defines Knowledge Management for government (KM4G) as "leveraging knowledge for improving internal processes, for formulation of sound government policies and programmes and for efficient public service delivery for increased productivity".

Knowledge Management compliments other management and learning initiatives and adds value to them through an action-based, goal-oriented and holistic approach. By managing knowledge, the Public Sector can leverage efficiencies across all public services through accessing the right information for making informed decisions and eliminating duplication of effort in its various branches. Public Sectors around the world are striving to

be ever more efficient and effective in order to deal with the constantly evolving needs of their citizens. This is so because, "increasingly, customers of the Public Sector are demanding higher service quality.

2.2.1 Knowledge Management Applications and Techniques

To solve common problems, Public Sectors around the world have introduced several reforms with e-government being one of the most recent. Knowledge Management can offer a number of applications and techniques to e-government (Priti Jain, 2009:5)

2.2.1.1 Community of Practice (CoP) To Capture and Share Knowledge

"Communities of practice"(CoPs), are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Jashapara, 2004:203 as cited in Jain 2009). CoPs produce mutual practices as members engage in a collective process of learning. CoPs can be online, digital and face-to-face. They can be informal and formal, within the government, outside the government, with private sector, citizens', rural communities, and non-government organizations. Tacit knowledge in government can often be more important than explicit, however, capturing tacit knowledge remains a major challenge. No technology or database can capture all knowledge. CoPs have proved the most powerful tools for learning and sharing knowledge for intellectual interaction and experience. They can be used to capture retired and older government employees' knowledge; connect information silos in various Public Sector divisions and market government's new initiatives.

2.2.1.2 Knowledge Organization Tools

Knowledge organization tools as cited by Jain (2009) can be very useful for e-government content organization. There are many knowledge organization tools borrowed from library and information science such as thesauri, classification schemes, subject heading schemes, taxonomies and ontologies, knowledge maps, intranet, discussion list archives, e-mail archives, websites.

2.2.1.3 Knowledge Maintenance Tools

Maintenance of knowledge involves reviewing, refining, preserving and updating both implicit and explicit knowledge. Knowledge Management is meaningful only when

the right time and in the right format in a cost effective way. To achieve this, Knowledge Management emphasizes the importance of knowledge maintenance both in quality and quantity.

2.2.1.4 Social Network Analysis (SNA)

Similar to knowledge mapping, SNA is a tool to analyze how nodes and users are interlinked. It maps and measures the relationships and flows between people, groups, organizations, computers, and websites or other information and knowledge processing entities and presents a visual and mathematical analysis. SNA identifies knowledge brokers and connectivity gaps. This is an essential activity for Knowledge Management in e-government, to measure and ensure the smooth flow of knowledge.

2.2.1.5 Knowledge Harvesting

Knowledge harvesting is a new dimension in the established field of Knowledge Management system that is used to elicit a contributor's tacit knowledge. It can be a very useful technique in capturing employees' tacit knowledge and making it accessible to others. Information technology has provided numerous systems for knowledge harvesting, such as, Electronic Document and Records Management (EDRM), Enterprise content management which are being used in many e-portals.

2.2.1.6 Knowledge Management Portals

Knowledge Management portals are other Knowledge Management tools "to extract analyze and categorize both structured and unstructured information, and reveals the relationship between content, people, topics and user activities in the organization. They can provide users with many interactive facilities such as e-mail, chat rooms, personalized news, search engines, and external links.

2.3 KM Strategies

Processes and policies are important to provide a roadmap on how government knowledge can be better managed. The Knowledge Management (KM) strategy is the foremost important document in initiating Knowledge Management practice. It is like an integrated framework to maximize organizational capabilities and leverage existing knowledge. It should be based on the real needs of the government, gathered through a knowledge mapping and knowledge auditing exercise, and should be an all-encompassing

strategic planning document, aligned with government mission and vision. It must include a Knowledge Management vision, mission, and background, challenges, implications and entire action plan.

A survey of various Knowledge Management (KM) strategies that have been proposed shows that the major difference between the various approaches is the emphasis on different aspects of Knowledge Management; some strategies focus on the knowledge, others on the business processes/areas, and others on the end results. However the elusive and dynamic nature of knowledge results in a cycle in which *data* is filtered to produce meaningful *information* and this information is then abstracted and codified to produce useful *knowledge*. As the knowledge is applied in diverse situations it produces new experiences in an uncodified form that produces the data for a new cycle of knowledge creation. A synthesized approach (Binney, 2001) that identifies different techniques that are applicable for different types of Knowledge Management seems feasible as shown in table 1:

Table 1: Survey of various Knowledge Management (KM) strategies as cited by Knox, H and John K., (June 2003)

KM BY KNOWLEDGE		KM BY BUSINESS PROCESS		KM BY END RESULT		A SYNTHESISED APPROACH
BOISOT,1998	**Nonaka & Takeuchi,1995**	Karl Wiig,1997 Manasco, 1996	Day & Wendler, 1998 of McKinsey & Company	Zack, 1999	Treacy & Wiersema, 1993	Binney, 2001
"Social Learning Cycle" (SLC) that uses the I-Space to model the dynamic flow of knowledge through a series of six phases: ***Scanning:*** insights are gained from generally available (diffused) data ***Problem-Solving:*** problems are solved giving structure and coherence to these insights (knowledge	*Knowledge creation ***through*** four modes of knowledge conversion ***socialisation*** (from tacit to tacit, whereby an individual acquires tacit knowledge directly from others through shared experience,	*six emerging KM strategies in a study of organisations **Knowledge Strategy as a Business Strategy** ->A comprehensive, enterprise-wide approach to KM, where frequently knowledge is seen as the product. **Intellectual Asset Management Strategy** ->Focuses on assets already within the company that can	*five knowledge strategies employed by large corporations **Developing and Transferring Best Practices** →Like the "Knowledge Transfer Strategy" identified by Wiig and the APQC, this strategy focuses on identifying best practices within an organisation and spreading them across a dispersed network of	*framework which helps an organisation make an explicit connection between its competitive situation and a Knowledge Management strategy to help the organisation maintain or (re-)establish its competitive advantage	*proposed three "value disciplines," as a way to focus an organisation's activities -Customer Intimacy □Product Leadership -Operational Excellence (Organisation	* focus is on the KM activities that are being carried out, grouped into six categories: ***Transactional KM:*** Knowledge is embedded in technology. ***Analytical KM:*** Knowledge is derived from external data sources, typically focusing on customer-related information.

becomes 'codified') ***Abstraction***: the newly codified insights are generalised to a wide range of situations (knowledge becomes more 'abstract') ***Diffusion***: the new insights are shared with a target population in a codified and abstract form (knowledge becomes 'diffused') ***Absorption***: the newly codified insights are applied to a variety of situations producing new learning experiences (knowledge is absorbed and produces learnt behaviour and so becomes becomes 'uncodified', or	observation, imitation and so on); ***externalisation*** (from tacit to explicit, through articulation of tacit knowledge into explicit concepts); ***combination*** (from explicit to explicit, through a systematisation of concepts drawing on different bodies of explicit knowledge); and ***internalisation*** (from explicit to tacit, through a process of "learning by	be exploited more fully or enhanced. **Personal Knowledge Asset Responsibility Strategy** ->Encourage and support individual employees to develop their skills and knowledge as well as to share their knowledge with each other. **Knowledge Creation Strategy** →Emphasises the innovation and creation of new knowledge through R&D. Adopted by market leaders who shape the future direction of their sector. **Knowledge Transfer Strategy** -> Transfer of knowledge	locations. **Creating a new industry from embedded knowledge** ->This approach is to recognise that an organisation may have knowledge which it can exploit in new ways. In particular, it may have built up knowledge about its customers which reveals a gap in the market for a new product. **Shaping Corporate Strategy around knowledge** (innovation-based vs best practice) **Fostering and Commercialising Innovation** →Similar to the Knowledge	-> ***core, advanced*** **or** ***innovative*** -> SWOT analysis to identify gap by: ..Exploration vs. Exploitation This is "the degree to which the organisation needs to increase its knowledge in a particular area vs. the opportunity it may have to leverage existing but under-exploited knowledge resources."Internal vs. External Knowledge	& delivery process)	***Asset Management KM:*** Explicit management of knowledge assets (often created as a by-product of the business) which can be reused in different ways. ***Process-based KM***: The codification and improvement of business practice and the sharing of these improved processes within the organisation. ***Developmental KM:*** Building up the capabilities of the organisation's knowledge workers through training and staff development.

'tacit') ***Impacting***: abstract knowledge becomes embedded in concrete practices, for example in artefacts, rules or behaviour patterns (knowledge becomes 'concrete')	doing" and through a verbalisation and documentation of of experiences).	and best practices in order to improve operational quality and efficiency. **Customer-Focused Knowledge Strategy** ->Aims to understand customers and their needs and so provide them with exactly what they want.	Creation Strategy identified by Wiig and the APQC, this strategy focuses on establishing a competitive position by increased technological innovation and reduced time to market. **Creating a standard by releasing proprietary knowledge** ->The example of Netscape is cited as a strategy for "Intellectual Asset Management Strategy" identified by Wiig and the APQC study (1997).			***Innovation/creation KM:*** Fostering an environment which promotes the creation of new knowledge, for example through R& D and through forming teams of people from different disciplines.

2.4.1 Analysis of KM strategies

According to Knox and John (2003), given that the classifications by knowledge listed in table 1, (Nonaka & Takeuchi's knowledge matrix and Boisot's I-Space model) focus on the process of knowledge transformation, and that most real world processes operate on a continuum rather than a step transformation, it is perhaps not surprising to find that some researchers have suggested that "explicit" and "tacit" knowledge should be considered to be at the ends of a spectrum of knowledge types rather than being the only two categories on that spectrum. These are Beckman (Beckman, 1999) who suggested that "implicit" knowledge is an intermediate category of knowledge that is tacit in form, but is accessible through querying and discussion and Nickols (Nickols, 2000) who proposes that Nonaka & Takeuchi's categories are broken down according to whether they focus on declarative or procedural knowledge.

What is needed is a classification that proposes a spectrum of Knowledge Management approaches. Derek Binney (Binney, 2001) provides a framework, 'The KM Spectrum', to help organisations make sense of the large diversity of material appearing under the heading of KM, and to help them assess where they are in KM terms. His focus is on the KM activities that are being carried out, grouped into six categories. For each of these categories of KM, Binney lists several examples of KM Systems or approaches that support them—see tables 2, 3 & 4 as cited by Knox and John (2003) ;

Table 2: KM Spectrum and Applications (Binney, 2001)

Transactional	Analytical	Asset Improvement	Asset Management	Process	Develop-mental	Innovation and Creation
-Case Based Reasoning (CBR) -Help Desk Applications -Customer Service Applications -Order Entry Applications -Service Agent Support - Applications	-Data Warehousing -Data Mining -Business Intelligence -Management Information Systems -Decision Support Systems -Customer Relationship Management (CRM) -Competitive Intelligence	-Timetabling -Job shop scheduling -Configuring layouts -Time & Motion studies -Supply chain management -Allocation of resources	-Intellectual Property -Document Management -Knowledge Valuation -Knowledge Repositories -Content Management	-TQM -Benchmarking -Best Practices -Quality Management -Business Process (Re) Engineering -Process Automation -Lessons Learned Methodology -SIE/CMM, ISO9xxx, Six Sigma	-Skills Development -Staff Competencies -Learning -Teaching -Training	-Communities -Collaboration -Discussion Forums -Networking -Virtual Teams -Research and Development -Multi-Disciplined Teams

Table 3: KM Spectrum mapped against other KM Classifications

KM Spectrum	Transactional	Analytical	Asset Management	Process	Developmental	Innovation & Creation
K. Accessibility:	explicit		Implicit		Tacit	
K. Conversion:	combination		Externalisation		internalisation	socialisation
SLC (Boisot)	Problem Solving	Scanning / Abstraction	Impacting		Diffusion	Absorption
K. Type	Mostly procedural	Mostly declarative	Declarative	Procedural	Either	Either
Value Disciplines (Treacy & Wiersema, O'Dell & Grayson)	Operational Excellence	Customer Intimacy	Any	Operational Excellence	Any	Product Leadership
KM Strategies (Wiig/APQC)	Knowledge Transfer	Customer-Focused Knowledge	Intellectual Asset Management	Knowledge Transfer	Personal Knowledge Asset Responsibility	Knowledge Creation
KM Strategies (Day & Wendler)	Developing and transferring best practices	Creating a new industry from embedded knowledge	Creating a standard by releasing proprietary knowledge	Developing and transferring best practices	Transferring best practices	Fostering and commercialising innovation
K. Strategy type (Zack)	conservative (exploiting existing knowledge)				aggressive (creating new knowledge)	

For each element of the spectrum, Binney also lists a set of enabling technologies used to implement those kinds of KM Applications. This provides an alternative way to identify KM activity already being undertaken within an organisation, even if not previously perceived in KM terms.

NB: Classifications of Asset Improvement against the Knowledge Management perspectives of Table 3 would therefore be:

Knowledge Accessibility: Explicit; Knowledge Conversion: Combination; Knowledge Type: Mostly procedural; Value disciplines: Operational excellence; KM strategies (Wiig): Intellectual asset management; KM strategies (Day & Wendler): Developing best practices; KM strategy type (Zack): Conservative

Table 4: Enabling technologies mapped to the KM Spectrum (Binney, 2001)

Transactional	Analytical	Asset Improvement	Asset Management	Process	Develop-mental	Innovation & Creation
• Expert Systems • Cognitive Technologies • Semantic Networks • Rule-based Expert Systems\ • Probability Networks • Rule Induction Decision Trees • Geospatial Information Systems	• Intelligent Agents • Web Crawlers • Relational and Object DBMS • Neural Computing • Push Technologies • Data Analysis and Reporting Tools	• Linear Programming • Genetic Algorithms • Ant colony programming • Operational Research techniques	• Document Management Tools • Search Engines • Knowledge Maps • Library Systems	• Workflow Management • Process Modelling Tools	• Computer-based Training • Online Training	• Groupware • e-Mail • Chat Rooms • Video Conferencing • Search Engines • Voice Mail • Bulletin Boards • Push Technologies • Simulation Technologies

2.4.2 Features of the KM Spectrum

Several features that differentiate Knowledge Management approaches can be observed from this spectrum. The different approaches have different specializations; for example, there is a left-to-right transition from techniques that are good for managing explicit knowledge to techniques that are good for managing tacit knowledge, with techniques for managing Beckman's category of implicit knowledge falling in the middle of the spectrum. There are several other transitions, too: the degree of individual choice (for the user of the managed knowledge) increases from left to right; the choice of tools or approaches for carrying out a knowledge based task increases from left to right; and the emphasis on the need for organizational change increases from left to right. It is clear that what is referred to as "Knowledge Management" actually consists of a range of techniques that address different organizational issues and needs.

There are two views of Knowledge Management described in Binney's knowledge spectrum above characterized as the "cognitive" view and the "community" view. The

There are two views of Knowledge Management described in Binney's knowledge spectrum above characterized as the "cognitive" view and the "community" view. The community view emphasizes knowledge as socially constructed and is managed primarily by encouraging groups and individuals to communicate and share experiences and ideas. The cognitive view regards knowledge in objective terms which can be expressed and codified, and is often expressed by the capture and codification of knowledge in computer systems.

However, as Binney points out, if Nonaka & Takeuchi's knowledge spiral is accepted, then the organization must be managing both explicit and tacit knowledge at all times in some way, in order for the knowledge spiral to keep flowing. This view is supported by Hansen and colleagues (Hansen et al, 1999 as cited by Knox and John 2003), who suggest that most organisations should operate with a mixture of an explicit codified knowledge strategy and a highly creative and customised strategy, but not in equal proportions. So it would seem that Binney's KM spectrum does identify different techniques that are applicable for different types of Knowledge Management, but that most organisations will be using two or more of these techniques, incorporating both a "cognitive" and a "community" approach, if their knowledge continues to grow or improve.

2.4.3 Selecting a KM Strategy

The split between the technophilic "cognitive KM" community and the technophobic "community KM" camp may be that Developmental KM and Innovation/Knowledge Creation KM are simply harder to support well with technology (or at least, knowledge-based technology) than the more "conservative" tasks to the left of the KM spectrum. Several factors need to be considered when deciding on a KM approach for an organisation as shown in table 5.

Table 5: Factors influencing the selection of a KM Strategy

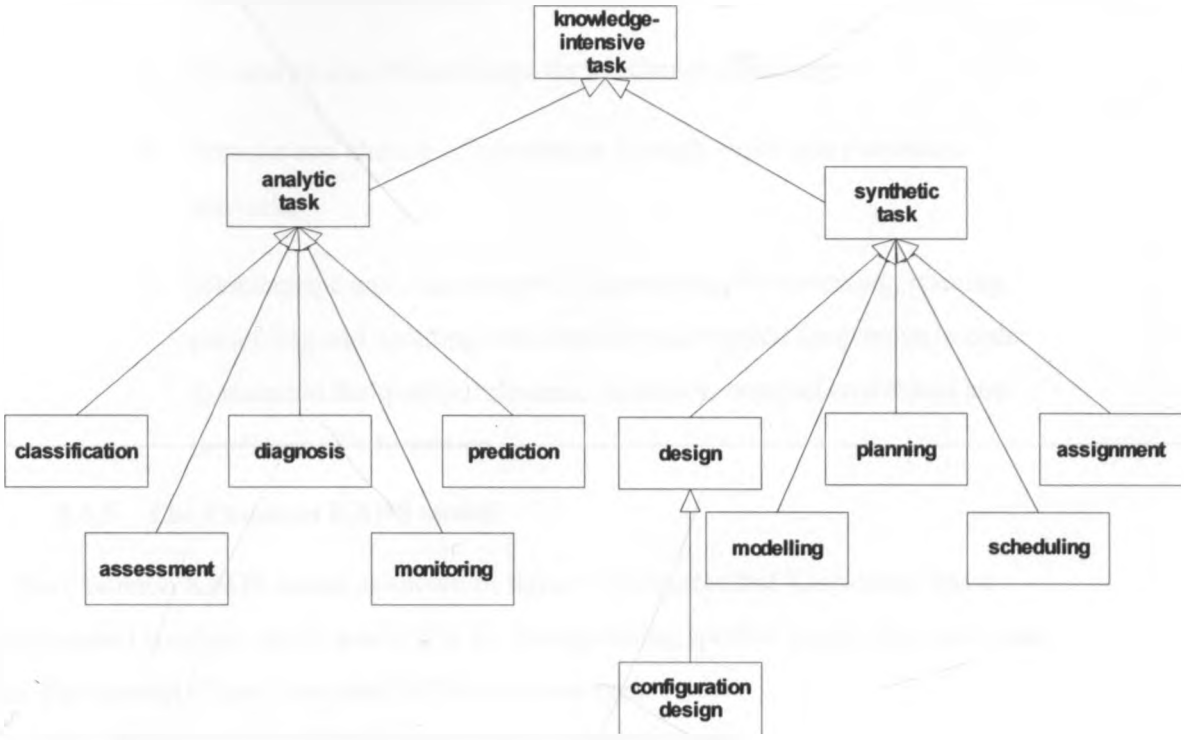
Factor	Examples
Current/Planned Knowledge Management Strategy	Goals, desired applications, technology capabilities, analytic/synthetic approach
Business Sector Characteristics	Highly regulated, Innovative, Risk factors,

Factor	Examples
	Competitiveness, Globalisation, etc.
Strengths, Weaknesses, Opportunities and Threats (SWOT)	Reputation, Leading product, Changing regulations, Acquisitions and Mergers, Globalisation, etc.
Value Focus	Operational Excellence, Product Leadership or Customer Intimacy
Organisational Structure	Hierarchical, Loose
Organisational Culture	Team spirit, Individualistic, Sharing, Learning
Nature of Knowledge	Explicit, Implicit or Tacit; Task Type; Symbolic/Numeric/Geometric/Perceptual

2.4.4 Combining KM spectrum and CommonKADS Methodology

The approach taken here is to devise a set of self-examination questions as shown in 'appendix A' that reflect each set of factors resulting to a new heuristic for choosing a Knowledge Management strategy in small, problem-focused situations. A popular approach to knowledge engineering is the very detailed CommonKADS (Knowledge Acquisition and Documentation Structuring) methodology (Schreiber et al, 2000). CommonKADS is a comprehensive methodology that also provides some guidance on Knowledge Management itself, in the form of a recommended knowledge-oriented organisational model. One of its most widely admired aspects is its classification of knowledge based tasks into knowledge types; a range of knowledge based task types are proposed (classification, diagnosis, assessment, configuration, planning, etc.), generally classified under "analytic" tasks (analysis of an existing situation or artefact) and "synthetic" tasks (generation of a new situation or artefact). So if the knowledge related process requires solving problems that fall into one of CommonKADS' task types, consider approaches from the left side of the KM spectrum if not, consider approaches from the right side as shown in figure 3.

Figure 3: Classification of knowledge based tasks



Adapted from commonKADS (Schreiber et al, 2000)

2.4 Implementation Model

The researcher wishes to adopt the Binney/common KADS KM strategy and test in a specific organizational setting. The strategy consists of a range of techniques that address different organisational issues and needs. Key steps towards implementation;

- Knowledge mapping in order to identify and address the real knowledge needs and problems of TSC
- Formulation of a Knowledge Management strategy (framework) based on the knowledge mapping findings
- Raise awareness of Knowledge Management strategy benefits at key levels of service to win the support from management
- Provide guidelines for:

    1. Identification, creation and capture of new knowledge;

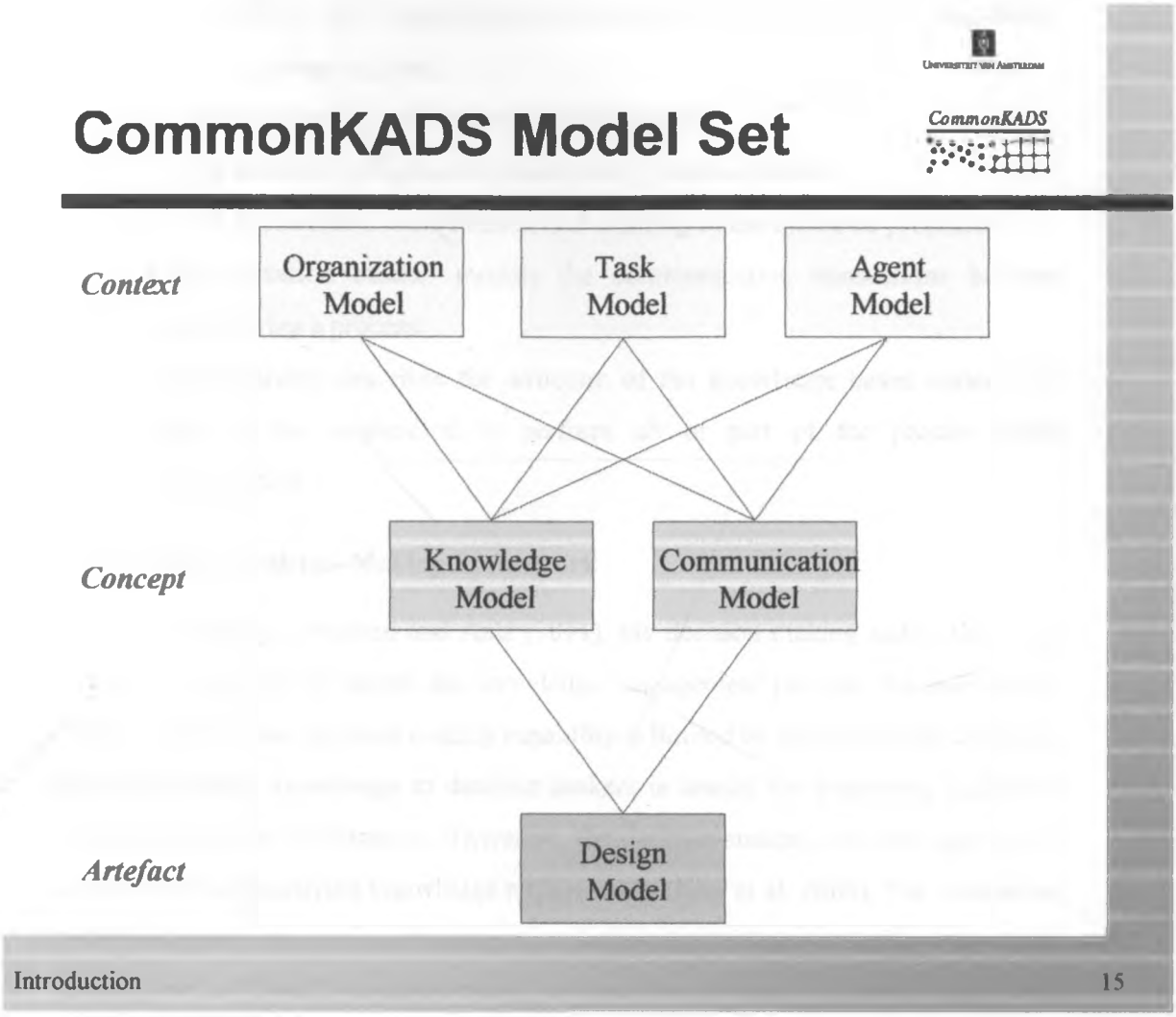
2. Storage and organization of all important knowledge for easy retrieval and increased effectiveness and efficiency;
3. Use and re-use of knowledge for maximum efficiency;
4. Transfer and sharing of knowledge through social and electronic networks
5. Maintenance and Assessment of Knowledge; by reviewing, refining, preserving and updating both implicit and explicit knowledge in order to maintain the quality, relevance, accuracy, comprehensiveness and timeliness of information.

2.4.5 The Common KADS model

The Common KADS model as shown in figure 4 advocates that Knowledge has a stable internal structure that is analyzable by distinguishing specific knowledge types and roles. The context of the CommonKADS Model set has;

1. The Organizational Model for creating a knowledge map.
2. The Task Model for charting out where the knowledge is used. Knowledge items are central in KM.
3. The Agent model for analyzing who owns the knowledge and who uses it.

Figure 4: Common KADS



(Adapted from commonKADS (Schreiber et al, 2000))

Common KADS recommends construction of six models

1. Organization model – represents the processes, structure and resources within an organization
   (a) supports analysis of an organization,
   (b) Goal: discover problems, opportunities and possible impacts
2. Task model –shows the tasks carried out in the course of a particular process; tasks that are performed or will be performed in the organizational environment
3. Agent model –represents the capabilities required of the agents who perform a process and constraints on their performance. (agent = executor of task)

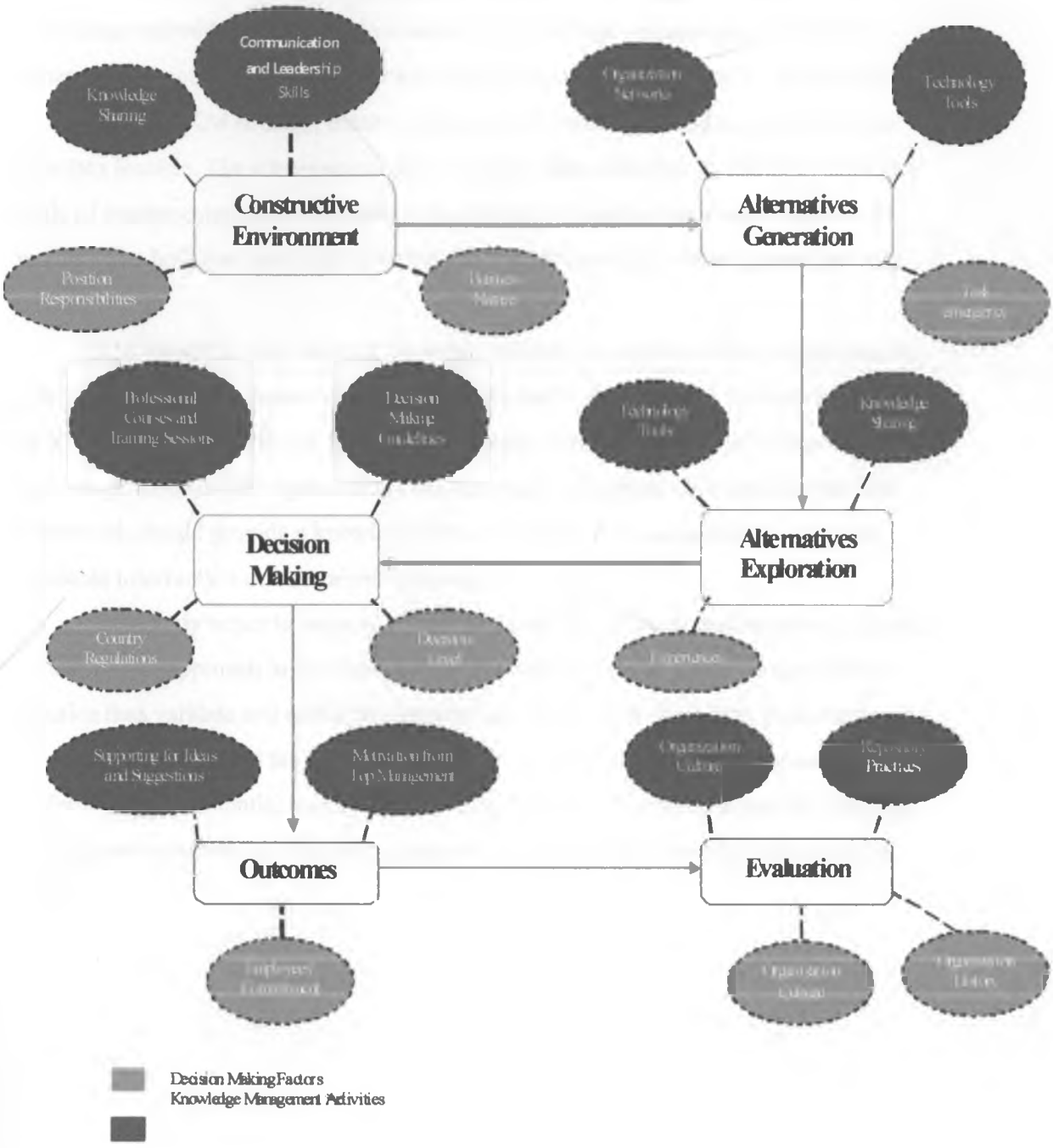
4. Knowledge model –expertise required to perform a particular task.
    (a) Gives an implementation-independent description of knowledge involved in a task.
    (b) Declarative knowledge about the domain
    (c) Inference processes required during problem solving
    (d) Hierarchical classification and ordering of the inference processes
5. Communication model- models the communicative transactions between agents during a process.
6. Design model- describes the structure of the knowledge based system that needs to be constructed to perform all or part of the process under consideration.

2.4.6 Decision-Making Framework

According to Noman and Aziz (2011), the decision making action should be used as a supporter to enable the knowledge management process. An individual's problem solving and decision making capability is limited by the knowledge available. Having available knowledge to decision makers is crucial for improving individual and organizational performance. Therefore, the decision-making oriented approach is a valid way of identifying knowledge requirements (Kim et al, 2004). The connection between decision making and knowledge management has been related by knowledge sharing method. Insufficient information will lead to misleading solutions. Employees will work much better if all the necessary information is provided by the organization or leader.

Figure 5 embeds the knowledge management practices with the decision making framework thus giving a holistic view.

Figure 5: Decision flow



Adopted from Decision Making Model Supported by KM Activities (Bowett, 2009) & (Mindtools, 2010) as cited in Marwan, H., and Azira, A. (2011)

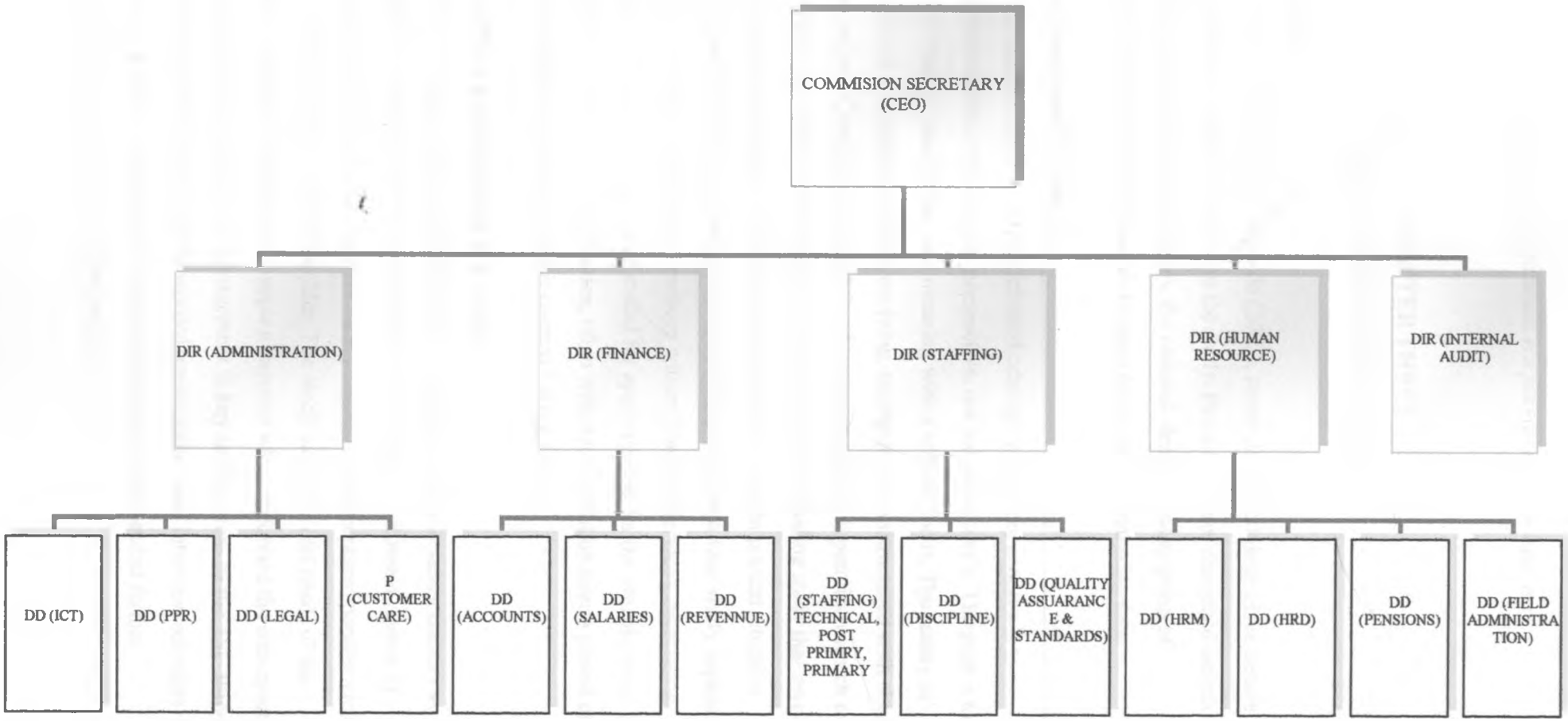
2.5 Link between Research Framework and Defined Problem

The study was motivated by practical concerns of leveraging information and knowledge embedded in people, documents, processes and organization practices to enhance information flow and better service delivery in the Public Sector. It is hoped that by applying this KM strategy, better management of intellectual and knowledge assets becomes feasible. The robustness of any strategy is determined by its ability to stand the trials of implementation in a dynamic environment. A practical approach towards KM requires that both the social and technical aspects of Knowledge Management are fully addressed.

KM should be seen as being embedded within the context of the changes that are affecting public management more widely. This can be done through Knowledge Mapping (refer to appendices A, B, C). Knowledge mapping involves location of intellectual and knowledge assets in the organization. The information generated in context of the KM framework should provide a knowledge-oriented model that manages and leverages available information as a sustainable strategy.

This study hopes to make a contribution to a line of theory and empirical research, by testing this approach in the context of a case study (TSC) knowledge organization practice thus validate and enrich the Binney/Common KADS theoretical perspective. It is important to understand the "institutional logic" of organisations in order to avoid undermining the potential impact of the strategy. Figure 6 therefore shows the TSC top management structure and this also represents various information silos in key service areas.

Figure 6: TSC Top Management Chart



CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

According to Mugenda and Mugenda (2003), research methodology gives details regarding the procedures used in conducting the study. Pertinent issues discussed include the population, sample and sampling techniques, the research design, a description of instruments/tools used to collect data and techniques to be used in analyzing data.

3.2 Research Design and Justification

The study utilized qualitative research methodology whose key concern is to understand phenomena from participants' perspective, not the researcher's. The goal is to provide an understanding, description, and meaning with a holistic focus. The reality of design characteristics is dynamic, flexible, evolving, emergent and unstructured with changes in people's perceptions. Qualitative research is advantageous in that it permits research to go beyond statistical results. Descriptive method of research is a fact-finding study that involves adequate and accurate interpretation of findings according to a certain present situation.

The study employed the descriptive research design utilizing a **case study** approach in order to reveal Knowledge Management practices within Teachers Service Commission (TSC) and establish a knowledge-oriented model for applying KM for the organization. A case study" consists of a detailed investigation, often with data collection over a period of time, of phenomena under study within their context." King (2004)

3.3 Sources of Data and Relevance to Problem

Data from literature review was collected from primary and secondary sources as well as similar organization best practice in Knowledge Management. Document review of existing KM strategies employed the multiple view perspective that captured parallel views and avoided domination by any one stakeholder. The study based the real needs of the Commission by conducting a knowledge mapping exercise which informed the conceptual framework. This was later validated by management in key service areas of the TSC through structured interviews involving a carefully worded questionnaire and interview schedule. In depth interviews as well were used as a follow-up to responses that needed further clarification by the researcher thus providing insight.

3.4 Description of Sample and Sampling Procedures

Non-probability sampling is used when a researcher is not interested in selecting a sample that is representative of the population. Non-random sampling implies that the researcher deliberately selects the items to the sample' (Ratio, 2007 as cited in Marwan, H., and Azira, A. 2011). Since this is a qualitative study, the focus was on in-depth information and not making inferences or generalizations. The non-random method chosen for this study is judgmental or purposive sampling. Purposive sampling is a technique that allows a researcher to use cases that have the required information with respect to the objectives of the study. It is very useful to prove a concept or principle from the study. 'The researcher only interviews those people who in his/her opinion are likely to have the required information and be willing to share it' (Kumar, 2005: 179 ibid).

The sample chosen for this study was small, non-random, purposive, and theoretical. The primary data was collected from heads of service areas from the 5 departments within TSC management structure. The answers were from individuals that have different authorities and participate in the decision making process hence homogeneity.

3.5 Data Collection Procedures And Justification

According to Gathenya (2008:43), data collection techniques allow for the systematic collection of information about people, objects and phenomena within settings in which they occur. The Researcher was the primary instrument for data collection and analysis that involved observations, interviews, review of case studies and document review. The study employed an inductive research strategy. Data collection procedures also included methods of corroborating information obtained. Three methods were used to collect the qualitative data.

(a) Direct observation where the required behaviour was observed in a particular setting. This also included participant observation where data was collected by the researcher who is a regular full time participant in the activities being observed i.e. through long term interaction.

(b) Use of detailed questionnaire to enhance the collection of reliable and relevant data. Data was collected by administering the instruments "live" to respondents to facilitate any clarification required.

(c) Interview method which was done as a face-to-face interaction with the researcher using an interview schedule.

Before interacting with participants, permission was sought directly or through telephone conversations. The questionnaire was also tested for clarity with some respondents and it was improved accordingly.

3.6 Description of Instruments

3.6.1 Observation Schedule

One of the instruments used in this study was the observation schedule. This involves direct observation of selected aspects especially on behaviour in order to develop a holistic perspective and fully understand the context e.g. employee perception towards adopting Knowledge Management practices. The participant may be unaware, unable or unwilling to discuss in an interview session. Participant observation by the researcher was therefore applied using questions in 'appendix A' that mostly sought to provide organizational level information.

3.6.2 Document Review

The study used document review extensively which involved use of a range of resources to provide relevant subject matter for the problem. This composed books including e-books, journals (search by date of publication) and internet. On analysis of available literature, a theoretical model was developed that formed the basis for collection and analysis of data.

3.6.3 Interview Schedule

The purpose of the interview is to translate research objectives into specific questions whose answer provide necessary information. This schedule was carried out hand in hand with the observation schedule and involved in-depth interviews with decision makers. However probing was time consuming and sometimes subjective.

The interview schedule used (Appendix C), had nine questions all focused on the decision making and information flow. Specific questions on knowledge mapping required information on sources and quality of knowledge, important process based knowledge, agents of knowledge including their functions and constraints experienced during decision making.

3.6.4 Questionnaire

For this study, a two-part questionnaire (appendix B) was designed by the researcher for getting information on current knowledge practices in TSC. The variables were based on KM best practice of knowledge capture and acquisition, knowledge sharing, knowledge creation, knowledge application. The KM spectrum framework and common KADS

knowledge oriented model were also informed by responses to specific questions. The nine-page questionnaire used included questions related to the organisation as a whole, the nature and use of knowledge in the organization at present, and questions related to strengths, weaknesses, opportunities and threats.

In Section A, both open-ended and direct questions were used. A limited number of questions on background information such as gender, age, academic qualifications, leadership skills, work experience, employees under respondents' jurisdiction were included. Direct questions included types of services offered by the service area in line with the Teacher Management mandate and skills required for staff towards achieving Vision 2030.

Section B had four subsections that contained both closed and open-ended questions designed to answer research questions formulated. Subsection I had questions on knowledge practices used within various service areas. The response format used a five point scale. Subsection II had questions on reasons for using KM practices in level of importance. This also combined with subsection III which had questions to check on motivation levels for using KM practices. Sub section IV had a question on which group(s) within the organization would be best placed to take responsibility of Knowledge Management.

3.7 Data Analysis Procedures and Justification

Data analysis involved an iterative comparison of theory and empirical observations and was guided by the researcher's study objectives and theoretical framework. The analysis in turn suggested new theoretical formulations and new directions for the topic under study.

3.7.1 Qualitative Data Analysis

This refers to non-empirical analysis that may not require quantifiable data e.g. case studies. In such studies, the researcher is interested in analyzing information in a systematic way in order to come to some useful conclusions and recommendations. The researcher obtains detailed information about the phenomenon being studied and then tries to establish patterns, trends and relationships from the information gathered.

The mode of analysis is inductive (by researcher) and the procedure involves outline steps to be taken to analyze the data guided by the research questions or objectives. The findings are comprehensive, holistic, expansive, and richly descriptive and may involve thematic codification (establish categories that respond to study objectives/hypotheses). Qualitative data obtained are compatible with practice to make meaningful contribution to the organization by;

1. Analyzing and interpreting information to determine its adequacy, credibility, usefulness, consistency, and validation in answering the research questions.
2. Report writing which is done while analyzing citing significance and implications of the findings.

Analytical methods used during this qualitative study included:

(a) Document review analysis thus a conceptual framework, theoretical model (Binney KM spectrum) was developed that formed the basis for collection and analysis of data.

(b) Grounded theory which compares incidents applicable to each category then integrates with concepts.

(c) A thematic narrative uses themes that emerged through the organization of the data

(d) Participant observation through interpretative research (ethnography).

(e) Content analysis which is agreement about meaning associated with particular signs on close scrutiny

(f) Conversation analysis whose aim is to uncover implicit assumptions and structures

(g) Frequency tabulation

This study analyzed existing Knowledge Management frameworks and assessed components necessary to develop and sustain an effective KM in organizations in the Public Sector. The decision making process was examined using responses from in-depth interviews. The study also qualitatively analyzed information flows and knowledge intensive activities in the organization including current digital information generated with a view to determine adequacy to perform core services offered under the Teacher Management function of the TSC.

3.8 Limitations of Methodology

There were limitations of sampling method i.e. large vs. small mapping to generalization vs. information rich. A lot of clarity from respondents' information was needed in order to gain significance. Some respondents felt the question items were technical and too many. There was limited response rate due to the busy schedule of respondents. The reality of design characteristics is dynamic, flexible, evolving, emergent and unstructured with changes in people's perceptions. Although convenient and rich in information, interpretation and analysis of qualitative data depend a great deal on judgment thus prone to violation. The

nature and quality of knowledge is heuristic and may need standardization by the researcher. Due to high rates of change there's need to update methods.

CHAPTER FOUR

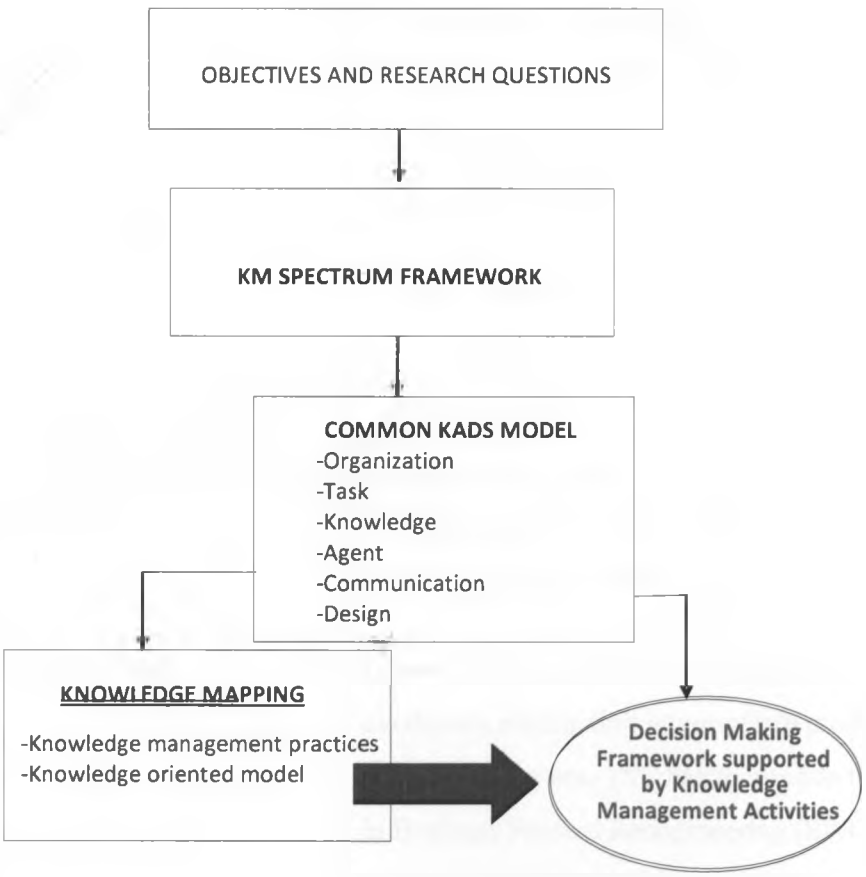
DATA ANALYSIS AND DISCUSSION

4.1 Introduction

The objective of this study was to determine various knowledge practices in the public sector and by validation through a case study recommend a knowledge management strategy that would leverage available knowledge in people, documents, process. A KM relational framework/ model as shown in figure 7 was therefore proposed as an implementation strategy in the public sector. The findings resulted from mapping the following knowledge frameworks against TSC organization practices;

1. KM spectrum framework
2. Binney/Common KADS knowledge oriented model
3. Decision making framework
4. Knowledge mapping findings

Figure 7: KM relational Framework



4.2 Teachers Service Commission (TSC)

The TSC is a Public Sector organization with the sole mandate of providing services on Teacher Management. An analysis was done for TSC using the KM spectrum and common KADS model.

4.2.1 Organizational Model

Table 6: Factors influencing the selection of a KM Strategy in TSC

Factor	Examples
Current/Planned Knowledge Management Strategy	**Goal**: Effective Service for Quality Teaching **Desired applications**: Fully networked and automated environment to enable knowledge sharing **Technology capabilities**: Towards automation of key Teacher Management processes Most **analytic** knowledge is automated while the **synthetic** knowledge is manual
Business Sector Characteristics	Highly regulated environment
Strengths, Weaknesses, Opportunities and Threats (SWOT)	TSC is an autonomous body with a clear mandate in the Kenya Constitution to carry out the Teacher Management function for all public educational institutions. However efficient information access remains a challenge.
Value Focus	**Operational Excellence**: This approach involves minimising overheads, eliminating intermediate production steps, optimising business processes. TSC has focused in this direction by investing in Business Process Reengineering (BPR) and Organization of International Standards (ISO) systems. **Product Leadership**: This requires a highly creative environment

	and the ability to bring new ideas to market quickly. In order to enhance interactivity, TSC has initiated online services through the Teachers Portal www.teachersonline.go.ke and email communication through info@tsc.go.ke **Customer Intimacy**: TSC has invested in a Customer Relation Management (CRM) system to collect information about its customers who are the teachers. This is towards shaping their services to match their customer's needs as closely as possible.
External drivers	TSC value discipline within the Public Sector and the Kenya Vision 2030 include: Value for money; Cost control; Political objectives; Customer focus; Modern governments.
Organisational Structure	**Hierarchical** similar to most organizations in the public sector
Organisational Culture	TSC has core values that can be classified within KM spectrum; Professionalism, Customer focus, Integrity, Innovativeness and Team Spirit. Knowledge sharing and Learning is practiced but not to optimal levels
Nature of Knowledge	**Explicit** through Information Systems and set procedures **Implicit or Tacit**; mostly stored as knowhow in employees **Task Type**; mostly Perceptual

This focus may therefore be more biased towards analytical KM or developmental KM (due to the customer focused aspects).

4.2.1.1 Knowledge Intensive Tasks

Information Systems within organizations act as facilitators of the KM process thus enhance faster and efficient adoption to system analysis techniques (any system is made up of inputs, outputs, processes, resources, and objectives) once enough situational information has been collected. In analyzing the knowledge- intensive activities, the TSC mandate functions

within its structure were considered. The current disparate Information Systems that serve the various functions were categorized as shown in table 7:

Table 7: TSC Knowledge Intensive Analysis

DIRECTORATE	DIVISION	FUNCTION	INFORMATION SYSTEM
ADMINISTRATION	TEACHER REGISTRATION(TR)	Register trained teachers	-FILE TRACKING SYS - DOCUMENT MANAGEMENT SYSTEM(DMS)
HUMAN RESOURCE (HR)	-FIELD ADMINISTRATION -Human Resource Development(HRD) -Human Resource Management(HRM) -PENSIONS	1. Recruit and employ registered teachers 2. Promote and transfer teachers 3. Terminate the employment of teachers	-IPPD (Integrated Personnel Payroll Database System) -TSC ONLINE SERVICES portal www.teachersonline.go.ke - DOCUMENT MANAGEMENT SYSTEM (DMS)
FINANCE	-SALARIES -ACCOUNTS -REVENUE	Administration of finance and payroll of employed teachers. Reconciliation of accounts.	-IPPD -IFMIS (Integrated Finance Management System)
STAFFING	-STAFFING PRIMARY -STAFFING POST-PRIMARY -STAFFING TECHNICAL	Assign teachers employed by the Commission for service in any public institutions	EMIS (STAT EDUC2)
	DISCIPLINE	Exercise disciplinary control over teachers	-CRM
	QUALITY ASSURANCE STANDARDS(QAS)	Review the standards of education and training of persons entering the teaching service	ICT integration activities in the teaching & learning process
	POLICY PLANNING AND RESEARCH(PPR)	Review the demand for and supply of teachers	TEACHER PROJECTION MODEL
MANAGEMENT		Advise the national government on matters relating to the teaching profession	

ADMINISTRATION	-GENDER -INTEGRITY -ICT -LEGAL -PUBLIC RELATIONS(PR) -AIDS CONTROL UNIT(ACU) -CUSTOMER CARE (CC)	Crosscutting issues and support of core functions	-TSC WEBSITE www.tsc.go.ke & E-MAIL SERVICES info@tsc.go.ke -TSC ONLINE SERVICES www.teachersonline.go.ke -CRM -BPR, ISO -Performance Contract and Appraisal System
INTERNAL AUDIT		Audit of processes & risk management	IDEA, TEAMMATE

The status of TSC in terms of its operational autonomy and levels of engagement with its stakeholders in effect demands a significant review of the Commission's structures, policies, procedures and overall mobilization and management of its knowledge resources. Knowledge Management will help the managers by providing adequate information for decision making.

Table 8: Mapping current Enabling technologies and applications in TSC against the KM Spectrum (Binney, 2001)

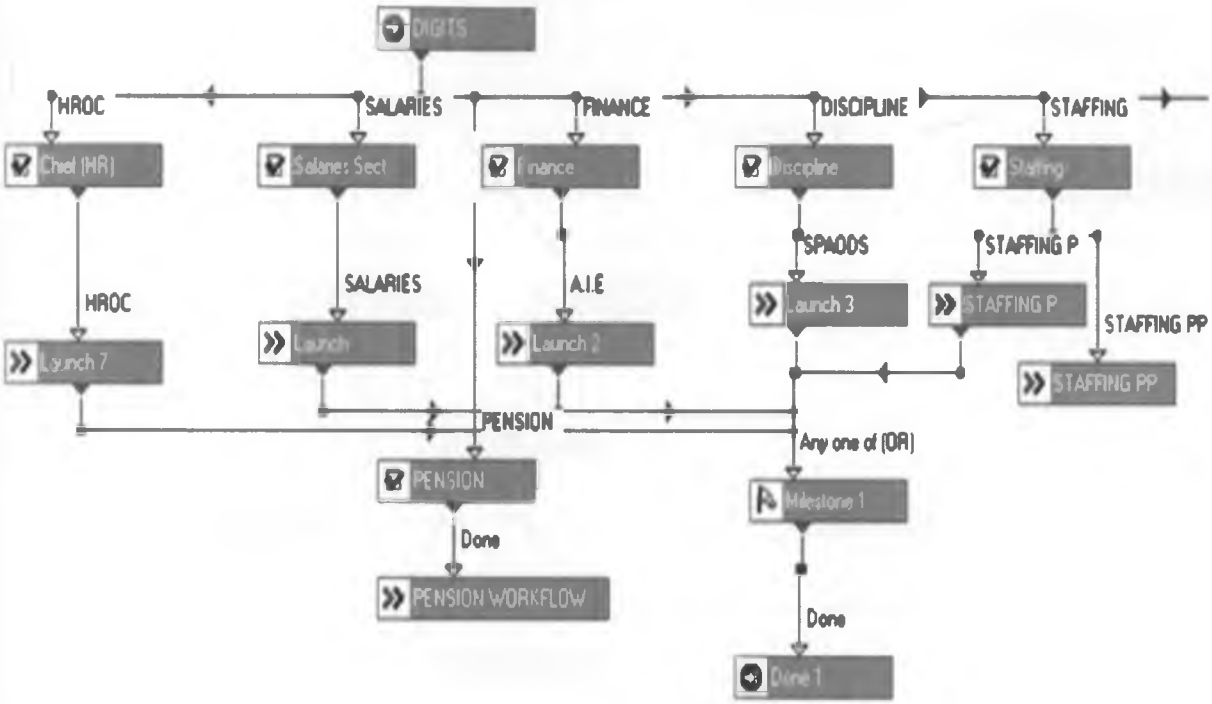
Transactional	*Analytical*	*Asset Improvement*	*Asset Management*	*Process*	*Develop-mental*	*Innovation & Creation*
Cognitive Technologies Help Desk Applications Other Applications	Relational and Object DBMS Data Analysis and Reporting Tools Management Information Systems Customer Relationship Management (CRM)	Operational Research techniques Supply chain management	Document Management Tools Library Systems Document Management system	Workflow Management Benchmarking Best Practices Quality Management Business Process Re-Engineering (BPR) Process Automation -ISO	Skills Development Staff Competencies Learning Training	e-Mail Discussion Forums Networking Multi-Disciplined Teams

NB: Most synthetic tasks to the right are manual

4.2.2 Task Model

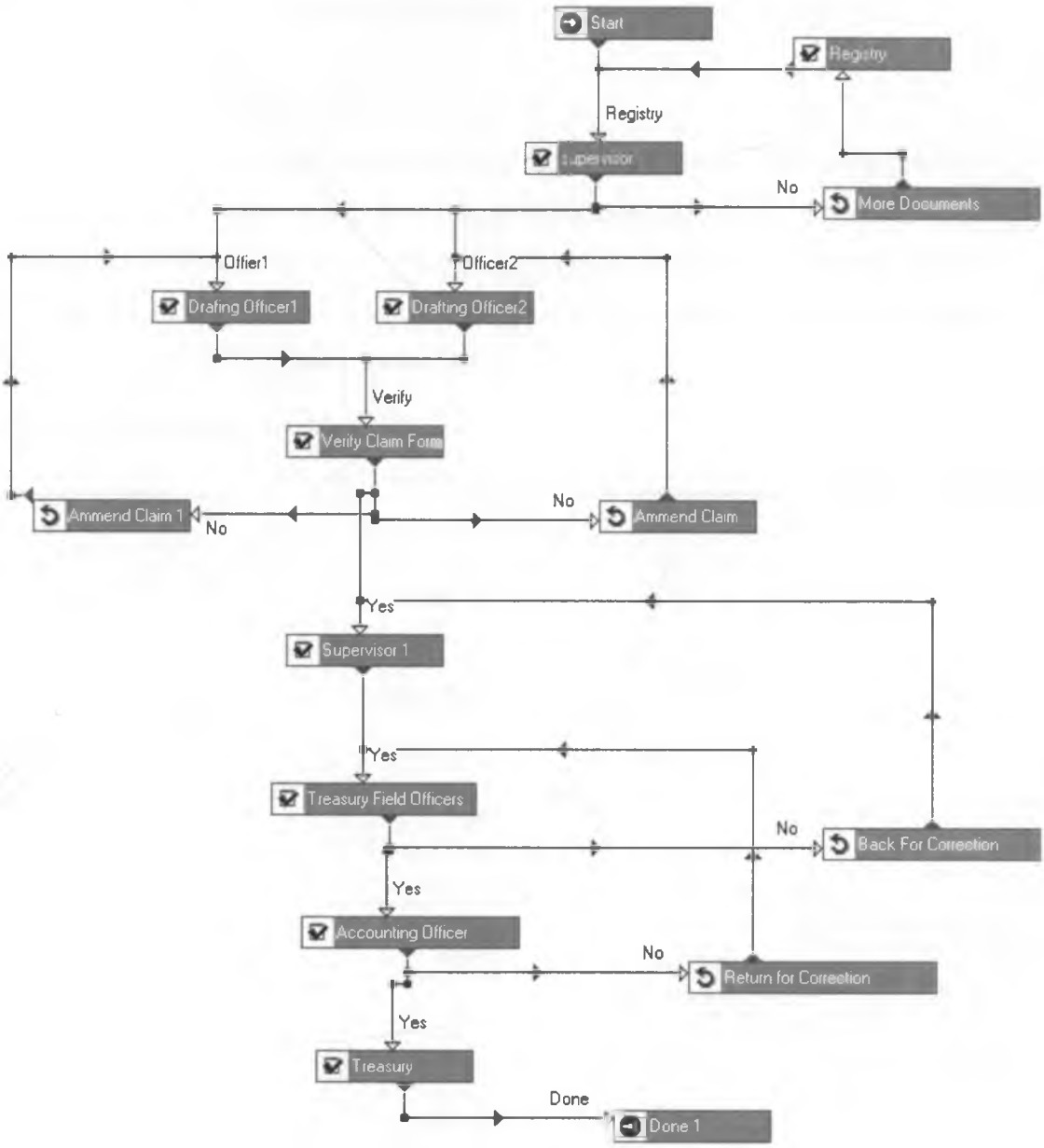
The Teacher Management functions inform the bulk of the knowledge used within service areas. Appendix D represents the document flow process which describes workflows within service areas up to archival stage. Each service area has a workflow of tasks and action officers unique to services offered. An example is showed below starting from Teacher Registry (figure 8) to service areas and a specific workflow for the Pensions division.

Figure 8: Teacher Registry workflow



The details of the pensions workflow launched from the Teacher registry workflow are shown in fig 9

Figure 9: Pensions workflow



4.2.3 Agent Model

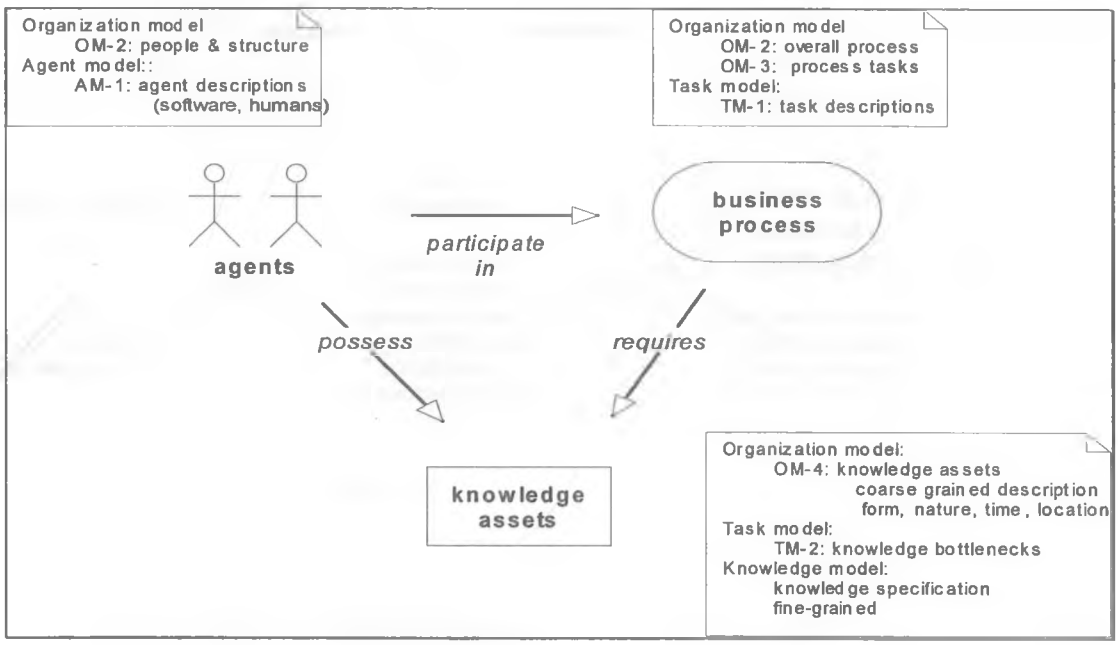
The capabilities required of the executors of the tasks/ process including the constraints were analysed through the interview schedule performed on Heads of service areas. Use of mentoring through the alternator/ buddy system was seen as an effective way of knowledge sharing. The skills inventory provides the knowledge map of agents within TSC but it was recommended that each service area updates their own regularly to ensure optimization of ability. Capacity building can be enhanced through specialized skill

training, Communities of Practice, collaboration and use of e-learning within the organization intranet.

4.2.4 Knowledge Model

The expertise required for performance of each task was described by figure 10 where agents are the professional staff among the different cadres of TSC and available software that facilitates their work. The business processes within the core mandate of TSC follow the ISO standards. The Knowledge assets are available but access and quality needs to be enhanced to achieve optimization.

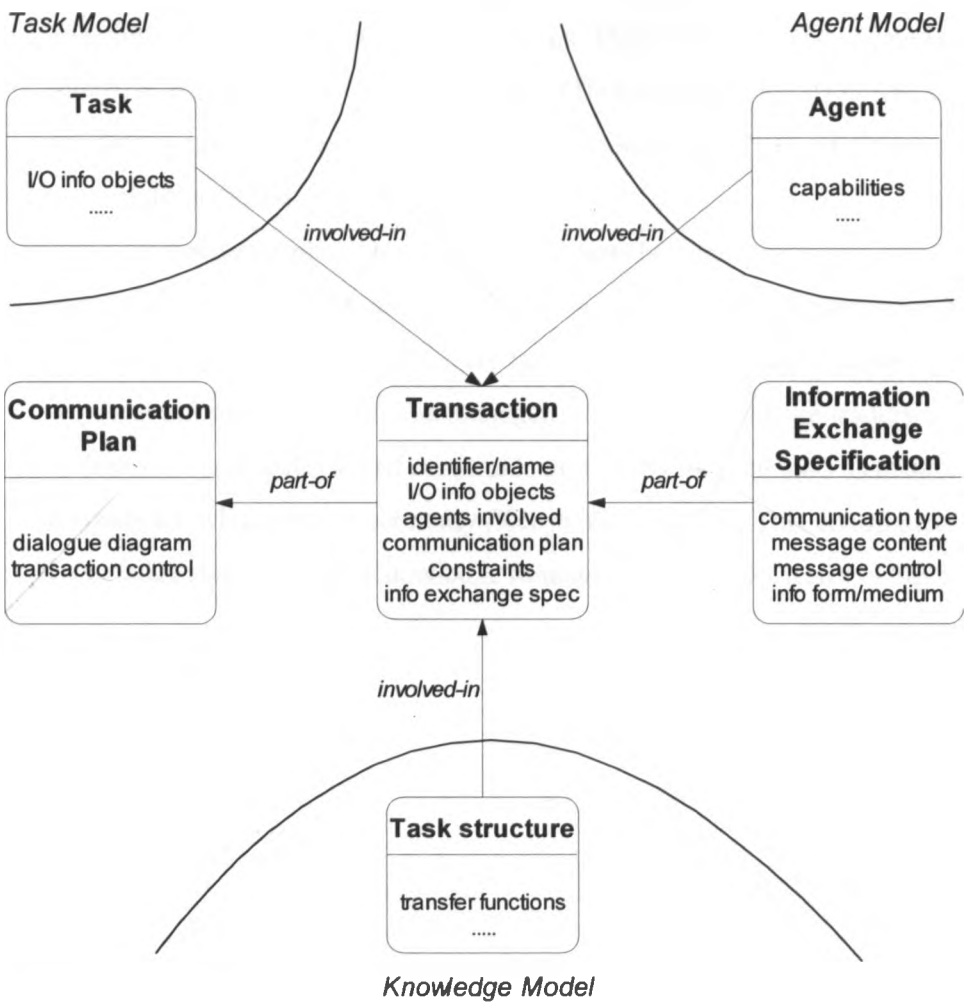
Figure 10: Knowledge Model



4.2.5 Communication Model

This brings out a conceptual specification of what kind of information objects are exchanged between agents in cooperating in and carrying out a task as shown in figure 11?

Figure 11: Communication Model



4.3 Background Information to the Questionnaire

The questionnaires and interview schedules distributed for knowledge mapping were **20**. The rate of return of instruments was 70% with interviews conducted having an 85% success rate. The researcher had to clarify the concepts during the in depth interviews.

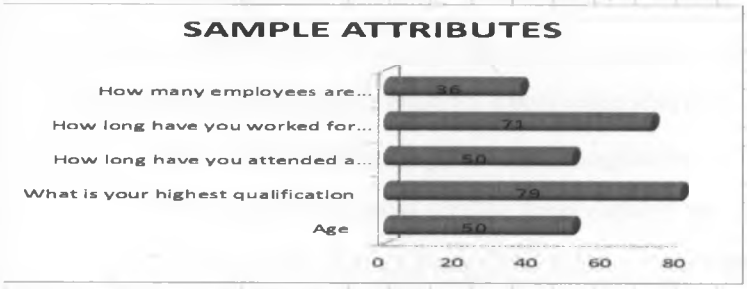
The target group was composed of 19 heads of divisions and 1 head of department from service areas distributed among the key functions performed under the TSC constitutional mandate hence homogeneous. These functions also formed the knowledge intensive activities. The researcher utilized Binney/common KADS KM strategy to validate or inform a realistic knowledge-oriented model. The participants who responded were eight male and six female.

From the results, 79% of the participants had an education qualification of Masters and above which supports a knowledge strong culture in the organization. Most managers have a long working experience, very familiar with service area business processes and requisite information flows. The managers who all had requisite leadership skills mostly emphasized on acquisition of communication skills for their staff as being important towards knowledge based economy (Kenya Vision 2030). This contributes significantly to knowledge sharing, a key Knowledge Management practice. Refer to Fig 12;

Figure 12: Sample Background Information Analysis

SAMPLE SET

PERSONAL INFO		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	TOTAL
Gender		F	M	F	F	M	M	F	F	F	M	M	M	M	M	8M;6F
Age	50	2	2	2	2	1	3	3	2	2	3	1	2	3	1	1(3);**2(7)**;3(4)
What is your highest qualification	79	3	3	3	3	3	1	3	3	3	2	3	2	3	3	1(1);2(2);**3(11)**
How long have you attended a management course?	50				2	1		3	2	1	2	3	3	3	3	1(2);2(3);**3(5)**
How long have you worked for the organization	71	4	4	1	4	3	4	4	4	4	4	1	4	4	1	1(3);3(1);**4(10)**
How many employees are under your jurisdiction	36	2	1	2	2	2	4	4	1	1	4	1	2	4	1	**1(5)**;**2(5)**;4(4)



KEY

2 AGE: 35-44(1)
45-54(2)
55-60(3)
OVER 60(4)

3 QUALIFICATION:
DIPLOMA(1)
DEGREE(2)
MASTERS & ABOVE(3)

4 MANAGEMENT COURSE:
LESS THAN 4 WEEKS(1)
4 WEEKS(2)
ABOVE 4 WEEKS(3)

5 LENGTH OF SERVICE:
LESS THAN 3 YEARS(1)
3-6 YEARS(2)
6-12 YEARS(3)
OVER 12 YEARS(4)

6 NO. OF EMPLOYEES:
LESS THAN 50(1) **50-100(2)** 100-150(3) OVER 150(4)

SERVICES(TSC MANDATE)	VS SKILL(TOWARDS VISION 2030)
	DIGITIZED RECORD MANAGEMENT
	RESEARCH & REPORTING; M&E
	COMMUNICATION
LEGAL SERVICES & PREVENTION OF LITIGATION	RESEARCH
	ICT
CAPACITY BUILDING	PRESENTATION & COMMUNICATION
	ANALYTICAL BASED ON TNA
	TRAINING
	PROPOSAL WRITING
CORPORATE IMAGE IN LINE WITH CORE VALUES	COMMUNICATION
	NEGOTIATION
MAINSTREAMING CUSTOMER CARE FOR QUALITY TEACHING	ICT
	COMMUNICATION
	LEADERSHIP
	CHANGE MANAGEMENT
	MENTORING & COUNSELLING
	TRAINING
RECRUIT, PROMOTE & TERMINATE TEACHERS	INNOVATION
	COMMUNICATION
	KNOWLEDGE SHARING
	COUNSELLING
TEACHER REGISTRATION AND RECORD MANAGEMENT	ICT
	INNOVATION
AUTOMATION & TECHNICAL SUPPORT OF OPERATIONS FOR EFFICIENT SERVICE	
	DOCUMENTATION
	CRITICAL THINKING
	ARTICULATE TACIT TO EXPLICIT
RECONCIALIATION OF ACCOUNTS	TREND ANALYSIS
	IFMIS
	COACHING & MENTORING
ADEQUACY OF CONTROLS AND RISK MANAGEMENT	CONSULTATION
	AUDIT
	COMMUNICATION
ADMINISTRATION	COMMUNICATION
TEACHER DISCIPLINE	REPORT WRITING
	COMMUNICATION
	KNOWLEDGE SHARING
	66% COMMUNICATION SKILLS

4.4 Content Analysis for Knowledge Management Practices

4.4.1 Policies and Strategies

A policy provides commitment, rules and guidelines towards achieving specific goals. Most service areas have some form of written policy/strategy with hidden rules on Knowledge Management. The culture of knowledge sharing is limited to meetings and unstructured brainstorming sessions. Some recommended a policy to improve worker retention, most had a noncommittal opinion. Strategic partnerships were supported and recommended by 92%.

4.4.2 Incentives

An incentive is a form of reward towards an achievement. Most participants do not give incentives (monetary & non-monetary). However current ad hoc recognition practices may be better structured to enhance knowledge sharing.

4.4.3 Knowledge Capture and Acquisition

From the results, most service areas capture and use knowledge from other industry sources. However, there is missing link in the use of knowledge from public research institutions including universities; only 42% utilize this knowledge. A high proportion with an exception of 1 respondent dedicates resources to research and to obtain external knowledge. Majority recommended participation of project teams with external experts. From the results all respondents acquire knowledge through circulars & procedures and trainings. Key recommendations from respondents supported organizational support for professional groups and information access through centralized data bases.

4.4.4 Training and Mentoring

Most Heads of service areas agreed that a lot of training and capacity building has been done with some recommending that future training be mapped to service area needs. Mentoring practices for majority though not in practice formally were highly recommended. Staff members are encouraged to continue their education by being sponsored. Offsite training was also proposed as a popular option for staff to keep skills current.

4.4.5 Knowledge Sharing (Communication)

From the results, chatting is a common way of communication within service areas. Learning within departments through groups is also practiced and recommended by majority. Multimedia presentations rarely take place but were highly recommended especially as a requirement for staff to share knowledge after seminars. Facilitation of team

work by virtual teams still remains a new concept in the organization. Use of intranet was highly recommended as a means of electronic communication and document versioning which was seen as a means of reducing frequent meetings. However enforcement is needed. The most popular means of knowledge sharing recommended by most managers was regular updates of good work practice databases which was seen as a way of better decision-making. Preparation of written special reports and articles by staff was common practice. The challenge expressed was the lack of centralized storage and regular updates needed for TSC update and website. A suggestion for a dedicated information officer per service area was given.

4.4.6 Knowledge Creation

Various avenues for knowledge creation were cited through self-study &trainings, self-reflection, meetings & brainstorming sessions, appraisal reports were seen as a good way of enforcing innovative practice by insisting and appreciating evidence. Meetings had 100% participation rate but the perception was that some may not be necessary. Prior planning and time keeping is important. Frequent staff reshuffles seem to also contribute to knowledge creation. The internet was highly recommended as a clear channel of knowledge creation; however practice and collaboration may need to be encouraged particularly through Communities of Practice (CoPs).

4.4.7 Other KM Practices

Respondents mentioned Study tours, Information systems team programming sessions and innovation calls to professional groups.

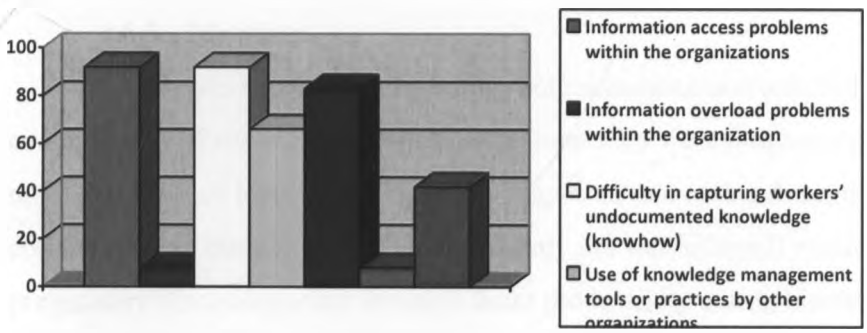
4.5 Importance of Using Knowledge Management Practices

Most participants agreed on importance of the reasons given for using KM practices; refer to table 9. However improving staff retention was not regarded as important by most with an exception of 8% respondents who felt it was critical. Exit interviews were therefore proposed to gain more insight.

Table 9: Motivation towards KM Implementation

Reason	%
Information access problems within the organizations	92
Information overload problems within the organization	8
Difficulty in capturing workers' undocumented knowledge (knowhow)	92
Use of Knowledge Management tools or practices by other organizations	66
Loss of key personnel and their knowledge	83
Loss of organizational relevance	8
Difficulties in incorporating external knowledge	42
Others : *continuous capacity building*	

Figure 13: Motivation towards KM Implementation



4.6 Thematic Narrative

During the study, emerging issues that informed reality were:

4.6.1 Information Access

On close scrutiny of results on motivation, table 9 reveals that there seems to be an emphasis on information access problems and difficulty in capturing workers' undocumented knowledge as compared to information overload problems earlier predicted. A contradiction however emerges between the high support (92%) for the concept of avoiding loss of key personnel and the low support (33%) for worker retention policy in earlier questions.

This could mean that managers would wish to capture undocumented staff knowhow periodically during active employment before staff leave in order to improve organizational memory. However they expressed a difficulty in willingness of staff to document knowhow due to fear of losing relevance and perceived competition in the few vacancies for promotion. Current practice of having a system where **alternators/buddy system** are assigned for important tasks in service areas seems a quick win to ensure continuous performance.

4.6.2 Process Based Knowledge

Process based knowledge was the most common. Most Managers acknowledged ISO as having the greatest impact as compared to others like Business Process Reengineering (BPR). This could be because the radical change proposed by BPR results mostly results in a lack of control in the managers jurisdiction otherwise deemed important for accountable leadership. Consequently ISO' emphasis on structured processes, the frequent audits and feedback, incorporation of other best practices like the performance contracting (PC) system and sensitizations carried out by the ISO team offers a good leverage for building a KM implementation strategy.

4.6.3 Meetings

The results showed that meetings, both scheduled and unscheduled were the most common way of sharing knowledge. Sometimes they were frequent and sometimes took more than 3 hours long. Some managers suggested that online document versioning and communication through the intranet (currently not well utilized) would inform a lot of the preliminary discussions thus increase faster productivity during meetings. Top management would however need to enforce this practice as had been seen through online requisition of items for service areas through the Information Financial Management Information System (IFMIS).

4.6.4 Responsibility

The study sought for information on what group should be responsible for Knowledge Management practices in the organization. This resulted in opinions that were still as varied as the number of options given in fact with further additions. This could mean that further sensitization on actual role of KM as a best practice enforcement vehicle would be important.

4.6.5 Bureaucracy

From the study, it emerged that bureaucratic practices in the public sector and an organizational culture that is not aggressive towards creating new knowledge may become an impediment towards reaching the full potential of a knowledge managed environment. The notion to the fact that TSC is autonomous and does not have external threats might reduce the urgency towards change. However a challenge to benchmark with best practice from other countries would show that a KM framework gives a competitive advantage.

4.7 Decision Making and Information Flow

During the interview sessions which focused on decision making, the 'participants' voice' was recorded and analyzed according to various categories as shown below with a number of sample records.

Table 10: Field notes

Participants	Categories
P1	**Type of knowledge** - Knowledge considered important was around the aspect of knowledge sharing, dialogue and communication. ISO was considered to have had biggest impact on knowledge in processes. **Prioritized Source of knowledge** -mostly relies on knowledge in available organization documents on process guidelines then own experience and training. Respondent recommended access to current monthly information updates from various service areas. -On resources needed, a read only access of relevant information systems would be a faster way of knowing various staff transactions and assist in decision making. Capacity building to service areas on system wide file movement system would improve information flow. A good method used for special needs was in assisting slow learners to carry out tasks. Respondent was familiar with the requirements on the organization, task, agent and knowledge model. However better communication and faster access to information needed was recommended. **Constraints** -Quality of information was cited as an impediment to knowledge intensive

	decision making. Among the challenges cited before and after decision making were time, financial constraints and commitment from employees. **Recommendations** -online document versioning among stakeholders -laptops for managers to have continuous availability of power during interruptions -exit interviews important
P2	**Type of knowledge** -ISO considered as a quality standard for process knowledge and through organizational collaboration **Source of knowledge** -By priority relies on Own experience then available documentation on regulations and procedures then others knowhow. Information stakeholders were known. **Constraints** -Slow feedback and lack of central information database **Recommendations** -Access to file movement system, digitized records and CRM to make technology meaningful -Online filling of forms and Enhanced specialized training
P3	**Type of knowledge** Mostly transactional, analytical and process based. **Prioritized Source of knowledge** -mostly relies on knowledge in available organization documents on process guidelines then own experience then others knowhow (interpersonal skills important) **Constraints** -financial, bureaucracy, time and proper follow-up -Right quality of available knowledge **Recommendations** -formalized succession management system for transfer of requisite knowledge and planned meetings

P4	**Type of knowledge** Process-based and tactical **Source of knowledge** By priority relies on Own experience then others knowhow and organization networks before looking at available documentation. Motivation from top management is key for success in implementation **Constraints** -information access, time and financial constraints **Recommendations** -Access to relevant information systems -Enhanced collaboration across department and business units - effective delegation of duties
P5	**Type of knowledge** Process based, developmental **Prioritized Source of knowledge** -organization networks, available documentation, own experience, others knowhow **Constraints** -Innovation and knowledge sharing is not structured -culture to enforce status quo **Recommendations** -collaboration(external and internal), information access important -customer is key, employ change management strategies -skill inventory important in identifying knowledge assets, enforce exit interviews
P6	**Type of knowledge** Process-based and analytical **Source of knowledge** By priority relies on organizational documents, organization networks, Own experience then technology. Motivation from top management is key for success in implementation. Emphasis on communities of practice (COP) **Constraints**

	-User resistance, quality of knowledge, time and financial constraints **Recommendations** -higher skilled employees

4.8 Linking Research Expectations with Findings

Inadequate information access is a major problem that hampers service delivery at all levels within the TSC. Currently, a lot of information is collected, stored, and processed using documents, disparate information systems and organizational practices that have been internalized by employees. There is therefore a need to develop a digital base that captures almost every imaginable and explicit intellectual asset found within the Commission. However, there is a marked resistance to such changes because of the non-existence of clear mechanisms to motivate and encourage staff to share and re-use knowledge as well as generate new ones. Effective and efficient communication with stakeholders within TSC headquarters and units through electronic media (to leverage on cost) will provide essential information that will foster decision-making. Organizational turnover has created challenges in form of knowledge retention and access, and this has resulted in information management being practiced to some extent within TSC. However, since most of the information is manual, there is a necessity to have a digital dawn within TSC, which will provide an efficient and centralized access to the information.

Of course TSC lacks a Knowledge Management (KM) Strategy that would efficiently manage its intellectual and knowledge assets and improve information flow. The informal KM Strategies at the Commission need to be formalized and structured within service areas. Easier information access can be through common KADS model. This model is beneficial to the Knowledge Management for government (KM4G), which is an initiative that is being promoted by government to enhance service delivery within the public service. The advantage of this model is that it compliments other management and learning initiatives, as well as eliminating duplication of efforts. The KM strategy is therefore an integral framework that maximizes organizational capabilities, which are based on the real needs of the government that were gained through mapping of knowledge .This document is expected to be an all-encompassing strategic plan that is aligned to government mission and vision.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter contains the summary of findings as related to research objectives, conclusions and recommendations. The purpose of this study was to provide a Knowledge Management (KM) model that leverages on information and knowledge available in the Teachers Service Commission (TSC) thus avoid duplication, improve information access and decision making process.

5.2 Summary

5.2.1 Discussions on Research Questions

(i) How do existing KM strategies inform the recommended Knowledge Management framework?

Various KM strategies were reviewed (see table 1) and were categorized according to:

(a) Knowledge (Boisot, 1998; Nonaka & Takeuchi, 1995)

(b) Business process(Wiig,1997;Manasco,1996; Wendler,1998)

(c) End result(Zack,1999; Treacy & Wiersema, 1993)

The preferred approach which is synthesized (Binney, 2001) offers a framework that identifies different techniques that are applicable for different types of Knowledge Management. The Binney/common KADS KM strategy consists of a range of techniques that address different organizational issues and needs. The KM Spectrum (framework) mapped against other KM strategies was found to incorporate the technophilic "cognitive KM" community and the technophobic "community KM". The TSC situational analysis was informed by categorizing current knowledge and information into requisite technologies. (Refer to table 7)

(ii) What are the current Knowledge Management practices at the TSC and major knowledge-intensive activities undertaken by the organization?

These KM practices were informed by knowledge mapping through:

(a) Categorizing the knowledge-intensive Teacher Management function along the core mandates in the Constitution for relevance

(b) Use of questionnaires to analyse knowledge practices in the organization in line with best practice

(c) In-depth interviews with decision makers of key service areas to inform possible misconceptions. The findings show that managers are aware of knowledge assets, business processes and knowledge agents that inform their decisions in their knowledge intensive activities.

Knowledge sharing is common through structured and ad hoc meetings. Most managers were able to utilize daily morning briefs as a channel where staff shared knowledge. They however agreed on the need to monitor the skill set of their staff and encourage more knowledge sharing activities. TSC has several but disparate information systems within its structure that serve the various knowledge intensive Teacher Management functions. In order to avoid duplication, the study recommends an integration platform for the Information systems for decision making. The need for right information access was highlighted as most important for decision making. A central database with important information resources was recommended as an immediate solution.

(iii) What knowledge-oriented model can be recommended?

The study also sought to provide a KM model that leverages on information and knowledge available in the Teachers Service Commission thus avoid duplication and improve information access. The recommended knowledge-oriented organisational model was the Common KADS model which advocates that Knowledge has a stable internal structure that is analyzable by distinguishing specific knowledge types and roles.
The six commonKADS model-set was informed by organizational knowledge and best practice which can be leveraged namely:

- Organization model – KM strategy categorization of knowledge and public sector values
- Task model - Business process according to ISO standards and Document Management system as shown in appendix D.
- Agent model –through available skills inventory and best staff practice
- Knowledge model – enhanced use of knowledge sharing practice will inform the knowledge agents and improve business process. This is still in progress.

- Communication model –automated knowledge sharing activities through an active intranet is recommended. This should blend with the decision making framework.
- Design model - KM system prototype that combines all models has been recommended for future implementation.

(iv) What activities, tools and techniques comprise Knowledge Management process (capture, creation, storage, dissemination and application) according to best practice?

The study proposes that proper Knowledge Management through faster creation, capturing, storage, sharing and application of knowledge be facilitated; this includes the transformation of data into "enduring value" and making that value accessible and available wherever and whenever it is needed within the organization.

Other activities include working together to improve access to reliable information for key staff by;

(a) Articulation: People can describe their information needs by communicating intended use of information and directing information requests appropriately.

(b) Awareness: People know where to find knowledge resources through using Communities of Practice (CoPs) to cast a spotlight on organisational knowledge and access where people have the (ICT) tools they need to find and capture information (intranet; a centralized information database which also draws key information from existing information systems).

(c) Guidance by giving new organisational roles to support information seekers, creating a new role for the knowledge manager/ information officer and using experts as information filters.

(v) How can the proposed Knowledge Management strategy enhance the decision making process, improve information flow and reduce duplication?

From the results, organizational memory is a key source of knowledge for decision making. Available knowledge can be categorized in a structured way for easier access. Technology may then be used as a quick cost effective way to leverage available knowledge existing in the organization for managers.

5.3 Conclusion

Results from the findings show that information access, process based knowledge (organization memory), structured knowledge sharing forums, clear rewarding mechanisms, mentoring practice and commitment towards knowledge creation were ranked highly among managers towards using available resources for effective decision making. As an organization in the public sector, TSC needs to adhere to become a 'learning organization with an embedded knowledge sharing culture'. Knowledge Management is meaningful only when accurate, relevant, necessary and up-to-date information is available to the right people at the right time and in the right format in a cost effective way. Quality of information was cited as an impediment to knowledge intensive decision making.

In order to bridge this gap and achieve KM best practice, certain interventions have been proposed towards creation, storage, access and sharing of correct information. This includes use of intranets and enhancing Communities of Practice (CoPs) within the organization. A strategy towards system-wide storage practice using user friendly backup practice can ensure that organizational memory is safeguarded. KM should be seen as being embedded within the context of the changes that are affecting public management more widely. A knowledge-based economy requires higher skills than just transactional, thus skills and competencies constantly need updating. By availing easy access to all relevant information, Knowledge Management can enhance partnerships with all the stakeholders and by doing so improve the overall performance of the Public Sector.

5.4 Recommendations

This study recommends a collaborative system through the intranet where staff members are motivated to share knowhow in forums and discussions. To achieve this, Knowledge Management emphasizes the importance of knowledge maintenance in terms of quality and quantity. Maintenance of knowledge involves reviewing, refining, preserving and updating both implicit and explicit knowledge.

A Knowledge Management portal is recommended as a tool "to extract, analyze and categorize both structured and unstructured information, and reveal the relationship between content, people, topics and user activities in the organization. Hariharan (2011) They can provide users with many interactive facilities such as e-mail, chat rooms,

personalized news, search engines, and external links. Refer to appendix E for functional specifications of the KM portal.

5.4.1 Proposed Interventions

5.4.1.1 Management, Human Resources and Culture:

Education and training should be specialized towards higher order competencies and skills, embed a reward system to encourage innovation, use the skill inventory for recruitment and placement, management behaviour should be aggressive to knowledge sharing.

5.4.1.2 Jobs & Organizational Structure:

Digital storage of Staff department knowledge and strategy even through scanning, best practice database for various lessons learned in departments, introduction of a 'buddy' system to enhance the current alternator system, working teams with overlapping knowledge areas to be more frequent, out-sourcing for knowledge and voluntary expertise.

5.4.1.3 Technological Tools:

Intranets & internet for knowledge sharing & Lessons learned architectures, 'who knows what' guide ('knowledge map'), Employee Information System with knowledge profiling, Groupware-based applications with 'knowledge' databases (best practices), Decision Support Systems (expert systems, case repositories, simulations), Data mining, Document retrieval systems with advanced indexing & retrieval mechanisms.

LIST OF REFERENCES

Anuradha, K., (2008) *A Framework for Knowledge Management of Wildlife Research.* Unpublished MSc Project desertation: University of Nairobi

Burford, S., (2011) 'The Adoption Of Knowledge Management Standards And Frameworks In The Australian Government Sector' *Journal of Knowledge Management Practice, 12(1)* University of Canberra

Gathenya, J.N., (2008)*Using Classroom Based Assessment for Learning.* Unpublished MSc Project desertation: University of Nairobi

Gau, W., (2011) 'A Study of Tacit Knowledge Management In The Public Sector.' *Journal of Knowledge Management Practice 1,* (12) National chung cheng University

Hariharan, A., (2011) 'How To Build A Great Knowledge Management Portal *'Journal of Knowledge Management Practice 12(2)*

Hesham,M.N. and Aziz, A.A., (2011) 'Decision Making Framework Supported by Knowledge Management Activities.'*Journal of Knowledge Management Practice 3*, (12) Multimedia University

Jain, P., (2009)'Knowledge Management in e-Government' *Journal of Knowledge Management Practice 4*,(10) University of Botswana

Katua, C.J.,(2010) *A Framework for applying Knowledge Management in organizations in Kenya.* Unpublished MSc Project desertation: University of Nairobi

Knox, H. John, K.,(2003)'Choosing Your Knowledge Management Strategy.' *Journal of Knowledge Management Practice* University of Edinburgh

Maingi, N. (2007) *Knowledge Management readiness score*. University of Nairobi:Unpublished MSc Project desertation

Mugenda, O. and Mugenda, A., (2003) *Research Methods:Quantitative and Qualitative Approaches.* Nairobi:Acts Press

Ogara, W. Jalang'o, J. and Othieno, O.,(2010), 'Knowledge Management & Institutional Framework: Kenyan Veterinary Services.' *Journal of Knowledge Management Practice,* 3(11) University of Nairobi

OECD (2009). *Analysis of the Qualitative Data.* OECD/Joint Research Centre:OECD Publishing, doi: 10.1787/9789264076860-3-en

OECD (2008). *Ensuring Capacity: Towards an Integrated Public Service.* Ireland: OECD Publishing. doi: 10.1787/9789264043268-6-en

Riverland,(no date) *Engineering and managing knowledge: common KADS* [Online]. Available from: http://www.commonkads.uva.nl [Accessed 31October 2011]

APPENDICES

Appendix A: Background Information

(Observation, Participative research and Document Review)

Step 1: Factors believed to be most significant in choosing a Knowledge Management approach can be derived from the KM spectrum. Questions might include:

1. What do you hope to achieve through Knowledge Management?
2. What applications do you think you need?
3. Is your focus on following best practice in-house; establishing an external standard; encouraging innovation and creativity; or learning knowledge from data?
4. What technologies do you think you need?
5. Do your people rely on explicit or tacit knowledge to solve problems?
6. Do you plan to analyse existing knowledge or to create new knowledge?
7. Would you consider that your major activities fall into one or more of the following task types: classification; diagnosis; assessment; monitoring; optimisation; configuration/design; planning/scheduling; control?

Step 2: The guidelines given by the **CommonKADS** approach are:

1. to "make a shortlist of perceived problems and opportunities, based on interviews, brainstorm and visioning meetings, discussions with managers, etc."
2. These problems are then to be put into a wider context by considering the organisation's mission, vision, goals, external factors, strategy and major value drivers.
3. Part of this process should be to identify the various stakeholders in terms of providers and users of knowledge and the decision-makers.
4. From this investigation, a shortlist of problem and opportunity areas related to certain business processes should emerge. Particular attention is given to the *Process* which is decomposed into tasks (specified as a UML activity diagram)

and also to the *Knowledge Assets* involved - What are they? Who possesses them? Who uses them? Are they available in the right form and place and at the right time and of appropriate quality?

Step 3: Questions that might be asked during, or as a result of a CommonKADS analysis might be:

1. Who are the key decision makers, providers, users or beneficiaries of knowledge?
2. What resources are used in the business process? - Information systems, equipment, materials, technology, patents, etc.
3. What are the key knowledge assets in the organisation?
4. What are the cultural "rules" of the organisation? - Styles of working, authority structures, communication styles and networks, etc.
5. What is the task type of these key assets? - classification, diagnosis, assessment, configuration, scheduling, ...
6. Is the knowledge used largely symbolic, numerical, geometric or perceptual?
7. How long does an employee take to solve the same problem?
8. Is the knowledge available? This could be organization memory in terms of: Knowledge sharing systems, best practice databases, learning from past projects and experiences, directories of experts, online docs, discussion forums, and intranets.

From these questions should emerge a recommendation on whether transactional KM (and specifically, knowledge-based systems software) is a suitable approach for developing and transferring a particular knowledge asset.

Step 4: Propose a series of activities to undertake to help identify an appropriate KM initiative:

1. List the external business drivers for your sector.

2. Perform an organisational SWOT analysis in the context of this environment, clearly identifying your product or service.

3. Identify the primary organisational Value Discipline, which represents how your organisation attracts its segment of the market.

4. Use these findings to identify the *primary* KM area to consider using the self-examination questions listed above.

5. List the (major) knowledge-intensive or knowledge transfer activities undertaken by the organisation, looking initially for those that match the primary KM type identified above. Try to sort these into order of importance to the organisation's mission. Then, for each of these activities, identify:

   (a) the Knowledge Assets used

   (b) the nature of these Assets (explicit, implicit or tacit)

   (c) the location, form and quality of these Assets

   NB/ KNOWLEDGE ASSETS

   -Identify intellectual and knowledge assets

   -Measure and monitor their development

   KNOWLEDGE IN PEOPLE

   -Innovation workshops

   -Experts and learning networks

   -Communities of practice

   KNOWLEDGE IN SERVICES

   -How knowledge can be embedded in services

   -Knowledge products-user guides, service charter, online help, hotline

   KNOWLEDGE IN PROCESSES

   -Embed knowledge into business processes and management decision-making

6. Make an assessment for each of the more important activities identified, as to how well it is being performed at present. Looking at the different applications in the KM Spectrum, look for a KM approach that corresponds to the activity in question.

Appendix B: Research Questionnaire

UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

MASTERS OF SCIENCE DEGREE IN INFORMATION SYSTEMS

SURVEY RESEARCH QUESTIONNAIRE

My name is __Anne Njagi__, a student at the University of Nairobi School of Computing and Informatics. I am carrying out research for Masters of Science degree in Information Systems. The research title is: **A KNOWLEDGE MANAGEMENT (KM) FRAMEWORK FOR THE PUBLIC SECTOR. CASE: TEACHERS SERVICE COMMISSION (TSC)**

The main focus of the research is to provide a KM model that leverages on information and knowledge already available in the Public Sector and specifically TSC thus avoid duplication and improve information access for effective decision making. Knowledge is power, but only if it's recorded. Knowledge Management involves any systematic activity related to the capture and sharing of knowledge by the organization. Knowledge mapping prevents reinventing the proverbial wheel, provides baseline data for measuring progress, reduces the burden on experts, makes visual thinking tangible, and manages large volumes of information.

Data collected in this survey will result in a greater understanding of Knowledge Management practices to support enhanced learning and performance by organizations in the Public Sector. The research is purely academic, confidential and will be solely used for that purpose.

Thank you for your time.

SECTION A: PERSONAL INFORMATION

Please tick the box which best describes you.

1. Gender	☐ Female ☐ Male
2. Age	☐ 35 - 44 ☐ 45 - 54 ☐ 55 - 60 ☐ Over 60
3. What is your highest qualification	☐ Diploma ☐ Degree ☐ Masters and Above
4. How long have you attended a management course?	☐ Less than 4 weeks ☐ Above 4 weeks ☐ 4 weeks
5. How long have you worked for the organization	☐ Less than 3 Years ☐ 3 – 6 years ☐ 6 – 12 years ☐ Over 12 years
6. How many employees are under your jurisdiction	☐ Less than 50 ☐ 50-100 ☐ 100-150 ☐ More than 150

7. What type of services in line with the TSC mandate in the Kenya Constitution does your department/division offer?

a. _____

_____

b. _____

_____

8. What skills towards Vision 2030 do you consider important for your staff to have in terms of?

    a. Contribution to existing Knowledge (Application)

b. Creation of new Knowledge (Innovation)

c. Knowledge sharing

_____

_____

_____

Section B: KNOWLEDGE MANAGEMENT PRACTICES

I. Please tick the number which best **describes your opinion** on Knowledge practices within your department/division using the five point scale where:

1 = YES

2 = NO

3 = MAYBE

4 = NOT APPLICABLE

5 = RECOMMENDED

Practice	Your department/division	1	2	3	4	5
Policies and Strategies	1. has a written Knowledge Management policy or strategy	☐	☐	☐	☐	☐
	2. has a culture intended to promote knowledge sharing	☐	☐	☐	☐	☐
	3. has policies intended to improve worker retention.	☐	☐	☐	☐	☐
	4. uses strategic partnerships to acquire knowledge.	☐	☐	☐	☐	☐
Incentives	Your department/division specifically rewards Knowledge sharing with: 2. Monetary incentives 3. Non-monetary incentives	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Knowledge capture & acquisition	Your department/division regularly; 4. Captures and uses knowledge obtained from other industry sources such as associations,	☐	☐	☐	☐	☐

	clients and suppliers 5. Captures and uses knowledge obtained from public research institutions including universities 6. Dedicates resources to discover and obtain external knowledge as well as communicate it within the organization 7. Encourages workers to in project teams with external experts 8. Acquires knowledge through;(tick where appropriate) a. Circulars and procedures b. Internet c. Trainings d. Professional groups e. Conferences and seminars f. Feedbacks g. Central database	☐	☐	☐	☐	☐
Training & Mentoring	Your department/division regularly; 9. Provides formal/informal training related to Knowledge Management practices 10. Uses formal mentoring practices, including apprenticeships 11. Encourages peer training 12. Encourages staff to continue their education by sponsoring or reimbursing tuition fees for successfully completed work-related courses 13. Offers off-site training to staff in	☐	☐	☐	☐	☐

	order to keep skills current					
Communication	In your department/division staff share knowledge or information by: 14. Chatting with other staff 15. Learning with other staff within department through groups 16. Through multimedia presentations 17. Facilitating team work by virtual teams 18. Using intranet (internal electronic communication e.g. outlook) 19. Regularly updating databases of good work practices, lessons learned or listings of experts 20. Preparing written documentation of lessons learned, training manuals, good work practices, articles for publication e.g. in TSC update and website, special topic reports etc. (organization memory)					
Creation of knowledge	Do you provide avenues for staff to create knowledge; 31. Through self-reflection 32. From self-study 33. From trainings 34. By providing incentives 35. By conducting meetings 36. Through reflecting on appraisal reports 37. Through organizational					

	collaboration 38. By conducting open discussions (brainstorming) 39. Through learning groups (technical transfer) 40. From information obtained from the internet	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐

Are there any Knowledge Management practices that your department/division uses that have not been included in this survey?

i. No____

ii. Yes, please specify

_____

_____

_____

_____

II. This section is about the **reasons for using** Knowledge Management practices. Please indicate by ticking the level of importance you attribute to each reason.

	Reasons Knowledge Management practices are used	**Very important**	**Important**	**Somewhat important**	**Not at all important**
A	To improve the competitive advantage of the				
B	To help integrate knowledge within the organization thus prevent duplication of tasks				
C	To improve the capture and use of knowledge from sources outside the organization				

D	To improve knowledge sharing with strategic partners				
E	To improve knowledge sharing horizontally (across departments, functions or business units)				
F	To protect the organization from loss of knowledge due to staff turnover				
G	To train staff to meet strategic objectives of the organization				
H	To increase staff acceptance of innovations/ creativity				
I	To improve staff retention				
J	To identify and/or protect strategic knowledge present in the organization				
K	To ease collaborative work of virtual teams				
L	To promote sharing knowledge about/with clients or customers thus increase adaptation of services to client requirements.				

III. What would **motivate** your division/department to implement or to increase Knowledge Management practices? Check all that apply.

1. Information access problems within the organization ☐
2. Information overload problems within the organization ☐
3. Difficulty in capturing workers' undocumented knowledge (know-how) ☐

4. Use of Knowledge Management tools or practices by other organizations ☐
5. Loss of key personnel and their knowledge ☐
6. Loss of organizational relevance ☐
7. Difficulties in incorporating external knowledge ☐
8. Others, please specify

_____

_____

IV. Which of the following groups is/or should **be responsible** for the Knowledge Management practices in use in the organization. **Tick one only**.

- Human Resource department ☐
- ICT department ☐
- Knowledge Management unit ☐
- Library/documentation centre ☐
- Executive Management team (direct responsibility) ☐
- Other, please specify

_____

_____

- Don't know ☐

Please indicate how long it took you to complete this questionnaire.

Minutes_____

If you would like to receive summary results from this survey please check.

Yes_____ No_____

Thank you for participating. Your response is appreciated.

Appendix C: Interview Schedule

1. ***Establishing a positive decision-making environment.***
2. ***Generating potential solutions.***
3. ***Evaluating the solutions.***
4. ***Deciding.***
5. ***Checking the decision.***
6. ***Communicating and implementing.***

Focus: Decision Making and **Information flow**

1). When making decisions do you rely on knowledge available in; (please prioritize)

a. own experience
b. technology
c. others knowhow
d. organization networks/knowledge sharing
e. available documentation on regulations, policy, process guidelines
f. training/professional courses
g. other, specify

2). What improvement would you recommend on the above sources to make your decision making process easier?

3). Does the success of decision implemented mostly depend on;

a. Support for ideas and suggestions
b. Motivation from top management
c. Employee commitment

4). What do you consider important in;

a. Customer knowledge
b. Knowledge in people
c. Knowledge in products and services
d. Knowledge in processes
e. Organizational memory
f. Knowledge in relationships

g. Knowledge assets

5). What resources do the tasks performed in your division/department depend on in terms of;

a. Information systems
b. equipment and materials
c. non-knowledge skills and competencies
d. knowledge
e. special resources

6). Who are the actors involved in the information flow of tasks (e.g. file movement)

7). Who are the stakeholders when making decisions;

a. decision makers
b. providers
c. users
d. customers
e. creators of knowledge
f. communicators
g. consolidators

8). Is the task requiring decision making knowledge intensive?

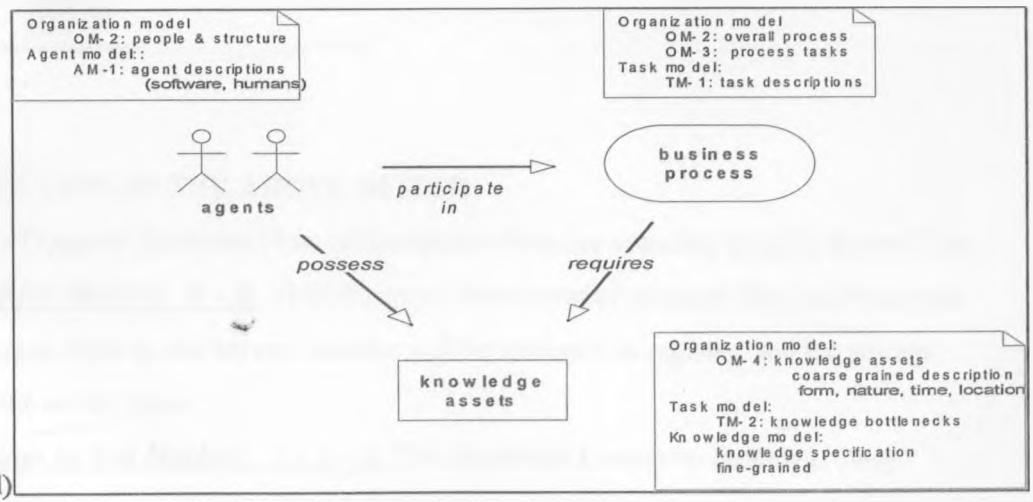
If yes, is the knowledge available in the right form (mind, paper, electronic, action skill), right place, right time, right quality, right nature (formal, rigorous, empirical, quantitative, heuristic, rule of thumb)?

9). What are the constraints during decision making?

a. Pre-conditions (before)

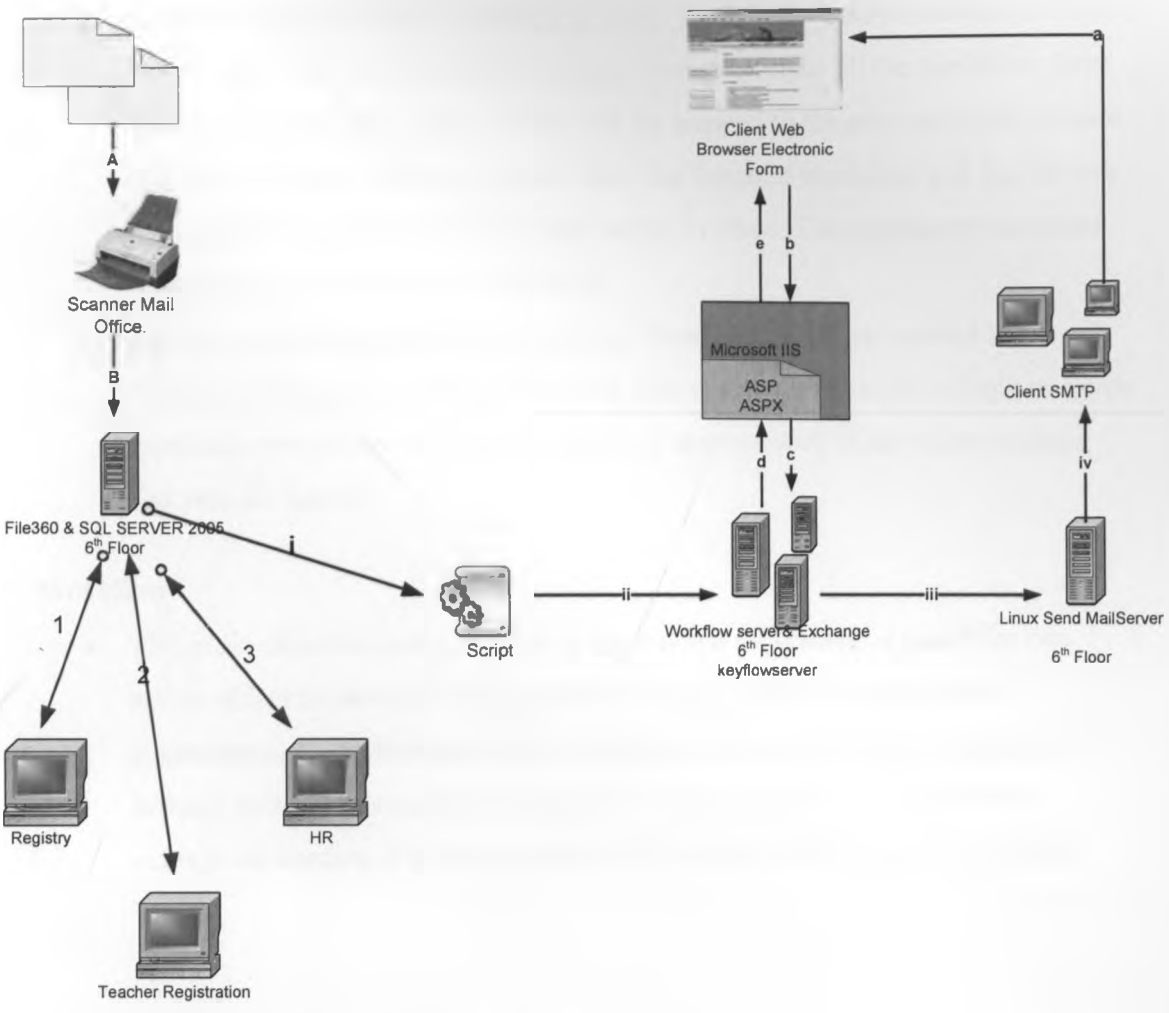
b. Post-conditions (after)

KNOWLEDGE OBJECT LEVEL diagram (adapted from COMMON KADS model)



Appendix D: Document Movement

TEACHERS SERVICE COMMISSION DOCUMENT FLOW



EXPLANATION OF THE ABOVE DESIGN

The above Diagram illustrates Flow of documents from the scanning stage to the end User. ***Lines in Blue Marked A – B.*** This Illustrates Movement of scanned files and Processed to the Storage Area on the Server. Scanner will be stationed in registry, and the storage server in the server room.

a) ***Lines in Red Marked 1 – 2 – 3.*** This illustrates Document Indexing. Once Documents have been scanned, they will be indexed by respective individuals for purposes of Archival. This will ease the process of retrieval of Documents. These lines represent polling of documents from storage server from various departments

or sections for purposes of electronic Archival. This could be HR, Teacher Registration, Staffing, etc.

b) ***The lines in Brown Color marked i- ii – iii – iv.*** Illustrate the movement of work send to the relevant individuals for action. Normally, once all the workflows have been mapped into the system, a URL will be mapped to the relevant email account of a User. The user will receive this URL. The initiated workflow will find its way to the email account by use of the mail server in place. This represents document flow from one action officer to another.

c) ***Lines in Black Marked a – b – c – d – e.*** These lines illustrate normal user activity. Clicking on the URL send to the user prompts him or her to login to a web application to retrieve the send files and Act appropriately (User access to their task lists for action).

Workflow

- TSC main objective was to be able to track down movement of files from one action officer to another at any particular time enhance efficiency at the commission. To achieve this there was need to procure a workflow solution to manage these processes. After document imaging the next step would be to manage the content of these documents. This is achieved through a workflow.

Appendix E: KM Portal Specifications

1. Creation of multiple knowledge repositories and sub-repositories. Typically, each repository would be a critical business process linking a single knowledge submission to more than one repository.
2. Creation of communities of experts / virtual groups; virtual meetings* / discussions* (* these applications are outside the KM portal, but the portal provides links to these).
3. Personalization - individual users must be able to subscribe to selected repositories that are of relevance / interest to them; and create their personal library of selected knowledge submissions.
4. Workflow capabilities (e.g. knowledge submission, alert to Knowledge Champion, editing and acceptance for publishing in repository)
5. Quick, robust and accurate search & retrieval capability
6. Rating of content by readers
7. Logs / reports for number of contributions, number of hits per repository / sub-repository, number of views / downloads per knowledge submission, details (name and dates) of employees visiting the portal, who has read / downloaded which knowledge-object, etc.
8. Access control - Capability to provide restricted access to certain employees; or certain sections only to specific users, read-only access. e.g. access to only meta-data with contact-details of the owner
9. "What's new" button that displays recently added content or features
10. Capability to interface with other applications wherever required