

Knowledge Management and Service Delivery

a Knowledge Management Model for the Housing Sector

by

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Opsomming

Die Suid-Afrikaanse regering en sy organisasies en instellings, net soos ander internasionale state, word gekonfronteer met uitdagings om hul bates te bestuur, soos onder andere data, inligting, kennis, mense en prosesse. Hierdie uitdagings tel onder die faktore wat dienslewering negatief beïnvloed.

Alhoewel die Departement van Behuising ongeveer twee miljoen en sewe honderd duisend huise gelewer het, sedert 1994 was daar nog steeds uitdagings. Gepaardgaande met swak dienslewering, het die Departement ook gesukkel om bates soos inligting, kennis, inligtingstegnologie en menslike hulpbronne te bestuur.

Alhoewel dit uitgebreide beleggings gemaak het in inligting tegnologie, veral in die ondersteuningsdienste, het die departement nog nie die tegnologie ten volle benut nie.

Die tesis poog om die positiewe aspekte te ontdek wat deur die toepassing van kennisbestuur binne die behusingsektor oor al drie regeringsvlakke teweeggebring kan word. ‘n Vraelys is versprei onder beamptes wat die bestaande behuisingsinformasie-sisteme gebruik in die areas van behuisingsubsidie administrasie, monitering en evaluering en projekbestuur afdelings in die behusingsektor.

Gebaseer op die bevindinge van die vraelys word ‘n kennisbestuursmodel vir die behusingsektor voorgestel wat dienslewering kan bevorder.

Summary

The South African government and its organisations and institutions, just like other global States, are represented with the challenge of managing their assets i.e. data, information, knowledge, people and processes. This challenge has proved to be one of the factors that have a negative impact on service delivery.

Although the Department of Housing (currently known as the Department of Human Settlements) has delivered more than two million and seven hundred thousand (2.7 million) houses to South African citizens since its inception in 1994, this delivery has been met with service delivery challenges. Coupled with the challenges of poor service delivery, the department has also been faced with the challenge of maintaining its assets, namely information, knowledge, Information Technologies and human resources. Although it has made extensive investments in its information the department has not fully exploited its technology.

The thesis seeks to explore the positive aspects that can be achieved by applying Knowledge Management within the Housing Sector Departments across the three spheres of government in South Africa. A survey was distributed amongst officials who use the existing housing information systems in the housing subsidy administration, monitoring and evaluation and project management sections within the housing sector.

Based on the findings, a knowledge management model is proposed for the housing sector departments that will enhance service delivery.

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List of Acronyms

AI	Artificial Intelligence
CPSI	Centre for Public Service Innovation
COP	Community of Practice
DID	Department for International Development
DPSA	Department of Public Service and Administration
DoH	Department of Housing
DHS	Department of Human Settlements
DPSA	Department of Public Service and Administration
GITOC	Government and Information Technology Officers Council
HUIMS	Housing Urbanisation and Information Management System
HSS	Housing Subsidy System
IC	Intellectual Capital
ICT	Information and Communications Technology
IPSP	Integrated Provincial Support Programme
KI(M)	Knowledge and Information (Management)
KM	Knowledge Management
MEIA	Monitoring, Evaluation and Impact Assessment
OSS	Open Source Software
PA	Public Administration
PSC	Public Service Commission
SITA	State Information Technology Agency
URL	Uniform Resource Locator (URL)
WPTPS	White Paper on the Transformation of the Public Service
WWW	World Wide Web

Chapter 1

Introduction

Knowledge Management (KM) as a practice has been widely adopted and embraced as organisations and/or institutions began to realise that their competitive advantage is not only dependent on an organisation's unique, intangible resources, but also on its ability to exploit those resources effectively¹. Private and public sector institutions have embraced KM practices with the aim of creating more innovative and complex systems that connect people to information and knowledge².

As a practice, KM has been widely implemented by institutions in developed countries, although the implementation of KM is relatively new in South Africa. Many of the South African organisations and public sector institutions which have initiated KM draw from the lessons learned and best practices of their European and Asian counterparts. According to Khoza³, a study was conducted on KM for service delivery in the South African public sector in 2007/2008, and this indicated that experiences from different countries e.g. Canada, United States, Australia and New Zealand have shown that service delivery via KM can be fast-tracked⁴. To support this argument, case studies related to KM implementation have been drawn from the United Kingdom, United States, Brazil and South Africa in this study.

Service delivery is one of the key focus areas used to assess the performance of private and public sector institutions. The success of service delivery depends on proper planning, implementation and monitoring processes. The implementation of KM has been viewed as one of the factors that have an impact on the improvement of service delivery. Therefore, through KM, all three spheres of government can exchange knowledge to enable them to plan, implement and monitor by sharing best practices and lessons learned, thus improving service delivery outputs.

¹Nelson, R. and S. Winter. 1982. *An Evolutionary Theory of Economic Change*, p15

²Ried and Lindsay. 2006. *Knowledge Management in the Public Sector: stakeholder partnerships in the public policy development*, Journal of Knowledge Management. 10, p25.

³Khoza, S. 2009. Knowledge Management in Africa. Conference publication: *Knowledge Management for Service Delivery in the South African Public Sector*.Presentation.KM Africa Conference. Dakar.

⁴Improvement and Development Agency. 2008.<http://www.idea.gov.uk/idk/core/page.do?pageId=11901555>.

This chapter provides an introduction to the study. It also presents definitions of terms within the context of the research. For the purpose of this study, the Department of Human Settlements, as it is currently known, will be referred to as the Department of Housing. The chapter also provides an overview of the legislative mandate that forms the basis of housing delivery, as well as a discussion of the department's information systems, which are used across the three spheres of government to facilitate housing delivery. The problem statement, research questions, significance and objectives of the study are also outlined in this chapter.

1.1 Definitions

1.1.1 Knowledge Management

The concept of KM was made popular by Nonaka's research on organisational theory and the corporate structure. This theory has been widely published in both Japanese and English, and was first introduced to a wider audience with the publication of "*The Knowledge-creating Company*", which he co-authored with Hirakata Takeuchi in 1995⁵.

Literature reveals that there is no universal definition of KM - this is due to different approaches and perspectives that are applicable to the concept of KM. This section will outline various definitions of KM from a social and technological perspective in order to provide a better understanding of the concept. However, for the purpose of this study, a definition from an organisational perspective is considered, as it provides a comprehensive view of KM as a collection of organisational processes that deal with knowledge creation, capture, storage, transfer, sharing and application.

The organisational perspective also views KM as being embedded in and expressed through multiple organisational resources, including its people, processes, and technologies. Various authors, including Becerra-Fernandez et al. Davenport and Rumizen, have referred to KM as a collection of organisational processes, technologies and procedures that are involved in the discovery, creation, capturing, acquiring and sharing of knowledge.

According to Becerra, KM is a process that involves performing the activities related to discovering, capturing, sharing and applying knowledge, in order to enhance, in a cost-effective fashion the impact of knowledge on the unit's goal achievement⁶.

⁵Nonaka, I. and Takeuchi, H. 1995. *The Knowledge-Creating Company*.

⁶Becerra- Fernandez et al. 2004. *Knowledge Management: Challenges, Solutions and Technologies*. New Jersey: Pearson, p31.

Davenport refers to KM as the systematic, organisational and specific process of acquiring, organising and communicating both the tacit and explicit knowledge of employees, so that their employers may make use of it to improve productivity⁷.

According to Rumizen, KM focuses on how an organisation identifies, creates, captures, acquires, shares and leverages knowledge. He further indicates that systematic processes support these activities, thereby also enabling the replication of successes⁸.

McNabb defines KM as a dynamic, evolving set of interacting, existing and new tools, practices and procedures that employ technology and social interactions in the delivery of public services. He further indicated that KM is viewed from a social perspective as a collection of social processes that involve human and social dimensions, the role of technology, measurement, top management, professions and the concept of knowledge. KM is a dynamic, evolving set of interacting existing and new tools, practices and procedures that employ technology and social interactions in the delivery of public services⁹.

The technology-oriented definition of KM emphasises the fact that technology is one of the primary drivers of KM. However, a number of authors, including McElroy, strongly emphasise the subservient role of technology, its prominence having grown to dominate many conferences and publications worldwide. According to McElroy¹⁰, due to the continuing promotion of a narrow, technology-centred brand of thinking, the nascent field of KM places its own credibility at risk". He predicted a 'second generation' of KM, which would correct these deficiencies. This view is also shared by Davenport and Prusack, who warn against the over-emphasis of ICT, as well as the delegation of KM to ICT by organisations. They caution against an excessive focus on technology, whereby some organisations attempt to design knowledge to suit technology¹¹.

1.1.2 Knowledge Management System

In this section, the research study evaluates the KM System using references from Maier and McNabb. A KM System is an information technology application aimed at supporting a

⁷Davenport, T. 1997. Information Ecology: *Mastering the information and knowledge environment*, p313

⁸Ruminez, M. C. 2002. *Complete Idiot's Guide to Knowledge Management*, p9.

⁹McNabb, D. 2007. *Knowledge Management in the Public Sector*, p25.

¹⁰McElroy M. 1999. *Second-Generation Knowledge Management*. IBM, Knowledge Management Consulting Group, p45

¹¹ Nonaka & Takeuchi, 1995. *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*.

collection of organisational KM processes, in order to facilitate knowledge creation, capture, storage, transfer, sharing and application among people. The main purpose of the KM system is to enable officials to have readily available access to the organisation's documented information and knowledge.

According to Maier¹², a Knowledge Management System (KMS) is an ICT system, application or platform that combines and integrates functions for contextualised handling of both explicit and tacit knowledge throughout the organisation. He also argues that a KMS should not be seen as a voluminous centralised database, but rather as a networked collection of contextualised data and documents linked to directories of people and skills, in order to provide intelligence to analyse these documents, links, employee's interests and behaviours, as well as advanced functions for knowledge sharing and collaboration.

To facilitate KM in the public sector, McNabb indicated that a broad literature review of management and exposure to a wide variety of government management applications suggests that the public sector should develop a KMS. According to McNabb, the purpose of a KMS in the public sector is to enable government departments to develop and maintain it in order to achieve the following:

- Identify relevant information for the achievement of agency missions.
- Strengthen interagency collaboration.
- Store, organise and catalogue every day and invaluable knowledge, so that it can be used in the near and distant future¹³.

Both authors indicated that the KMS requires a systematic KM initiative in order to be used effectively and efficiently, and this includes a KM Model, supporting strategies, goals, supporting organisational culture, as well as roles and responsibilities for knowledge-related tasks and processes. They also indicated that organisations need to develop a KMS to support the variety of fields and disciplines that are applicable to KM.

According to Maier, the KMS consists of organisational goals for officials within organisations to generate, share and apply knowledge, locate experts and networks, actively participate in networks of communities, create and exchange knowledge within these

¹²Maier, R. 2007. Knowledge Management Systems: *Information and Communications Technologies for Knowledge Management*, p87.

¹³McNabb, D. 2007. *Knowledge Management in the Public Sector*, p25.

networks, and to argue the employees' ability to learn and understand the relationships between knowledge, people and processes¹⁴.

McNabb indicated that a KMS consists of five subsystems that come together to make up the fundamental building blocks of management, namely the information process, social process, human interaction, collaborative culture and organisational learning subsystem¹⁵.

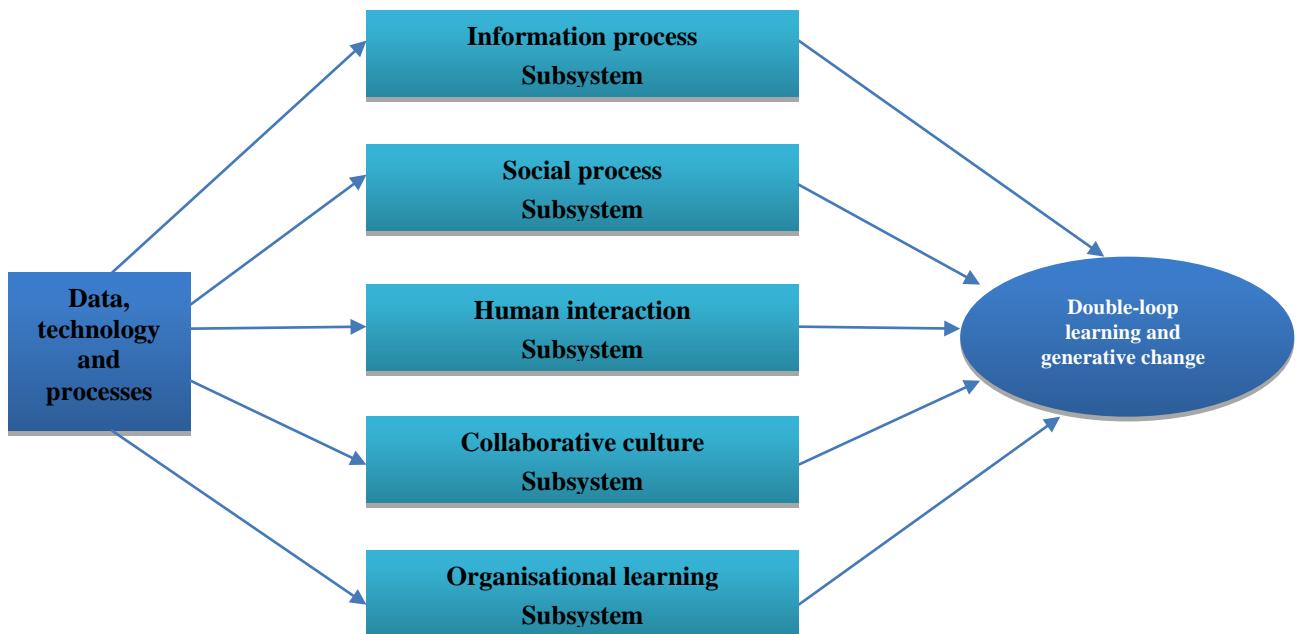


Fig 1: Diagrammatic presentation- Management system subsystems ¹⁶(McNABB.)

The information process subsystem is technology-based, and is used to collect, codify and record data according to the organisation's needs and in the forms that people want and need in terms of the procedures laid down by the government's architecture initiative.

The social process subsystem transfers information and transforms it into knowledge through the processes of socialisation, internalisation, combining and externalisation.

The human interaction subsystem employs tools such as the audit, communities of practice and knowledge repositories, in order to begin the transition from the culture of knowledge hoarding to that of knowledge sharing.

The collaborative culture subsystem makes it the norm for all the experiences and knowledge of members in the community of interest to be freely shared and employed, when and where needed, in order to achieve the mission of the organisation.

¹⁴Maier, R. 2007. Knowledge Management Systems: *Information and Communications Technologies for Knowledge Management*, p7.

¹⁵McNabb, D. 2007. *Knowledge Management in the Public Sector*, p26.

¹⁶McNabb, D. 2007. *Knowledge Management in the Public Sector*, p27.

The organisational learning subsystem facilitates the shift from the agency focus on the essential, single loop, adaptive change process to a focus on the more rewarding process of double loop, generative learning¹⁷.

McNabb also indicated that, when developing a KMS, the first step that needs to be considered is to employ an enterprise architecture that will enable the organisation to collect and share information across agency boundaries. He further indicated that this particular system should be aligned with the operational needs of the organisation and supports its processes.

He added that the collaborative capability of a KMS constitutes one of its major components, as it has a far-reaching effect on organisations with officials who are always on the move. In relation to the housing sector, the geographical location of the housing sector across provincial and municipal boundaries in South Africa is one of the major challenges that the housing sector is facing, as the three existing information systems do not facilitate collaboration between officials in the three spheres of government. Coupled with this challenge, the Department of Housing must ensure that information and knowledge are shared timorously through its existing information systems. In addition, the department is also faced with service delivery inefficiencies in all its regions.

1.1.3 Knowledge Management Model

In KM there are various models that have been developed, in this study McNabb's KM Systems Model developed for implementation in the public sector is considered and reference is also drawn from Nonaka and Takeuchi Socialisation, Externalisation, Combination and Internalisation or SECI Model. According to McNabb the KM System Model as a comprehensive tool that combines concepts, mechanisms and processes to interact with and shape an organisational culture that values knowledge creation and knowledge sharing¹⁸.

Nonaka and Takeuchi developed a SECI Model Takeuchi as a theory of the dynamic organisational knowledge creation in an attempt to set up a knowledge creation company. This theory was later adopted and elaborated on by Nonaka, Toyana and Konno as a unified model of dynamic knowledge creation. According to Nonaka the creation of knowledge is a continuous dynamic interaction between tacit and explicit knowledge. There are four modes of knowledge conversion that interact in the spiral knowledge creation i.e.

¹⁷McNabb, D. 2007. Knowledge Management in the Public Sector, p27.

¹⁸McNabb, D. 2007. Knowledge Management in the Public Sector,p25.

Socialisation, Externalisation, Combination and Internalisation. The spiral becomes larger in scale as it moves up through organisational levels and can trigger new spirals of knowledge creation¹⁹.

1.1.4 Knowledge Management Strategy

The KM strategy is the foundation for the establishment of any KM programme. It is also important that the KM strategy is aligned with the strategy of the organisation, in order to close any strategic knowledge gaps that may exist within the organisation. The KM organisational strategy should also be supported by business strategies and vice versa , in order to ensure successful implementation.

According to Maier, a KM strategy is defined as a strategy that balances an organisation's knowledge resources and capabilities in terms of the knowledge required for providing products and services with those of competitors²⁰. He further argues that a KM strategy can be seen as a general, abstract, high-level approach that aligns organisational knowledge resources and related capabilities with the knowledge requirements of a business strategy.

According to Ungerer et al²¹. a successful knowledge-centric organisations base their primary strategic thrust on some identified key strengths. He based his approach on the dynamic capability school on strategy, which utilises organisational capabilities as a key departure point for competitive differentiation. He also argued that in order to develop a KM strategy, an organisation must describe the “what” of the dynamic capability view within the context of the capability-based approach to strategy, as well as the “how” of the execution, and these identified core capabilities form the basis for the core capability architecture overview.

1.1.5 Service Delivery

According to Smith, the first step in developing any KM Model and its supporting strategies is to define the problem that the programme is to solve and address, identify the objectives of the Management programme which need to be aligned with the corporate strategy, and develop an action plan based on these objectives. Once an action plan has been developed, a budget to achieve the plan should be determined by conducting a cost benefit analysis, and

¹⁹Ikujiro Nonaka, Noboru Konno, The concept of "Ba": Building foundation for Knowledge Creation. California Management Review Vol 40, No.3 Spring 1998. Access from http://www.cyberartsweb.org/cpace/ht/thonglipfei/nonaka_seci.html

²⁰Maier, R. 2007. Knowledge Management Systems: *Information and Communications Technologies for Knowledge Management*, p104.

²¹Ungerer, M ,Herholdt, J and Uys K. 2006. *Leveraging Knowledge-based assets*, p 91-93.

the resources needed must also be identified, such as people, processes, data and technology, and then monitoring and evaluation must be done to measure the success of implementation²².

The term service delivery refers to a set of activities that provide services to citizens. The legislative framework for delivering services in the South African context is the Constitution of the Republic of South Africa, Act 108 of 1996²³.

In line with the constitutional principles, the White Paper on the Transformation of Public Service Delivery (WPTPS) (1995) calls on all national and provincial departments to make service delivery a priority, as this is applicable to both national and provincial departments, which are regulated by the Public Service Act²⁴.

The WPTPS paved the way for the development of the eight Batho Pele Principles “People First” to serve as guiding principles for government institutions when delivering services to citizens. The Batho Pele Principles also aimed to enhance the quality and accessibility of government services by improving efficiency and accountability towards the recipients of goods and services.

As with other public sector institutions, the Department of Housing is mandated to adhere to the Batho Pele Principles in both national and provincial spheres. The eight Batho Pele Principles include the following five principles, which are applicable to this study:

1. Service standards should be established and citizens must be informed about the level of quality of services they will receive, in order to make them aware of what they can expect.
2. Citizens should be afforded equal access to all services due to them.
3. Citizens must have complete and accurate information about the public services that are to be provided.
4. Openness and transparency are essential for informing citizens about the functioning and management of government departments.

²²Smith, F.A. 2005. Knowledge Management Strategy. [online] Available at: <http://www.gisdevelopment.net/proceedings/gita/2005/papers/62.pdf>(Accessed January 2010, p 5).

²³Republic of South Africa1996a. *The Constitution of the Republic of South Africa*, p40

²⁴South Africa (Republic). 1997. *White Paper on Transforming Public Service Delivery*, p2.

5. The provision of public services must be done in a cost-effective manner, so as to provide citizens with value for their money²⁵.

Innovation is also emphasised as an essential strategy, and the success of Batho Pele Principles depends on the commitment, energy and skills of public servants being harnessed to tackle inefficient, out-dated and bureaucratic practices, simplify complex procedures, and identify new and better ways of delivering services.²⁶ Innovation is a cornerstone of KM and is viewed as one of the strategies that need to be enhanced in order to improve the delivery of public services. It is through this initiative that the DPSA established the Centre for Public Sector Innovation (CPSI) to encourage service delivery in the public sector through the incubation and piloting of innovative projects in government and the private sector²⁷.

1.1.6 Housing Sector

It is evident that service delivery is one of the key focus areas used to assess government performance in South Africa. The success of service delivery depends on proper planning, implementation and monitoring processes. Through KM, all three spheres of government should be able to feed each other with information to enable them to plan, implement and monitor by sharing best practices and lessons learned, thus improving service delivery outputs.

The Department of Housing, has been established as one of the South African public sector institutions, in order to fulfil the mandate of the South African Constitution, Act 108 of 1996, and other legislative mandates, including the Housing Act no 107 of 1997, The Comprehensive Plan for the Development of Sustainable Human Settlements (BNG), White Paper on Transforming Public Service Delivery (1995), and the Department of Public Service and Administration's (DPSA) Batho Pele Principles (1997).

In terms of the Constitution, the Department of Housing, as with other government departments, consists of three spheres, namely the national, provincial and local spheres of government, which are distinctive, interdependent and interrelated²⁸. These spheres are the national and provincial departments, as well as local government. These spheres are present

²⁵Batho Pele “People First”.1997. Available at: www.dpsa.gov.za/batho-pele/principles.asp

²⁶South Africa (Republic). 1997. *White Paper on Transforming Public Service Delivery*, p14.

²⁷South Africa (Republic). 2003. *Public Sector Review*.p9

²⁸Republic of South Africa. 1996a. *The Constitution of the Republic of South Africa*,p40.

in all 9 provinces, namely the Eastern Cape, Free State, Gauteng, Limpopo, Mpumalanga, North West, Northern Cape and Western Cape.

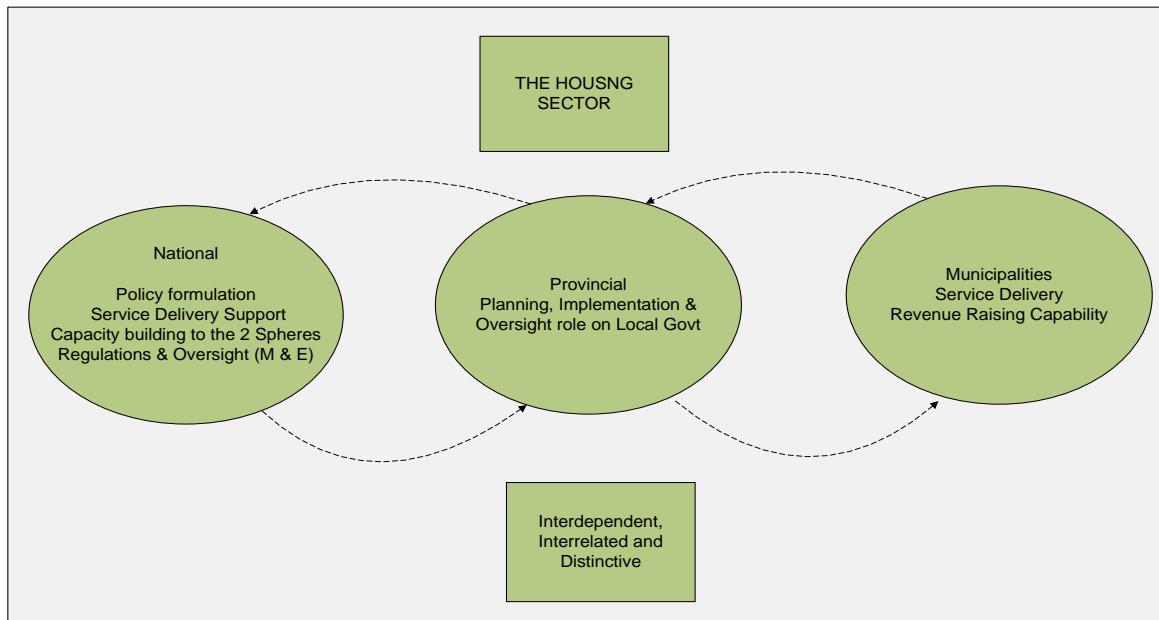


Fig 2 : Diagrammatic representation - 3 levels of government, indicating their positioning within the three spheres of government

The National Housing Department, as mentioned in section 163 (a) of the Constitution, has been established to facilitate a sustainable national housing development process through the provision of the National Housing Policy and identification of broad national housing delivery goals, and to facilitate the setting of provincial and, where appropriate, local government housing delivery goals in support thereof. The National Department of Housing has also been mandated to assist provinces to develop, support and strengthen the administrative capacity required for the effective exercise of their powers and performance of their duties in respect of housing development, and to evaluate the performance of the housing sector in relation to set goals and equitableness and effectiveness requirements.²⁹

The role of the provincial government, as stated in section 163 (a) of the Constitution and the revised Housing Act of 2001, is to promote and facilitate the provision of adequate housing in its province within the framework of the National Housing Policy, and to establish and facilitate a sustainable national housing development process.

Section 152 (1) of the Constitution provides for the objectives of local government, which are:

²⁹Republic of South Africa. 2001. *The National Housing Code of South Africa*, p17.

- a) to provide a democratic and accountable government for local communities;
- b) to ensure the provision of services to communities in a sustainable manner;
- c) to facilitate social and economic development;
- d) to promote a safe and healthy environment; and

The Constitution also states that the provincial and local governments must act within a framework of cooperative governance as interdependent spheres. The Presidential Coordinating Council (PCC) also directs national and provincial departments to ensure that their investments in municipal areas are in line with IDP priorities.

The Housing Act no 107 of 1997 was established to provide a mandate for housing delivery, and this fell squarely within the Constitutional framework. In terms of the Housing Act, the Department of Housing aims to establish and facilitate the provision of and access to affordable houses within the context of sustainable human settlements and economic opportunities for all³⁰. The provision and delivery of affordable houses is done through the housing subsidy programme across the three spheres of government, namely national, provincial and local government³¹.

To complement the Housing Act, as well as to address the findings of the 10 year review report, the Department of Housing published *Breaking New Ground (BNG): A Comprehensive Plan for the Development of Sustainable Human Settlements* in 2004. This document discussed the development of sustainable human settlements, embracing the Department of Housing's People's Contract as the basis for delivery, as well as the challenges faced by the housing sector and the changes in the way that sustainable human settlements will be addressed, with a summary of key programmes, and highlighted the improvements necessary for successful implementation³².

The abovementioned plan also prioritised the intergovernmental co-ordination envisaged to increase inter- and intra-governmental co-ordination with regard to integrated development and budget planning, through the consolidation of development planning instruments, provincial housing development plans and the National Housing Development Plan, in order

³⁰Republic of South Africa. 2007. *The Department of Housing Annual Report 2007-2008*, p15. Available online at:<http://www.dhs.gov.za/Content/Documents/Annualpercentage20Reportpercentage2007-percentage202008/Small/01.pdf>

³¹Kanga, K.C. 2002. *Towards Sustainable Low-income Housing* ,p5.

³²Department of Housing.2004. *Comprehensive Plan for the Development of Sustainable Human Settlements*, p2.

to promote integrated delivery and co-ordinated funding prioritisation (including the Municipal Infrastructure Grant(MIG)), as well as targeting delivery to meet the unique challenges faced by local and provincial governments³³.

To facilitate the processes involved in delivering affordable houses through national housing subsidy programmes, the Department of Housing established and implemented housing information systems. These systems, namely the Housing Subsidy System (HSS), Housing and Urbanisation Information Management System (HUIMS), and the Monitoring and Evaluation Impact Assessment System (MEIA), are deployed and applicable to the entire housing sector and all housing departments at national, provincial and municipal level, as well as to all the housing institutions created by the National and Provincial Housing Departments to facilitate the housing delivery process³⁴.

The system forms an integral part of the value chain of the Department of Human Settlement's information systems, as it provides feedback and disseminates the findings of data input from the HSS, in order to provide a basis for recommendations regarding lessons learned and best practices to all the relevant role players in the housing sector. The system also assists in facilitating and promoting effective communication in respect of housing development.

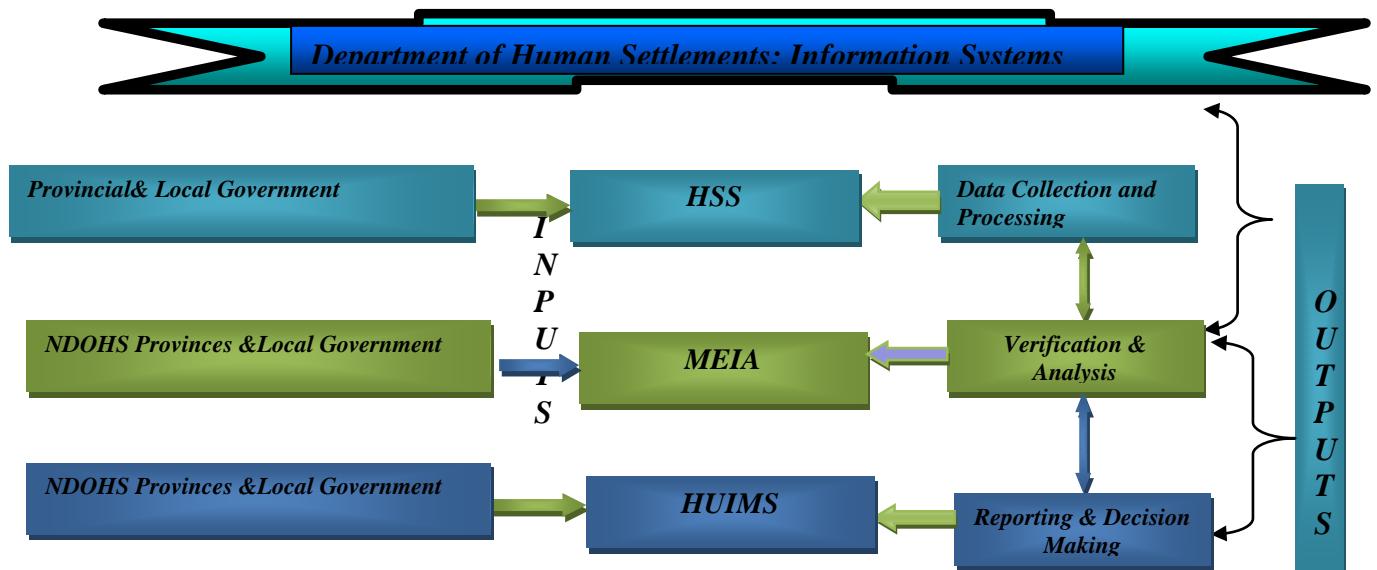


Fig 3: Diagrammatic representation - Department of Housing Information Systems

³³Department of Housing.2004. *Comprehensive Plan for the Development of Sustainable Human Settlements*, p24.

³⁴Republic of South Africa. 2008. *The Department of Housing Monitoring and Evaluation Policy*, p10.

a. The Housing Subsidy System

The Housing Subsidy System (HSS) is a transversal and operational system that administers the provision of housing subsidies through national housing programmes. The HSS databases provide various tools to aid project planning, and it is managed by the National Department of Housing and deployed in the provincial housing departments (PHD) and accredited local government housing departments. The HSS ensures adherence to the National Housing Code and serves as a guide and control mechanism for the implementation of housing programmes through pre-defined processes, in order to ensure that no person can access the assistance measures twice, by recording all beneficiaries who have received housing subsidies on the National Housing Subsidy Database. The provincial departments receive housing-related information from local governments to input into the system, which is done by provincial HSS administrators. The provincial governments are also responsible for housing subsidy administration on the system, and must provide accurate information to the National Department of Housing on a regular basis.

The HSS also provides an online platform through the HSS- ON-LINE, which is available at: <http://www.hssonline.gov.za>. The online environment provides a portal that serves as a single point of entry to housing subsidy-related matters for housing administrators and project managers across the three spheres of government within the housing sector. The portal also serves as a feedback mechanism, by providing access to reports for provincial and municipal administrators. Access to housing statistics is also provided for visitors, and these statistics are based on actual information obtained from provincial housing databases.

b. The Monitoring, Evaluation and Impact Assessment System

The Monitoring, Evaluation and Impact Assessment (MEIA) system has been developed to monitor and evaluate the implementation of national housing policies, programmes and projects, to document and provide feedback and disseminate results, as well as to promote accountability.

The MEIA system is available in departmental servers across the three spheres of the housing sector. The system forms an integral part of the department's information systems, as it provides an integrated approach for the reporting of housing and housing-related information. The MEIA system draws its information primarily from the Housing Subsidy System (HSS).

Data and information are migrated to the MEIA database directly from the HSS, and this is supplemented by manual data capturing when an application is not available.

Reports are extracted from the MEIA system to provide a comprehensive overview of National Department of Housing's activities, in order to ensure that the information is actually used for decision-making³⁵.

c. The Housing and Urbanisation Information Management System

The Housing and Urbanisation Information Management System (HUIMS) is aimed at improving decision-making by providing up-to-date access to accurate and reliable business information. The HUIMS consists of an established data warehouse that is populated with various regular updates of housing and human settlement-related data sets. The HUIMS aims to address housing information through the provision of and research into housing-related information from external sources and stakeholders.

The HUIMS is also available in an online environment to departmental officials across the three spheres of the housing sector at the following address: <http://www.huims.gov.za>. Information is obtained from the HSS and MEIA systems through verified reports. The system forms an integral part of the department's information systems, as it provides an integrated approach towards the reporting of housing and housing-related information.

Even though the HSS, HUIMS and MEIA information systems are managed by the National Department of Housing, implementation of these systems within provincial and local housing departments has always remained a challenge. The provincial and local government housing departments are faced with challenges with regard to resources, both financial and human, capacity building and end-user support services, as well as the updating of project progress information³⁶.

1.2 Research Problem

In the housing sector, there is no effective KM system and strategies that facilitate the capturing, sharing, disseminating and preserving of knowledge across the three spheres of government. This gap is evidenced by the disparities and inconsistencies regarding delivery patterns within the housing sector.

³⁵Republic of South Africa. 2008. *The Department of Housing Monitoring and Evaluation Policy*. p10.

³⁶BOAMAH. S. *Towards a Sustainable Housing Provision in Queensland in Rural and Aboriginal Communities*. 2003.p9

Although the Department of Housing has the Housing Subsidy System (HSS), Housing and Urbanisation Information Management System (HUIMS), and the Monitoring, Evaluation and Impact Assessment System (MEIA), which were established to facilitate the processes involved in delivering affordable houses, none of these systems have facilitated the implementation of KM in the housing sector³⁷.

A number of studies have been conducted on one of the Department of Housing's systems, namely the Housing Subsidy System (HSS). These include the Performance Audit conducted by the Office of the Auditor-General in 2006, which identified shortcomings in the administration of housing subsidies by provincial departments. In this regard, and as a result, the Department enhanced its operational system, as a response to the Auditor-General performance audit, in order to ensure policy compliance. The Housing Subsidy System was improved so as to enforce better control and subsidy application evaluation processes, and to facilitate the system's interface with other government databases³⁸.

Despite the numerous studies conducted on the HSS, none of them attempted to determine the interrelatedness of the three housing systems, namely the HSS, MEIA and HUIMS, and their possible roles in facilitating KM, in order to improve service delivery in the sector.

Although the department has delivered 2.7 million houses since its inception in 1994 and gone through progressive phases of housing development, citizens have expressed dissatisfaction with the quality of houses and associated infrastructure, as well as the social and economic amenities. This has been marked by service delivery protests across most of South Africa, especially in informal settlements. Various studies have also confirmed that challenges have been experienced with regard to housing delivery³⁹.

The Department of Housing, in its 2007 annual report⁴⁰, also highlighted the prevalence of protests due to slow pace of service delivery at municipal level, across the country. Reference was also made to the court battle concerning the moving of residents of the Joe Slovo

³⁷ Republic of South Africa. 2008. *The Department of Housing Monitoring and Evaluation Policy*, p10.

³⁸ Republic of South Africa. 2007. The Department of Housing: Annual Report 2006-2007, p5. Available at: <http://www.dhs.gov.za/Content/Documents/Annualpercentage20Reportpercentage20-percentage202007/Small/01.pdf>

³⁹ BOAMAH, S. *Towards a Sustainable Housing Provision in Queensland in Rural and Aboriginal Communities*. 2003, p16

⁴⁰ Republic of South Africa. 2007. *The Department of Housing Annual Report 2007-2008*, p15. Available at: <http://www.dhs.gov.za/Content/Documents/Annualpercentage20Reportpercentage2007-percentage202008/Small/01.pdf>

informal settlement in Cape Town to make way for the second phase of the N2 Gateway project.

The three spheres of the housing sector also work in a fragmented way, resulting in ineffectiveness and inefficiency in terms of service delivery. To overcome this challenge, the housing sector needs to implement KM to facilitate cooperative governance and coordinated service delivery. According to Malan, cooperative governance involves a relationship between the three spheres of government⁴¹, and aims to establish and maintain good relations between the three spheres of government. Through cooperative governance, the three spheres are called on to foster friendly relations, assist and support one another, and to coordinate their actions with one another.

It is argued that governance is an approach to strengthen government services and make them more responsive to the needs of society. Through cooperative governance, all three spheres should be able to feed each other with information and knowledge, which would enable them to deliver affordable houses in a consistent manner. With this in mind, the principles of co-operative governance and intergovernmental relations could be useful in the three spheres of the housing sector, namely the national, provincial and local governments, as housing delivery is a mandate shared by all three spheres.

The above literature clearly indicates that the successful provision and delivery of houses depends on various factors, including cooperative governance, intergovernmental relations, policy formulation and policy implementation. According to Malan, the system of intergovernmental relations is essential when policies are drafted or projects and programmes planned and implemented. Malan goes on to say that through the establishment of various institutional arrangements for intergovernmental relations - and the successful operation of these structures - it is expected that all three spheres of government will continually strive to co-operate with one another in mutual trust and good faith. Without the effective operation of intergovernmental relations in South Africa, projects and programmes cannot succeed.

1.3 Research questions

The objective of the study is to explore the following questions:

⁴¹Malan, L 2005. 'Intergovernmental relations and co-operative government in South Africa: the ten-year review'. *Politeia*, 24(2), p226.

1. Are there any interrelated features of existing information systems within the housing sector?

The aim here is to investigate housing sector information systems (HSS, MEIA and HUIMS) and determine whether or not these systems have any features that are interrelated.

2. How can the Department of Housing's information systems facilitate KM across the three levels of government?

The aim of this question will be to explore ways in which housing sector information systems can facilitate KM and improve service delivery across the three spheres of government.

3. What are the positive aspects that can be achieved through KM?

This study will also seek to determine the positive aspects that can be achieved by housing sector departments across the three spheres of government.

This study will explore the above questions by conducting a survey among housing officials across the three spheres of the housing sector.

1.4 Significance of the Study

This study will benefit the housing sector in general through an investigation of existing Department of Housing information systems, and look at the ways in which they can facilitate KM and improve service delivery across the three spheres of government.

The findings and recommendations of this study will be used to formulate a National KM Model for Housing, which will address the different ways in which knowledge can be captured, shared, disseminated and preserved across the three spheres of the housing sector. The National KM Model for the Housing Sector will also form the basis from which provincial and local government housing departments can develop their own KM strategies.

1.5 Chapter Organisation

The chapters in this study are organised as follows:

Chapter 1: “Introduction”– this chapter provides the introduction to this study. It also provides definitions of terms within the context of the study, as well as an overview of the legislative mandate that underpins housing delivery, and a discussion of the department's information systems that are used across the three spheres of government to facilitate housing

delivery processes. The problem statement, research questions, and significance and objectives of the study are also outlined in this chapter.

Chapter 2: “Knowledge Management in the Public Sector” – this chapter provides a comprehensive overview of KM in the public sector, and discusses KM Models, strategy and systems within the context of the study. It also presents accounts of the implementation of KM in the public sector, with a particular focus on challenges faced, and makes use of KM case studies from the United Kingdom, United States of America, Brazil and South Africa.

Chapter 3: “Research Methodology” – this chapter outlines the research methodology used in this study. It discusses the rationale for the study, research design, research methods, target population, sampling methods, data collection tools, pilot study, administration and collection of questionnaires, data analysis, limitations of the study and the elimination of bias.

Chapter 4: “Data Analysis and Research Findings” – this chapter conducts an analysis of the data and presents the findings. Data presentation in the form of graphs will be included, in order to ensure that it is understandable.

Chapter 6:“Knowledge Management Model” –this chapter makes recommendations in the form of a proposed KM Model for the housing sector across the three spheres of government. It also makes recommendations for future research on the topic.

1.6 Conclusion

This chapter introduced the topic for this study, and also provided background information regarding how the Department of Housing is structured and its mandate in terms of the provision of affordable, low-cost houses and service delivery. This chapter also provided an overview of the housing sector and the different information systems used by the Department of Housing to facilitate the implementation of housing subsidy programmes across the three spheres of government. The interrelationships between the housing sector information systems were also explored, and this chapter also presented the research problem and questions, as well as discussing the significance of this study. The next chapter will provide a contextual overview of KM in the public sector.

Chapter 2

Knowledge Management in the Public Sector

The preceding chapter provided a historical background to the Department of Housing, and looked at its composition and the legislative mandate governing the provision of affordable, low-cost houses. The departmental information systems that have been established to facilitate the delivery of houses were also discussed, with specific reference to interrelationships and challenges.

The chapter also mentioned, in terms of the research problem, that the department has been unsuccessful in capturing, sharing, disseminating and preserving knowledge, in order to enhance learning across the three spheres of government within the housing sector. This gap was evident in the disparities and inconsistencies in terms of housing delivery by housing sector departments across the three spheres.

It was also indicated that there is an absence of research focusing on the interrelatedness of the three housing information systems, namely the HSS, MEIA and HUIMS, and their possible roles in facilitating KM in order to improve service delivery in the sector.

This chapter will explore some of the basic theories, historical contexts and concepts related to KM. It will also focus on the implementation of KM in the public sector, making use of case studies of successful implementation of KM in the United Kingdom, USA, Brazil and India. The literature reviewed in this chapter is also drawn from South African public sector institutions.

2.1 Evolution of Knowledge Management in the Public Sector

The evolution of KM in the public sector can be drawn from different perspectives of KM. In the context of this study, the following perspectives have been considered, namely the three converging trends in the workforce, the driving forces of globalisation, information and communications technology, and information management, and lastly, the need to manage information and knowledge assets.

2.1.1 The three converging trends in the workforce

According to McNabb, there are three converging trends behind the drive for public sector organisations to gain better control of their information infrastructures and the management of tacit and explicit knowledge held by employees and in knowledge repositories within organisations⁴².

The first trend is the expected high turnover of knowledge workers as the baby boom generation retires. It has been mentioned that the impending loss of senior project and technical managers is the greatest risk facing the public sector at the start of the 21st century.

The second trend is the global acceleration of the push to implement e-government - agencies at all levels have been increasing the amount and variety of online services available to citizens. This trend was characterised by a government shift towards providing services online, as well as a shift towards mobile technologies for their knowledge workers, thereby enabling mobile communication as information becomes available.

The third trend is characterised by the continuous emphasis on enterprise architecture initiatives i.e. shared services to achieve greater operational efficiencies and implement web-based service delivery. This means that all government agencies must include information technology acquisition in their strategic plans and establish common network platforms for e-mail and all information management systems.

2.1.2 Globalisation and the Knowledge Economy

The introduction of computers and the Internet led to globalisation, also known as the information age. Globalisation has facilitated communication and opened up new markets to organisations separated by geographical boundaries, sectors or institutions. Globalisation has also been widely associated with the emergence of web technologies and the Internet, which has created opportunities in markets that would otherwise have remained unreachable for the majority of businesses. According to Maier, complex changes in organisational structures and the blurring of organisational boundaries are the results of organisational activities in the global economy⁴³.

Friedman defined globalisation as the emergence of new forms of communication and innovation, and referred to three main eras of globalisation. Globalisation 1.0 was the first

⁴²McNabb, D. 2007. *Knowledge Management in the Public Sector*, p6.

⁴³Maier, R. 2007. Knowledge Management Systems: *Information and Communications Technologies for Knowledge Management*, p3.

one, and it lasted from 1492 to 1800, when Columbus set sail, thereby opening up trade between the old and new world. This era was characterised by the globalising of the world. The second era was Globalisation 2.0, which lasted from roughly 1800 to 2000. This era was characterised by the Industrial Revolution, globalising of companies, introduction of steam engines and the rail road, and the early version of the World Wide Web (www). The third era, known as Globalisation 3.0, is characterised as individual globalisation and a need to collaborate and compete globally. According to Friedman, these three eras led to the flattening of the world for the creation of global platforms and multiple forms of knowledge sharing⁴⁴.

Ungerer⁴⁵ mentioned that globalisation or the information age is also referred to as the knowledge economy era. This era represents a break from industrial economics and is visible in industries associated with the information age, which includes information technology, aerospace, semiconductors, advanced communication media and genetics.

Drucker⁴⁶ also referred to the knowledge economy as the knowledge society. He has been strongly associated with the field of knowledge. According to Drucker, the world is moving from an economy based on traditional resources (land, natural resources, and capital) towards a new economy based on knowledge as a key economic resource.

The implications of globalisation for KM are immense, both in practical terms and from a broader social perspective.

2.1.3 Information management

The advent of the Internet resulted in free and readily available information for individuals. Information management is not merely the location and retrieval of available information via the Internet or any other available source, but also involves the process of gathering and distributing information to facilitate decision-making through the utilisation of ICT tools and technologies. The utilisation of ICT tools and technologies for information management, namely contextualisation, data mining and artificial intelligence, enabled the management to information and knowledge to take place. According to Becerra et al⁴⁷. Data mining, artificial intelligence and condensation are means of facilitating information and KM.

⁴⁴Friedman, L . 2006. *The World in Flat*, p510.

⁴⁵Ungerer, M. Herholdt, J. and UYS, K. 2006. *Leveraging Knowledge-based Assets*, p17.

⁴⁶Drucker. 1993. *Post-Capitalist Society*, p7.

⁴⁷Becerra, I. Gonzalez, A. and Sabherwal. R. 2004. *Knowledge management: Challenges, Solutions and Technologies*, p101 -244.

Contextualisation involves putting the enormous amount of available data into the context of the organisational environment. With regards to the Department of Housing, the information systems that are currently used generate a lot of data that is utilised for internal, departmental purposes - in this case, we can refer to the HSS and MEIA systems, which constitute an operational system. The data that is generated is aggregated to create meaningful information through reports, in order to facilitate decision making, and these are made available via the HUIMS and MEIA systems. To facilitate this process, horizontal communication from the National Department to the provinces and local governments needs to be enhanced for easy access to data.

Data mining is the discovery of knowledge in databases, and is suited to the discovery of new knowledge. Becerra et al. further indicated that descriptive data mining and prescriptive data mining are the two main types of data mining systems. They also mentioned that the symbolic, connectionist and statistical methods are the techniques used in data mining.

Artificial intelligence (AI) is another technique for KM. AI is an area of computer science that endeavours to build machines exhibiting human-like cognitive abilities. It is a science that provides computers with the ability to manipulate symbols so that they can be used to solve problems that are not easily solved by means of algorithmic models. Becerra et al. also argued that AI is inextricably linked with knowledge, thereby making it a natural technology for the management of intellectual assets.

In addition, they indicated that the importance of AI in KM lies in the inherent relationship between intelligence and knowledge, and the term AI is therefore used interchangeably with knowledge-based systems (KBS).

2.1.4 Information and Communications Technology

As already mentioned in Chapter 1, many authors in the field of KM have warned against the overemphasis on information and communications technology (ICT) in KM, indicating that ICT should rather be viewed as an enabler or vehicle to facilitate KM.

Countries with mature information technology applications have also been faced with the general concern of the over-purchasing of ICT applications and architectures by their individual government departments. As such, they had to come up with ICT management structures to regulate the ICT systems and find a way of addressing various ICT system-related issues, as well as integrating government disparate systems that were disintegrated.

To address these issues, the US federal government established the Chief Information Council (CIO) in 1996⁴⁸.

In the South African context, the Government Information Technology Officers Council (GITOC) was established in November 2003⁴⁹. GITOC consists of various networks or communities of interest, where government Chief Information Officers (CIOs) meet and share their problems, successes and experiences. The GITOC networks have grown over the years to include sub-committees for the development of the OSS, KIM and e-government projects.

The mandate of the GITOC includes the following:

- Procurement of ICT technologies.
- Focus on information and communications technology (ICT), information management and KM in the South African public service sector.
- Support and guidance to the Government Chief Information Officer in terms of operationalising government information technology and information management policies and providing feedback on their implementation, as well as updates.
- Development of the Knowledge and Information Management processes for government, as a joint effort with the DPSA.

The GITOC draft discussion document further indicates that, in order for organisations to meet client demands, the workforce will have to become more skilled in dealing with knowledge and information, as well as the resulting high demand for the facilities offered by state of the art technology.

As already mentioned, the housing sector information systems (HSS, HUIMS and MEIA) are not integrated. It is therefore the responsibility of the housing sector to establish ICT management structures from the three spheres to regulate the sector's information systems, and find a way of integrating them in order to facilitate the processes of KM in the sector.

The housing sector information systems were also implemented within the three spheres, which are geographically divided into 9 provinces. Therefore, in order to facilitate the processes of KM, the housing sector must establish a KM system that will enable it to

⁴⁸ McNabb, D. 2007. *Knowledge Management in the Public Sector*, p171.

⁴⁹ Government Information Technology Officers Council. 2004. *Developing a Government Knowledge and Information Management (KIM) Strategy: Draft Discussion Document*.1.2 and p11-14

effectively capture, share, disseminate and preserve knowledge, in order to enhance learning across the three spheres of the housing sector. KM system will also assist officials in the three spheres to collaborate and provide feedback, and will facilitate intergovernmental relations, cooperative governance and coordinated service delivery across the sector. According to McNabb, the development of government executive management systems facilitated the development of comprehensive KM systems in the late 1990s. A KM system is more than technology - it is a social system in which the needs and dictates of the people for whom the system is designed remain paramount⁵⁰.

According to Sandrock, research in the field of knowledge has no geographical boundaries and can be conducted throughout the world. This is facilitated by the Internet, which allows knowledge to flow at the speed of light, making the transfer of knowledge almost instantaneous⁵¹.

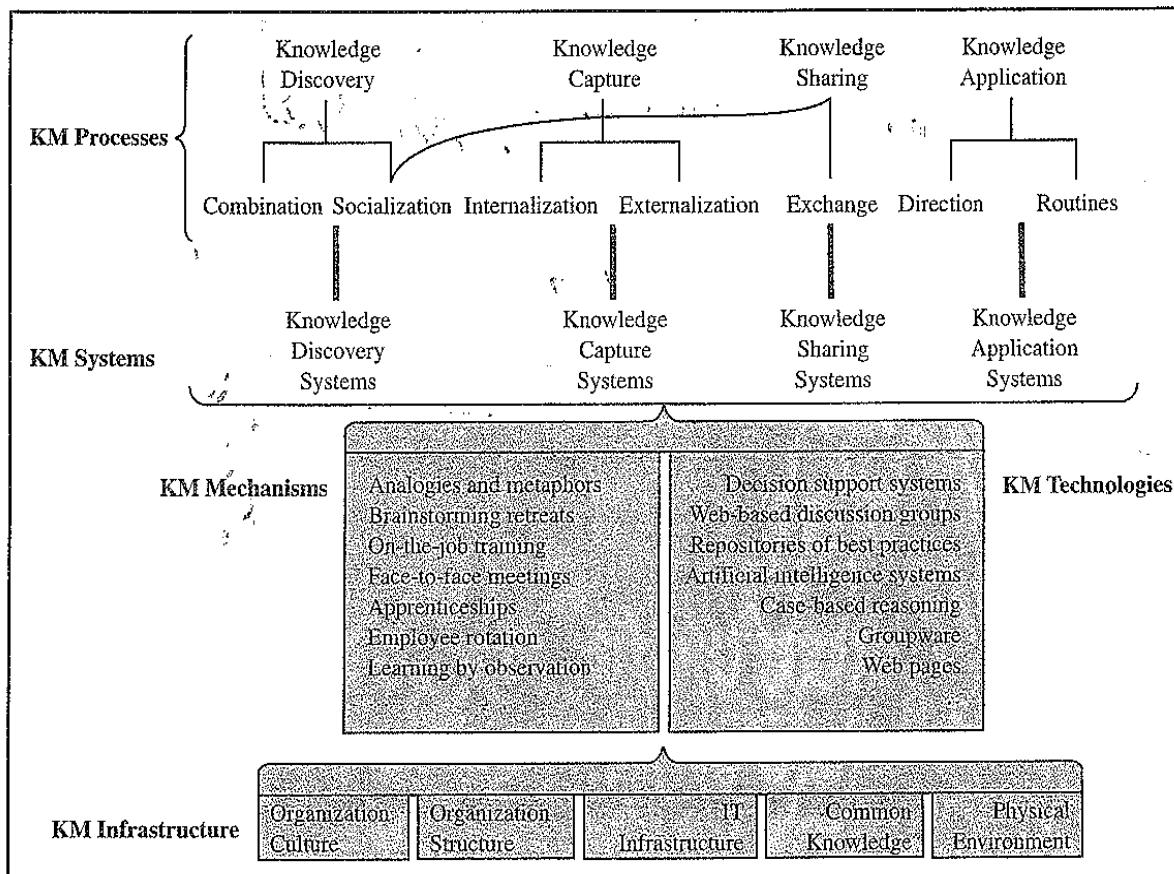
2.2 Knowledge Management Solutions

This study considers a definition of KM from the organisational perspective, as this definition provides a comprehensive view of KM as a collection of organisational processes that deals with knowledge creation, capture, storage, transfer, sharing and application. To complement this definition, Becerra's KM solutions have been included in this study, as they refer to a variety of ways in which KM can be achieved. According to Becerra, KM solutions provide a comprehensive view of how processes, systems, mechanisms and technologies can contribute to the successful implementation of KM in organisations. In this regard, KM solutions are divided into four broad categories, namely KM processes, KM systems, KM mechanisms and technologies, and KM infrastructure, which facilitate the activities of discovering, capturing, sharing and applying knowledge⁵².

⁵⁰ McNabb, D. 2007. *Knowledge Management in the Public Sector*, p26.

⁵¹ Sandrock, J.N. 2010. *The Art of Managing Knowledge. A practitioners Guide*, p5.

⁵² Becerra, I. Gonzalez, A. and Sabherwal, R. 2004. *Knowledge management: Challenges, Solutions and Technologies*, p.31-39.



◆◆◆ FIGURE 3-3 Detailed View of Knowledge Management Solutions

Fig 5: Diagrammatic representation - KM solutions: Becerra et al. Fig 3-3⁵³

Knowledge discovery is associated with the processes that facilitate the development of new tacit or explicit knowledge from data and information, or from the synthesis of prior knowledge. The knowledge discovery process is facilitated by the sub-processes of combination and socialisation, which occur when tacit knowledge is shared through joint activities of explicit knowledge to form more complex explicit knowledge. The process of knowledge discovery is supported by knowledge discovery systems that assist with the process of developing new tacit and explicit knowledge from data and information, or from the synthesis of prior knowledge.

Knowledge capturing is associated with processes that facilitate the retrieval of either explicit or tacit knowledge residing within people, artefacts or organisational entities. This occurs

⁵³Becerra, I. Gonzalez, A. and Sabherwal, R. 2004. *Knowledge management: Challenges, Solutions and Technologies*, p. 47.

through externalisation, where tacit knowledge is converted into explicit knowledge, and internalisation, where explicit knowledge is converted into tacit knowledge. Knowledge capture systems facilitate the process of retrieving either explicit or tacit knowledge residing within people, artefacts or organisational entities. These systems can help capture knowledge that resides outside the organisation, through the processes of externalisation and internalisation. Technologies that support knowledge capture systems by facilitating externalisation include intelligent technologies i.e. case-based reasoning and expert systems, while technologies that support internalisation include computer-based training and communication technologies.

In terms of knowledge sharing, tacit or explicit knowledge is exchanged between individuals or groups. A knowledge-sharing culture is one in which “knowledge, in all its diversity and representations, is willingly made available and effectively utilized for the realization of the organizational strategy and objectives. Knowledge sharing systems support the process by which explicit or implicit knowledge is communicated to other individuals. This is done by supporting exchange and socialisation. Mechanisms and technologies that support socialisation, i.e. discussion or chat groups, facilitate knowledge sharing by enabling individuals to explain their knowledge to the rest of the group. These technologies include memorandums, manuals, progress reports, letters and presentations. Technologies that facilitate exchange include groupware, databases and information repositories⁵⁴.

According to Gurteen, organisations benefit from knowledge sharing through the retention strategies of intellectual capital, which empower members to make more informed decisions and to leverage expertise gained and applied in one part of the organisation in other areas, as well as the fact that the knowledge base of organisations is continuously eroding⁵⁵.

At the organisational level, KM provides two major benefits for an organisation. This includes improving the organisation's performance through increased efficiency, productivity, quality and innovation. Knowledge sharing also increases organisational effectiveness and efficiency, and therefore, organisations that manage their knowledge have a high rate of productivity. By having greater access to their employees' knowledge, organisations can make better decisions, streamline processes, and reduce the occurrence of

⁵⁴Becerra, I. Gonzalez, A. and Sabherwal, R. 2004. *Knowledge management: Challenges, Solutions and Technologies*, p.39.

⁵⁵Gurteen , D. 1999. Creating a knowledge sharing culture. *Knowledge Management Magazine*, 2(5) [Online]. Available at: <http://www.gurteen.com/gurteen/gurteen.nsf> (Accessed 12 February 2010).

‘re-invention of the wheel’ work. This means that, in the case of the public sector, managing knowledge could reduce the cost of operations and improve customer service. Knowledge also increases the financial value of the organisation, by treating people’s knowledge as an asset.

With regard to knowledge application, Becerra et al. indicated that the application of knowledge is a process whereby knowledge in an organisation about individuals and artefacts is used for decision making purposes. Mechanisms and technologies support knowledge application systems by facilitating routines and directions. Technologies supporting direction include expert knowledge embedded in expert systems, decision support systems, and troubleshooting systems. On the other hand, technologies that facilitate routines include expert systems, enterprise resource planning systems and traditional management information systems⁵⁶.

2.3 Knowledge Management Systems Model

In relation to the KM solutions discussed above, McNabb’s KM Systems Model is considered as a means for implementing KM in the public sector. According to McNabb, KM is a dynamic, evolving set of interacting, existing and new tools, practices and procedures that employ technology and social interactions in the delivery of public services⁵⁷. To facilitate KM, McNabb suggested that the KM Systems Models a comprehensive tool that combines concepts, mechanisms and processes to interact with and shape an organisational culture that values knowledge creation and knowledge sharing⁵⁸.

⁵⁶Beccerra- Fernandez et al. 2004.*Knowledge Management: challenges, solutions and technologies*. New Jersey: Pearson,p.39.

⁵⁷McNabb, D. 2007. *Knowledge Management in the Public Sector*,p25.

⁵⁸McNabb, D. 2007. *Knowledge Management in the Public Sector*,p25.

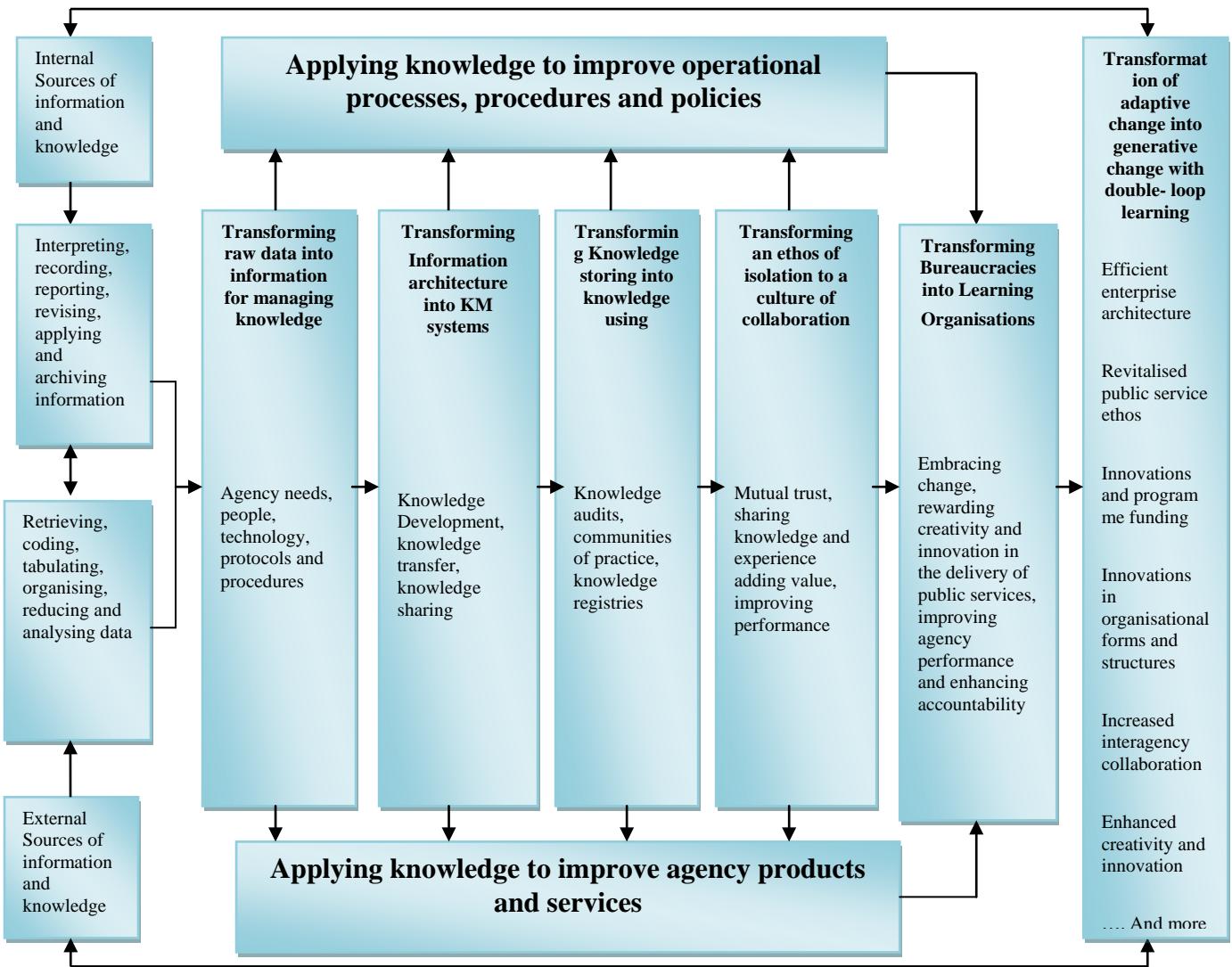


Fig 6: Diagrammatic presentation of Fundamental Mechanisms, Processes and Payoff in Public Sector KM Systems (MCNABB.)⁵⁹

According to McNabb, this model is a living dynamic system, in which new, innovative tools, goals and approaches are being added almost daily. As knowledge concepts continue to evolve and change their focus, they are eventually replaced by improved ideas and processes as individuals' knowledge also grows.

In the South African context, the Government Information Technology Offices Council (GITOC), in their discussion document, has also outlined the KM processes that are referred to as the knowledge value chain. These include: needs determination, knowledge acquisition,

⁵⁹McNabb, D. 2007. *Knowledge Management in the Public Sector*, p26.

knowledge capture, organising, conservation, protection, sharing, dissemination utilising and assessing value⁶⁰.

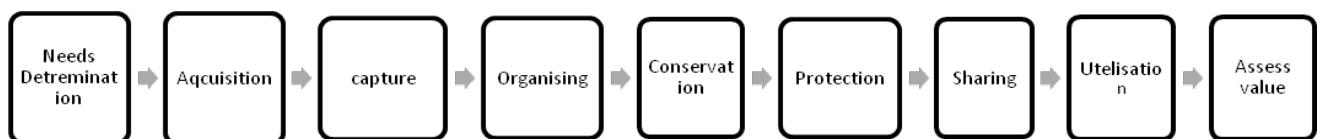


Fig 7: Diagrammatic Representation - GITOC Processes

The Asian Bank also highlighted the fact that successful implementation of KM involves embedding KM into all of an organisation's business processes. It is not an activity delivered by a distinct department or particular process. Architecture must be built to initiate and implement organisation-wide KM initiatives. The bank emphasised the fact that the four pillars of KM are critical to its implementation and success, which are based on their interrelatedness. The successful implementation of KM relies on all four pillars being addressed⁶¹.

2.4 Implementation of Knowledge Management in the Public Sector

Public sector organisations and institutions are increasingly recognising the importance of KM as a strategic resource to improve their effectiveness and address their challenges. According to Yuen, the impact and explosion of digital connectivity enabled government agencies all over the world to increase productivity, improve accountability, enhance transparency and facilitate public sector reform⁶². The interest in KM in the public sector can be attributed to the benefits of KM in terms of public service delivery, which include the following: generating and sharing knowledge to improve service delivery; sharing best practices and providing a total value-added package to the communities that it serves; creating and innovating new products and services as service delivery demands change; sharing knowledge across government spheres – by creating an open society and e-

⁶⁰GITOC.2004. Developing a Government Knowledge and Information Management (KIM) Strategy: Draft Discussion Document, p14.

⁶¹Asian Bank.Linking to results-4 knowledge pillars: article.Available online at: <http://www.adb.org/evaluation/linking-to-results/default.asp>

⁶²Yuen, Y. *Overview of Knowledge Management in the Public Sector*. United Nations Public Administration Network. Available online at:www.unpan.org.

government learning; building customer relations by providing better customer solutions and communication, in line with a knowledge society and knowledge economy; avoiding the repetition of mistakes that end up being costly and impacting on service delivery; and avoiding the duplication of work by reinventing the wheel, thereby causing a delay in the delivery of services to the populace.

The successful implementation of KM in organisations should contribute towards a growing strategic knowledge, address the needs for knowledge to flow across the organisation, and create value from the harnessing of knowledge. According to Khoza⁶³, all governments around the globe are interested in two broad objectives, namely providing quality services and maintaining an acceptable, just, orderly and secure society. Governments believe that if these two objectives are met, freedom from ignorance, unemployment, poverty and crime will be achieved. As the public sector continues to work with the private sector and the two learn from each other, the public sector begins to acknowledge the importance of KM and recognise its value in terms of product development and service delivery.

It is often emphasised that successful implementation of KM involves recognition of organisational assets, namely people, processes and technologies. Gopinathan supports the view that KM involves the use of intellectual and knowledge assets in an organisation, and that these need to be effectively harnessed in order to benefit everyone⁶⁴.

2.5 Challenges of Knowledge Management in the Public Sector

This section will focus on common challenges that public sector institutions are faced with and how they can be mitigated by the implementation of KM. According to Ried and Lindsay⁶⁵, the most critical issues for implementing KM initiatives in the public services sector are, firstly, the change of organisational culture, in order to increase efficiency across the public services sector by integrating information contained in silos on different levels of government and across provincial borders in particular.

⁶³Khoza, S.2009. Knowledge Management in Africa.*InKnowledge Management for Service Delivery in the South African Public Sector: KM Africa Conference*. Dakar.

⁶⁴Gopinathan, R. 2008.*Knowledge Management in the Public Society*. Available online at: <http://knowledge.smu.edu.sg/article.cfm?articleid=1162#>

⁶⁵Ried and Lindsay, 2006.*Knowledge Management in the Public Sector: stakeholder partnerships in the public policy development*,p25.

The second issue is the need to develop a new system or consolidate out-dated systems, in order to improve overall performance and capitalise on a broader, more integrated and accessible knowledge base.

Thirdly, it is important for public sector institutions to improve accountability and mitigate risk by making informed decisions and resolving problems faster, and this should be supported by access to integrated, transparent information across all organisational boundaries.

The fourth challenge that public institutions are faced with is to deliver better and more cost-effective constituent services, such as enhancing partnerships with and responsiveness to the public, thereby clearly demonstrating a higher return on tax payers' money.

Arora identified the common challenges faced by public sectors worldwide as the following: driving efficiencies across all public services; improving accountability; making informed decisions; enhancing partnerships with stakeholders; capturing the knowledge of an ageing workforce; and improving overall performance. To deal with these challenges, public sectors often introduce several reforms, including KM and, most recently, e-government⁶⁶.

According to McNabb,⁶⁷ the common challenges faced by public sectors in the twenty-first century include:

- The shift towards market-orientated, knowledge-based public services and the continued pressure of privatisation of government services.
- Continued rapid advances in science and technology and the blending of the two, as well as the opportunities and challenges that they both provide.
- The challenges that government managers and administrators face with the changing and increasingly diverse nature of government structures, such as collaborations across jurisdictions and tools, including e-government.
- A continuing demand that governments need to do more with less and for greater accountability of the government.
- The need to capture the knowledge of an ageing workforce, and improve overall performance.

⁶⁶Arora, E.2011. *Knowledge Management in the Public Sector*, p238.

⁶⁷McNabb, D. 2007. *Knowledge Management in the Public Sector*, p.xv.

- Maintaining a reliable stream of social security income and repairing an aging and in many cases decaying physical infrastructure, the globalisation of society, which will continue to increase the interdependence of businesses and industries, national and regional economies, markets for products and services, civil societies and national governments.

The geographical location of the housing sector across provincial and municipal boundaries in South Africa is one of the major challenges that the housing sector is currently experiencing. Coupled with this challenge, the Department of Housing must ensure that information and knowledge are shared timorously through its existing information systems. In addition, the department is also faced with inefficiencies in terms of delivery of houses across its regions. To address public sector challenges, Arora indicated that KM provides the overall strategy and techniques to manage e-government content effectively, in order to make knowledge more usable and accessible, and to keep it updated⁶⁸.

2.6 Case studies of Knowledge Management implementation

KM as a practice has been widely adopted by European countries. According to Khoza⁶⁹, a study was conducted on KM for service delivery in the South African public sector in 2007/2008. Khoza added that experiences from different countries e.g. Canada, United States, Australia and New Zealand have shown that service delivery through KM can be fast-tracked⁷⁰. In this regard, case studies of KM implementation have been drawn from the United Kingdom, United States, Brazil and South Africa in this study.

2.6.1 The United Kingdom Local Government Association (LGA) Group

Case studies of KM implementation in the United Kingdom can be traced far back as from 1999, when a special envoy office was established in 2004, known as the e-Government Unit, which introduced the knowledge network in 2000, followed by knowledge enhanced government (KEG). The United Kingdom Local Government Association (LGA) Group developed the Housing Knowledge web resource (portal) in April 2009. This resource aims to support councils in dealing with their strategic housing role during the current recession, and

⁶⁸Arora, E. 2011. *Knowledge Management in the Public Sector*, p238.

⁶⁹Khoza, S.2009. Knowledge Management in Africa. In *Knowledge Management for Service Delivery in the South African Public Sector: KM Africa Conference*. Dakar.

⁷⁰Improvement and Development Agency. Available online at:<http://www.idea.gov.uk/idk/core/page.do?pageId=11901555>

to help them lead their communities out of this recession to recovery. This is done through networks, online communities of practice and web resources, and through the support and challenges provided by councillor and officer peers. The portal also provides online services to its citizens.

With regard to the steps taken by the United Kingdom Local Government Association (LGA) Group,⁷¹ Yuen stated that the main aim of KM is to maximise productivity in the public sector, while also enhancing public service delivery. More specifically, the objectives of KM initiatives include the following:

- To maximise efficiency among all public services by connecting silos of information on different levels of government and across borders.
- To develop new systems or consolidate out-dated systems, in order to improve overall performance.
- To capitalise on a broader, more integrated and easily accessible knowledge base.
- To improve accountability and mitigate risk by making informed decisions and resolving problems faster, and this should be supported by access to integrated, transparent information across all organisational boundaries.
- To deliver better and more cost-effective constituent services, such as enhancing partnerships with and responsiveness towards the public.

2.6.2 The United States

With regard to KM in the United States, McNabb indicated that KM has been widely embraced by a wide variety of organisations in the federal government. He suggested that in agencies where KM is found, it is often considered to be an important, if not essential, management tool. In addition, he indicated that KM enables agencies to meet their service and performance requirements, in spite of the many challenges that the government faces in the 21st century⁷².

According to McNabb, KM was adopted by the US federal government late in the 1990s, with the General Service Administration being one of the first federal agencies to realise how

⁷¹ Yuen, Y. *Overview of Knowledge Management in the Public Sector*. United Nations Public Administration Network. Available online at: www.unpan.org

⁷² McNabb, D. 2007. *Knowledge Management in the Public Sector*, p88.

KM could improve their ability to carry out their operations. The first attempt of the US Department to implement a KM programme began in 1999 with the Foreign Affairs Systems Integration (FASI) project⁷³.

The FASI programme was reviewed and replaced in June 2002 by the Office of e-Diplomacy, in order to support the commitment of the Secretary and Undersecretary for Management to establishing secure and innovative systems at headquarters and overseas missions, so as to support diplomacy in the 21st century. The aim of the e-Diplomacy Office was to enhance the department's foreign affairs leadership by promoting a knowledge-sharing culture and making new technologies readily available to help provide faster, more effective services to internal and external customers, capturing the knowledge of Foreign Service Officers (FSO) to ease the transition of their replacements, as they rotate positions at overseas missions every two to three years.

NASA adopted the use of KM for their programme and project management (PM), in order to complete complex, multifaceted and highly technical missions, as well as to deal with the challenges associated with their ageing workforce and skills development. An effective PM workforce is critical to the undertakings of NASA, and in 1994, the agency witnessed the rapid evolution of a variety of systems and techniques for directing the combined efforts of thousands of individuals cooperating in close knit programmes, in which government, universities and private industries played mutually reinforcing roles.

The agency also faced difficulty in determining how to select, train and rotate managers for its projects. Compounding this problem was an inability to identify qualifications that distinguished the ideal candidate for project management assignments from other types of managers, as well as the skills development of its other staff⁷⁴. To address this challenge, NASA established a KM Model with, and introduced the building blocks of KM to, the agency, using the concepts of competency, capability, knowledge sharing, expertise, innovation, creative and critical thinking and information technology tools to enable organisations to implement KM fundamentals.

This KM Model emphasised the importance of training, and as such, the NASA Academy of Program and Project Leadership (APPL) was introduced, with the aim of providing total team

⁷³ McNabb, D. 2007. *Knowledge Management in the Public Sector*, p88.

⁷⁴ McNabb, D. 2007. *Knowledge Management in the Public Sector*, p210.

and individual professional development, and to ensure the successful generation of project professionals. The Academy focused on maintaining the legacy of project excellence.

Training was facilitated by developmental activities and tools for the organisation's benefit and in order to support individuals and teams working on NASA's programmes and projects, and also focused on developing career development activities and tools, performance enhancement projects, knowledge sharing communities of practice, and cutting edge research and development. In addition, training was strengthened by with real professionals' experience with NASA projects and a reliance on the knowledge of a previous generation of project talent. The previous generation of NASA served as mentors, coaches and expert guides.

NASA'S KM Model also emphasised the importance of innovation in its projects, with the aim of reducing costs and increasing speed and quality. The innovation management approach meant that the raw materials of knowledge, critical to innovation and better decision making, needed to move faster, better and cheaper throughout the agency.

As a result of this fundamental shift in thinking, several changes were initiated i.e. there was an increased emphasis on development, curriculum certification, benchmarking and research, and a greater emphasis on job aids and tools. These represented a natural extension of the learning environment and significant advances in adult learning theory, educational technology and IT. In this regard, the recruitment of a human resource expert in development and training, as well as a development budget, were necessary in order to achieve this new organisational model.

2.7 Knowledge Management in Developing Countries

KM implementation in developing countries is still in its early stages. According to Yuen, a NUS survey study was conducted by the University of Singapore in 2007 with respondents from 31 developing countries, namely Barbados, Brunei, Cambodia, Cyprus, Egypt, Fiji, Ghana, India, Iran, Jamaica, Jordon, Maldives, Mozambique, Nigeria, Pakistan, Philippines, Romania, Seychelles, Solomon Islands, South Africa, Sri Lanka, St Lucia, Tanzania, Thailand, Trinidad and Tobago, Turkey, Tuvalu, Uganda, Vietnam, Yemen and Zimbabwe.

The study was aimed at providing an overview of KM initiatives and trends in primarily developing countries⁷⁵. The findings from the NUS survey were analysed in terms of various themes. However, for the purpose of this study, the following are considered: the role of leadership and strategy definition, provision of ICT infrastructure, as well as partnership collaboration.

With regard to the NUS survey findings on the role of leadership and strategy definition, respondents indicated that they are aware of KM and have a programmes in place, or are developing a programme or examining the need for such a programme. They also indicated that the key challenges they face include the setting up of these programmes, promoting awareness, and prioritising various initiatives within government. It was also stated that there is insufficient documented evidence of government-wide KM initiatives in developing countries.

In terms of the provision of ICT infrastructure, a number of respondents indicated that they have launched their central government portals as a first step towards providing easy access to and ensuring transparency of information.

With regard to partnership and collaboration, the respondents indicated that collaboration and cooperation at local, regional and national levels, as well as between public and private organisations, are important for building trust in government. They also indicated that developing a citizen-centred focus for projects can help to identify opportunities for closer technical, service delivery and policy integration, and that cross-agency teams within government can help to implement and manage these projects⁷⁶.

2.7.1 Brazil

According to Knight, Brazil is still in the early stages of applying KM techniques in government. Brazil's federal government and some state governments have been moving toward the adoption of comprehensive KM policies, and although there are a number of isolated instances of successful implementations at the agency or sub-agency level, in general, Brazil has lagged behind with regard to the implementation of KM. A Technical Committee on Knowledge and Strategic Information Management was established in 2003 to

⁷⁵ Yuen, Y. *Overview of Knowledge Management in the Public Sector*. United Nations Public Administration Network. Available online at: www.unpan.org.

⁷⁶ Yuen, Y. *Overview of Knowledge Management in the Public Sector*. United Nations Public Administration Network. Available online at: www.unpan.org.

promote the use of KM principles, concepts and methodologies in the Federal Public Administration, as well as to identify and monitor best practices in KM within the Federal Public, and to implement KM policy in the electronic government⁷⁷.

To facilitate e-government and KM, the e-Brasil Project was established. The aim of this project was to build support among political leaders, their advisors, the ICT sector, and the public at large for the intensive use of ICT, in order to accelerate Brazil's socio-economic development. The e-Brasil Project was supported by ICT to enable the electronic medium to facilitate collaboration, involving a network of over 60 specialists, mostly Brazilian, but including some from other countries.

The e-Brasil Project has collaborated in a programme of publications and presentations at major conferences in Brazil, as well as the development of the Portal e-Brasil (www.e-brasil.org.br). The project team has also moved to develop a strategic communication campaign, academic programmes to support the development of "e-leaders" knowledgeable in both public administration and ICTs, and fundable projects at the municipal, state and federal level which can attract financial support from Brazilian and international sources. As of late May 2007, the e-Brasil Program¹¹ that the team had developed was adopted as its own by two major Brazilian organisations, the Brazilian Chamber of e-Commerce (www.camara-e.net) and the Brazilian Telecommunications Association (www.telecom.org.br). The team hopes to attract the support of additional organisations in Brazilian civil society⁷⁸.

2.7.2 The South African Public sector

In the South African context, extensive efforts have been made by the Department of Public Service and Administration (DPSA), as well as the Government and Information Technology Officers Council (GITOC), to introduce KM as a practice in South African public sector government departments. Collaboration with private sector institutions such as the Development Bank of South Africa (DBSA) has also been forged to ensure an integrated effort, as well as to learn from the DBSA how to implement KM.

The DPSA introduced KM in the public sector in 2001 by establishing and coordinating the Learning and Knowledge Management Programme (LKMP). The purpose of the LKMP was

⁷⁷Knight . 2007. *Knowledge Management and e-Government in Brazil*, p1.

⁷⁸Knight . 2007. *Knowledge Management and e-Government in Brazil*,p1.

to introduce and market the benefits of KM countrywide and with the support of the UK's Department for International Development (DID) through the Integrated Provincial Support Programme (IPSP)⁷⁹.

In line with this, government departments were mandated to commit themselves to being learning organisations which are driven by systems, processes and culture aligned with KM processes, in order to harvest existing experience and knowledge, with the aim of institutionalising individual memories. Government departments were also mandated to establish KM functions within their departments, which will help coordinate and align their department-wide KM efforts and improve overall KM practice, as well as to enhance innovation within their respective departments.

In the financial year 2002/2003, the DPSA, through the learning network, drafted the KM framework based on the needs expressed and observations made across the public service sector, comments and concerns raised by public servants in KM workshops that were held in the nine provinces by a joint team from the DPSA and the Department of Communications in 2002/2003, and subsequent engagements with various departments, NGOs, and academic and private sector institutions⁸⁰.

The draft KM framework outlined the pillars for the implementation of a public service-wide KM. According to Radebe, the DPSA draft framework for the implementation of KM mandates the DPSA to intervene and coordinate the implementation of KM initiatives within the South African government and other governments in Africa.

Since the inception of KM in 2001, several strides in terms of developing chapters for the DPSA's KM framework have been made, and continuous consultations and workshops are being held through the DPSA Learning and KM Programme with KM officials across the three spheres, in order to finalise the KM framework.

The Government Information Technology Officers Council (GITOC) established a Knowledge and Information Management Work Grouping in November 2003. Through this group, the Knowledge and Information Management discussion document was drafted to provide inputs towards the development of the proposed Knowledge and Information

⁷⁹ RSA.DPSA Indaba on Public Networks programme: learning networks. Available online at: http://www.dpsa.gov.za/ln_km_indaba_2006.asp.

⁸⁰ Radebe. T. *Presentation of Draft framework for Public Service Learning & Knowledge Management: the gist*. Reflecting DPSA Initiatives.Slide10.

Management framework to improve service delivery effectiveness, efficiency, economy, ethics, equity and excellence.

The proposed Knowledge and Information Management document's focus was on giving effect to the 6 e-values, namely Effectiveness, Efficiency, Economy, Ethics, Equity and Excellence, in the workplace. The 6 values were developed and linked to the eight Batho Pele principles of service delivery. To achieve the six values, the Knowledge and Information Management role should formulate organisational goals, strategies, processes, structures, culture, and utilisation of people and other resources⁸¹.

The effectiveness value is aimed at meeting the objectives and/or fulfilling the purpose of Knowledge and Information Management, while efficiency value is aimed at using resources optimally to execute a process and produce an output. The economy value is aimed at obtaining Knowledge and Information Management resources at the best price/cost and producing outputs at the best price/cost to the business, and the ethics value is aimed at acting within the law, in honesty and integrity, thus maintaining a high moral standard.

The equitable value is aimed at showing fairness to everybody concerned -being reasonable, unbiased, just, and devoid of favouritism, and lastly, the excellent value is aimed at providing an output that is likely to exceed expectations, that exceeds normal standards, is the best, or as close to the best as humanly possible.

The GITOC also proposed the development of a government-wide knowledge and information management strategy that is aimed at increasing the ease, effectiveness and/or efficiency of the processes of governance, validation, regulation, contextualising, enrichment and conversing, which can be deeply embedded in overall operations.

The Development Bank of South Africa (DBSA) re-established itself to become a world-class knowledge-based institution in 1999. The knowledge needs of the DBSA included building knowledge of development and infrastructure and understanding the market, particularly metropolitan local government and district local government.

The DBSA, together with the African Development Bank, also initiated the KM Africa Forum in 2005, focusing on Africa's development challenges. The principles of KM Africa were adopted from KM Europe, and were aligned with the strategic priorities of the DBSA to

⁸¹Government Information Technology Officers Council.2004.*Developing a Government Knowledge and Information Management (KIM) Strategy: Draft Discussion document,1.2.*

expand its knowledge base and create platforms for partnerships for the enhancement and building of knowledge⁸². The objective of KM Africa was to facilitate the harnessing of knowledge in order to improve the development outcomes in Africa in the social, economic and cultural spheres. The mission of KM Africa is to:

- Facilitate research, including mobilisation of enabling resources.
- To build platforms for knowledge exchange by encouraging cooperation between knowledge institutions and other development agencies.
- To identify and bring together African expertise on various developmental challenges.
- To link primary and applied research on the African continent and beyond.
- To increase the ability to mobilise and deploy knowledge for the successful social and economic transformation of the continent.

2.8 Conclusion

This chapter provided a contextual overview of KM in the public sector, focusing on the evolution of KM within the context of the public sector. The chapter also explored various components of the successful implementation of KM in developed countries, such as the United Kingdom and United States of America, but there is unfortunately insufficient documented evidence of government-wide KM initiatives in developing countries. The following chapter will present the research methodology used in this study.

⁸² Khoza, S.2009. Knowledge Management in Africa. In Knowledge *Management for Service Delivery in the South African Public Sector*.

Chapter 3

Research Methodology

The aim of this chapter is to outline the research methodology used to achieve the research objectives of this study. The two research methods that have been used in this study are compared, focusing on both their advantages and limitations. The chapter then considers the different research methods and the research design chosen for this study. It outlines the research objectives, and discusses the target population, data collection instruments, validity and reliability, as well as ethical considerations that are relevant to this study.

3.1 Research Objectives

The objective of this study is to explore the existing information systems in the housing sector and look at the ways in which they can facilitate KM and improve service delivery across the three spheres of government (national, provincial and local) in the housing sector. The study will also seek to explore the positive aspects that exist and the interrelatedness of existing systems within the Housing Sector as well as their utilisation to facilitate the implementation of KM within the Housing Sector across the three spheres of government. The study also assesses the understanding of KM concepts and practices and how these can assist the development of the model and implementation thereof.

This study will also seek to formulate a national KM Model that addresses different ways in which knowledge can be captured, shared, disseminated and preserved within the Department of Housing.

3.2 Research Methodology

This study focuses on social research methods that are based on three different approaches, namely positivism, interpretative social science and critical social science. Although these three approaches are based on different philosophical assumptions, they all have an impact on the way in which we view knowledge⁸³.

This study used the survey research method. The survey, as stated by Saunders et al. is usually associated with the deductive approach⁸⁴. The survey allowed for the collection of a

⁸³Neuman, L.W. 1997. *Social Research Methods*, p 62 -84.

⁸⁴Saunders, M., Lewis, P. and Thornhill, A. 2003. *Research Methods for Business Students*, p92.

large amount of data from a sizeable population in a highly economic way, i.e. this study used questionnaires to collect data.

Triangulation was employed to ensure a combination of both qualitative and quantitative methods are used to collect data based on the premise that these methods are complementary.

On the other hand, the qualitative research method was used to obtain data regarding anticipations, experiences, attitudes and behaviour concerning the research objectives. Nueman also defined qualitative study as an inquiry process of understanding a social, cultural or human problem based on building a complex, holistic picture formed with words, reporting detailed views of informants and conducted in a natural setting⁸⁵.

3.2.1 Rationale for the Methodology

Quantitative data was obtained from 20 local government officials and 16 provincial respondents (department of housing officials) through a survey questionnaire supplemented by interviews. Internal working arrangements of respondents utilising the housing information systems were explored across the three spheres of government in South Africa.

An exploratory research was used to establish lack of KM in the housing sector across the three spheres of government in South Africa and ineffective information sharing and reporting.

A cross-sectional design was used to obtain a picture of the existing housing information systems that various business units utilise in the housing sector across the three spheres of government. The survey was used⁸⁶, to allow for the collection of a large amount of data from 4 provincial and 10 local government officials in a highly economic way as well as to explore the role of information systems that are currently used in the Department of Housing and to reach an understanding of the role that KM can play in improving the effectiveness of the organisation, thus improving service delivery in the housing sector environment, questionnaires were used in this study.

The qualitative method was then used to explore the challenges, negative and positive aspects, of departmental systems in use, the status of KM awareness within the context of the housing sector across the three spheres of government. The explanatory research method was

⁸⁵ Nueman, L.W. 1997. *Social Research Methods*. USA: A Viacom Company, p106, 128.

⁸⁶ Saunders, M., LEWIS, P. and THORNHILL, A. 2003. *Research Methods for Business Students*, p92.

also used to build theory and predict what could happen if KM was promoted across the three spheres of government.

3.2.2 Research Design

In addressing the different types of research, Saunders et al. ‘research process onion’ was used.⁸⁷ The research process in this instance talks to the research philosophy, research approaches, research strategies and time horizons. In this study, the research philosophy that has been used is positivism. Positivism adopts the philosophical stance of the natural scientist.⁸⁸ It is best known to have a strong connection to the structural, functional, rational choice and exchange theory frameworks.⁸⁹ It is further indicated that this works with an observable social reality, and that the end product of such research can be law-like generalisations, similar to those produced by physical and natural scientists.

In this study, the reality of inconsistencies in terms of utilising the existing housing information systems and lack of coordination of KM initiatives between the national, provincial and local governments was observed, and the end product was a generalisation of the situation based on a statistical analysis of the primary data collected.

The research approach used in this study is the deductive approach. According to Hussey, a deductive approach provides the basis for explanation, permits the anticipation of phenomena, predicts their occurrence, and therefore enables them to be controlled⁹⁰. In this study, the most important characteristic of deduction was used. This characteristic indicates that concepts need to be operational in a way that enables facts to be measured quantitatively.⁹¹ Facts were measured quantitatively and analysed statistically using the Statistical Software Package for Social Sciences (STATA) and Excel spread sheets in this study.

⁸⁷Saunders, M. Lewis, P. Thornhill. A. 2003. Research Methods for Business Students. Pitman Publishing: England. P83

⁸⁸Remenyi, D. et al. 1998 Doing Research in Business and Management: an Introduction to process and Method, London.P 32

⁸⁹Neuman L.W. 1997. Social Research Methods. USA .A Viacom Company. P62

⁹⁰Hussey, J. & Hussey R. E1997. Business Research: A practical Guide for Undergraduate and Postgraduate Students, Basingstoke, Macmillan Business.P. 52

⁹¹Saunders A. et al.2003. Research Methods for Business Students. Pitman Publishing: England. P86-87

3.3 Target Population

The target population is the group to which the researcher wishes to generalise the results of the study. The target population in this study is the officials who use the existing housing information systems in the housing subsidy administration, monitoring and evaluation and project management sections within the housing sector both at national, provincial and local government level in South Africa. In total, there are 9 provincial housing departments and 262 functional local governments with housing subsidy administration and project management sections.

3.4 Sampling

The sampling in this study was also informed by the stratified sampling method⁹². This choice guaranteed representativity of the proportion of different strata within a sample. The total population for the study was divided into sub-populations on the basis of sub-information. In this case, the 9 Provincial departments were divided into strata and 4 were selected namely; Gauteng, North West, Limpopo and the Western Cape.

The 4 selected provinces were compared to one another and thereafter, a random sample from each sub-population, which in this case is the local government, was selected for the sample. These groupings represented the strata⁹³.

The local governments were clustered and then compared to one another. Of the 99 local governments, 10 local government housing departments were selected, of which 14 housing subsidy administration and project management staff members were selected for interviews.

Sphere of Government	Target	Respondents
National	19	19
Provincial	28	27
Local government	14	5

Table 1: Total number of distribution and respondents: National, Provincial and Local government

⁹²Lind, A.D. et al. 2001. *Statistical Techniques in Business & Economics*, p270.

⁹³Neuman, L.W. 1997. *Social Research Methods*, p212.

Provinces	Target	Respondents
Gauteng	7	7
Limpopo	7	6
North West	7	7
Western Cape	7	7

Table 2: Total number of distribution and respondents: Provinces

Province	Local government	Distribution	Respondents
Gauteng	Ekurhuleni	2	1
	Tshwane	1	2
	Johannesburg	1	0
Limpopo	Vhembe	2	1
	Sekhukhune	1	0
North West	Potchefstroom	2	0
	Sedibeng	1	0
	Mafikeng	1	0
Western Cape	Cape town	2	1
	Stellenbosch	1	0
Total		14	5

Table 3: Total number of distribution and respondents: Municipalities

The above tables indicate the total number of questionnaires that were distributed to respondents across the three spheres in the housing sector. 19 questionnaires were distributed to the National Department of Housing. The total number of questionnaires distributed in this study was 61.

3.5 Research Instruments

The instruments for data collection in this study were the literature on the subject and a combination of data sources. The implementation of the survey was done through the administration of questionnaires, which were supplemented by semi-structured interviews, in order to collect primary data from the respondents.

Questionnaires were sent to identify Department of Human Settlement managers, system administrators and users within the National Department, as well as housing managers, subsidy administrators and project management staff members within the selected provincial housing departments and local governments. In this regard, the selected staff members were interviewed telephonically, in order to supplement what they had said in the questionnaires and to determine whether or not they were satisfied with the manner in which the available

systems were implemented, as well as whether or not they facilitated KM initiatives. The literature on the subject provided secondary data, which was supportive of the empirical research conducted in this study⁹⁴.

3.6 Research Process

3.6.1 Pilot Study

The pilot study was conducted by constructing and sending out questionnaires to the following number of participants: 2 managers in the National Department, 2 managers in each province and 2 managers in 2 local governments. Interviews were also conducted to determine if the methodology would be effective in obtaining the required data. On completion of the pilot study methodology was adjusted, and questionnaires were customised and enhanced to ensure that the information required would be obtained. Thereafter, the study was rolled out to the full sample.

3.6.2 Questionnaire Construction

The questionnaire was constructed based on the research objectives, with the aim of answering the research questions. The constructed questionnaires were tested during the pilot study that was conducted, and on completion of the pilot study, they were evaluated and reviewed to check if the questions actually provided the information required for the study. On completion of these reviews, the questionnaires were customised to ensure that the information required would be obtained. The questionnaire consisted of 10 question categories, namely:

- Biographical information of respondents
- Departmental information systems (HSS, HUIMS and MEIA)
- Understanding of KM by management and staff members
- Current status of KM
- Knowledge sharing
- Methods and tools used to preserve knowledge
- Measuring knowledge
- Assessing knowledge future

⁹⁴Saunders, A. et al. 2003. *Research Methods for Business Students*, p180.

- Preservation of knowledge assets
- Critical success factors for KM

The questionnaire, its detailed description and its categories is provided in Appendix A.

3.6.3 Administration of Questionnaires

The questionnaires were distributed to respondents via e-mail. Where respondents had no e-mail, telephonic interviews were conducted. The respondents were sent an introductory e-mail a week before the questionnaire was sent out. This introductory e-mail had the pre-survey contact letter attached. The questionnaires were distributed together with a covering letter. The respondents were requested to acknowledge receipt of the questionnaire. The time-frame for returning the completed questionnaire was 2 weeks. The first reminder was given telephonically and by e-mail after 5 days, and the second reminder was given by phone and e-mail 2 days before the actual submission date for the completed questionnaire.

3.6.4 Collection of Questionnaires

Completed questionnaires were returned via e-mail, facsimile and post. The respondents who were interviewed telephonically were also taken through the questionnaire items. As soon as the completed questionnaires were received, they were printed, and back-up hard copies were filed. They were also saved electronically, in order to ensure that their information was stored.

3.6.5 Conducting of Interviews

The interviews were based on questionnaire items. Face-to-face interview sessions were conducted by visiting the official's workplace. Interviews were also conducted telephonically, and the respondents who were interviewed telephonically were also taken through the questionnaire items.

3.6.6 Ethical Considerations

Saunders et al. emphasised the importance of observing the necessary ethical principles when dealing with human beings⁹⁵. The following ethical considerations were observed. The researcher ensured that accurate research accounts were given to ensure that the research is ethically sound. The researcher acted within the law, in order to develop the required

⁹⁵Saunders, et al 2003.*Research Methods for Business Students*. Pitman Publishing, p183

expertise. Written permission to conduct the study was granted to the researcher by the National Department of Housing.

The participants were given information about the nature of the study, in order to ensure that they fully understood what the study was about. Their involvement, the activities that they would be involved in, and the topics covered were clearly communicated to them.

The researcher ensured that the participants who were selected had the intellectual capacity and psychological maturity necessary to understand their involvement in the study. The participants were allowed to make an autonomous decision regarding their participation in the study. They were made aware of the nature and details of the research being conducted, and that they had a right to withdraw from the study if they, at any point, felt that their dignity, privacy or well-being was being violated. The researcher also ensured that no harm was caused to the participants of the research project.

The participants' confidentiality and anonymity were ensured by protecting their identity. The researcher protected all raw data by securing its storage - findings were reported in a manner that did not allow for the ready identification of participants, and permission was obtained for the subsequent use of the data.

3.7 Data Analysis

Data analysis was conducted with the sole purpose of providing a summary of findings, in order to provide answers to the research questions. Data gathered was analysed by using both qualitative and quantitative research techniques. The Statistical Package for the Social Sciences (STATA) was used to analyse quantitative data. The analysis included thematic discussions and graphs, in order to clarify the findings. The data collected through interviews was also explained in the context of a detailed written report, including the discussion, conclusion and recommendations.

Statistical tests were used to address the research questions. The t-test was used in this study. This test was used because there are two groups, the municipal and provincial officials, and a single measurement of the dependent variable. This test is used to determine if the mean of one group is different from the mean of the other.

Descriptive statistics are used to describe the main features of a collection of data in quantitative terms, and these were used to describe data that had been collected. Frequency counts, ranges (high and low scores or values), means, modes, median scores, and standard

deviations were used in analysing the collected data. Inferential statistics were also used. With inferential statistics, one is trying to reach conclusions that extend beyond the immediate data. For instance, one uses inferential statistics to try to infer from the sample data what the population might think. In this study, they were used to draw conclusions and make predictions based on the descriptions of data collected. Quantitative data was coded according to the numbers 1 to 5, and also according to the major themes, as they appear in the questionnaire. The data was captured in the Microsoft Excel spreadsheet. The code for missing data was represented as 6, and tables and graphs were used to present the findings.

3.8 Limitations of the Study

This study managed to obtain some useful data and information from participants, which enabled the objectives of the study to be achieved. However, this study had the following limitations:

The researcher limited the sample to the National Department of Housing, 4 provincial government and 10 municipal officials. The sample did not include all 9 provincial and 262 local governments. The sampling ensured that the selected provinces had local governments which belonged to category or level 1, which are metropolitan, as well as level 3 local governments, which are not accredited and therefore lack infrastructure. It should be noted that category 3 local governments are not accredited to administer housing subsidies as developers, and have to be carried through by their provinces. In this case, the exact responses from participants were important in determining if KM is relevant to improving service delivery in local government that are at various levels in terms of available infrastructure and capacity.

It was also not easy to obtain cooperation from the respondents for completion of the questionnaires, because they were often engaged in their official activities and felt that completing questionnaires was a waste of time. In addition, most officials felt that participating in the study might expose their practices, and that this could endanger their jobs.

Despite the abovementioned limitations, the researcher managed to obtain some useful data and information from the participants, which enabled the objectives of the study to be achieved.

3.9 Conclusion

This chapter provided an account of the research methodology used in this study. It also elaborated on the two major schools of thought on which the different research methods are based i.e. positivist, which is used for quantitative research, and interpretative, which is used for qualitative research. This study discussed the use of the triangulation research method, which involves the use of both qualitative and quantitative methods of research. The nature of data that was collected for the study consisted of secondary data, which is the literature on the subject, and this is presented in Chapters 1 and chapter 3 respectively. Primary data was collected from the survey through administration of questionnaires, which were supplemented by semi-structured interviews. The target population for the study was 61 respondents, who were distributed across the three spheres in the housing sector.

This chapter also outlined the ethical considerations that were observed. The researcher ensured that accurate research accounts were given, so that the research would be ethically sound. The researcher acted within the law, in order to develop the required expertise, and written permission to conduct the study was granted to the researcher by the National Department of Housing.

The participants were given full information about the nature of the study in order to ensure that they understood and what the study involved. Their involvement, the activities that they would be involved in, and the topics covered were clearly communicated to them.

The researcher ensured that the participants selected had the intellectual capacity and psychological maturity necessary to understand their involvement in the study. The participants were allowed to make an autonomous decision regarding their participation in the study. They were made aware of the nature and details of the research being conducted, and that they had a right to withdraw from the study if they, at any point, felt that their dignity, privacy or wellbeing was being violated. The researcher also ensured that no harm was caused to the participants.

The participants' confidentiality and anonymity whereas ensured by protecting their identity. The researcher protected all raw data by securing its storage - findings were reported in a manner that did not allow for ready identification of participants, and permission was obtained for the subsequent use of the data.

Quantitative data was analysed using the Statistical Package for the Social Sciences (STATA). The analysis included thematic discussions and graphs, in order to clarify the findings. The data collected through interviews was also explained in the context of a detailed written report, which included the discussion, conclusion and recommendations. The findings of the qualitative and quantitative data were analysed and summarised. This formed the basis for the discussion and presentation of the findings in the next chapter.

Chapter 4

Data Analysis and Presentation of Findings

In the housing sector, there is no effective KM system and strategies that facilitate the capturing, sharing, disseminating and preserving of knowledge across the three spheres of government. This gap is evident in the disparities and inconsistencies in terms of delivery patterns across the housing sector.

Although the Department of Housing has the Housing Subsidy System (HSS), Housing and Urbanisation Information Management System (HUIMS), and the Monitoring, Evaluation and Impact Assessment System (MEIA), which were established to facilitate the processes involved in delivering affordable houses, none of these systems have facilitated the implementation of KM in the housing sector⁹⁶.

A number of studies have been conducted on one of the Department of Housing's information systems, namely the Housing Subsidy System (HSS)⁹⁷, but none of these studies focused on determining the interrelatedness of the three housing information systems, namely the HSS, MEIA and HUIMS, and their possible roles in facilitating KM, in order to improve service delivery in the sector.

Although the department has delivered 2.7 million houses since its inception in 1994 and has also gone through progressive phases of housing development, citizens have expressed dissatisfaction with the quality of houses and associated infrastructure, as well as social and economic amenities. This has been marked by service delivery protests across most of South Africa, especially in informal settlements. Various studies, including the Development Works, have also confirmed that challenges have been experienced with housing delivery⁹⁸.

⁹⁶Republic of South Africa. 2008. *The Department of Housing Monitoring and Evaluation Policy*. p10.

⁹⁷Republic of South Africa. 2007. *The Department of Housing: Annual Report 2006-2007*,p5. Available online at:<http://www.dhs.gov.za/Content/Documents/Annualpercentage20Reportpercentage20-percentage202007/Small/01.pdf>

⁹⁸GAUTENG Provincial Government. 2001. Development works. Department of Housing Development works.2005.

The Department of Housing, in its 2007 annual report, also highlighted the fact that protests have taken place against the slow pace of service delivery, especially with regard to housing at the municipal level, throughout the country. Reference was also made to the court battle concerning the movement of residents of the Joe Slovo informal settlement in Cape Town to make way for the second phase of the N2 Gateway project⁹⁹.

The three spheres of the housing sector also work in a fragmented manner, resulting in ineffectiveness and inefficiency in terms of service delivery. It is against this backdrop that this chapter presents a statement of the findings and an analysis of the data that was collected by means of the survey questionnaires and semi-structured interviews. Data was collected to answer the following research questions:

1. What features of the existing information systems within the housing sector are interrelated?
2. How can the Department of Housing's information systems facilitate KM across the three levels of government?
3. What are the positive aspects that can be achieved through KM?

A cross-sectional design was used to obtain a picture of the situation that exists in terms of the systems utilised and KM patterns within the housing sector across the three spheres of government. The results are meant to inform and promote development and implementation of a KM Model within Housing Department. The survey enabled the collection of a large amount of data as follows:

Table 4: Total number of respondents

Sphere	Number of offices	Sampled Respondents	Number of respondents
National	1	19	19
Provincial	4	27	27
Municipalities	10	15	5
Total	15	61	51

19 respondents were selected from the National Department, 4 provincial offices and 10 local governments in a highly economic way, via e-mail and facsimile.

⁹⁹Republic of South Africa. 2007. The Department of Housing Annual Report 2007-2008,p15.Available online at:<http://www.dhs.gov.za/Content/Documents/Annualpercentage20Reportpercentage2007-percentage202008/Small/01.pdf>.

The questionnaires were distributed to 19 National Department officials. The selected provinces were sent a total of 27 questionnaires, and local governments a total of 15 questionnaires, via e-mail and facsimile. The total distribution of questionnaires was 61. Questionnaire distribution was also supplemented by the collection of qualitative data through interviews, in order to explore the challenges, together with the negative and positive aspects, of the departmental information systems that are in use, as well as KM awareness within the context of the housing sector across the three spheres of government. The questionnaire in this study is attached as Appendix A.

Of the total of 61 targeted samples, only 51 responded. Only 5 officials from the local municipalities responded giving a total response rate of more than 90%. In this study, facts were measured quantitatively and analysed statistically using a STATA data analysis and Statistical Software Package for Social Sciences, as well as Excel spreadsheets.

4.1 Presentation of Findings

The findings are presented in the form of tables and graphs for each of the test items in the questionnaire, in order to ensure that they are understandable. Below each graph, the quantitative results of ANOVA are presented. Qualitative data findings are summarised below each of the qualitative test items in the questionnaire.

The analysis is presented as follows:

- Descriptive statistics
- Correlations between data sets
- ANOVA tests

4.1.1 Quantitative Responses

Biographic Information (1)

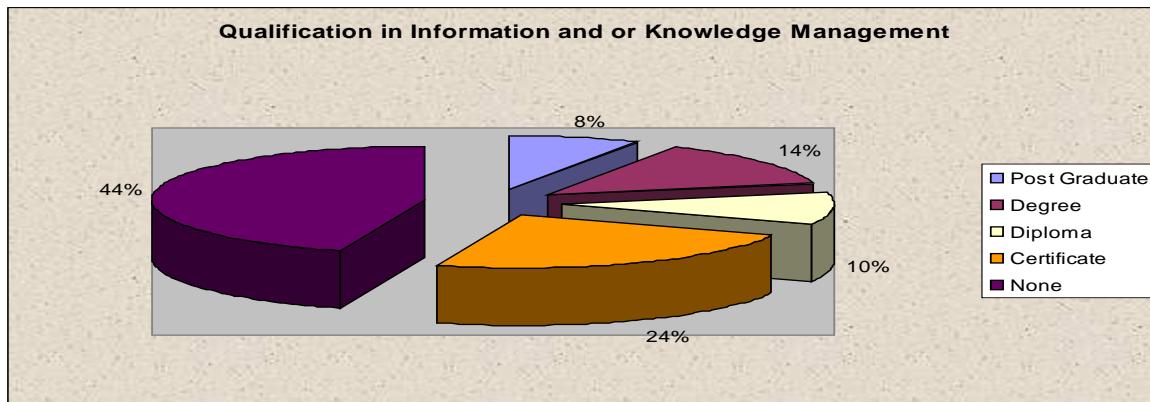
This section presents some general and personal information regarding the respondents, including their level of qualification, number of years in their current position, and the number of people who are available in their business units.

Qualification in Information and or Knowledge Management (1.1)

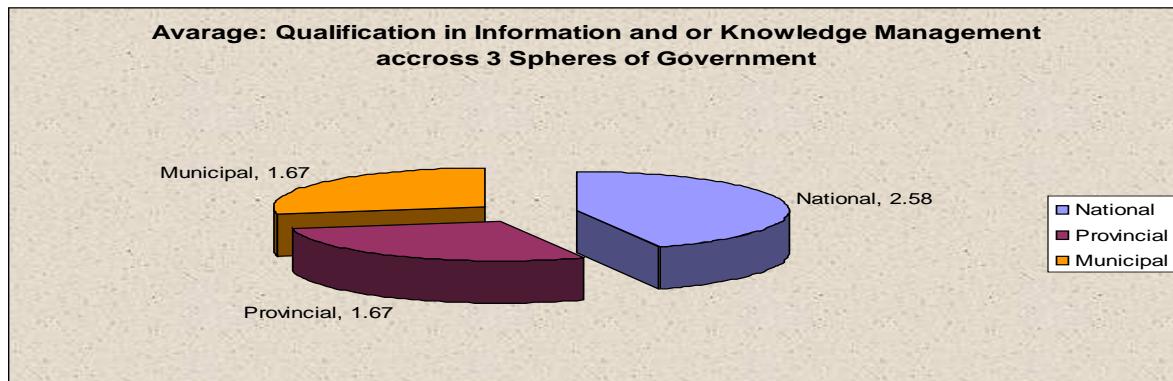
Table 1.1: Qualification in Information and or KM

Item	Type of qualification	Number of respondents
1.1 Qualification in Information and or KM	Post Graduate	4
	Degree	7
	Diploma	5
	Certificate	12
	None	23
TOTAL		51

Graph 1.1 (a): Qualification in Information and or KM



In this question, the respondents were asked to indicate the level of qualification that they had in the field of information and/or KM. Table 1 and Graph 1 (a) above illustrate the types of qualifications in information and/or KM that the total population of respondents had at national, provincial and local government level. The highest percentage, namely 44%, of the total number of respondents indicated that they did not have any qualification in information and/or KM. This was followed by 24% of the respondents, who had a 3 months to 1 year certificate, and then by 14% of the respondents with a degree qualification, while 10% of them had a diploma qualification. The lowest percentage of 8% was shared between respondents who had a diploma and post-graduate qualification.

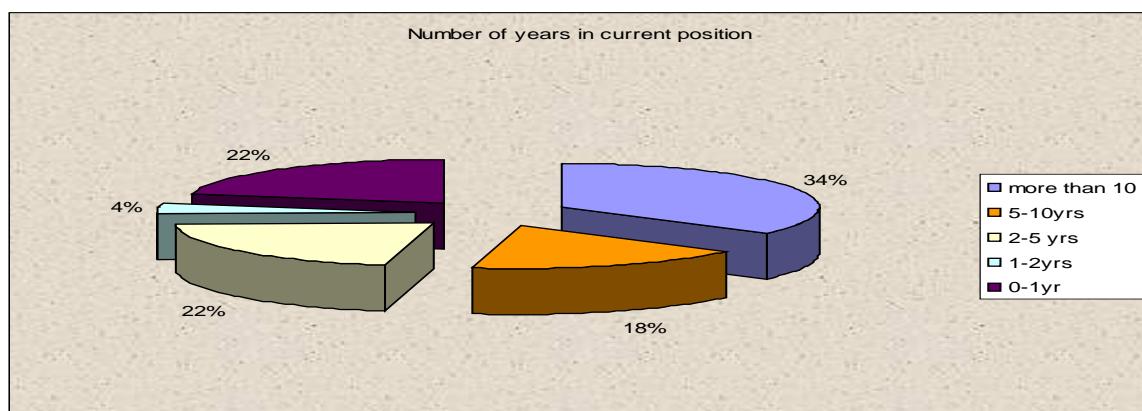
Graph 1.1(b): Average: Qualification in Information and or KM across the 3 levels of government

Graph 1 (b) above indicates the total average of qualifications in information and/or KM across the 3 levels of government within the housing sector environment. The National Department has the highest average of 2,58%, which means that the average respondent lies between having a certificate and a diploma, followed by the provincial and local governments, with an average of 1.67%, which means that the average respondent lies between having no qualification and a certificate in information and/or KM respectively.

Number of years in current position (1.2)

Table 1.2 (a): Number of years in current position

Item	Number of years in current position
more than 10	18
5-10yrs	9
2-5 yrs.	11
1-2yrs	2
0-1yr	11

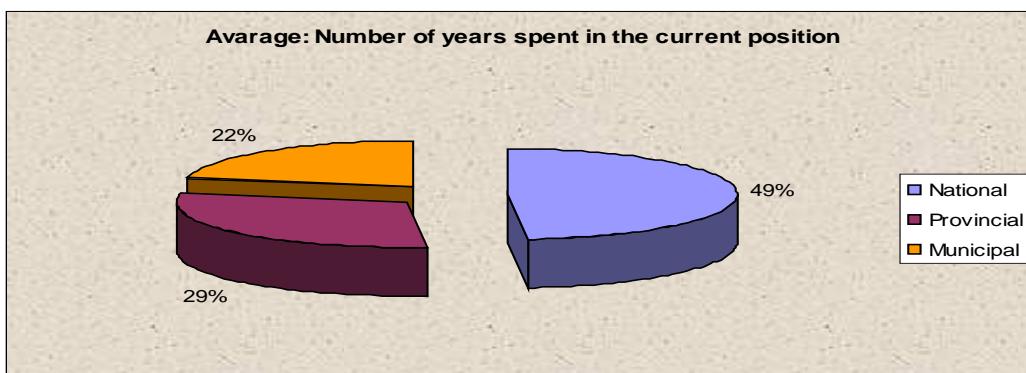
Graph 1.2 (a): Number of years in current position

In this question, the respondents were asked to indicate the number of years that they had been in their current position. Table 1.2 (a) and Graph 1.2 (a) above illustrate the number of years that respondents had been in their current position, at national, provincial and local government level. The highest percentage of respondents, namely 34%, had more than 10 years of experience in their current position. This was followed by 22% of respondents who had spent 1-2 years and 0-1 years in their current position respectively. 18% of respondents had spent 5-10 years in their current position, and 4% of them had spent less than a year in their current position.

Table 1.2 (b): Average: Respondents' years in current position

Item	Average in years
NDOH	3.42
PROV	3.37
MUNIC	3.50

Graph 1.2 (b): Average: Respondents' years in current position



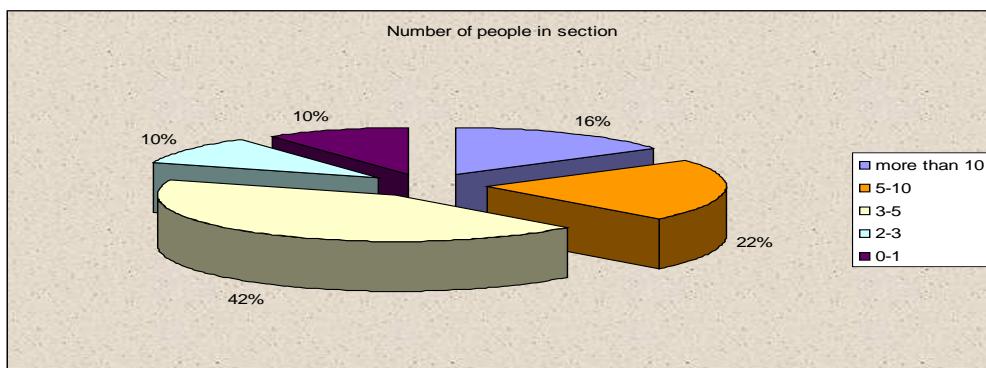
Based on the average, there is no significant difference between the number of years spent by respondents in their current position at national, provincial and local government level. Graph 1.2 (b) indicates an average of 3.50, which means that the average number of years that the respondents in local government have spent in their current position lies between 3-5 years and 5-10 years, followed by an average of 3.42 for respondents who had spent between 3-5 years and 5-10 years in their current position at the national level. The provinces had an average of 3.37, which indicated that they had spent between 3-5 years and 5-10 years in their current position. It is very interesting to note that many people either had very small number of years' service or many years, with few people lying in between. This indicates that people either join the organisation and leave after a short time, or stay for a very long time, often over 10 years.

Number of People in a section (1.3)

Table 1.3 (a): Number of people in a section

Item	Number of people in section
more than 10	8
5-10	11
3-5	22
2-3	5
0-1	5

Graph 1.3 (a): Number of people in a section



In this question, the respondents were asked to indicate the number of people who are available in their section/business unit. Table 1.3 (a) and Graph 1.3 (a) above illustrate the number of people in the section at national, local government and provincial level. The highest percentage, namely 42%, of the respondents indicated that they had 3-5 people in their section. This was followed by 22% of the respondents, who indicated that they had 5-10 people in their section, while 16% of the respondents indicated that they had more than 10 people in their section. The lowest percentage, namely 10%, was shared by respondents who had 2-3 people in their section and 0-1 people in their section.

Table 1.3. (b): Average number of respondents in a section

Province / Local government	Average
National	4.42
Province	2.67
Local government	2.00

Table 1.3 (b) and Graph 1.3 (b) illustrate the average of respondents in a section who had access to the HSS at national, provincial and local government level. The highest percentage of respondents, namely 44%, had access to the HSS. This was followed by 43% of the respondents, who had access to the HSS at local government level. 8% of the respondents at the national level had access to the HSS.

. One-way a1_3 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	43.0546956	2	21.5273478	97.19	0.0000
Within groups	10.6315789	48	.221491228		
Total	53.6862745	50	1.07372549		

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the number of people in a section at national, provincial and local government level in the housing sector environment, with the p-value of 0.0000, which indicates a significant result at the 5% significance level.

Departmental Information Systems (HSS, HUIMS, MEIA) (2)

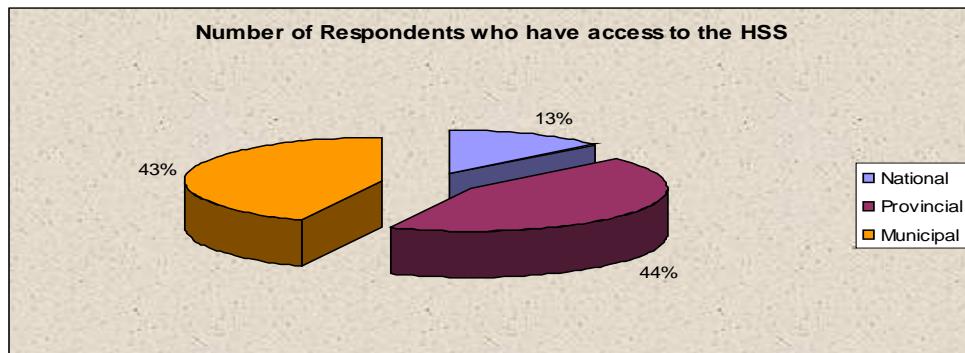
This section provides an overview of housing Sector information systems. It also attempts to answer the following research questions:

1. What are the interrelatedness features of the existing information systems within the housing sector?
2. How can the Department of Housing's information systems facilitate KM across the three levels of government?

To arrive at the answers for the above questions, this section investigated the number of people who have access to the housing sector's information systems, namely the HSS, HUIMS and MEIA. It also explored the relevance of the departmental systems within the context of housing delivery and in terms of their relevance to completing the necessary tasks of respondents, as well as the interrelatedness of the information systems. This section also attempted to determine whether or not training is provided on how to use the MEIA system, and if the systems are reviewed for accuracy and used all the time by respondents to complete their tasks.

Number of Respondents who have access to the HSS (2.1)

Graph 2.1 Number of Respondents who have access to the departmental HSS



In this question was asked to assess the level of access to HSS information systems. The respondents were asked to indicate if they had access to the HSS information system. Table 2.1 and Graph 2.1 (a) illustrate the total number of respondents with access to the HSS, at national, provincial and local government level. The highest percentage of respondents, namely 44%, had access to the HSS. This was followed by 43 % of the respondents, who had access to the HSS at local government level. 8% of the respondents at the national level had access to the HSS.

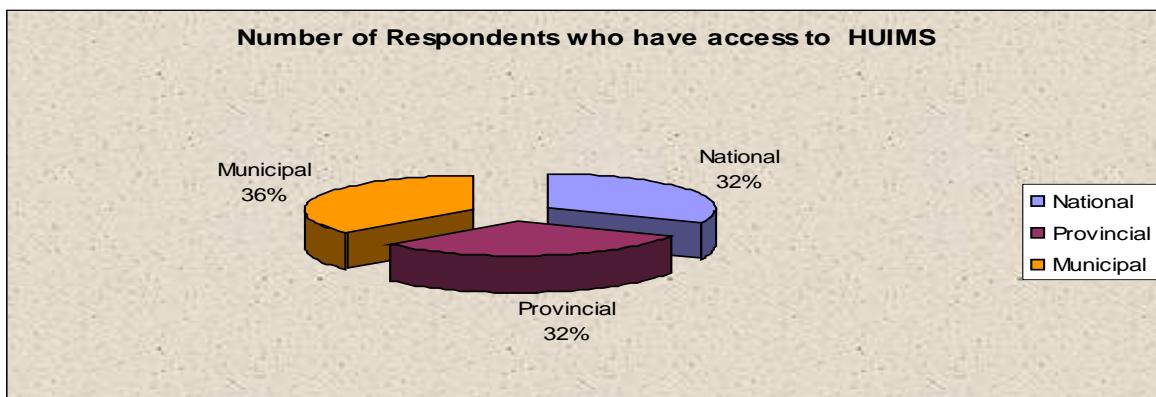
. One-way a2_1 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	143.851393	2	71.9256966	321.55	0.0000
Within groups	10.7368421	48	.223684211		
Total	154.588235	50	3.09176471		

A significant difference was found between the use of HSS, HUIMS and MEIA systems across the three spheres of government, with the p-value of 0.0000, which indicates a significant result at the 5% significance level.

Number of Respondents who have access to HUIMS (2.2)

Graph 2.2 Number of employees who have access to the departmental HUIMS system



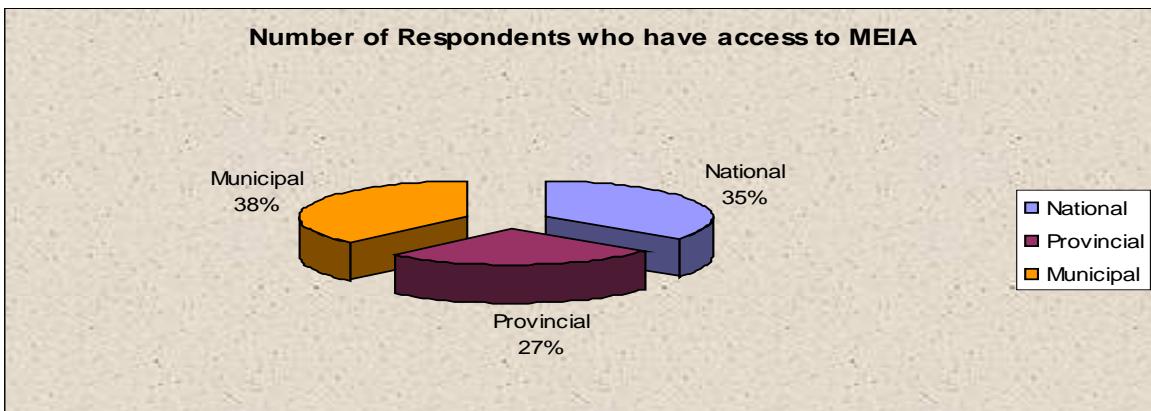
In this question, the respondents were asked to indicate if they had access to the HUIMS system. Graph 2.2 above illustrates the total number of respondents who had access to the HUIMS system at national, provincial and local government level. The highest percentage of respondents in the local government, which accounted for 36%, indicated that they had access to the HUIMS system. This was followed by 32% of respondents who had access to the HUIMS system at national and local government level respectively.

In this question there is no significant difference between the number of respondents who had access to the HUIMS system at national, provincial and municipal level , as evidenced by the p-value of 0.1365.

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	1.79245499	2	.896227497	2.08	0.1365
Within groups	20.7173489	48	.431611436		
Total	22.5098039	50	.450196078		

Number of Respondents who have access to MEIA (2.3)

Graph 2.3: Number of Employees with Access to the departmental MEIA system



In this question, the respondents were asked to indicate if they had access to the MEIA information system. Graph 2.3 above illustrates the total number of respondents who had access to the MEIA system at national, provincial and local government level. The highest percentage of respondents in the local government, which accounted for 38%, indicated that they had access to the MEIA system. This was followed by 35% of respondents who had access to the MEIA system at national level. 27% of the total number of respondents at provincial level indicated that they had access to the MEIA system.

A significant difference was also found between the number of respondents who had access to the MEIA system at national, provincial and municipal level as evidenced by the p-value of 0.0095.

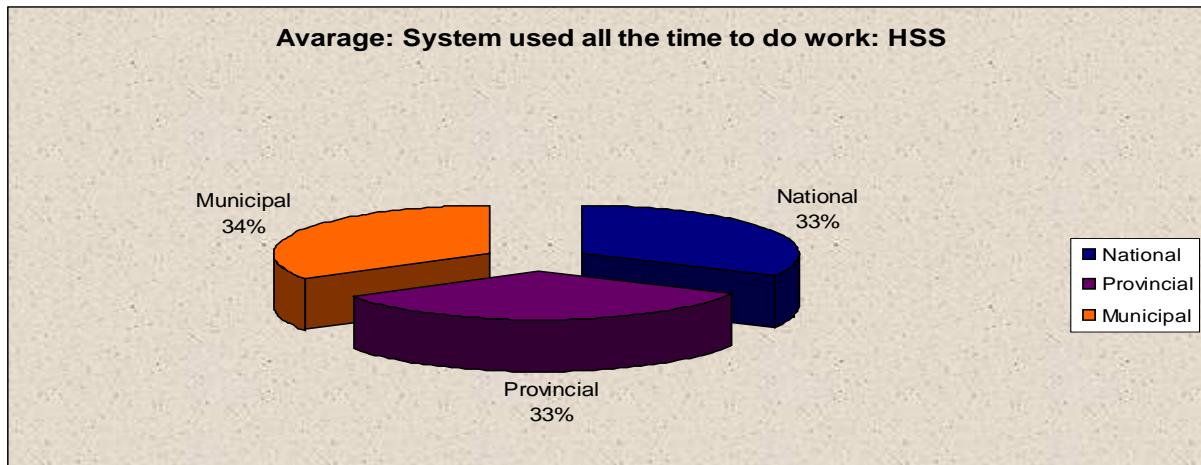
. One-way a2_3 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	20.0330237	2	10.0165119	5.14	0.0095
Within groups	93.6140351	48	1.9502924		
Total	113.647059	50	2.27294118		

The Relevance for completing tasks: HSS (2.4)

In this question, the respondents were asked to indicate whether or not the HSS information was relevant to the completion of their tasks. All the respondents at national, provincial and municipal level indicated that they strongly agreed that the HSS was relevant to the completion of their tasks.

Graph 2.4: Relevance of completing tasks: HSS

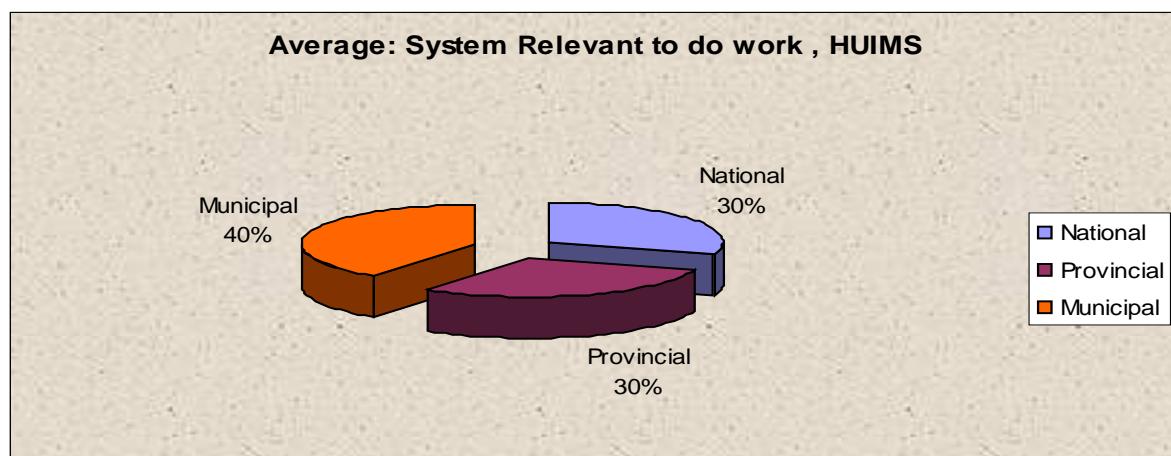


The Relevance for completing tasks: HUIMS (2.5)

Table 2.5 Average: Relevance of the System for completing tasks: HUIMS

HUIMS	NDOH
NDOH	3.26
PROV	3.26
MUNIC	4.33

Graph 2.5 Average: Relevance of System for completing tasks: HUIMS



In this question, the respondents were asked to indicate whether or not HUIMS system was relevant to the completion of their tasks. Based on the average, there is no significant

difference in terms of the number of years spent by respondents in their current position at national, provincial and local government level. Table 2.5 and Graph 2.5 above indicate an average of 4.33, which means that the respondents at local government level indicated that the HUIMS system was relevant to the completion of their tasks, followed by an average of 3.26, which was shared by both national and provincial respondents, who indicated that the HUIMS system was relevant to the completion of their tasks.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is no significant difference between the total number of respondents who indicated that the HUIMS system was relevant to the completion of their tasks at national, provincial and local government level at the 5 percent level, as evidenced by the p-value of 0.1550.

. One-way a2_5 agovt

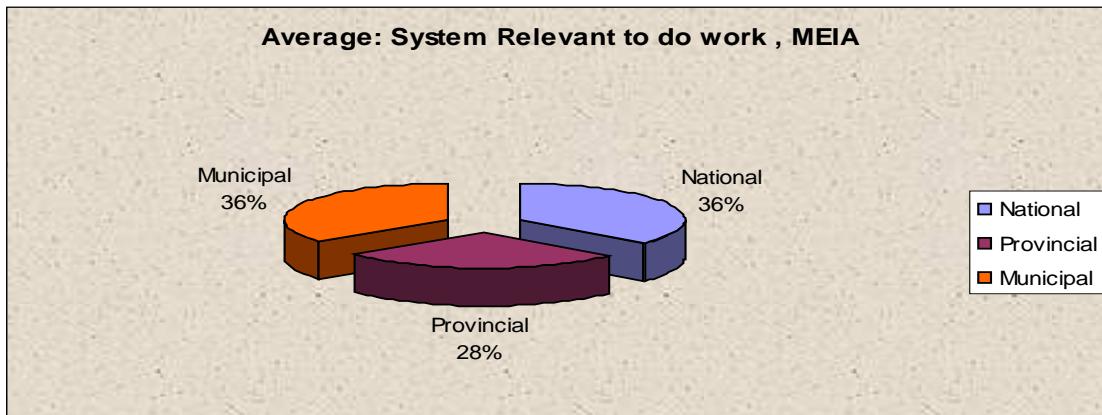
Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	13.6404082	2	6.82020411	1.94	0.1550
Within groups	168.869396	48	3.51811241		
Total	182.509804	50	3.65019608		

The Relevance for Completing Tasks: MEIA (2.6)

Table 2.6 Relevance of the System for Completing Tasks: MEIA

MEIA	NDOH
NDOH	4.26
PROV	3.26
MUNIC	4.17

Graph 2.6 Relevance of the System for completing tasks: MEIA



In this question, respondents were asked to indicate whether or not the MEIA information was relevant to the completion of their tasks. Table 2.6 and Graph 2.6 above illustrate that an

average of 36% respondents at national and municipal level indicated that the MEIA system is relevant to the completion of their tasks while 28% was indicated by respondents at the provincial level.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who had access to the MEIA system at national, municipal and provincial level, at a 5percent significance level, as evidenced by the p-value of 0.0299.

. One-way a2_6 agovt

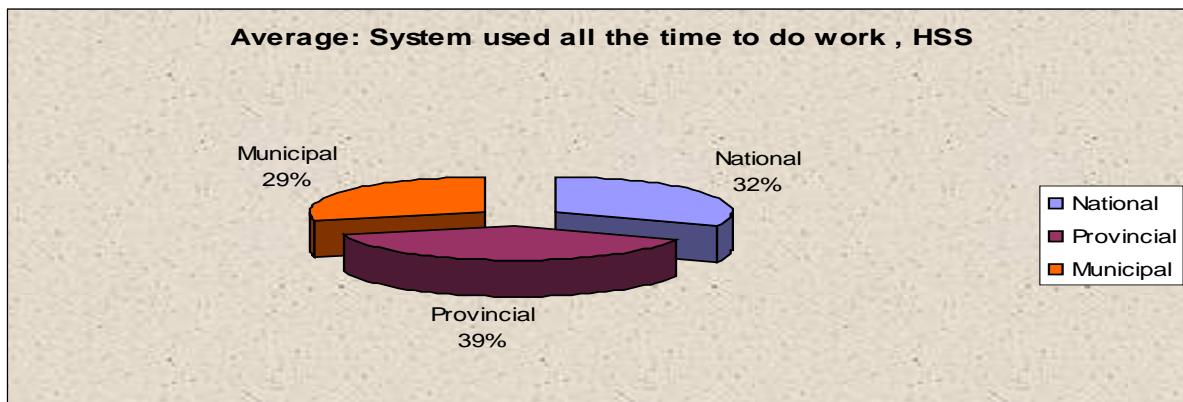
Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	16.9580553	2	8.47902763	3.78	0.0299
Within groups	107.669396	48	2.24311241		
Total	124.627451	50	2.49254902		

Systems used all the time to complete tasks (2.7)

Table 2.7 System used all the time to complete tasks:, HSS

HSS	NDOH
NDOH	4.26
PROV	3.26
MUNIC	4.17

Graph 2.7 System used all the time to complete tasks: HSS



In this question, the respondents were asked to indicate whether or not they used the HSS information system all the time to complete their tasks. Table 2.7 and Graph 2.7 above illustrate the total average of respondents who indicated that they used HSS all the time to complete their tasks at national, provincial and municipal level.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who indicated that HSS was used all the time to complete their tasks at national, municipal and provincial level, at the 5percent level, as evidenced by the p-value of 0.0002.

. One-way a2_7 agovt

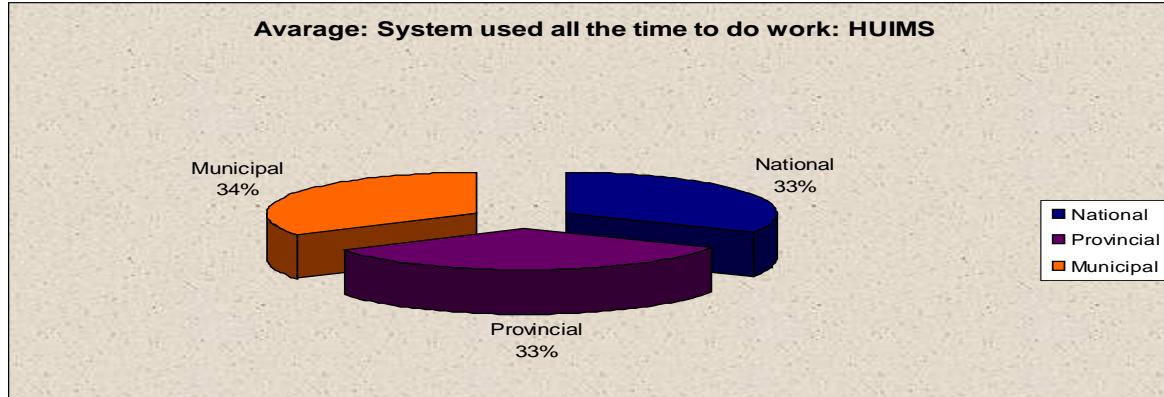
Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	9.79727096	2	4.89863548	9.99	0.0002
Within groups	23.5360624	48	.490334633		
Total	33.3333333	50	.666666667		

Systems used all the time to complete tasks: HUIMS (2.8)

Table 2.8 System used all the time to complete tasks: HUIMS

HUIMS	NDOH
NDOH	2.53
PROV	2.85
MUNIC	3.00

Graph 2.8 System used all the time to complete tasks: HUIMS



In this question, the respondents were asked to indicate whether or not they use the HUIMS information system all the time to complete their tasks. Table 2.8 and Graph 2.8 above illustrate the total average of respondents who indicated that they used the HUIMS system all the time to complete their tasks at national, provincial and municipal level.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is no significant difference between the total number of respondents who indicated that the HUIMS system was used all the time to complete their tasks at national and municipal level, with the provincial level at a 5 percent level, as evidenced by the p-value of 0.2780.

. One-way a2_8 agovt

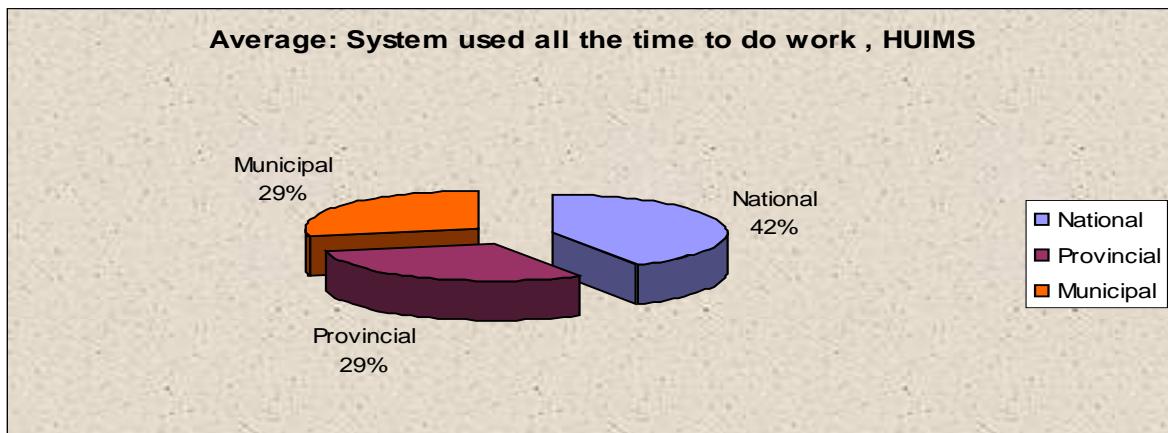
Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	1.542025	2	.771012499	1.31	0.2780
Within groups	28.1442495	48	.586338532		
Total	29.6862745	50	.59372549		

Systems used all the time to complete tasks: MEIA (2.9)

Table 2.9 System used all the time to complete tasks: MEIA

MEIA	NDOH
NDOH	4.37
PROV	3.07
MUNIC	3.00

Graph 2.9 System used all the time to complete tasks: MEIA



In this question, the respondents were asked to indicate whether or not they used the MEIA information system all the time to complete their tasks. Table 2.9 and Graph 2.9 above illustrate the total average of respondents who indicated that they used the MEIA system all the time to complete their tasks at national, provincial and municipal level.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who indicated that the MEIA system was used all the time to complete their tasks at national, municipal and provincial level at the 5percent significance level, as evidenced by the p-value of approximately 0.

. One-way a2_9 agovt

Analysis of Variance

Source	SS	df	MS	F	Prob > F
<hr/>					
Between groups	20.3545465	2	10.1772732	21.93	0.0000
Within groups	22.2729045	48	.464018843		
<hr/>					
Total	42.627451	50	.85254902		

Correlations were also used to test the hypothesis that there is a relationship between the two variables of interest. In terms of the HSS, there is a negative correlation between the number of people in a section (Q1.3) and the daily use of the HSS (Q2.7), with this correlation being -0.2758. This indicates that, as the number of people in a section increases, the reported daily use of the HSS decreases (and vice versa). This result is statistically significant (just) at a 5percent level, with a p-value of 0.0501.

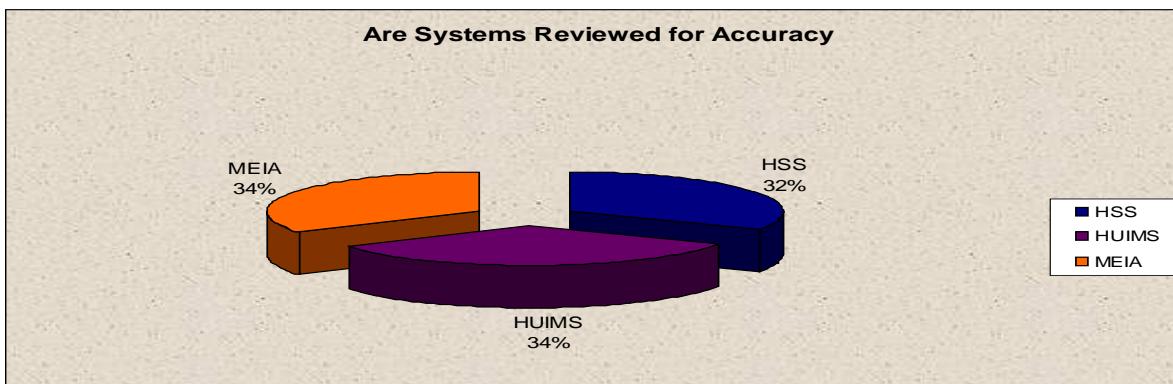
In terms of the HUIMS system, there is also a negative correlation between the number of people in a section (Q1.3) and the daily use of the HUIMS system (Q2.8), and this correlation is - 0.3679. This indicates that, as the number of people in a section increases, the reported daily use of the HUIMS decreases (and vice versa). This result is statistically significant at belowthe5percent level, with a p-value of 0.0079.

With regard to the MEIA system, there is a positive and strong correlation between the number of people in a section (Q1.3) and the daily use of the HUIMS system (Q2.9), and this correlation is - 0.5824. This indicates that, as the number of people in a section increases, the reported daily use of the HUIMS increases (and vice versa). This result is statistically significant because the p-value of 0 (0.0000) is very low, which means that the observed correlation of 0.5825 is statistically significant.

Systems Reviewed for Accuracy (2.10)

Table 2.10 Systems reviewed for accuracy HSS, MEIA and HUIMS

HUIMS	NDOH
HSS	4.79
HUIMS	5.00
MEIA	5.00

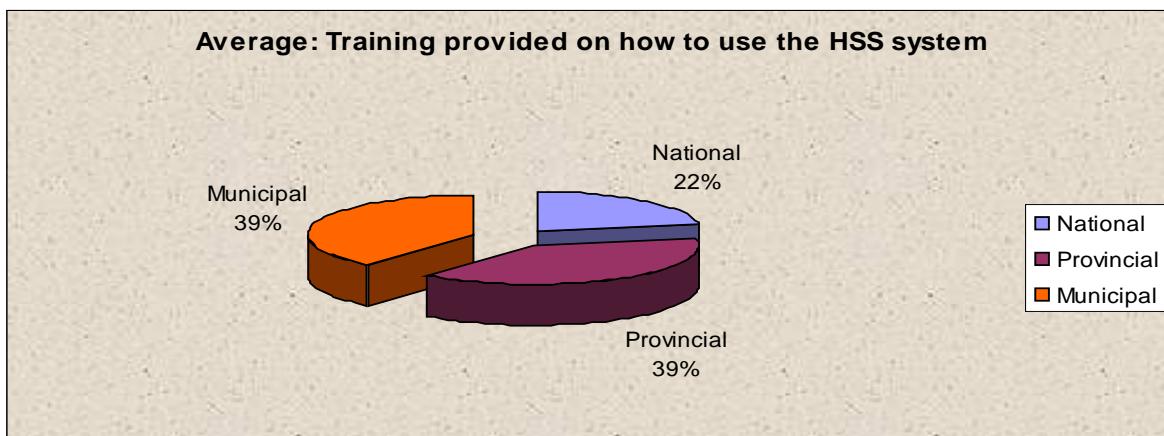
Graph 2.10 Systems reviewed for accuracy HSS, MEIA and HUIMS

In this question, the respondents were asked to indicate whether or not the HSS, HUIMS and MEIA information systems were often reviewed for accuracy. Based on the average, Table 2.10 and Graph 2.10 above illustrate the total number of respondents who indicated whether or not the HSS, HUIMS and MEIA systems were reviewed for accuracy. 34% of the total number of respondents indicated that the HUIMS and HSS systems were often reviewed for accuracy, while 32% indicated that the HSS was often reviewed for accuracy.

Training is provided on how to use the HSS system (2.13)

Table 2.11 Training provided on how to use the HSS

HSS	NDOH
NDOH	2.84
PROV	5.00
MUNIC	5.00

Graph 2.11 Training provided on how to use the HSS

In this question, the respondents were asked to indicate whether or not training was provided on how to use the HSS information system. Based on the average, Table 2.11 and Graph 2.11

above illustrate the total average of respondents who indicated that training was provided on how to use the HSS, categorised according to national, provincial and local government levels. The highest percentage of respondents, namely 39%, at provincial and local government level, indicated that training was provided on how to use the HSS. 22% of the total number of respondents at national level indicated that training was provided on how to use the HSS.

. One-way a2_11 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.718357986	2	.359178993	0.12	0.8884
Within groups	145.320858	48	3.02751787		
Total	146.039216	50	2.92078431		

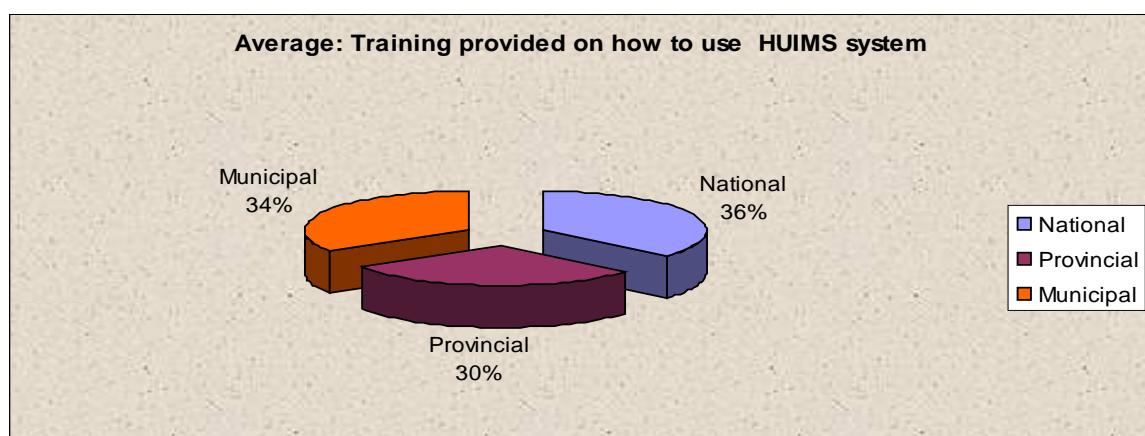
Bartlett's test for equal variances: $\text{chi2} (2) = 4.4925$ Prob>chi2 = 0.106
 In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is no significant difference between the total number of respondents who indicated that training was provided on how to use the HSS, both at national and municipal level, with the provincial level being significant at the 5percent level, as evidenced by the p-value of 0.8884.

Training is provided on how to use the HUIMS system (2.14)

Table 2.12: Training provided on how to use the HUIMS system

HUIMS	NDOH
NDOH	5.00
PROV	4.11
MUNIC	4.67

Graph 2.12 Training provided on how to use the HUIMS system



In this question, the respondents were asked to indicate whether or not training was provided on how to use the HUIMS information system. Table 2.12 and Graph 2.12 above illustrate the total average of respondents who indicated that training was provided on how to use the HUIMS system at national, provincial and local government level. The highest percentage of the total number of respondents, namely 36%, was at the national level, where respondents indicated that training was provided on how to use HUIMS system, followed by 34% at municipal level. 30% of respondents at the provincial level indicated that training was provided on how to use the HUIMS system.

. One-way a2_12 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	18.472744	2	9.23637198	3.90	0.0269
Within groups	113.566472	48	2.36596816		
Total	132.039216	50	2.64078431		

Bartlett's test for equal variances: chi2(2) = 6.2972 Prob>chi2 = 0.043

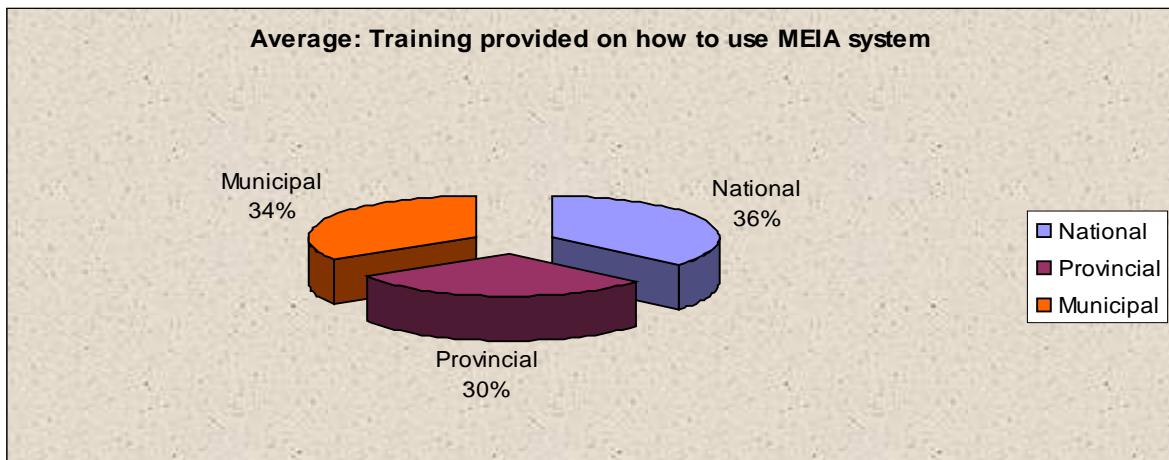
In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who indicated that training was provided on how to use the HUIMS system at national, municipal and provincial level with a p-value of 0.0269, which indicates a significant result at the 5percent significance level.

Training is provided on how to use the MEIA system (2.15)

Table 2.13 Training is provided on how to use the MEIA system

MEIA	NDOH
NDOH	5.00
PROV	4.11
MUNIC	4.67

Graph 2.13 Training is provided on how to use the MEIA system



In this question, the respondents were asked to indicate whether or not training was provided on how to use the MEIA information system. Based on the average, Table 2.13 and Graph 2.13 illustrate the total average of respondents who indicated that training was provided on how to use the MEIA system, according to national, provincial and municipal level. The highest percentage of the total number of respondents, which amounted to 36%, was at the national level, where respondents indicated that training was provided on how to use MEIA system, followed by 34% at the municipal level. 30% of respondents at the provincial level indicated that training was provided on how to use the MEIA system.

. One-way a2_13 a govt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	55.5128999	2	27.7564499	27.46	0.0000
Within groups	48.5263158	48	1.01096491		
Total	104.039216	50	2.08078431		

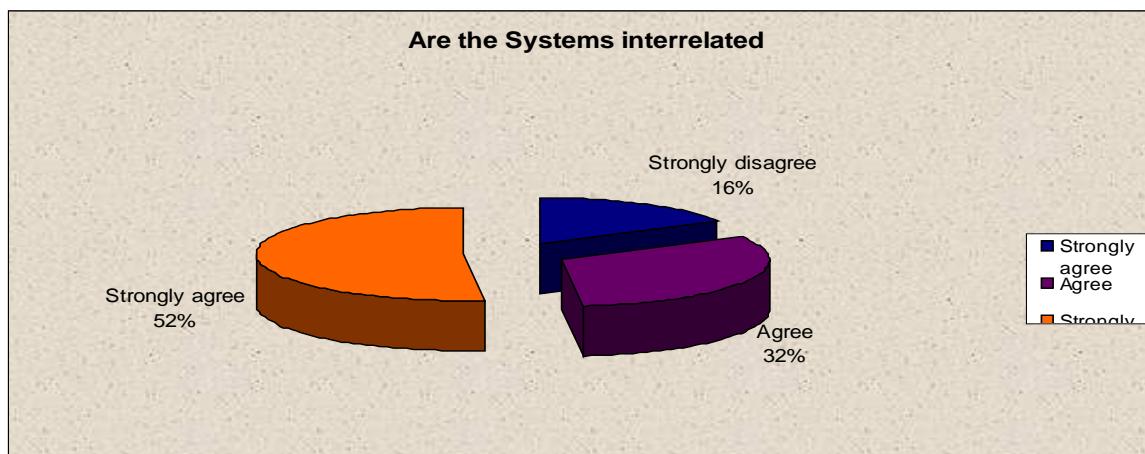
In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who indicated that training was provided on how to use the MEIA system at national, municipal and provincial level, with a p-value of 0.0000, which indicates a significant result at the 5percent significance level.

Interrelatedness of information systems (2.19-2.21)

Table 2.14 Interrelatedness of information systems

Item	Number of respondents
Strongly disagree	1.58
Agree	3.11
Strongly agree	5.00

Graph 2.14 Interrelatedness of information systems



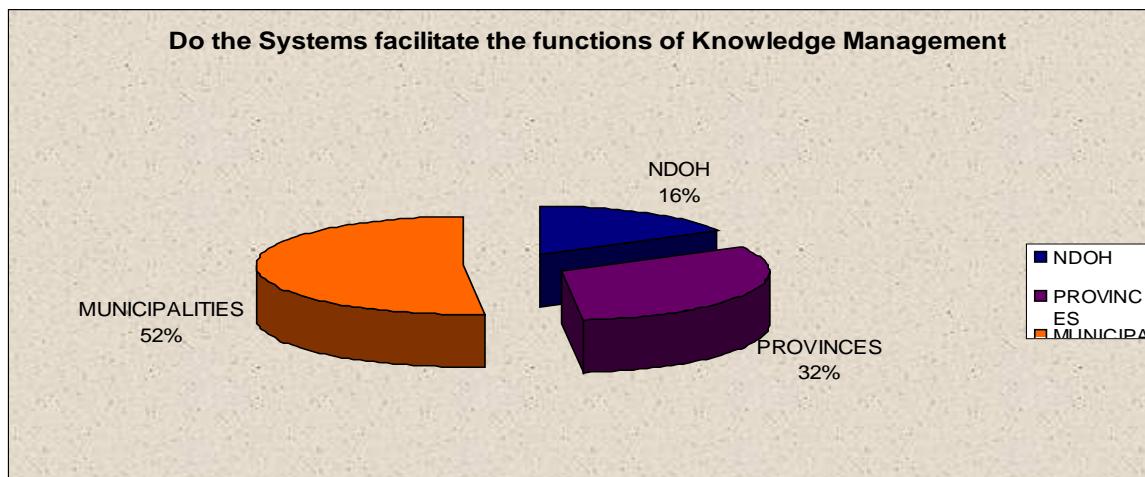
In this question, the respondents were asked to indicate whether or not there was interrelatedness between the HSS, HUIMS and MEIA information systems. Table 2.14 and Graph 2.14 above illustrate the total number of respondents who indicated the interrelatedness of the Department of Housing's information systems at national, provincial and municipal level. The highest percentage of the total number of respondents, which amounted to 52%, indicated that the housing information systems were interrelated. This was followed by 32%. 16% of the total number of respondents were at the national level.

Do the systems facilitate the functions of knowledge Management (2.22-2.24)

Table 2.15 Functions of KM

Item	Number of respondents
NDOH	1.58
PROVINCES	5.00
MUNICIPALITIES	3.11

Graph 2.15 Functions of KM



In this question, the respondents were asked to indicate whether or not the HSS, HUIMS and MEIA information systems facilitated the functions of KM. Table 2.15 and Graph 2.15 above illustrate the total number of respondents at national, provincial and municipal level who indicated that the Department of Housing's information systems facilitated the functions of KM. The highest percentage of the total number of respondents, which amounted to 52%, was at the municipal level, and they indicated that the Department of Housing's information systems facilitated the functions of KM. This was followed by 33% at the provincial level. 16% of the total number of respondents was at the national level.

Understanding of Knowledge Management (3)

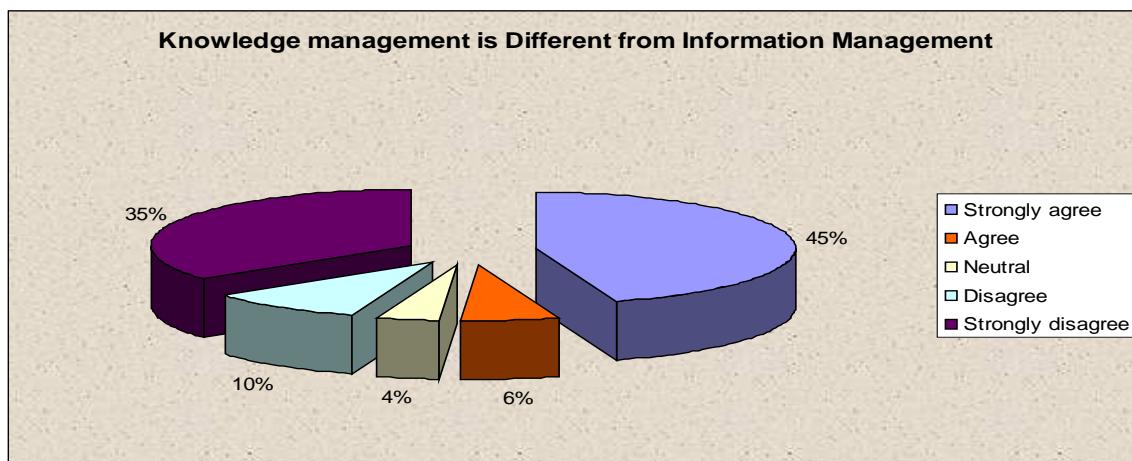
This section presents the general understanding of the respondents with regard to the concept of KM and its related features.

Difference between Information and Knowledge Management (3.1)

Table 3.1 Difference between Information and KM

Item	Number of respondents
Strongly agree	23
Agree	3
Neutral	2
Disagree	5
Strongly disagree	18

Graph 3.1 Difference between Information and KM



In this question, the respondents were asked to indicate whether or not there is a difference between information and KM. The purpose of this question was to determine if respondents knew whether or not there is a difference between the two concepts. Table 3.1 and Graph 3.1 above illustrate the respondents' understanding with regard to the difference between information and KM at national, provincial and local government level. The highest percentage of respondents, namely 45%, strongly agreed that there is a difference between information and KM. This was followed by 35% of the respondents, who strongly disagreed, and 10% who disagreed that there is a difference between information and KM. 6% of the respondents agreed that there is difference between information and KM, while 4% indicated that they are neutral.

Correlations were also used to test the hypothesis that there is a relationship between the two variables of interest. In terms of KM, there is also a negative correlation between the number of people in a section (Q1.1), qualifications in information and KM, and understanding the difference between information and KM (Q3.1), and this correlation is - 0.1310. This indicates that, as the level of education in information and KM increases, the reported understanding of knowledge and information management decreases (and vice versa). This result is statistically significant below the 5percent level, with a p-value of 0.0079.

From an analysis of the responses, it emerged that although KM was carried out in the housing sector, the officials did not actually understand the concept of KM.

Most respondents defined KM as information management. Their views indicated how information is stored and shared.

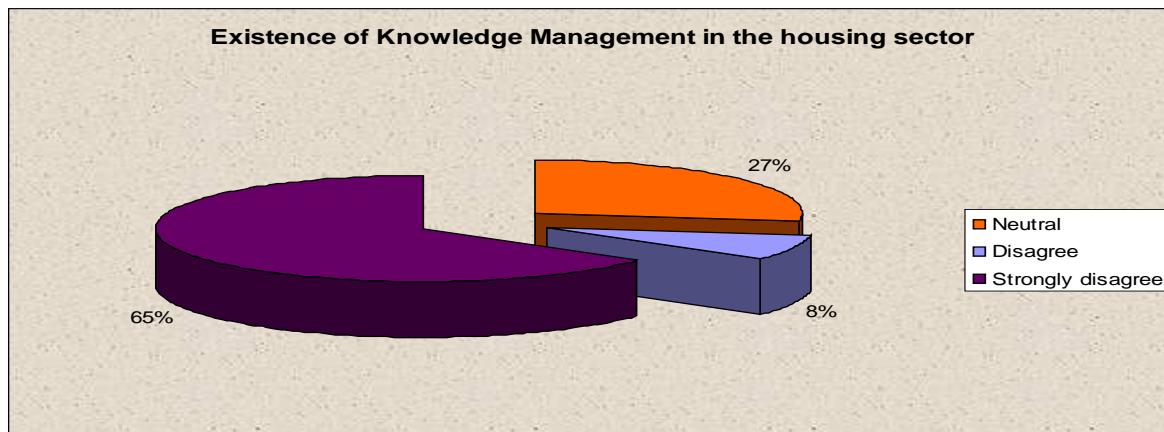
Current status of Knowledge Management (4)

Existence of Knowledge Management in the Housing Sector (4.1)

Table 4.1 Existence of KM in the Housing Sector

Item	Number of respondents
Neutral	14
Disagree	4
Strongly disagree	33

Graph 4.1 Existence of KM in the Housing Sector



In this question, the respondents were asked to indicate whether or not any KM practices existed in the housing sector. This question was also formulated to strengthen the findings of Question 3.1. The purpose of this question was to determine whether any KM practices existed in the housing sector, with the aim of recommending those practices to be implemented and replicated in other housing departments where they are non-existent. Table 4.1 and Graph 4.1 above illustrate the extent to which respondents agreed or disagreed that KM exists in the housing sector at national, provincial and local government level. The highest percentage of respondents, namely 65%, strongly disagreed that KM existed in the housing sector. This was followed by 27% of the respondents who were neutral. 8% of the respondents indicated that they agreed that KM existed in the housing sector.

Knowledge Capture

Capturing of knowledge encouraged in the Housing Sector

In this question, the respondents were asked to indicate whether or not they captured any knowledge. The purpose of this question was to determine if any knowledge capturing practices existed in the housing sector, with the aim of recommending those practices to be implemented and replicated in other housing departments where they are non-existent. With

regard to this process, 86% of the total number of respondents indicated that they did not capture their knowledge. Of the 86% respondents who were interviewed, they also indicated that they did not know if the department creates knowledge however the remaining 14% indicated that the department does create knowledge but it is not properly managed. Example of knowledge that is created by the department ranges from that which refers to information and knowledge. The following was indicated:

- Primary Data collected from Projects
- Yes, it is innovation and information is available at anytime

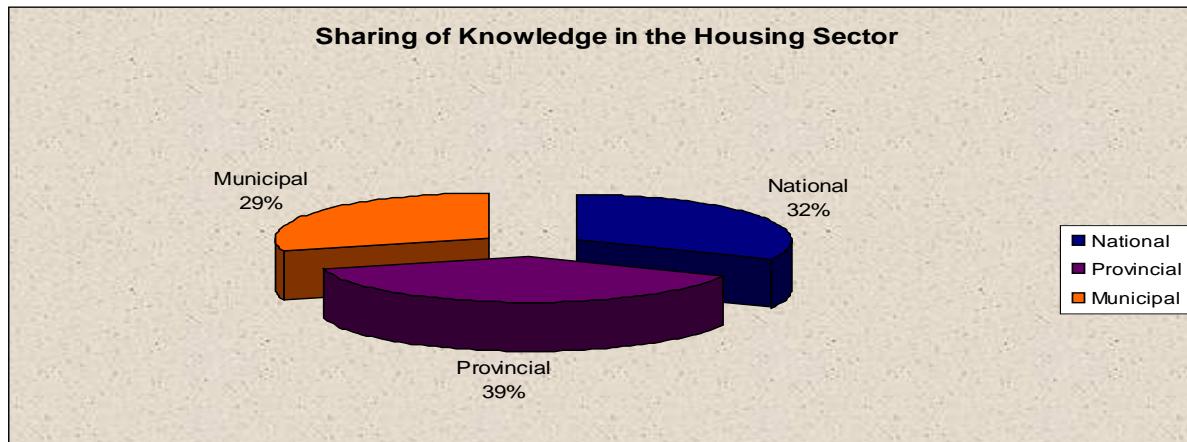
Knowledge Sharing

Sharing of knowledge encouraged in the Housing Sector (5.1)

Table 5.1 Sharing of knowledge encouraged in the Housing Sector

Item	Number of respondents
Agree	1
Neutral	10
Disagree	12
Strongly disagree	28

Graph 5.1 Sharing of knowledge encouraged in the Housing Sector



In this question, the respondents were asked to indicate whether or not they shared any knowledge. The purpose of this question was to determine if knowledge sharing practices existed in the housing sector, with the aim of recommending those practices to be implemented and replicated in other housing departments where they are non-existent. Table 5.1 and Graph 5.1 above illustrate the extent to which the respondents agreed or not agree that information and knowledge sharing is encouraged in the housing sector at national,

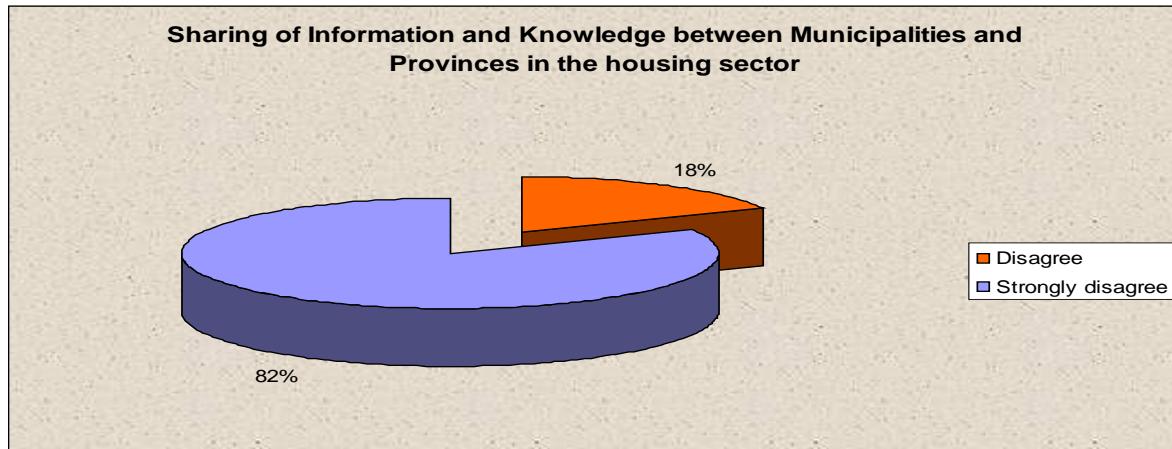
provincial and local government level. The highest percentage of respondents, namely 54%, strongly did not agree that information and knowledge sharing is encouraged in the housing sector. This was followed by 24% of the respondents who did not agree that information and knowledge sharing is encouraged in the housing sector, while 20% were neutral. The remaining 2% of the respondents agreed that information and knowledge sharing is encouraged in the housing sector.

Sharing of knowledge between Provincial and Local Governments within the sector (5.2)

Table 5.2 Sharing of knowledge encouraged in the Housing Sector

Item	Number of respondents
Disagree	9
Strongly disagree	42

Graph 5.2 Sharing of knowledge encouraged in the Housing Sector



In this question, the respondents were asked to indicate whether or not they shared any knowledge with other provincial and local government housing departments. The purpose of this question was to strengthen the responses and findings of Question 5.1 above. This question was also aimed at determining which provincial and local government housing departments shared knowledge, with the aim of recommending those practices to be implemented and replicated in other housing departments where they were non-existent. Table 5.2 and Graph 5.2 above illustrate the extent to which the respondents disagreed that information and knowledge were shared between the two levels of government, namely provincial and local government, within the housing sector. The highest percentage of

respondents, namely 82%, strongly disagreed, while 18% disagreed that information and knowledge were shared between local governments and provincial departments within the housing sector.

The 82% of the respondents also indicated that national, provincial and municipal housing department's shares information with other departments outside the housing sector environment. They also indicated that the department does acquire information from outside the department and it was also indicated that this information mostly comes from sector departments. Most of the departments that shares information with the department are those that influences housing delivery of the housing sector. The following were indicated:

- The Presidency
- Department of Rural and Land Reform
- Department of Water Affairs
- Statistics South Africa
- The National Treasury
- Cooperative Governance and Traditional Affairs

The 82% of the total number of respondents also indicated the following as threats facing the department in terms of KM in the future

- Loss of organisational memory
- Cost and time of re-inventing the wheel
- Aging workforce and high turnover rate
- Provinces and Local Government operating in silos
- Unaccountability
- Inconsistencies of housing delivery patterns across the sector
- Poor systems of reporting
- Fostered competition across Provinces and Local Government instead of learning from best practices and lessons learned
- Poor management practices

Respondents indicated that KM can assist them to improve their daily work as follows:

- Getting readily available information at disposal

- Sharing of departmental lessons learnt and best practices from past experiences, this can lessen the time and money needed to execute the projects.
- Assist management with decision making
- Improved and enhanced housing delivery

Respondents indicated that KM can enhance the provision of service delivery as follows:

- improved reporting and alignment
- saving costs and redirecting those savings to service delivery
- An organisation that has competent officials will ensure good provision of service delivery

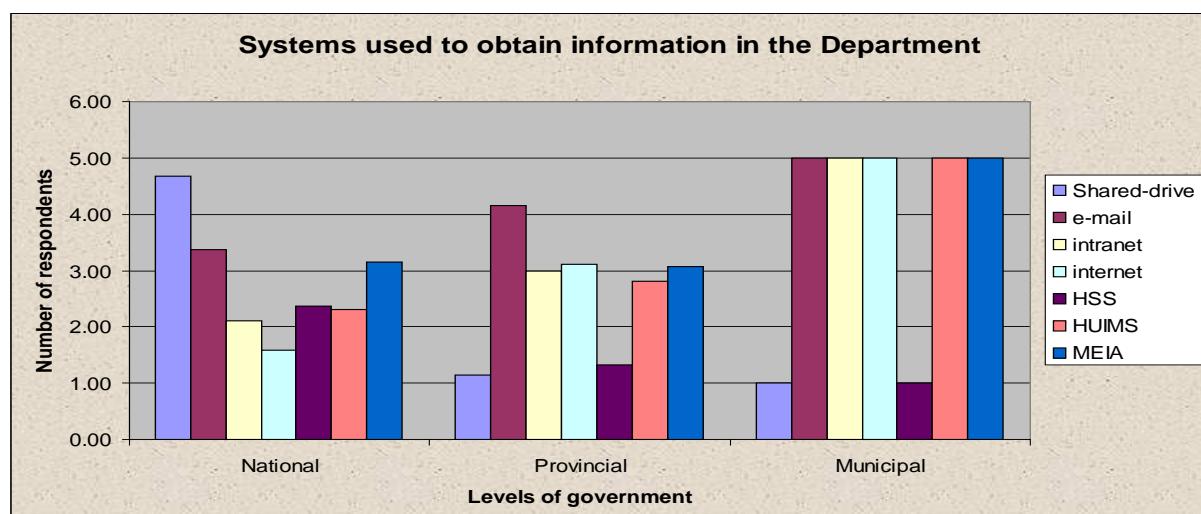
Methods and tools

Systems used to obtain information in the department (6)

Table 6.1 Systems used to obtain information in the department

Item	Shared-drive	E-mail	Intranet	Internet	HSS	HUIMS	MEIA
National	4.68	3.37	2.11	3.16	2.37	2.32	3.16
Provincial	1.15	4.15	3.00	3.08	1.33	2.81	3.08
Municipal	1.00	5.00	5.00	5.00	1.00	5.00	5.00

Graph 6.1 Systems used to obtain information in the department



In this question, the respondents were asked to indicate what tools they used to obtain information in their housing departments. To answer this question, the departmental shared drives, e-mail system, intranet, internet and the three information systems namely; the HSS,

HUIMS and MEIA were identified. The purpose of this question was to determine the most commonly used KM tools and technologies across the three spheres of the housing sector, with the aim of recommending those tools and technologies in the proposed KM Model which should be implemented in the housing sector. Based on the average, 3.94 for the total number of respondents at national, provincial and municipal level within the housing sector indicated that they used the e-mail system to obtain information, which means that the average total number of respondents, which lies between 3.5 and 5, indicated that they used the e-mail system to obtain information in the department. This was followed by the MEIA system, with an average total of 3.30, and the Internet, with a total average of 2.86. The system that was not used often to obtain information is the HSS, with an average of 1.69.

This indicates that there is a significant difference between the total number of respondents who indicated that they used the e-mail system to obtain information in the department at national, municipal and provincial level, at a 5percent significance level, as evidenced by the p-value of 0.0246

. One-way a6_2 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	12.9950694	2	6.49753469	4.01	0.0246
Within groups	77.82846	48	1.62142625		
Total	90.8235294	50	1.81647059		

There is also a significant difference between the total number of respondents who indicated that they used the MEIA system to obtain information in the department at national, municipal and provincial level, at a 5percent significance level, as evidenced by the p-value of 0.0246.

. One-way a6_7 agovt

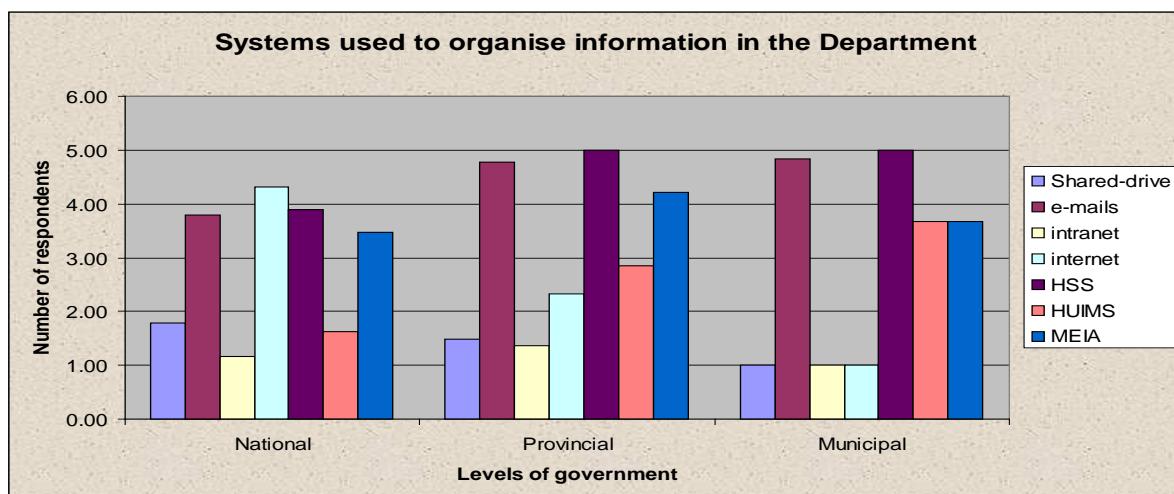
Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	16.1275304	2	8.06376518	4.49	0.0164
Within groups	84.3724696	47	1.79515893		
Total	100.5	49	2.05102041		

Systems used to organise information in the department

Table 6.2 Systems used to organise information in the department

Item	Shared-drive	E-mail	Intranet	Internet	HSS	HUIMS	MEIA
National	1.79	3.79	1.16	4.32	3.89	1.63	3.47
Provincial	1.48	4.78	1.37	2.33	5.00	2.85	4.22
Municipal	1.00	4.83	1.00	1.00	5.00	3.67	3.67

Graph 6.2 Systems used to organise information in the department



In this question, the respondents were asked to indicate which systems they used to organise information in their housing departments. The purpose of this question was to identify the most commonly used KM tools and technologies across the three spheres of the housing sector, with the aim of recommending those tools and technologies in the proposed KM Model, in order for them to be implemented as part of the KM system. To answer this question, the departmental shared drives, e-mail system, intranet, internet and the three information systems namely; the HSS, HUIMS and MEIA were identified. Based on the average, Table 6.2 and Graph 6.2 above illustrate the systems that were used by respondents to organise information in the department. The total number of respondents, at an average total of 4.56 at national, provincial and municipal level within the housing sector, indicated that they used the HSS to organise information, which means that the average total number of respondents, which lies between 3.5 and 5, indicated that they used the HSS to organise information in the department. This was followed by the e-mail system, with an average of 4.43, and by the MEIA system, with an average of 3.90. The system that was not used often to organise information is the HSS, with an average of 1.25.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who indicated that they used the HSS to organise information at national, municipal and provincial level, at the 5 percent significance level, as evidenced by the p-value of 0.0004.

. One-way a6_12 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	14.0230263	2	7.01151316	9.34	0.0004
Within groups	33.7894737	45	.750877193		
Total	47.8125	47	1.01728723		

There is also a significant difference between the total number of respondents who indicated that they used the e-mail system to obtain information at national, municipal and provincial level, at a 5% significance level, as evidenced by the p-value of 0.0007.

. One-way a6_9 agovt

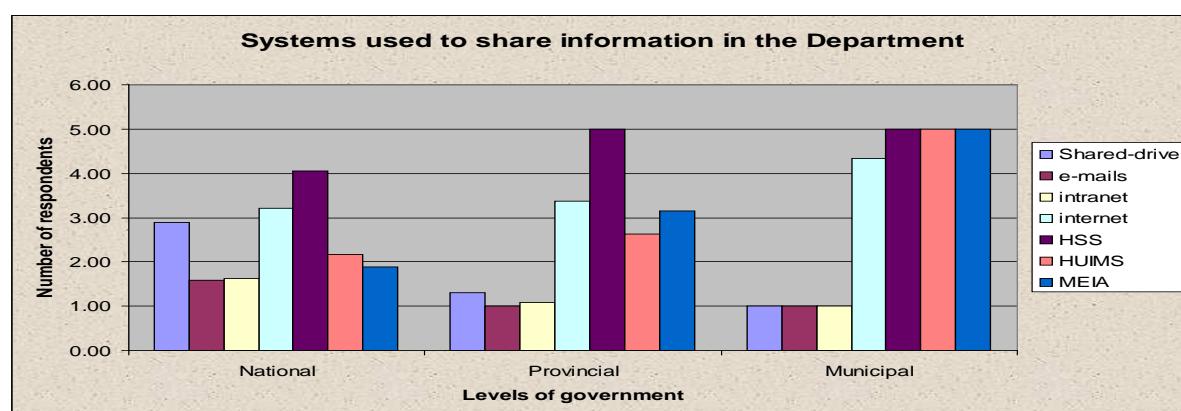
Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	12.6852425	2	6.34262126	8.50	0.0007
Within groups	35.8245614	48	.746345029		
Total	48.5098039	50	.970196078		

Systems used to share information in the department

Table 6.3 Systems used to share information in the department

Item	Shared-drive	E-mail	Intranet	Internet	HSS	HUIMS	MEIA
National	2.89	1.58	1.63	3.21	4.05	2.16	1.89
Provincial	1.30	1.00	1.08	3.37	5.00	2.63	3.15
Municipal	1.00	1.00	1.00	4.33	5.00	5.00	5.00

Graph 6.3 Systems used to share information in the department



In this question, the respondents were asked to indicate which systems they used to share information in their housing departments. The purpose of this question was to identify the most commonly used KM tools and technologies across the three spheres of the housing sector, with the aim of recommending those tools and technologies in the proposed KM Model, in order for them to be implemented as part of the KM system. Based on the average, Table 6.3 and Graph 6.3 above illustrate the systems that were used by respondents to share information in the department. The total number of respondents, with an average total of 4.65 at national, provincial and municipal level within the housing sector, indicated that they used the e-mail system to share information, which means that the average total number of respondents, which lies between 3.5 and 5, indicated that they used the e-mail system to share information in the department. This was followed by the MEIA system, with an average of 3.43. The system that was not used often to share information is the HSS, with an average of 1.22.

In terms of ANOVA (Analysis of Variance) tests for statistical methods, there is a significant difference between the total number of respondents who indicated that they used the e-mail system to share information in the department at national, municipal and provincial level, at a 5% significance level, as evidenced by the p-value of 0.0480.

. One-way a6_16 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	3.94842105	2	1.97421053	3.24	0.0480
Within groups	28.6315789	47	.609182531		
Total	32.58	49	.664897959		

There is also a significant difference between the total number of respondents who indicated that they used the MEIA system to share information in the department at national, municipal and provincial level, at a 5% significance level, as evidenced by the p-value of 0.0001.

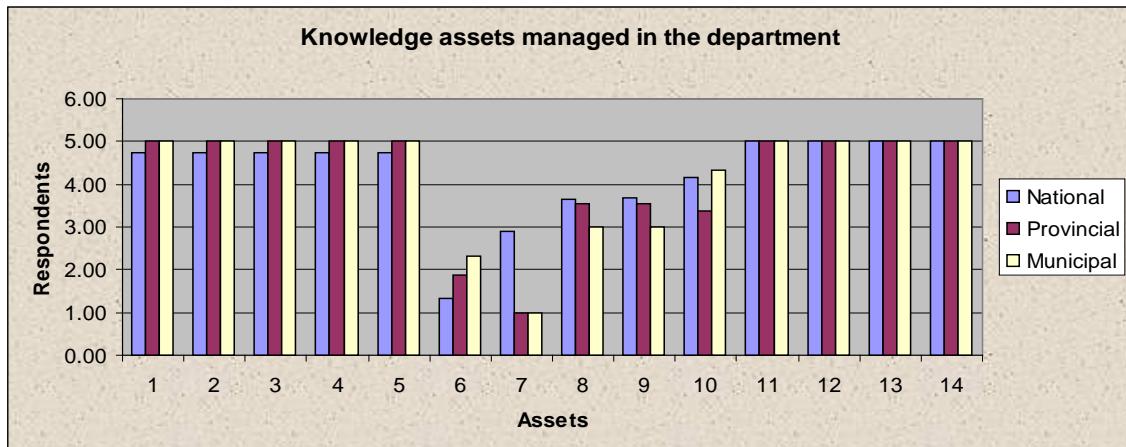
. One-way a6_21 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	42.8423346	2	21.4211673	11.53	0.0001
Within groups	89.1968811	48	1.85826836		
Total	132.039216	50	2.64078431		

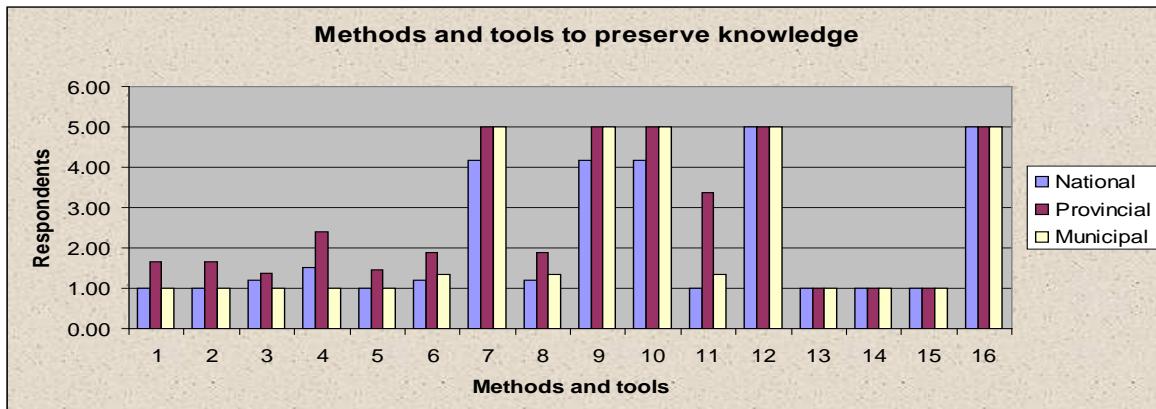
Preserving of Knowledge (7)

Knowledge assets managed in the department

Graph 8.1 Knowledge Assets managed in the department



Graph 7.2 Methods and tools to preserve knowledge in the department



In this question, the respondents were asked to indicate what methods and tools they used to preserve knowledge in their housing departments. The purpose of this question was to identify the most commonly used KM tools across the three spheres of the housing sector, with the aim of recommending those methods in the proposed KM Model for the housing sector.

Critical success factors of Knowledge Management (9)

This section presents the findings with regard to the critical success factors of KM in the housing sector. It also attempts to answer the following research question:

1. What positive aspects can be achieved through KM?

To arrive at the answer to the above question, the following factors, which are critical to the implementation of KM, were evaluated: the alignment of KM with the organisational

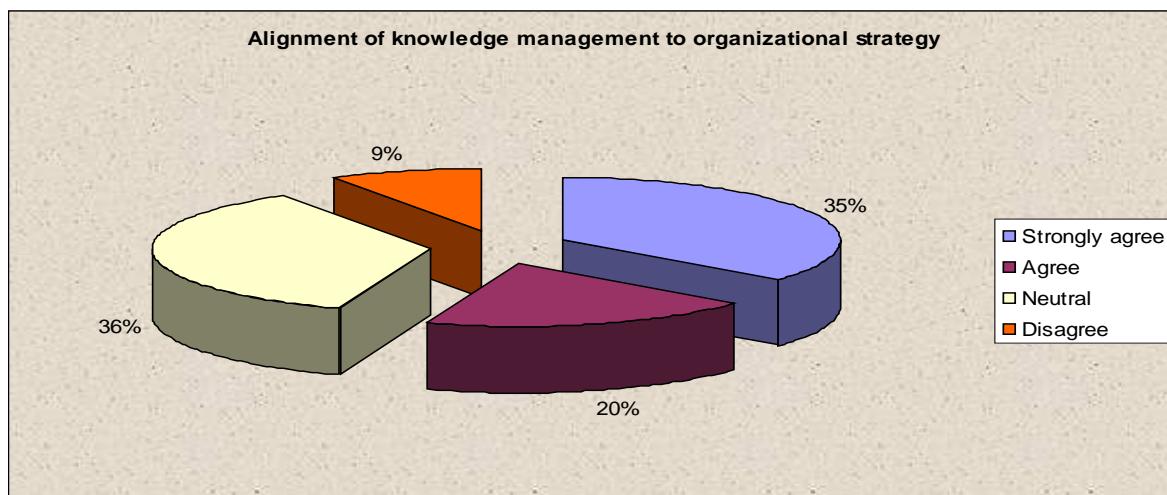
strategy, linking individuals to departmental performance, supporting of KM by knowledge managers, implementation of KM-enabling technologies and processes, adoption of a knowledge-sharing culture, the use of multiple channels of knowledge transfer, and the use of knowledge to ensure the effectiveness of the department.

Alignment of Knowledge Management with organisational strategy (9.1)

Table 9.1 Alignment of KM with organizational strategy

Item	Alignment of KM with organisational strategy
Strongly agree	20
Agree	11
Neutral	20
Disagree	5

Graph 9.1 Alignment of KM with organizational strategy



In this question, the respondents were asked to indicate whether or not KM was aligned with the organisational strategy of the housing departments. Table 9.1 and Graph 9.1 above illustrate the extent to which the total number of respondents at national, provincial and local government level agreed or disagreed that the alignment of KM with organisational strategy is a critical success factor for KM. The highest percentage of respondents, namely 35%, strongly agreed that the alignment of KM with organisational strategy is a critical success factor for KM, while 20% agreed that the alignment of KM with organisational strategy is a critical success factor for KM. This was followed by 9% who disagreed that the alignment of

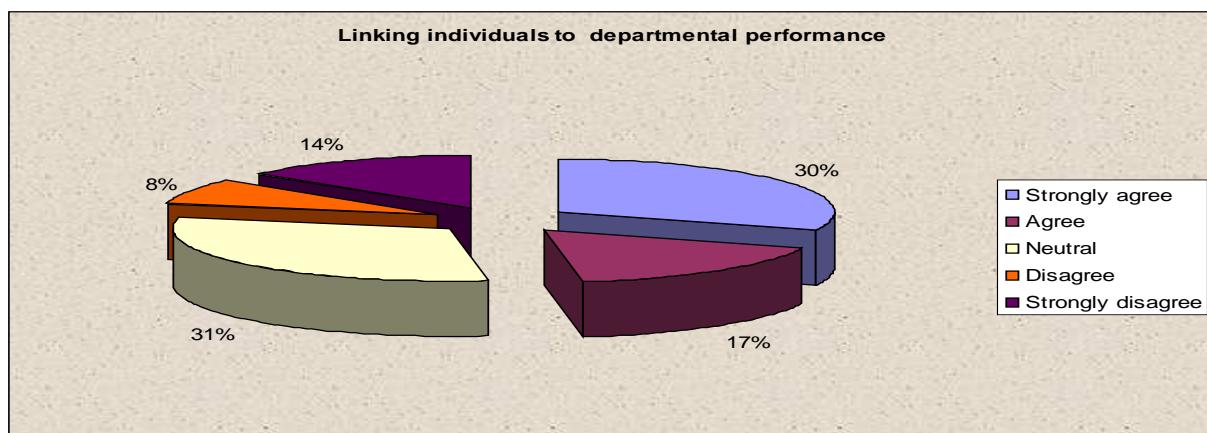
KM with organisational strategy is a critical success factor for KM. 36% of the respondents remained neutral.

Linking individuals to departmental performance (9.2)

Table 9.2 *Linking individuals to departmental performance*

Item	Linking individuals to departmental performance
Strongly agree	20
Agree	11
Neutral	20
Disagree	5
Strongly disagree	9

Graph 9.2 *Linking individuals to departmental performance*



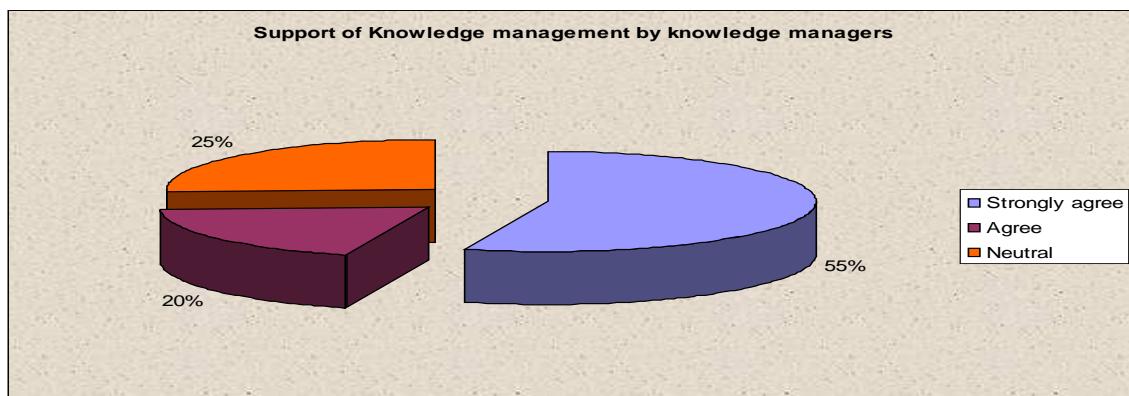
In this question, the respondents were asked to indicate whether or not they agreed with the linking of individuals to departmental performance. Table 9.2 and Graph 9.2 above illustrate the extent to which the total number of respondents at national, provincial and local government level agreed or disagreed that the linking of individuals to departmental performance is a critical success factor for KM. The highest percentage of respondents, namely 31%, strongly agreed that the linking of individuals to departmental performance is a critical success factor for KM, while 17% agreed that the linking of individuals to departmental performance is a critical success factor for KM. This was followed by 14% who strongly disagreed, and 8% who disagreed that linking individuals to departmental performance is a critical success factor for KM. 31% of the respondents remained neutral.

Support of Knowledge Management by knowledge managers (9.3)

Table 9.3 Support of KM by knowledge managers

Item	Support of KM by knowledge managers
Strongly agree	28
Agree	10
Neutral	13

Graph 9.3 Support of KM by knowledge managers

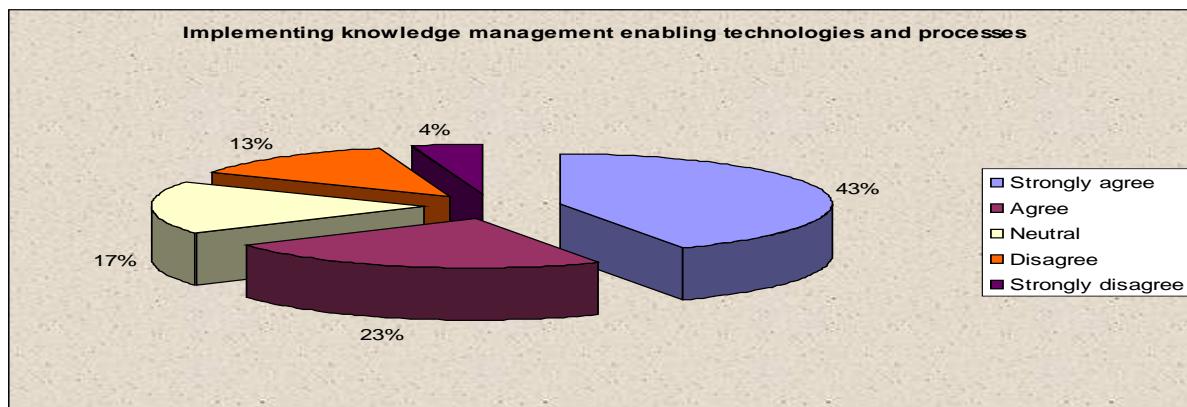


In this question, the respondents were asked to indicate whether or not they agreed that the support of KM by knowledge managers is a critical success factor of KM. The purpose of this question was to make recommendations in the proposed KM strategy for the leadership and sponsorship of the KM strategy across the housing sector. Table 9.3 and Graph 9.3 above illustrate the extent to which the total number of respondents at national, provincial and local government level agreed that the support of KM by managers is a critical success factor for KM. The highest percentage of respondents, namely 55%, strongly agreed that the support of KM by managers is a critical success factor for KM, while 20% agreed that the support of KM by managers is a critical success factor for KM. 20% of the respondents remained neutral.

Implementing Knowledge Management-enabling technologies and processes (9.4)

Table 9.4 Implementing KM-enabling technologies and processes

Item	Implementing KM- enabling technologies and processes
Strongly agree	20
Agree	11
Neutral	8
Disagree	6
Strongly disagree	2

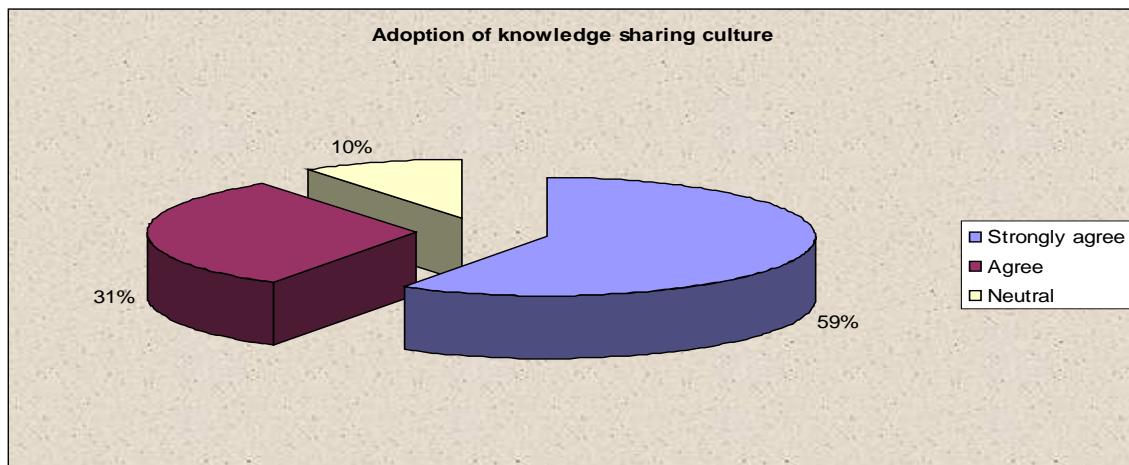
Graph 9.4 Implementing KM-enabling technologies and processes

In this question, the respondents were asked to indicate whether or not they agreed that the implementation of KM-enabling technologies and processes is a critical success factor for KM. Table 9.4 and Graph 9.4 above illustrate the extent to which the total number of respondents at national, provincial and local government level agreed or disagreed that implementing KM technologies and processes is a critical success factor for KM. The highest percentage of respondents, namely 43%, strongly agreed, followed by 23% who agreed. 17% of the respondents remained neutral, while 13% of them disagreed and 4% strongly disagreed that implementing KM technologies and processes is a critical success factor for KM.

Adoption of a knowledge-sharing culture (9.5)

Table 9.5 Adoption of a knowledge-sharing culture

Item	Adoption of a knowledge-sharing culture
Strongly agree	30
Agree	16
Neutral	5

Graph 9.5 Adoption of a knowledge-sharing culture

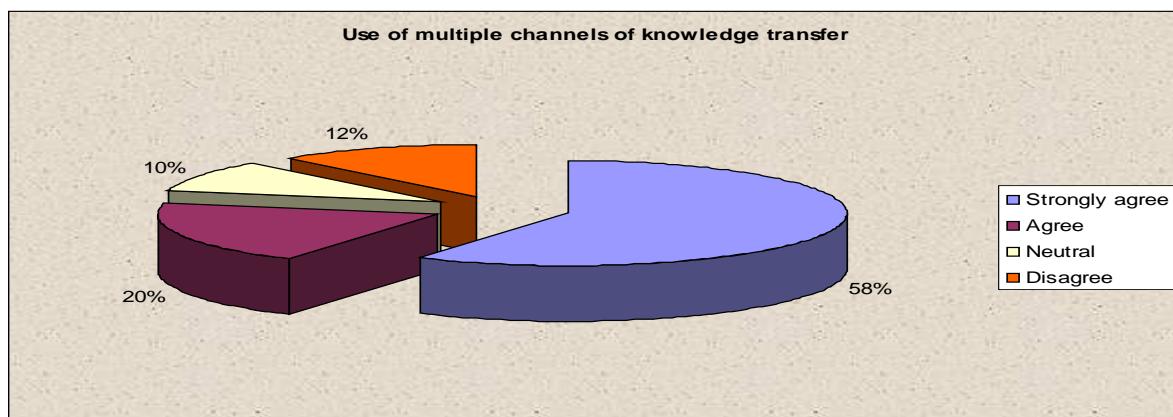
In this question, the respondents were asked to indicate whether or not they agreed that the adoption of a knowledge-sharing culture is a critical success factor for KM. The purpose of this question was to make recommendations in the proposed KM strategy for the adoption of an enabling environment for a knowledge-sharing culture in the housing sector. Table 9.5 and Graph 9.5 above illustrate the extent to which the total number of respondents at national, provincial and local government level agreed that the adoption of a knowledge-sharing culture is a critical success factor for KM. The highest percentage of respondents, namely 59%, strongly agreed that the adoption of a knowledge-sharing culture is a critical success for KM, followed by 31% who agreed. 12% of the respondents remained neutral.

Use of multiple channels of knowledge transfer (9.6)

Table 9.6 Use of multiple channels of knowledge transfer

Item	Use of multiple channels of knowledge transfer
Strongly agree	30
Agree	10
Neutral	5
	6

Graph 9.6 Use of multiple channels of knowledge transfer



In this question, the respondents were asked to indicate whether or not they agreed that the use of multiple channels of knowledge transfer is a critical success factor for KM. Table 9.6 and Graph 9.6 above illustrate the extent to which the total number of respondents at national, provincial and local government level agreed or disagreed that the use of multiple channels is a critical success for KM. The highest percentage of respondents, namely 58%, strongly agreed that the use of multiple channels is a critical success for KM, followed by

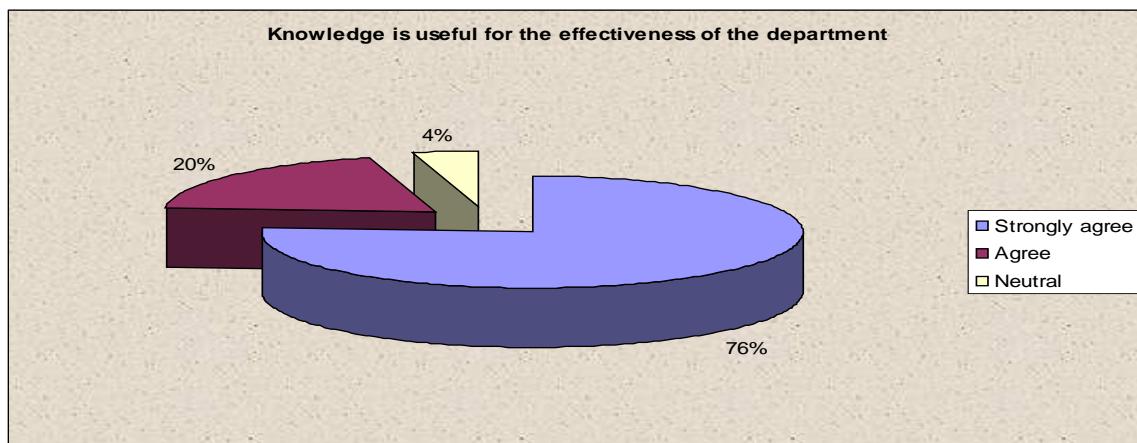
20% who agreed. 12% of the respondents disagreed that the use of multiple channels is a critical success for KM, while 10% of them remained neutral.

Knowledge is useful for the effectiveness of the department (9.7)

Table 9.7 Knowledge is useful for the effectiveness of the department

Item	Knowledge is useful for the effectiveness of the department
Strongly agree	39
Agree	10
Neutral	2

Graph 9.7 Knowledge is useful for the effectiveness of the department



In this question, the respondents were asked to indicate whether or not they agreed that the usefulness of knowledge in terms of the effectiveness of the department is a critical success factor for KM. Table 9.7 and Graph 9.7 illustrate the extent to which the respondents agreed that knowledge is useful for the effectiveness of the department within the housing sector at national, provincial and local government level. The highest percentage of respondents, namely 76%, strongly agreed that knowledge is useful for the effectiveness of the department. This was followed by 20% of the respondents who agreed that knowledge is useful for the effectiveness of the department, while 20% were neutral.

4.2 Conclusion

This chapter presented the findings and analysis of data. The findings were presented in the form of tables and graphs for each of the test items in the questionnaire, in order to ensure that they are understandable. Below each graph, the quantitative results of ANOVA tests and correlations were provided. Qualitative data findings were presented below each of the qualitative test items in the questionnaire.

The main findings relating to the research questions can be summarised as follows:

1. Do the existing information systems within the housing sector have features that are interrelated?
2. How can the Department of Housing's information systems facilitate KM across the three levels of government?
3. What positive aspects can be achieved through KM?

With regard to determining whether or not there is any interrelatedness of the systems, 52% of the respondents clearly indicated that the systems are interrelated. However, the systems are not integrated in terms of their use within the housing sector environment. The findings clearly indicated that incorporating KM system features into these systems and integrating them within single enterprise architecture would improve the effectiveness of these systems. According to McNabb¹⁰⁰, a KM system should be integrated into single enterprise architecture with other government systems.

In terms of determining how the Department of Housing's information systems can facilitate KM across the three levels of government, 52% of the total number of respondents at municipal level indicated that these systems do facilitate the functions of KM. This was followed by 33% at provincial level, and 16% at the national level. This clearly indicates the level of understanding of KM in the various spheres of government. This can also be interpreted as the level of need for KM across the three spheres. It should be noted that the service delivery of houses occurs in the third sphere of the housing sector, namely the municipalities. This is the sphere where service delivery challenges occur, and it is characterised by skill shortages and budget cuts.

The findings of the survey clearly indicate that officials are to some extent aware of KM and its importance in improving organisational effectiveness.

With regard to the positive aspects that can be achieved through KM, this study also revealed a range of desired outcomes for KM within the housing sector, which include the following:

- Scheduling regular and structured KM awareness sessions and knowledge sharing meetings across the sector.

¹⁰⁰McNabb, 2007.*Knowledge Management in the Public Sector*,p48.

- Ensuring that KM is incorporated into housing sector capacity building and training programmes, in order to facilitate the establishment of a learning organisation.
- Utilisation by the housing sector of methods and tools that facilitate the process of information and knowledge capturing, sharing, storage, dissemination, innovation and creativity, in order to preserve organisational memory.

The results of the analysis in this chapter provide an empirical overview of KM in the housing sector across the three spheres of government, namely the National Department, as well as provincial and local government housing departments. The results of the analysis form the basis for the development of a KM Model for the housing sector. The next chapter will discuss the findings and link them to the development of a KM Model.

Chapter 5

Recommendations for a Knowledge Management Model

The preceding chapters have explored whether or not the three housing sector information systems have features that are interrelated, and also to how these systems can facilitate KM across the three spheres of government. Lastly, the positive aspects that can be achieved through KM were also identified. Based on the findings, this chapter provides recommendations for the study in the form of a KM Model with the following elements:

5.1 Organisational Strategy

To support the development and implementation of the KM Model, the development of supporting strategies have been identified as the foundation. As defined by Maier¹⁰¹ and Ungerer et al.¹⁰², a KM strategy must be aligned with the strategy of the organisation, in order to close any strategic knowledge gaps that exist in the organisation. In the housing context, the primary objective of national, provincial and local governments is to work together, with the common goal of providing low-cost houses as efficiently and effectively as possible. Therefore, development of a KM Model and its supporting strategies for the housing sector is imperative to address organisational knowledge gaps that cut across the three spheres of government, addressing the process of how national policies and strategies can be most effectively implemented at the provincial and local government level.

In realising the above objectives, the proposed KM Model for the housing sector seeks to achieve the following:

- Provide the basis for establishing and coordinating department-wide KM efforts to improve the overall KM practice in the department.

¹⁰¹ Maier, R. 2007. Knowledge Management Systems: *Information and Communications Technologies for Knowledge Management*, p104.

¹⁰² Ungerer, .M, Hereholdt, J. and Uys,K. 2006.*Leveraging Knowledge-Based Assets*, p91-93.

- Provide the basis for recommending the development of a housing sector KM system to meet the needs of all three levels of government in the housing sector.
- Contribute towards the creation of a housing sector that is a learning organisation which is driven by systems, processes and culture.
- Establish and manage the processes associated with the harvesting of existing experience and knowledge, in order to institutionalise individual memories.

A KM Model will also serve as a guide for the implementation of KM strategies, systems, processes and technologies at national, provincial and municipal level, in order to facilitate collaboration, as well as the sharing of best practices and lessons learned, so as to address emerging service delivery needs and challenges and assist in the integration of capabilities, roles and responsibilities, sharing of services, strategic planning and execution of project plans.

5.2 Vision

To support the implementation of the KM Model the vision should be developed linked to that of the department of housing taking into consideration the aims and objectives of this study. This vision should also be supported by the overall housing policy and strategic priorities, which will ensure that the National Department becomes a nucleus within which development knowledge is created, captured, stored and shared.

5.3 Business Case

According to Smith, the first step in developing a strategy is to define the problem that the programme wishes to solve and address, identify the objectives of the KM programme that need to be aligned with the corporate strategy, and develop an action plan related to these objectives. Once an action plan has been developed, the budget that is required to achieve the plan should be determined by conducting a cost-benefit analysis, and the resources required must also be determined, for example people, processes, data and technology. Lastly, monitoring and evaluation needs to be done to measure implementation¹⁰³.

The research methodology used and the survey conducted in the three spheres of the housing sector formed the basis of the business case for the KM Model and supporting strategy. The purpose of the survey was to determine the following:

¹⁰³ Smith, F.A. 2005. Knowledge Management Strategy. [online] Available at: <http://www.gisdevelopment.net/proceedings/gita/2005/papers/62.pdf>(Accessed January 2010).p 5.

1. Do the existing information systems within the housing sector have any interrelated features?
2. How can the Department of Housing's information systems facilitate KM across the three levels of government?
3. What positive aspects can be achieved through KM?

5.3.1 Interrelatedness of Housing Sector Information Systems

As indicated in Chapter 1, the housing sector is geographically divided into nine provinces across the three spheres of government. The provision of houses across these geographical boundaries has proven to be a major challenge for the housing sector. Although the Department of Housing has the Housing Subsidy System (HSS), Housing and Urbanisation Information Management System (HUIMS), and the Monitoring, Evaluation and Impact Assessment System (MEIA), which were established to facilitate the processes involved in delivering affordable houses, none of these systems have facilitated the implementation of KM in the housing sector¹⁰⁴.

In addition, the department is also faced with inefficiencies in terms of delivery of houses across its regions. Coupled with these challenges, the National Department of Housing must ensure that information and knowledge are shared timeously through its information systems, in order to solve its internal service delivery problems and mitigate inconsistencies with regard to housing delivery across the sector.

With regard to determining whether or not the systems are interrelated, 52% of the total number of respondents indicated that the systems are interrelated in terms of their functionality. However, the systems are not integrated in terms of their use. The findings clearly indicated that incorporating KM features into these systems and integrating them within single enterprise architecture will improve the effectiveness of these systems, as well as the development of a KM system. McNabb¹⁰⁵ also indicated that a KM system should be integrated with other government systems.

¹⁰⁴Republic of South Africa. 2008. *The Department of Housing Monitoring and Evaluation Policy*. p10.

¹⁰⁵McNabb, D. 2007. *Knowledge Management in the Public Sector*,p48.

5.3.2 Determining how Housing Sector Information Systems can facilitate Knowledge Management

In terms of the findings from the survey, 52% of the total number of respondents at municipal level indicated that the Department of Housing's information systems facilitate the functions of KM. This was followed by 33% in the provinces and 16% in the National Department. This clearly indicates the level of understanding of KM in various spheres of the government. This can also be interpreted as the level of need for KM across the three spheres. It should be noted that service delivery of houses occurs in the third sphere of the housing sector, namely the municipalities. This is the sphere where service delivery challenges occur, and it is characterised by skill shortages and budget cuts.

The findings of the survey clearly indicate that officials are to some extent aware of KM and its importance in improving organisational effectiveness.

With regard to leadership, 71% of the respondents indicated that KM is not recognised as an important part of the departmental strategy. The following was recommended:

- Adoption of KM by senior managers in the department, in order to entrench KM practices.
- At a strategic level, the DG of the National Department of Housing and the heads of departments of various provincial housing departments, as well as the Local government managers of housing departments at municipal level, should act as KM sponsors in order to promote the adoption of KM practices in their departments.
- Although the findings also indicated that there are pockets of good KM practices in the various provincial housing departments, there is a need for the creation of more awareness regarding KM, through the sharing of best practices and lessons learned in models for building houses across the housing sector.
- KM should be seen as a key strategic practice relevant to the housing sector, and it therefore needs to be driven holistically through department management systems. However, the National Department should assume a coordinating role in order to facilitate the development of KM strategies in the remaining two spheres of government, as well as being responsible for legislative governance of KM in the sector.
- The findings have also clearly indicated the importance of having incentive mechanisms in place, particularly for promoting a knowledge-sharing culture in the

department. Based on the findings, it is also recommended that KM should be integrated with the departmental reward system i.e. performance evaluation and reward system information and experience that recognises officials' contributions to KM as achievements.

5.3.3 Positive aspects that can be achieved through Knowledge Management

With regard to the positive aspects that can be achieved through KM, respondents from the survey highlighted a number of aspects that can be achieved across the sector by implementing KM. The following were mentioned:

- If the sector develops a KM Model, this will also provide the business rationale and guidelines for the housing sector to build and expand its knowledge base, and to create platforms for intergovernmental relations and building of knowledge.
- An information and knowledge database for the sector should be established, which has a collaborative platform to facilitate the process of information and knowledge sharing across the three spheres. It was also indicated that this database should contain practical case studies of successful housing project implementation, so that officials can learn from these case studies and improve decision making. This clearly indicates that the department needs to enhance its systems, in order to ensure that it incorporates elements of a KM system.
- The housing sector should also identify its seasoned officials, who will then share their experiences and mentor new officials, as well as conducting peer reviews. Knowledge from these experienced officials should also be captured in manuals, in order to benefit the housing sector through capturing best practices and lessons learnt in terms of housing- related issues.
- The department should also hold regular quarterly review meetings to report on performance. These meetings should be reviewed, in order to focus on knowledge meetings across the sector as well.
- Online support should be provided to housing sector officials across the three spheres of government.
- Training on KM should be integrated with the housing sector's capacity building and training programmes, in order to facilitate the establishment of a learning organisation.

The findings from the survey also suggest that the culture of the housing sector is conducive to good KM practices, even though the following challenges were identified:

- Insular, silo-orientation and internally focused cultural behaviour
- Dispersal and lack of integration of events that should bring officials together around common goals, i.e. departmental strategic meetings are only prioritised for senior management, and this widens the gap between them and middle management.

5.4 Knowledge Management Processes

To ensure successful implementation, a KM Model must be supported by organisational strategies, processes, systems, mechanisms, technologies and infrastructure. According to Becerra et al. KM consists of processes, systems, mechanisms and technologies and infrastructure, which facilitate the activities of discovering, capturing, sharing and applying knowledge.¹⁰⁶ McNabb also indicated that the KM systems model consists of combined concepts, mechanisms and processes interacting to shape an organisational culture that values knowledge creation and knowledge sharing¹⁰⁷. The following KM processes have been identified to ensure the successful implementation of a KM Model for the housing sector.

5.4.1 Knowledge Creation

This first step in "contributing" towards KM implementation in the housing sector is through acquisition of information and knowledge from experienced people (officials), and documented experiences through networks of interaction i.e. project managers, housing system administrators and users. This can be facilitated through the following:

- Formal and informal networking activities i.e. communities of practice
- Sustaining high levels of creativity in terms of departmental problem solving as a means of generating new knowledge.

5.4.2 Knowledge Capture

With regard to this process, 86% of the total number of respondents who participated in the study indicated that they did not capture their knowledge. It was also recommended that:

- KM tools and methods should be created that can be used to facilitate this process.
- Officials should capture knowledge in reports after completing tasks.

¹⁰⁶Becerra, I. Gonzalez, A. and Sabherwal. R. 2004. *Knowledge management: Challenges, Solutions and Technologies*, p.47.

¹⁰⁷McNabb, D. 2007. *Knowledge Management in the Public Sector*,p25.

- Each housing sector department should start capturing the experiences of officials who have served on various housing projects, and such information should be used for planning purposes.

This process refers to the tacit knowledge that is captured from experienced officials during the knowledge creation process. In the context of the housing sector, project details generated from housing projects, knowledge and experiences of officials who have worked on previous housing projects, and experiences from long-term project managers, inspectors and housing subsidy systems, will also be captured and reused as best practices and lessons learned, in order to maximise knowledge creation.

This will be facilitated through the following:

Establishing and standardising operational processes and procedures regarding the know-how resulting from the synthesised acquisition of information (providing supporting policies, procedures, guidelines and manuals).

5.4.3 Knowledge Storage

The findings of this study indicated that only 14% of respondents at the national level indicated that they had access to the HSS system. This shows that national housing officials are not exposed to the HSS system. Based on this finding, it is recommended that the National Department should ensure that its officials have access to the system and know how to use it. This will assist them in understanding the business of provincial and municipal housing departments, and enable them to make an accurate interpretation of the policies.

This process will entail the storage of information and knowledge acquired during the knowledge creation and capture stages, with the aim of preserving organisational information, knowledge and memory. There is a need to integrate the current information systems, namely HSS, HUIMS and MEIA, into a single platform, in order to encourage their maximum utilisation, as well as to provide a single platform for information and storage. It is evident from the findings that an average of only 30% of the total number of officials at provincial and municipal level indicated that they used the HSS and HUIMS all the time to do their work, while 35% of the total number of respondents at the national level indicated that they used HUIMS all the time to do their work. The department will also have to use the existing databases of the information systems to store and record knowledge that is generated.

5.4.4 Knowledge Sharing

The findings also revealed that the National Department had significantly more people in its section i.e. 50% than the 26% in the provinces and 24% in the municipalities, and that people in the National Department had significantly more years' experience i.e. 49% in their current position than the provinces, with 29% and the municipalities, with only 22%. This means that people in the National Department have more experience than those in the municipalities. Based on this finding, it is recommended that National Department officials have a lot of information-sharing sessions with their provincial and municipal counterparts, in order to ensure that the experience they have gathered over the years is shared between them.

Knowledge sharing in the housing sector is facilitated by the process of socialisation, in which information and knowledge are exchanged between individuals or groups to create a knowledge-sharing culture in which officials share knowledge, in all its diversity and representations, make it available and ensure that it is effectively utilised for the realisation of the organisational model and its strategic objectives. The model will seek to address the gaps that exist and the knowledge-sharing patterns, as indicated by the respondents. In terms of the findings, it was indicated by 54% of the respondents that knowledge and information-sharing are encouraged in the housing sector. While 20% of them were neutral, the remaining 2% agreed that information and knowledge-sharing are encouraged in the housing sector.

The low-level knowledge-sharing culture was attributed to due to lack of time, skills and tools that facilitate electronic discussion, and lack of awareness of the existence and location of knowledge possessed by experienced officials in the department. It was also indicated that individuals perform their knowledge-related work activities alone, without assistance from others.

The following were recommended:

- Review and improvement of departmental information technology tools and systems that are currently used in the department, in order to facilitate dissemination.
- Conducting of consultative workshops on how to structure the intranet.
- Structuring of communication that is disseminated via the departmental e-mail system i.e. operations centre and post master.

In view of the findings, the housing sector departments must increase their existing platforms for sharing, and these must be used to support the process of socialisation. These will include online/virtual collaboration and face-to-face meetings.

Face-to-face meetings will be facilitated by the following:

- Structured communities of practice at the Conversation Café that will be established at the library
- Developing and publishing project case studies
- Library – coordinated information sessions
- Forums i.e.
 - Project management forums
 - Inter-provincial forums
 - Inter-local government forums
 - Housing Stakeholder Forum
 - Housing current affairs and round table discussions
- Mentoring and coaching Programmes
- Knowledge dissemination will be facilitated by virtual platforms
- The National Department should also create a physical information/knowledge centre in which hard copy information resources will be stored, and can also be loaned to provincial and municipal satellite libraries.

Technological platforms and organisational processes will be used as vehicles to facilitate creation, capture, storage, and sharing of knowledge. These technologies will be used to elevate face-to-face meetings to an online/virtual collaboration, which will be facilitated by:

- Online chat groups and blogs.

5.4.5 Collective intelligence

The findings revealed that 44% of the total number of the respondents did not have qualifications in information and KM, and only 24% of them had a 3 months to 1 year certificate. Therefore, they are not trained for the job that they are doing.

To achieve collective intelligence, the model therefore proposes that training should be provided for officials, in order to ensure that they have an understanding of the responsibilities that are entrusted to them and are able to execute them properly. This would then ensure the effectiveness of service delivery. To implement training, the housing sector

should establish an in-house learning or training institution that can facilitate skills development and re-institutionalise knowledge, in order to contribute to the learning organisation in the housing sector by means of the following:

- Establishing an in-house training institution that is accredited in terms of public sector regulations
- Affiliating itself with the project management institution
- Adopting total quality management and ISO standards, in order to improve project management
- Partnering with academic and training institutions
- Institutionalising knowledge and experience captured and gathered during project implementation and systems utilisation
- Draw up a service charter that is aligned with Batho Pele principles for delivery of services.

The proposed KM Model can only be successfully implemented by enabling the environment, in order to facilitate KM processes for capturing, sharing, storing and disseminating knowledge to facilitate:

- The identification of cultural and behavioural changes needed for implementation and training that must be put in place to facilitate learning and the institutionalisation of organisational memory, with the aim of improving service delivery.

5.5 Building Knowledge foundations

5.5.1 Addressing Governance Gaps

The findings also indicated that 82% of the total number of respondents indicated that information and knowledge were not shared between local government and provincial departments within the housing sector. Based on this finding, it is recommended that the stipulation in the Constitution of the Republic of South Africa in Chapter 1¹⁰⁸, which says that departments should co-operate with one another in mutual trust and good faith by fostering friendly relations, assisting and supporting one another, informing one another of, and consulting one another on, matters of common interest, co-coordinating their actions and legislation with one another and adhering to agreed procedures, should be adhered to.

¹⁰⁸Republic of South Africa. 1996a. *The Constitution of the Republic of South Africa*.p40-41.

It is further recommended that Malan's statement that a system of intergovernmental relations is essential when policies are drafted or projects and programmes planned and implemented, should be implemented. Malan goes on to say that through the establishment of various institutional arrangements for intergovernmental relations - and the successful operation of these structures - it is expected that all three spheres of government will continually strive to co-operate with one another in mutual trust and good faith. Without the effective operation of intergovernmental relations in South Africa, projects and programmes cannot succeed¹⁰⁹.

ICT governance and related processes should also be optimised to facilitate the establishment of a KM system that has a collaborative platform for information sharing and gathering. The model must also establish clear governance structures between all stakeholders within the three spheres of government; otherwise it will be difficult to integrate the crucial engagement points.

At the national and provincial level, there is a synergy and sort of governance structure, but at the municipal level, there is a huge gap.

5.5.2 Enabling environment

A KM Model for the housing sector seeks to create an enabling environment to routinely discover, capture, share and apply information and knowledge supported by processes, technologies and systems, in order to facilitate the improvement of service delivery within the context of the housing sector. To facilitate KM in the housing sector, officials must recognise and embed KM activities in their operational activities.

In order to facilitate the creation of an enabling environment, the proposed model emphasises the importance for senior and top management in the housing sector to recognise and support KM. This will ensure that a reflective learning culture is developed, departmental officials have access to the 'knowledge' base, and that they are equipped with the skills to find, share, evaluate and organise knowledge for future research.

5.5.3 Organisational Culture

KM is not an end in itself - it is a means of ensuring that people have the right knowledge, at the right place, and at the right time. Therefore, the Department needs to ensure that it manages its knowledge through developing a culture and environment where knowledge

¹⁰⁹Malan, L 2005. 'Intergovernmental relations and co-operative government in South Africa: the ten-year review'.*Politeia*, 24(2): 226.

sharing is a basic and core activity, which is appropriately rewarded and recognised. The housing sector department must ensure that:

- Departmental officials are encouraged to interact in order to share, learn and be creative.
- It reflects on projects and task undertaken, in order to innovate and develop ideas.
- It captures and re-uses quality information and knowledge for policy and operational decision making.
- It provides and promotes the use of appropriate technology for communication and information and knowledge flows.

Through the promotion of a culture of sharing and learning across the three spheres of government, the Department of Housing can contribute to the key area of corporate governance. The culture of sharing should be facilitated through the use of face-to-face collaboration and virtual collaborative approaches through the intranet across the three spheres of government, and in so doing, provide an important input into the way in which houses are delivered for the benefit of housing beneficiaries.

The department must also encourage the development of communities of common interest, through which officials can question, learn and collaborate, in order to develop and grow their shared expertise. The ultimate goal is to get people to participate willingly and freely in building virtual communities where knowledge and expertise can be shared and created. In order for KM to be successful, it needs to become part of the culture of the Department of Housing as a means of developing ways of sharing experience and promoting good practice, so that there is greater innovation and building on the ideas of others. It needs to become an organisation which gives people the confidence to believe that other people will find their knowledge useful, to be sure that they will not be losing control if they do share their knowledge, and which is increasingly responsive to the needs of housing beneficiaries, by using shared knowledge.

Institutional culture change can only occur with strong and visible commitment from the housing sector's IFAD's leadership to the values of mutual respect, transparency and accountability. Accordingly, support for appropriate management training will be integral to the sector's KM Model. This model will focus on the implementation of shorter-term,

pragmatic and concrete measures, which will contribute significantly towards positive cultural change.

These include the following:

- Proper resourcing of initiatives aimed at breaking the “silo” culture.
- The housing sector’s leadership, as a visible sign of commitment, must ensure that the key knowledge-sharing and learning processes that foster collaborative action, such as provincial and local government networks, are implemented.
- Recognition of employees who participate in the knowledge- sharing programme.
- Implementation of an exit debriefing for staff, in order to capture tacit knowledge, as well as the institutionalisation of special awards or rewards.

5.6 Building ICT systems

With regard to infrastructure in the housing sector, 95% of the total number of respondents indicated that one of the current methods and mechanisms that they are using in the department to share information is the departmental e-mail system. However, concerns were raised that there is no archiving system to store e-mails and organisational records.

In terms of the qualitative inputs that were made by the systems administrators of the departmental housing systems infrastructure, it was indicated that the architecture that has been used to build the three information systems is relatively good. However, the provincial and local government housing departments do not have a good ICT infrastructure in place.

The following were indicated as limitations:

- Integrating the HSS, HUIMS and MEIA systems poses challenges, as there are issues surrounding compatibility that limit the ICT’s ability to maintain and integrate them, in order to maximise the potential of current datasets.
- The systems have fragmented ICT platforms that do not enable users to obtain, organise and share information in an optimal manner.
- The different databases are not integrated and standard report cannot be extracted for all systems.

The systems administrators recommended that the following should be established:

- Department-wide information management processes.

- A single integrated system with compatible data sets as a key foundation for promoting a strong information and knowledge organization.
- A single departmental portal created by a single operating architecture that will be used as an entry point for officials, which will replace the current intranet.
- A central storage of personnel directories and shared folders on the departmental server.
- A departmental intranet with a collaborative workspace.
- An extranet to facilitate communication and collaboration with stakeholders.
- An e-mail archiving system that will store all official communication on the departmental server.
- An enterprise/departmental information management policy
- An enterprise records management process.

This study also presented case studies from the international forum and national departments, which will serve as benchmarking platforms for future studies and recommendations for the implementation plan for the proposed KM Model of the housing sector.

In the South Africa context, the Department of Public Service Administration has a learning network that assists government departments with the implementation of KM, and it also provides for the learning and sharing of best practices for implementation of KM. The Government Information Technology Officers Council also provides platforms for the sharing of information for government Chief Information Officers. Therefore, the Department of Housing's CIO should engage with the GITOC so as to align the systems development processes of the housing systems with the development of KM.

To align itself with the international context, the housing sector should draw from the NASA case study in terms of how they used KM for their programme and project management (PM), in order to complete complex, multifaceted and highly technical missions, as well as to deal with challenges associated with their ageing workforce and skills development.¹¹⁰

With regard to the tools and technologies identified in relation to the KM Model of the housing sector, the housing sector should implement an appropriate information technology infrastructure that will promote collaboration and provide ease of access to information and knowledge within housing departments across the sector.

¹¹⁰ McNabb, D. 2007. *Knowledge Management in the Public Sector*, p210.

To achieve improved delivery of affordable houses, the department needs to establish an accessible knowledge base, including both tangible knowledge resources such as books, journals, papers and minutes, and intangible knowledge such as people's know-how and experience. The advent of the Internet introduced the issue of free and readily available information for individuals. The Department of Housing needs to place its available data and information in the context of the organisational environment. The information systems that are currently used facilitate information management, and information generated can be used to facilitate KM activities through the enhancement of horizontal communication from the National Department to the provinces and local governments. The process of contextualisation can be facilitated by the use of ICT techniques i.e. databases that provide access to structural information and html products such as hypertext tools. Hypertext tools are commonly used to structure information and also enable the use of the same information in a different context.

With regard to data mining, the department can use this technique to compare patterns across provinces, as well as local governments, in order to improve service delivery. This can be used as a basis for establishing departmental communities of practice. Thus, data mining can be used to derive information of possible use as a basis for aligning departmental implementation processes and procedures.

5.7 Human Resources

The housing sector's KM strategy must also be aligned with human resource guiding principles, so as to integrate KM with officials' performance management and development plans to assist the Housing Minister and Director-General in their objective of providing affordable houses¹¹¹. Through aligning the model with human resource guiding principles the department will be able to foster the development of a learning organisation by empowering officials to gain the knowledge and skills required to implement best practices.

The department should identify its knowledge assets i.e. identify KM 'champions' or 'change managers' across the three spheres of government who can facilitate KM initiatives. The knowledge champions will be able to assist and advise officials with regard to mechanisms

¹¹¹South Africa (Republic). 1997. The Department of Housing. Housing Act. [online].available at: <http://www.dhs.gov.za/Content/Documents/thenational-housing-code202001-percentage202/Small/00.pdf> (Accessed May 2009).,p14.

for sharing knowledge and information, and will ensure that the KM Steering Group is aware of the views of officials.

Considerations of where and how information and knowledge are stored and shared, and the skills required to access and use knowledge should be properly developed. This is due to the fact that people are at the heart of this KM Model and must be supported by appropriate processes, technologies, mechanisms and systems. This view is supported by the literature review, as outlined by Becerra et al¹¹².

The model should also develop strategies for providing rewards and recognition for officials who contribute towards KM in the housing sector through the sharing of their knowledge and experiences.

The Department of Housing's KM Model will form the basis of developing strategies, policy, service development and practices that are based on the best evidence that is available (from research and practice). It is an explicit aim of the department to make information available to its officials across the three spheres of government. It is everyone's responsibility, from the Head of the Department, known as the Director-General, to all other workers within the department, and is not a technology-led process.

5.8 Techniques for Knowledge Management in the Housing Sector

The following techniques were identified for the implementation of a KM Model in the housing sector:

5.8.1 Knowledge Management system

The KM Model for the housing sector makes recommendations for the development of a KM system that will benefit all housing sector departments across the three spheres of government.

In developing this system, the following should be done:

- Leadership should provide directives and support for the future development of a single, virtual knowledge and information management repository portal.
- A data and information migration plan must be developed to pull relevant information from existing departmental information systems (HSS, HUIMS and MEIA) and planned databases.

- A plan must be developed to manage repository content, foster progress towards data and information collection in order to facilitate knowledge discovery and enable the productive expansion of the repository.
- The plans must address the needs of other stakeholders.

5.8.2 Establish a Knowledge Profiles Directory

The KM Model for the housing sector makes recommendations for the establishment of a knowledge profiles directory with the following objectives:

- The Department of Housing has an existing human resource skills database that should be utilised to establish a database of expert profiles of housing officials. These expert profiles should be developed and updated to leverage the expertise of housing officials.
- The model recommends that this expert profile directory should be used to enable officials to locate expertise on various issues related to the housing sector when doing their work.

5.8.3 Mentoring And Coaching Programme

The model also recommends the establishment of a mentoring and coaching programme, as well as a knowledge sharing and capturing programme. The mentoring and coaching programme should be prioritised for various functions in the housing sector that have been successfully implemented i.e. a mentoring and coaching programme between experienced officials who have served on housing projects and new officials who are embarking on projects. The purpose of these mentoring programmes would be to strengthen existing experiences and sharing of best practices and lessons learned.

5.8.4 Communities of Practice and Interest

The KM Model for the housing sector makes recommendations for the establishment of communities of practice between officials from housing departments across the three spheres. It is also noted that these structures already exist in the department in varying degrees i.e. departmental steering committee meetings and provincial reporting forums and peer reviews. The KM practices will therefore be utilised to strengthen these committees. The model therefore proposes the implementation of the following tools to facilitate the establishment of communities of interest and practice:

- Assessment tools and methodology for CoP/collaboration development based on lessons learned and case histories of impact. Other communities, in growing their CoPs and establishing collaborative processes, can use this toolkit.
- Policies, processes and tools that facilitate the establishment of collaborative environments.
- Supporting communities of practice and collaborative environments to facilitate the following:

5.8.5 Best Practices and Lessons Learned: Manuals and Case Studies

The model proposed the creation of manuals for best practices and lessons learned, as well as case studies. These will document best practices and lessons learned in various areas of housing implementation across the housing sector. It will also involve the processes of capturing best practices and lessons learned from experienced personnel and priority areas of operation in the department. The model proposes the following:

- Identification of key areas of successful implementation of housing projects.
- Identification of key role players and officials who played a significant role in project implementation.
- Identification and utilisation of best practice case studies for process improvement and to develop the department's business initiatives.
- Incorporation and reengineering of best practice processes to support integration, and providing solution development processes within housing sector programmes to reduce planning and execution time.

5.8.6 Training and Skills Development

The model proposes the establishment and alignment of existing training programmes in the housing sector, in order to incorporate practical case studies of KM. The model therefore recommends that the housing sector invests in its own human resources through training and recognition, as indicated by 34% of the total number of respondents. They had more than 10 years of experience in their current positions, followed by 22% of respondents who had spent 1-2 years and 0-1 years in their current positions respectively. It is evident that the department is not characterised by high employee turnover or staff mobility in its project management and system administration functions.

The department must develop people's skills, so that reports, policies, presentations and decision making are more effective. The following should be promoted:

- Training and skills in knowledge literacy.
- Developing KM skills and competencies through provision of training, in order to ensure that staffs at all levels are familiar with knowledge-sharing and learning processes and tools, and with the appropriate behaviours and attitudes.
- Providing space for knowledge-sharing and learning. This may include the following: creating a rotational programme among project teams to enhance their creativity and skills, and improving communication.
- Expanding the staff field immersion programme as a means of improving learning and knowledge-sharing.
- Developing the sector's training and mentoring programmes for newcomers.

5.8.7 Exit Interviews

The KM Model for the housing sector makes recommendations for the strengthening of existing human resource exit interview processes, in order for them to become knowledge capturing and gathering exercises for retaining organisational memory. It is proposed that this process should involve the following:

- Identifying officials who will soon be retiring, using human resource processes.
- Structuring exit interviews according to themes identified in the strategic priorities of the housing sector.
- Profiling areas of expertise in the housing sector and identifying themes for capturing knowledge.
- Extending the mandate and process of capturing exit interviews beyond when officials are leaving the department, so that this includes when officials are being promoted, and this should be linked to the performance appraisals of officials and housing departments.
- Integrating KM processes with the performance agreements of officials who are involved in missions.

5.8.8 Innovation and Creativity

The model proposes the establishment of innovation and creativity recognition and incentives for housing sector departments through their use of innovative ways in which to fast track and improve housing delivery. It is proposed that the housing sector profiles innovation and creativity in the department through the following:

- Creation of space for new ways of doing business, as well as to capture, store and share best practices and lessons learned from the various activities, in order to enhance innovation and continuous learning.
- Development of tools and criteria to identify innovation practices.
- Establishment of best practice and innovation awards as an incentive for knowledge sharing.
- Standardisation of innovation practices for replication throughout the department.

5.8.9 Policy and Process Development

The model proposes the establishment of policies and processes to support the KM model. The process and policy guidance will provide support for knowledge and information management, as well as innovation, in the department. The policy should provide guidelines for the following:

- Enterprise best practices process.
- Implementation of programmes for identifying, vetting, employing and improving the department's best practices.
- The development of a KM system and the use of new media technology, including social media, for collaboration within the department.

5.9 Implementation of the Knowledge Management Model

The implementation of the Department of Housing's KM Model will be facilitated by translating the developing various strategies that will be translated into realistic business plans and putting structural and managerial experiences in place to primarily institutionalise the model. This will also be facilitated by the establishment of a steering group that will work collaboratively with colleagues in the housing sector across the three spheres of government to meet the following key objectives, in order to facilitate the development of KM in the housing sector.

5.10 Monitoring and evaluation

The successful implementation of the KM Model for the housing sector will require monitoring and evaluation to be done across the sector. Considering the fact that the housing sector has a monitoring system i.e. the MEIA system, monitoring should be an integral part of the KM Model. The custodians of the MEIA system should assist with the development of indicators for KM, as well as to monitor progress and evaluate performance throughout the implementation of KM across the three spheres. The project management system that feeds into the M&E system must provide feedback on budgets, resource utilisation, timelines, deviations from the schedule, and reasons for deviation.

5.11 Conclusion

This chapter presented the proposed KM Model for the housing sector, and also explored the following research questions, as outlined in Chapter 1 of this study:

1. What are the interrelatedness features of the existing information systems within the housing sector?
2. How can the Department of Housing's information systems facilitate KM across the three levels of government?
3. What are the positive aspects that can be achieved through KM?

The proposed model for the implementation of KM across the three spheres of government in the housing sector has also been outlined in this chapter. The successful implementation of this model can be achieved through sound ICT and basic project management skills, combined with strategic direction and a clear business case. This can be achieved through the integration and enhancement of knowledge and collaboration, as well as the improvement of public services across the housing sector.

5.12 Future Research

This study proposed a KM Model to enhance service delivery within the housing sector environment across the three spheres of government.

For future studies, the following research areas have been identified:

1. Development of a KM Model and supporting strategies for each sphere of government within the housing sector;

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Appendix A

Questionnaire Construction

The questionnaire has 10 questions categories which consist of:

- Biographic information of the respondent
- Departmental information systems (HSS, HUIMS and MEIA)
- Understanding of KM by Management and Staff Members
- Current status of Knowledge Management
- Knowledge sharing
- Methods and tools used to preserve knowledge
- Measuring knowledge
- Assessing Knowledge future
- Preservation of Knowledge assets
- Methods and tools being used to preserve knowledge
- Critical success factors for KM

In the Biographic information of the respondent category there are 3 questions. In Departmental information systems (HSS, HUIMS and MEIA) that are available at the workplace of the respondent category there are 6 questions. In the KM awareness by Management, Project Management, System Administrators and Housing Subsidy Administrators category there are 3 questions. In the current status of KM, there is 6 sub categories namely, knowledge sharing with 11 questions, knowledge sharing with 4 questions, methods of preserving knowledge with 5 questions. In the Methods and tools used to capture and preserve knowledge sub-category there are 4 questions. In the Measuring knowledge sub-category there are 5 questions. In the preservation of Knowledge assets sub – category there are 15 questions. In the sub-category methods of preserving knowledge, there are 18 questions

In assessing Knowledge future in the department category there are 3 questions. In preservation of Knowledge assets category there are 21 questions. In the methods and tools

being used to preserve knowledge category there are 19 questions. In the Critical success factors for KM category there are 9 questions. The total number of questions is 126.

The biographic information category consisted of list closed questions. The respondents were expected to put a cross on their choice from the list of items provided. From categories (2), (3), (5) and (7) the questions were also closed questions. However category (4) and its subcategories contained a mixture of closed and open ended questions. Categories (7) and (5) consisted of open-ended questions. The Likert-style rating scale was used to design the questions. The respondents were asked how strongly they agree or disagree with the statements. The following key was used:

5 = Strongly agree

4 = Agree

3 = Neutral

2 = Disagree

1 = Strongly disagree

N/A = Not applicable, i.e., you have not had anything to do with the issue/aspect

When answering the open ended questions, respondents were expected to give answers in their own way¹¹³. All questions are aligned with the research objectives. The objectives of this research are:

- to explore how existing information systems within the Housing Sector can facilitate KM and improve service delivery.
- to explore the positive aspects that can be achieved through KM to improve service delivery within the Housing Sector environment

Draft Questionnaire

Respondents are requested to complete this questionnaire, as part of an exploration to determine the existence of KM in the Housing Sector across the three spheres of Government in South Africa. Your honest response is highly valued, and will be treated with strict confidentiality. Please take care to answer the following questions thoughtfully, accurately and fairly. Give your own opinion, indicating whether you agree or disagree with each

¹¹³DILLMAN.DA (2000) Mail and Internet Surveys: The tailored Design Method.

statement. Use the following key, and circle the item on the rating scale that corresponds most closely to your experience:

5 = Strongly agree

4 = Agree

3 = Neutral

2 = Disagree

1 = Strongly disagree

N/A = Not applicable, i.e., you have not had anything to do with the issue/aspect

Please cross “X” the appropriate box, or where indicated, provide a written response.

Name:

National Province/Local government:.....

Date:.....

Designation:

1. Biographic Information

1.1	Qualification in Information or KM	None 1	Certificate 3months – 1 year 2	Diploma 3	Degree 4	Post Grad 5
1.2	Number of years in current position	0-1 year 1	2-5 yrs. 2	1-2 years 3	5-9 yrs. 4	+ 10 yrs. 5
1.3	Number of people in section	1	2-3 2	3-5 3	5 - 9 4	+10 5

2. Departmental information systems (HSS, HUIMS and MEIA)

Employees have access to these systems	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.1HSS	5	4	3	2	1
2.2HUIMS	5	4	3	2	1
2.3MEIA	5	4	3	2	1
The systems relevant to do	Strongly	Agree	Neutral	Disagree	Strongly

your work	agree				disagree
2.4 HSS	5	4	3	2	1
2.5 HUIMS	5	4	3	2	1
2.6 MEIA	5	4	3	2	1
The systems are used all the time to do your work	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.7 HSS	5	4	3	2	1
2.8 HUIMS	5	4	3	2	1
2.9 MEIA	5	4	3	2	1
Systems are often reviewed for relevance and accuracy	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.10 HSS	5	4	3	2	1
2.11 HUIMS	5	4	3	2	1
2.12 MEIA	5	4	3	2	1
Training is provided on how to use the systems	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.13 HSS	5	4	3	2	1
2.14 HUIMS	5	4	3	2	1
2.15 MEIA	5	4	3	2	1
After care support is provided after on a continuous basis	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.16 HSS	5	4	3	2	1
2.17 HUIMS	5	4	3	2	1
2.18 MEIA	5	4	3	2	1
Are the functions of the systems interrelated	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.19 HSS	5	4	3	2	1
2.20 HUIMS	5	4	3	2	1
2.21 MEIA	5	4	3	2	1
Do the systems facilitate functions of KM	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.22 HSS	5	4	3	2	1
2.23 HUIMS	5	4	3	2	1
2.24 MEIA	5	4	3	2	1

3. Understanding of Knowledge Management

KM awareness		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
3.1	Is there a difference	5	4	3	2	1

	between Information and KM					
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4. Current Status of Knowledge Management

Current Status of KM		Effective	Partial effective	Unknown	Partial effective	Not effective
4.1	KM exists in the Housing Sector environment	5	4	3	2	1

5 .Knowledge sharing

Knowledge sharing		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
5.1.	Sharing of information and knowledge encouraged in the department	5	4	3	2	1
5.2	The department shares information and knowledge with other Provinces and Local Government within the sector	5	4	3	2	1
5.3	The Province shares information and knowledge with other peer Provinces within the sector	5	4	3	2	1
5.4	The Local government shares information and knowledge with other peer Local Government within the sector	5	4	3	2	1

5.5.	Does the department share information and knowledge with other sector departments outside the Housing Sector	5	4	3	2	1
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6. Methods and Tools

Indicate the systems that you use to obtain information in Department		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6.1	Shared drive	5	4	3	2	1
6.2	E-mail	5	4	3	2	1
6.3	Internet	5	4	3	2	1
6.4	Intranet	5	4	3	2	1
6.5	HSS	5	4	3	2	1
6.6	HUIMS	5	4	3	2	1
6.7	MEIA	5	4	3	2	1
Do you agree that the following system are used in organising information		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6.8	Shared drive	5	4	3	2	1
6.9	E-mail	5	4	3	2	1
6.10	Internet	5	4	3	2	1
6.11	Intranet	5	4	3	2	1
6.12	HSS	5	4	3	2	1
6.13	HUIMS	5	4	3	2	1
6.14	MEIA	5	4	3	2	1
What systems do employees in Department use to share		Strongly agree	Agree	Neutral	Disagree	Strongly disagree

information?						
6.15	Shared drive	5	4	3	2	1
6.16	E-mail	5	4	3	2	1
6.17	Internet	5	4	3	2	1
6.18	Intranet	5	4	3	2	1
6.19	HSS	5	4	3	2	1
6.20	HUIMS	5	4	3	2	1
6.21	MEIA	5	4	3	2	1
Indicate the following information system is most valuable to you		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6.22	Shared drive	5	4	3	2	1
6.23	E-mail	5	4	3	2	1
6.24	Internet	5	4	3	2	1
6.25	Intranet	5	4	3	2	1
6.26	HSS	5	4	3	2	1
6.27	HUIMS	5	4	3	2	1
6.28	MEIA	5	4	3	2	1

7. Preservation of Knowledge assets

Indicate which of the following KM assets are managed in the department		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
7.1	Housing Policies	5	4	3	2	1
7.2	Departmental internal policies	5	4	3	2	1
7.3	Organizational strategies	5	4	3	2	1
7.4	Operational guidelines	5	4	3	2	1
7.5	Business plans	5	4	3	2	1
7.6	Expertise profiles (expert networks)	5	4	3	2	1
7.7	Job and skills profiles	5	4	3	2	1

7.8	Experience(lessons learned)	5	4	3	2	1
7.9	Experience(best practices)	5	4	3	2	1
7.10	Experience (benchmarks)	5	4	3	2	1
7.11	Case Studies	5	4	3	2	1
7.12	Methodologies and consulting practices	5	4	3	2	1
7.13	Project specific details	5	4	3	2	1
7.14	Project designs and plans	5	4	3	2	1
7.15	Training material	5	4	3	2	1
7.16	Work related individual folders	5	4	3	2	1

8. Methods and tools being used to preserve knowledge

Do you use the following knowledge tools to preserve knowledge in the department?		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
8.1	Knowledge champion/chief knowledge officer	5	4	3	2	1
8.2	Knowledge based jobs functions i.e. knowledge manager , facilitator	5	4	3	2	1
8.3	Coaches and mentors	5	4	3	2	1
8.4	Knowledge bases	5	4	3	2	1
8.5	Departmental knowledge maps and knowledge inventories	5	4	3	2	1
8.6	Internet and intranet	5	4	3	2	1
8.7	Knowledge sharing systems	5	4	3	2	1
8.9	Document repositories	5	4	3	2	1
8.10	Special focused meetings	5	4	3	2	1
8.11	Training programs	5	4	3	2	1
8.12	Experienced (lessons learned) programs	5	4	3	2	1
8.13	Knowledge related	5	4	3	2	1

	incentive schemes					
8.14	Knowledge workshops and meetings	5	4	3	2	1
8.15	Cross functional execution of business initiatives	5	4	3	2	1
8.16	After action reviews	5	4	3	2	1

9. Critical success factors for Knowledge Management

Critical success factors for KM		Extremely important	Very important	Important	Unimportant	Very unimportant
9.1	Alignment of KM to organizational strategy	5	4	3	2	1
9.2	Linking individuals to departmental performance	5	4	3	2	1
9.3	Support of KM by knowledge managers	5	4	3	2	1
9.4	Implementing KM enabling technologies and processes	5	4	3	2	1
9.5	Adoption of knowledge sharing culture	5	4	3	2	1
9.6	Use of multiple channels of knowledge transfer	5	4	3	2	1
9.7	Knowledge is useful for the effectiveness of the department	5	4	3	2	1

10. Qualitative Evaluation

10.1 Does the department create new knowledge?

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10.2 Does the department acquire information from outside the department? What is this information, it is being utilized?

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10.3 What kind of information is shared by the National department?

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10.4 .If the answer above is yes, how is this information captured and shared?

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10.5 Are there formal procedures/ methods of measuring knowledge in the department?

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10.6 Does the department measure the competency of employees?

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10.7 Does the department measure the employee's intellectual property?

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10.8 Does the department measure the effectiveness of their culture and infrastructure in terms of knowledge creation and retention?

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10.9 Do you think lack of KM is a high risk for the department?

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10.10 What are the threats facing the department in terms of KM in the future?

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10.11. What are the opportunities facing the department in terms of KM in the future?

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10.12. How can KM improve your daily work and operations?

10.13. How can KM improve your relationship with other management colleagues?

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10.14. How can KM improve the effectiveness of your department?

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10.15. How can KM improve the provision of service delivery?

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10.16. What are the knowledge assets that exist in your organisation?

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10.17. Where is the knowledge assets situated?

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10.18. What do you understand about knowledge retention?

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10.19 Are there any positive aspects of HSS?

10.20. Are there any negative aspects of HSS? How could they be improved?

10.21. Are there any positive aspects of HUIMS system?

10.22. Are there any negative aspects of HUIMS system? How could they be improved?

10.23. Are there any positive aspects of MEIA system?

10.24. Are there any negative aspects of MEIA system? How could they be improved?

10.25. Positive aspects of KM. How could they be adapted and implemented in the Housing Sector?

10.26. How are best practices shared?

10.27 How is innovation rewarded?

Thank you for your assistance in completing this questionnaire.

Appendix B

Interview Schedule

Interviews were based on questionnaire items. Face to face interview sessions were conducted by visiting the official's offices. Interviews were also conducted telephonically. The respondents that were interviewed telephonically were also taken through the questionnaire items. The following schedule was drafted for the distribution of questionnaires and conducting of interviews:

DATA COLLECTION SCHEDULE

Date	Questionnaire	Interview
13/01/2010	Distribution of questionnaires to the National Department <ul style="list-style-type: none"> • 3 managers, • 3 administrators (of each system) • Distribution of questionnaires to 15 users (5 for each system) 	
	Distribution of questionnaires to 4 Provinces <ul style="list-style-type: none"> • Gauteng <ul style="list-style-type: none"> ○ 3 Managers ○ 4 Users • Limpopo <ul style="list-style-type: none"> ○ 3 Managers ○ 4 Users • North West <ul style="list-style-type: none"> ○ 3 Managers ○ 4 Users • Western Cape <ul style="list-style-type: none"> ○ 3 Managers ○ 4 Users 	
	Distribution of questionnaires to Municipalities <ul style="list-style-type: none"> • Gauteng <ul style="list-style-type: none"> ○ Ekurhuleni 2 ○ Tshwane 1 ○ Johannesburg 1 • Limpopo 	

	<ul style="list-style-type: none"> ○ Vhembe 2 ○ Sekhukhune 1 ● North West <ul style="list-style-type: none"> ○ Potchefstroom 2 ○ Sedibeng 1 ○ Mafikeng 1 ● Western Cape <ul style="list-style-type: none"> ○ Cape town 2 ○ Stellenbosch 1 	
18/01/2010		Interview Gauteng province
19-22/01/2010		Interview Ekurhuleni, Tshwane and Johannesburg Municipalities
25/01/2010		Interview Limpopo province
26-28/01/2010		Interviews, Vhembe and Sekhukhune Municipalities,
02/02/2010		Interview North West province
03-04/02/2010		Interviews Potchefstroom, Sedibeng and Mafikeng Municipalities
08/02/2010		Interview Western Cape province
09-10/02/2010		Interviews with Cape Town and Stellenbosch Municipalities,

Table 6: Data collection schedule

Appendix C

SASS : Transcript of Statistical Results

. One-way a1_1 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	9.54881321	2	4.7744066	3.04	0.0572
Within groups	75.4315789	48	1.57149123		
Total	84.9803922	50	1.69960784		

. One-way a1_2 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	1.69957574	2	.849787868	0.34	0.7114
Within groups	118.927875	48	2.47766407		
Total	120.627451	50	2.41254902		

. One-way a1_3 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	43.0546956	2	21.5273478	97.19	0.0000
Within groups	10.6315789	48	.221491228		
Total	53.6862745	50	1.07372549		

. One-way a2_1 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	143.851393	2	71.9256966	321.55	0.0000
Within groups	10.7368421	48	.223684211		
Total	154.588235	50	3.09176471		

. One-way a2_2 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	1.79245499	2	.896227497	2.08	0.1365
Within groups	20.7173489	48	.431611436		
Total	22.5098039	50	.450196078		

. One-way a2_3 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	20.0330237	2	10.0165119	5.14	0.0095
Within groups	93.6140351	48	1.9502924		
Total	113.647059	50	2.27294118		

. One-way a2_4 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	.528379773	2	.264189886	2.46	0.0963
Within groups	5.15789474	48	.10745614		
Total	5.68627451	50	.11372549		

. One-way a2_5 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	13.6404082	2	6.82020411	1.94	0.1550
Within groups	168.869396	48	3.51811241		
Total	182.509804	50	3.65019608		

. One-way a2_6 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	16.9580553	2	8.47902763	3.78	0.0299
Within groups	107.669396	48	2.24311241		
Total	124.627451	50	2.49254902		

. One-way a2_7 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	9.79727096	2	4.89863548	9.99	0.0002
Within groups	23.5360624	48	.490334633		
Total	33.3333333	50	.666666667		

. One-way a2_8 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	1.542025	2	.771012499	1.31	0.2780
Within groups	28.1442495	48	.586338532		
Total	29.6862745	50	.59372549		

. One-way a2_9 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	20.3545465	2	10.1772732	21.93	0.0000
Within groups	22.2729045	48	.464018843		
Total	42.627451	50	.85254902		

. One-way a2_10 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.297213622	2	.148606811	2.82	0.0693
Within groups	2.52631579	48	.052631579		
Total	2.82352941	50	.056470588		

. One-way a2_11 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.718357986	2	.359178993	0.12	0.8884
Within groups	145.320858	48	3.02751787		
Total	146.039216	50	2.92078431		

Bartlett's test for equal variances: chi2(2) = 4.4925 Prob>chi2 = 0.106

. One-way a2_12 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	18.472744	2	9.23637198	3.90	0.0269
Within groups	113.566472	48	2.36596816		
Total	132.039216	50	2.64078431		

Bartlett's test for equal variances: chi2(2) = 6.2972 Prob>chi2 = 0.043

. One-way a2_13 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	55.5128999	2	27.7564499	27.46	0.0000
Within groups	48.5263158	48	1.01096491		
Total	104.039216	50	2.08078431		

. One-way a2_14 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		

Between groups	10.0392157	2	5.01960784	9.04	0.0005
Within groups	26.6666667	48	.555555556		
Total	36.7058824	50	.734117647		

. One-way a2_15 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	10.0392157	2	5.01960784	9.04	0.0005
Within groups	26.6666667	48	.555555556		
Total	36.7058824	50	.734117647		

. One-way a2_16 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	58.25387	2	29.126935	23.63	0.0000
Within groups	59.1578947	48	1.23245614		
Total	117.411765	50	2.34823529		

. One-way a2_17 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	1.03222108	2	.516110538	1.60	0.2124
Within groups	15.4775828	48	.322449643		
Total	16.5098039	50	.330196078		

. One-way a2_18 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	1.03222108	2	.516110538	1.60	0.2124
Within groups	15.4775828	48	.322449643		
Total	16.5098039	50	.330196078		

. One-way a5_5 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	18.666208	2	9.333104	5.38	0.0078
Within groups	83.2553606	48	1.73448668		
Total	101.921569	50	2.03843137		

. One-way a6_1 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	151.11478	2	75.5573902	142.16	0.0000
Within groups	25.5126706	48	.53151397		
Total	176.627451	50	3.53254902		

. One-way a6_2 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	12.9950694	2	6.49753469	4.01	0.0246
Within groups	77.82846	48	1.62142625		
Total	90.8235294	50	1.81647059		

. One-way a6_3 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	34.249742	2	17.124871	6.05	0.0045
Within groups	135.789474	48	2.82894737		
Total	170.039216	50	3.40078431		

. One-way a6_4 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	54.8586171	2	27.4293086	15.44	0.0000
Within groups	85.2982456	48	1.77704678		
Total	140.156863	50	2.80313725		

. One-way a6_5 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	14.5593395	2	7.27966976	5.98	0.0048
Within groups	58.4210526	48	1.21710526		
Total	72.9803922	50	1.45960784		

. One-way a6_6 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	28.5657608	2	14.2828804	6.46	0.0033
Within groups	106.179337	48	2.21206953		
Total	134.745098	50	2.69490196		

. One-way a6_7 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	16.1275304	2	8.06376518	4.49	0.0164
Within groups	84.3724696	47	1.79515893		
Total	100.5	49	2.05102041		

. One-way a6_8 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	2.7288155	2	1.36440775	2.53	0.0903
Within groups	25.8986355	48	.539554906		
Total	28.627451	50	.57254902		

. One-way a6_9 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	12.6852425	2	6.34262126	8.50	0.0007
Within groups	35.8245614	48	.746345029		
Total	48.5098039	50	.970196078		

. One-way a6_10 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	.297213622	2	.148606811	0.84	0.4394
Within groups	8.52631579	48	.177631579		
Total	8.82352941	50	.176470588		

. One-way a6_11 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	64.7182663	2	32.3591331	11.76	0.0001
Within groups	132.105263	48	2.75219298		
Total	196.823529	50	3.93647059		

. One-way a6_12 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F

Between groups	14.0230263	2	7.01151316	9.34	0.0004
Within groups	33.7894737	45	.750877193		
Total	47.8125	47	1.01728723		

. One-way a6_13 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	26.116638	2	13.058319	7.07	0.0020
Within groups	88.62846	48	1.84642625		
Total	114.745098	50	2.29490196		

Bartlett's test for equal variances: chi2(2) = 4.0846 Prob>chi2 = 0.130

. One-way a6_14 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	6.30629515	2	3.15314757	1.89	0.1626
Within groups	80.2035088	48	1.67090643		
Total	86.5098039	50	1.73019608		

Bartlett's test for equal variances: chi2(2) = 7.7150 Prob>chi2 = 0.021

. One-way a6_15 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	32.6201124	2	16.3100562	28.55	0.0000
Within groups	27.4191033	48	.571231319		
Total	60.0392157	50	1.20078431		

. One-way a6_16 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	3.94842105	2	1.97421053	3.24	0.0480
Within groups	28.6315789	47	.609182531		
Total	32.58	49	.664897959		

. One-way a6_17 agovt

Source	Analysis of Variance				
	SS	df	MS	F	Prob> F
Between groups	3.81279352	2	1.90639676	10.84	0.0001
Within groups	8.26720648	47	.17589801		
Total	12.08	49	.246530612		

. One-way a6_18 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	7.85561289	2	3.92780644	3.45	0.0398
Within groups	54.654191	48	1.13862898		
Total	62.5098039	50	1.25019608		

Bartlett's test for equal variances: chi2(2) = 2.3719 Prob>chi2 = 0.305

. One-way a6_19 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	10.6996904	2	5.3498452	12.26	0.0001
Within groups	20.9473684	48	.436403509		
Total	31.6470588	50	.632941176		

. One-way a6_20 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	32.1577801	2	16.07889	7.22	0.0018
Within groups	106.822612	48	2.22547109		
Total	138.980392	50	2.77960784		

. One-way a6_21 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	42.8423346	2	21.4211673	11.53	0.0001
Within groups	89.1968811	48	1.85826836		
Total	132.039216	50	2.64078431		

. One-way a6_22 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	8.07843137	2	4.03921569	5.29	0.0084
Within groups	36.6666667	48	.763888889		
Total	44.745098	50	.894901961		

. One-way a6_23 agovt

Analysis of Variance

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	3.30237358	2	1.65118679	3.82	0.0288
Within groups	20.7368421	48	.432017544		
<hr/>					
Total	24.0392157	50	.480784314		

. One-way a6_24 agovt

Analysis of Variance					
Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	9.22004357	2	4.61002179	3.19	0.0501
Within groups	69.4074074	48	1.44598765		
<hr/>					
Total	78.627451	50	1.57254902		

. One-way a6_25 agovt

Analysis of Variance					
Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	2.6749226	2	1.3374613	2.23	0.1181
Within groups	28.7368421	48	.598684211		
<hr/>					
Total	31.4117647	50	.628235294		

. One-way a6_26 agovt

Analysis of Variance					
Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	5.44575725	2	2.72287863	6.23	0.0040
Within groups	20.1052632	46	.437070938		
<hr/>					
Total	25.5510204	48	.532312925		

. One-way a6_27 agovt

Analysis of Variance					
Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	52.3655544	2	26.1827772	12.07	0.0001
Within groups	104.14425	48	2.16967186		
<hr/>					
Total	156.509804	50	3.13019608		

. One-way a6_28 agovt

Analysis of Variance					
Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	63.3511741	2	31.675587	15.03	0.0000
Within groups	99.0688259	47	2.10784736		
<hr/>					
Total	162.42	49	3.31469388		

Bartlett's test for equal variances: chi2(1) = 8.0584 Prob>chi2 = 0.005

. One-way a6_28 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	63.3511741	2	31.675587	15.03	0.0000
Within groups	99.0688259	47	2.10784736		
Total	162.42	49	3.31469388		

Bartlett's test for equal variances: chi2(1) = 8.0584 Prob>chi2 = 0.005

. One-way a7_1 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.825593395	2	.412796698	5.38	0.0078
Within groups	3.68421053	48	.076754386		
Total	4.50980392	50	.090196078		

. One-way a7_2 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.825593395	2	.412796698	5.38	0.0078
Within groups	3.68421053	48	.076754386		
Total	4.50980392	50	.090196078		

. One-way a7_3 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.825593395	2	.412796698	5.38	0.0078
Within groups	3.68421053	48	.076754386		
Total	4.50980392	50	.090196078		

. One-way a7_4 agovt

Source	Analysis of Variance			F	Prob> F
	SS	df	MS		
Between groups	.825593395	2	.412796698	5.38	0.0078
Within groups	3.68421053	48	.076754386		
Total	4.50980392	50	.090196078		

. One-way a7_5 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	.825593395	2	.412796698	5.38	0.0078
Within groups	3.68421053	48	.076754386		
Total	4.50980392	50	.090196078		

.
. One-way a7_6 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	5.01630547	2	2.50815273	2.90	0.0649
Within groups	41.5719298	48	.866081871		
Total	46.5882353	50	.931764706		

Bartlett's test for equal variances: chi2(2) = 1.9954 Prob>chi2 = 0.369

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. One-way a7_7 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	38.1754386	2	19.0877193	39.56	0.0000
Within groups	23.1578947	48	.48245614		
Total	61.3333333	50	1.22666667		

.
. One-way a7_8 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	9.16078431	2	4.58039216	6.99	0.0022
Within groups	31.4666667	48	.655555556		
Total	40.627451	50	.81254902		

.
. One-way a7_9 agovt

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	2.87673432	2	1.43836716	3.63	0.0342
Within groups	19.0448343	48	.396767381		
Total	21.9215686	50	.438431373		

.
. One-way a7_10 agovt

Analysis of Variance

Source	SS	df	MS	F	Prob> F
<hr/>					
Between groups	10.6048389	2	5.30241945	6.69	0.0027
Within groups	38.0226121	48	.792137752		
<hr/>					
Total	48.627451	50	.97254902		

Bartlett's test for equal variances: chi2(2) = 1.2667 Prob>chi2 = 0.531

CORRELATIONS

		a1_1	a1_2	a1_3	a2_7	a2_8	a2_9
a3_1							
	--						
	a1_1	1.0000					
	a1_2	-0.0242 0.8661	1.0000				
	a1_3	0.2775 0.0486	-0.0604 0.6736	1.0000			
	a2_7	-0.0877 0.5407	-0.1472 0.3027	-0.2758 0.0501	1.0000		
	a2_8	-0.1940 0.1725	-0.1527 0.2848	-0.3679 0.0079	0.0530 0.7119	1.0000	
	a2_9	0.0906 0.5274	-0.0506 0.7244	0.5824 0.0000	-0.1503 0.2924	-0.2210 0.1191	1.0000
	a3_1	0.3677	-0.0034	0.1418	0.0487	0.1330	0.0997
1.0000		0.0079	0.9810	0.3209	0.7343	0.3521	0.4863
	a4_1	-0.1310	-0.0783	-0.0466	-0.1188	0.0046	-0.2320
0.2758		0.3597	0.5851	0.7455	0.4064	0.9747	0.1015
0.0501							
	a2_12	2_9 0.4511 0.0009					

Pour a2_7 a2_8 a2_9 a2_13 a2_14 a2_15 a2_16 a2_17 a2_18, sig

		a2_7	a2_8	a2_9	a2_13	a2_14	a2_15
a2_16							
	--						
	a2_7	1.0000					

a2_8	0.0530	1.0000					
	0.7119						
a2_9	-0.1503	-0.2210	1.0000				
	0.2924	0.1191					
a2_13	0.2943	-0.1341	-0.6230	1.0000			
	0.0360	0.3483	0.0000				
a2_14	0.0000	-0.1853	0.3331	-0.3122	1.0000		
	1.0000	0.1929	0.0169	0.0257			
a2_15	0.0000	-0.1853	0.3331	-0.3122	1.0000	1.0000	
	1.0000	0.1929	0.0169	0.0257	0.0000		
a2_16	0.3676	0.0389	-0.5504	0.8617	-0.3011	-0.3011	1.0000
	0.0080	0.7866	0.0000	0.0000	0.0318	0.0318	
a2_17	0.4405	-0.0177	0.2609	-0.0317	0.3393	0.3393	
0.0481		0.0012	0.9018	0.0644	0.8252	0.0149	0.0149
0.7375							
a2_18	0.4405	-0.0177	0.2609	-0.0317	0.3393	0.3393	
0.0481		0.0012	0.9018	0.0644	0.8252	0.0149	0.0149
0.7375							

METHODS AND TOOLS USED TO PRESERVE KNOWLEDGE VS. USE OF SYSTEMS

. Pour a2_7 a2_8 a2_9 a8_1 a8_2 a8_3 a8_4 a8_5 a8_6, sig

a8_4	a2_7	a2_8	a2_9	a8_1	a8_2	a8_3
a2_7	1.0000					
a2_8	0.0530	1.0000				
	0.7119					
a2_9	-0.1503	-0.2210	1.0000			
	0.2924	0.1191				
a8_1	0.0636	0.1547	-0.2780	1.0000		
	0.6574	0.2785	0.0483			
a8_2	0.0636	0.1547	-0.2780	1.0000	1.0000	
	0.6574	0.2785	0.0483	0.0000		
a8_3	-0.0900	-0.0176	-0.0916	0.6160	0.6160	1.0000
	0.5299	0.9022	0.5224	0.0000	0.0000	
a8_4	0.1944	-0.0454	-0.1795	0.4910	0.4910	0.2132
1.0000		0.1717	0.7516	0.2076	0.0003	0.1331

	a8_5	-0.0181	-0.0824	-0.1291	-0.2847	-0.2847	-0.1987
0.2123		0.8996	0.5652	0.3666	0.0428	0.0428	0.1622
0.1347							
	a8_6	-0.0662	0.0826	-0.2498	0.6879	0.6879	0.3933
0.3550		0.6442	0.5646	0.0771	0.0000	0.0000	0.0043
0.0106							

Pour a2_7 a2_8 a2_9 a8_7 a8_8 a8_9 a8_10 a8_11, sig

a8_10		a2_7	a2_8	a2_9	a8_7	a8_8	a8_9
	a2_7	1.0000					
	a2_8	0.0530	1.0000				
		0.7119					
	a2_9	-0.1503	-0.2210	1.0000			
		0.2924	0.1191				
	a8_7	0.4224	-0.2148	-0.2717	1.0000		
		0.0020	0.1301	0.0537			
	a8_8	-0.0662	0.0826	-0.2498	0.2425	1.0000	
		0.6442	0.5646	0.0771	0.0864		
	a8_9	0.4224	-0.2148	-0.2717	1.0000	0.2425	1.0000
		0.0020	0.1301	0.0537	0.0000	0.0864	
1.0000	a8_10	0.4224	-0.2148	-0.2717	1.0000	0.2425	1.0000
		0.0020	0.1301	0.0537	0.0000	0.0864	0.0000
	a8_11	-0.0871	0.2259	-0.1749	-0.0570	0.8316	-0.0570
0.0570		0.5433	0.1110	0.2196	0.6914	0.0000	0.6914
0.6914							
			a8_11				
	a8_11	1.0000					