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Implementation of Knowledge Management to improve performance in national government departments in South Africa

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Implementation of Knowledge Management to improve performance in national government departments in South Africa.

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2507144

A research article submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

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DECLARATION

I, **Mittah Lebogang Kwadjo**, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

MITTAH LEBOGANG KWADJO



Signed at ……**CENTURION……**

.

On the ……**28**…….. day of …**FEBRUARY**…… 2023

DEDICATION

I dedicate this work to God, who has helped me to persevere through some of life's most challenging and hard circumstances and given me the strength to stand firm. Philippians 4:13 I can do all things through Christ who strengthens me.

ACKNOWLEDGEMENTS

I would like to express my gratitude to the following:

- The all- mighty God, for giving me the strength to complete this work. All praise, glory, and honour unto him.
- To my supervisor, Professor Anthony Stacey, for being patient with me and directing me through the entire process.
- To my family for all of their support and encouragement particularly to my husband Eric, my children Rorisang and Tshegofatso.
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ABSTRACT

Government Departments are still lagging behind in implementing Knowledge Management. Managing knowledge is critical to the success and longevity of any business. Whilst the private sector is gaining traction in this management practice, government is still behind. The benefits of knowledge management are improved decision making, increased innovation and business efficiency. The unique barriers to implementing Knowledge Management in government departments warrant investigation. The purpose of this research was to identify barriers to implementing knowledge management processes and systems in national government departments in South Africa and to rate the extent of significance to knowledge management implementation. Methodology used to collect data was an online survey questionnaire. The sample was taken from the population of National Department of Transport employees, and results generalised to all national government departments. Thirty-five (35) statements on a 7-point Likert scale were used. Using Principal Component Analysis, 6 components were extracted and analysed. The 6 components were 1) strength of knowledge management leadership 2) departmental support of knowledge management, 3) level of employee interaction, 4) use of technology, 5) accessibility of technology and 6) level of team work. Seventy-five (75) participants, who were managers, senior managers and knowledge experts responded to the questionnaire. The study found that the barriers to knowledge management were strength of knowledge management leadership, level of employee interaction, departmental support, and use of technology. The study also identified the most significant barriers in implementing knowledge management in government departments were the "strength of knowledge management leadership" and the "level of employee interaction". A further study on leadership in government departments in implementing knowledge management in recommended. Future research examining the level of interaction among government employees related to increased sharing of tacit knowledge is also recommended.

Keywords: Knowledge management; public sector; government; barriers; implementation; knowledge sharing; survey

1. INTRODUCTION

The world is rapidly changing, and how organisations do business has improved significantly (Sutherland, 2020; Wiig, 2000). An organisation that studies its market closely and manages the knowledge created gains a competitive advantage (Anantatmula & Kanungo, 2010; Lin, Wu, & Yen, 2012; Rahimli, 2012) The dawn of big data analytics and business intelligence further illuminates the need to harvest meaningful insights from factual information through knowledge management. Therefore, knowledge management is leveraged by many organisations to improve performance and enhance competitive advantage (Karadsheh, Mansour, Alhawari, Azar, & El-Bathy, 2009; Mohamed; & Amr, 2013). Companies benefit in employing latest technologies in driving knowledge management initiatives. Since the dawn of the fourth Industrial Revolution, more technologies are being employed to acquire, store and share knowledge within private sector organisations (Botha, 2018). Thereby, companies, in keeping track of all their assets, have included the tracking of their intellectual capital. Intellectual assets include tacit and explicit knowledge the organisation has at its disposal (Cong & Pandya, 2003). Explicit knowledge is knowledge that has been coded or recorded and tacit knowledge is embedded in people's minds, experiences and beliefs (Chilton & Bloodgood, 2008).

1.1 RESEARCH PROBLEM

The need for quality services offered by government is increasing (Gaffoor & Cloete, 2010). Nevertheless, there are many challenges facing government departments, with knowledge retention one of them. Government departments are under pressure to implement change required for continued existence and relevance in a rapidly changing world. The importance of understanding the needs of communities and better ways to offer services cannot be over emphasised (Gaffoor & Cloete, 2010). However, lack of relevant skills, and loss of knowledge due to retirement have created a brain drain in the government sector (Budiarso, 2019). Lack of intentional knowledge management has created a paucity of institutional collective knowledge, resulting in lags in implementing strategies and technologies that could improve services to communities.

Therefore, government departments need mechanisms in place to ensure that knowledge assets are retained. Furthermore, in a non-profit driven setting, urgency to implement knowledge management to harvest its benefits may be absent. Current challenges in the

public sector have brought to the fore the importance of knowledge management in this sector. The unique barriers to implementing knowledge management in government departments warrant investigation. However, research studies on the successes of knowledge management implementation in SA government departments are scarce. Maphoto and Matlala (2021) found that management of knowledge can be improved through implementation of policy and strategies. In their study they recommended further research where senior managers are interviewed in order to understand the implementation of knowledge management in their organisations. Government departments are knowledge intensive (Joe, Yoong, & Patel, 2013), and knowledge management is important to organisations to improve efficiency and performance, and assists in creating an environment where innovation thrives. However, government departments are still lagging behind in benefitting from this management practice.

Government organisations have the huge responsibility to provide services to the country. These services include developing legislation to the betterment of its citizens. Other responsibilities include ensuring that services such as transport, education, water, and sanitation are accessible. Over the years, knowledge has been created and needs to be preserved. South African government departments have experienced a decline in service delivery, evidenced by the increase in number of protests around the country (Managa, 2012). The performance of government departments and state-owned entities has deteriorated (Chitiga-Mabugu, Henseler, Mabugu, & Maisonnave, 2021). Government has also lost intellectual assets through retirement and employees opting for the private sector (Budiarso, 2019). Knowledge Management could assist government to effectively manage its intellectual assets. Intellectual capital is when knowledge is used to the benefit of the organisation. However, limited study has been conducted on the outcomes of Knowledge Management implementation in the public sector. Furthermore, where implemented, this occurs in an unstructured manner. In spite of the importance and potential locked up in effective knowledge management, government departments less likely than the private sector to thoroughly investigate the advantages of knowledge management (Arora & Raosaheb, 2011). For example, Gaffoor and Cloete (2010) found that in Stellenbosch Municipality, knowledge management was implemented, but not in a structured manner. Therefore, public sector knowledge management is a research area of growing importance (Allameh & Zare, 2011; Massaro, Dumay, & Garlatti, 2015; Pawlowski & Bick, 2015).

Knowledge management is a management practice to manage knowledge creation, storage, dissemination and sharing in an organisation (MacNabb, 2007), and assists organisations to derive better value from their knowledge assets. Knowledge management is how an organisation establishes its future plan, processes, infrastructure, technology, and appropriate leadership in order to manage their knowledge assets (Ramachandran, Chong, & Ismail, 2009). Knowledge management refers to the process by which an organization generates, stores, and distributes its acquired information (Dikotla, Mahlatji, & Makgahlela, 2014). Effective management of knowledge improves the performance of an organisation. Therefore, knowledge management is a management practice adopted by many organisations to improve performance and enhance their competitive advantage (Mohamed; & Amr, 2013). Even though this practice has been around for more than 20 years, government departments are lagging behind (Liebowitz, 2004).

This research aims to explore the barriers that hinder South African national government departments from effectively implementing knowledge management. Insight into these factors will be used to draft recommendations to improve performance in government departments.

1.2 RESEARCH QUESTION AND OBJECTIVES

What are the barriers that affect the implementation of knowledge management in national government departments? The following research objectives were investigated:

a) To identify barriers to implementing knowledge management processes and systems in national government departments. This was achieved by assessing the employee's perception on the implementation of knowledge management practices in the organisation.
b) To rate the extent of significance of identified barriers to knowledge management implementation.

1.3 DELIMITATION OF THE STUDY

The research was limited to national government departments. Provinces and government entities were excluded. A sample size was taken from national Department of Transport and generalised for all government departments. The study through non-probability, purposive sampling targeted employees who are knowledge workers or subject matter experts. Cleaners, drivers and physical security personnel were excluded.

1.4 ASSUMPTIONS

Participants were assumed to have some knowledge of knowledge management. Anonymity of participants was assumed to enable accurate self-report responses, removing social-desirability bias.

2. LITERATURE REVIEW

Definition of knowledge management

Knowledge management is the process an organisation undertakes to generate or acquire knowledge, store, and access tacit or explicit knowledge in order to improve its decision making (Bharadway, Chauhan, & Raman, 2015).

This process occurs through coordination of the creation, sharing, and use of information, as well as the incorporation of important lessons learned and best practises into the corporate memory to promote ongoing organisational learning (Dalkir, 2013).

Bergeron (2003) states that knowledge management is the capacity to carefully record, preserve, and retrieve the best practices of work-related information and decision making from workers and supervisors including both individual and group practices.

Generally, knowledge management refers to how an organization develops, maintains, and distributes knowledge (Dikotla et al., 2014). While Bergeron (2003) and Dikotla et al. (2014) focus on the process of knowledge management, Botha (2018, p. 1146) emphasises the desired outcome of knowledge management: “knowledge management is the scientific discipline that focuses on managing information (explicit knowledge) and knowledge (tacit knowledge) to ensure a competitive advantage for the organisation”.

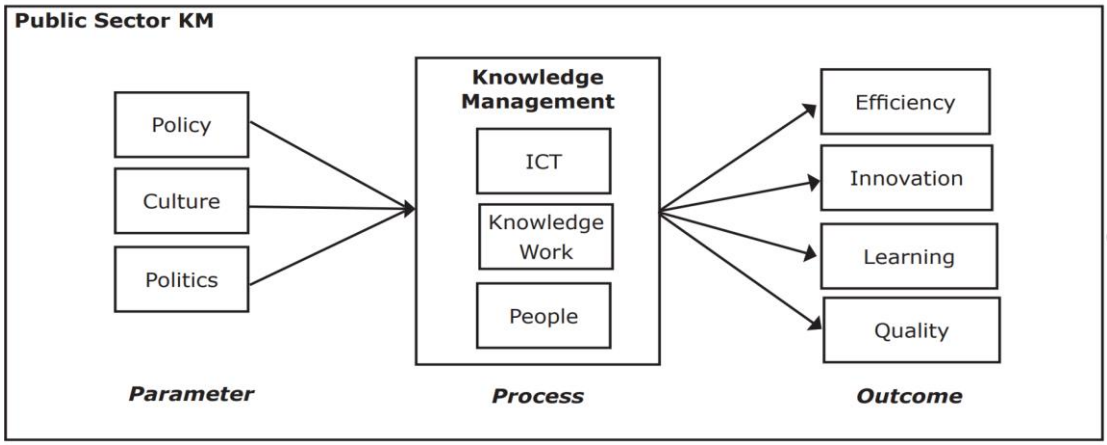
For this research the following definition was used:
"Knowledge management is the deliberate and systematic coordination of an organisation's people, technology, processes, and organisational structure in order to add value through reuse and innovation" (Dalkir, 2013, p. 3).

Importance of knowledge management in organisations and the public sector in particular

Knowledge management enhances organisational performance (Mazarodze & Buckley, 2019). Existing expertise assists the organisation to gain advantage and through experience and expertise, assists an organisation to grow (Mazarodze & Buckley, 2019). Organisations that manage their knowledge improve their decisions and therefore their competitiveness (Alawner., Abuali., & Almarabeh, 2009). When organisations do not manage their knowledge, they lose their intellectual capital (Stewart, 2007). Knowledge is very important as organisations use knowledge to forecast and plan, make informed decisions, and innovate. Government departments experience knowledge loss through retirements (Phaladi & Ngulube, 2022). Though knowledge is deemed as an organisation's intellectual capital, most government departments lack strategies to manage it. Although knowledge management has been around for decades, its implementation in the government sector is still lagging (Ahbabi. et al., 2018). Government departments, and even business units within departments, work in silos (de Bri & Bannister, 2010). Government structures are hierarchical and bureaucratic, and these layers of structures slow the pace of knowledge sharing within the organisation (Ncoyini & Cilliers, 2020). Consequently, it takes long for decisions to be made.

Government Departments in South Africa have different mandates (Moyo, 2019). Their goals are to serve the people of South Africa (Stanton, 2009). Over the years the quality of services offered by government has deteriorated (Managa, 2012). There are many challenges facing departments, knowledge retention being one. There is lack of knowledge about knowledge management amongst government employees (Mkhize, 2013). Information sharing is not done formally, and different departments are at different levels of implementing knowledge management (Nenungwi & Garaba, 2022).

Figure 1: Expanded pattern of Public Sector Knowledge Management



(Yuen, 2007)

As depicted in Figure 1, Yuen (2007) put forward a pattern for mapping Knowledge Management in the public sector. Maphoto and Matlala (2021) findings relate to figure 1, in that challenges in implementing knowledge management were lack of skills, financial resources, IT infrastructure investment and policy. Andries (2019) flags that within government a culture of knowledge sharing does not exist and technological advancement to support knowledge management is absent. Mello and Fombad (2018) also found lack of information sharing in the public sector, exacerbated by lack of systems to organise and store knowledge.

Government departments are still struggling with implementing knowledge management. Some departments are implementing knowledge management informally, like the KwaZulu-Natal Department of Public Works (Nenungwi & Garaba, 2022). Nenungwi and Garaba (2022) recommended that the KwaZulu-Natal Department of Transport implement awareness, employ knowledge management professionals, and invest in Information and Communications Technology (ICT) tools. Likewise Abu-Shanab and Shehabat (2018), studied the impact of knowledge management on e-government services by interviewing government employees. Their findings were that there is a greater need to invest in ICT infrastructure.

Knowledge Management Barriers

Leadership*:* Knowledge management needs to be implemented from the top (Bergeron, 2003), therefore executive management needs to champion the implementation of

knowledge management. Companies that effectively implement knowledge management experience improved service delivery, reduced cost, more efficiencies, and retain intellectual capital (Bergeron, 2003). If it is to be successful, knowledge management is a business process that has to be managed like every other major business initiative (Bergeron, 2003). Unfortunately, in government, knowledge management is managed (seldom lead) on an ad-hoc basis, and, where implemented, it is implemented informally.

Related to leadership, an organisational vision that aligns with the organisational strategy is required. Alignment between the knowledge management strategy and the organisational strategy is necessary in order for knowledge management initiatives to be supported by senior management (Butler & Murphy, 2007). To ensure alignment, Sunassee and Sewry (2002) recommend that the leader of the knowledge management initiative should be the Chief Executive Officer (CEO).

A different style of leadership might be required to enhance a knowledge management culture within the organisation (Singh, 2008). As previously highlighted, an organisation's leaders and leadership styles determine the degree to which knowledge sharing is fostered (Singh, 2008). According Singh (2008), the best leadership style is delegation where workers are given power and responsibility to explore and develop new innovations.

Knowledge Management is critical to performance (Karadsheh et al., 2009). Leaders of an organisation are responsible for its success (Amari, Rahim, & Ahmed, 2020). Al Amiri et al. (2020) found that there were specific leadership qualities that enabled effective implementation of knowledge management. Leadership styles that are recommended are transformational, transactional and knowledge oriented and are able to present positive feedback. When implementing knowledge management, outcomes can differ based on the leadership style used (Amari et al., 2020). Effective leadership enables teams to work together in order to drive change and implement strategy.

To reiterate, sharing of knowledge is highly dependent on organisational leadership (Green, 2008; Chandrashekar Lakshman, 2009). Senior Managers of organisations are responsible for strategy and allocation of resources (Green, 2008). Therefore, leadership forms a critical enabler of Knowledge Management, and leadership deficits affect

effective Knowledge Management implementation (Donate & de Pablo, 2015; C Lakshman, 2007; Singh, 2008).

Organisational culture*:* Ensuring there is awareness in the organisation, and there are leaders who understand the necessity of knowledge sharing, is critical in setting a conducive culture within the organisation (Cong & Pandya, 2003). Knowledge Management can fail due to lack of proper management of culture. The public sector is characterised by a culture of information hoarding (Cong & Pandya, 2003). Corporate culture can be a barrier to motivating people to share information (Hong, Suh, & Koo, 2011), especially where sharing of information is not incentivized (Butler & Murphy, 2007). Furthermore, cultivating the right culture to implement Knowledge Management can prove to be a challenge (Cong & Pandya, 2003).

Technology: To facilitate knowledge management, organisations must invest in Information Technology (IT) (Bharadway et al., 2015; Cong & Pandya, 2003; Kruger & Johnson, 2010). Effective implementation of knowledge management requires IT infrastructure, systems and tools (Cong & Pandya, 2003). Bergeron (2003), advocates that IT is important in enabling knowledge management processes, as without investment in technology, innovative ways information could be harvested, stored, and shared are forfeited. Furthermore, technology assists with collaboration amongst workers and enables Communities of Practice. Nevertheless government departments are still using old, disparate IT systems (Mutula & Mostert, 2010). This hinders integration and sharing of information across departments. Notably, technological investment requires significant budgets in the initial stages (Bergeron, 2003), and government is hindered in justifying the outlay of such capital. While the private sector can determine the return on investment through profits, customers, and brand growth, with government it is difficult to quantify returns.

Incentive*s:* The implementation of reward systems is an effective means to encourage knowledge sharing within organisations (Butler & Murphy, 2007; Cong & Pandya, 2003). Formally, organisations can ensure that knowledge sharing is a job requirement (Cong & Pandya, 2003).

Policy*:* Government intervention might be required in ensuring policies that mandate departments to manage their knowledge assets (Wiig, 2000). However, the hierarchical

nature of government institutions makes it systemically difficult to share knowledge or to drive knowledge management initiatives (Mc Evoy, Ragab, & Arisha, 2019). One workaround to this could be cultivating Communities of Practice which facilitate the sharing of tacit knowledge within the organisation or government department (Cong & Pandya, 2003).

***Effective implementation**:* Anantatmula and Kanungo (2010), identified leadership, technology, culture, and measurement as enablers of Knowledge Management. Leadership was emphasised as one of the most important components, and culture identified as a common enabler (Anantatmula & Kanungo, 2010).

Akhavan and Jafari (2006, p. 65) explain the critical success factors in implementing knowledge management as "strategic planning, public awareness and IT". Altaher (2010) concurs and adds that special attention should be paid to human interactions, since people play a central role in creating new knowledge. Team motivation and a strong team culture assist in adopting knowledge management processes and systems (Altaher, 2010). Altaher (2010) further emphasises the importance of technology in facilitating communication among employees. Knowledge sharing is a critical component of successful knowledge management implementation (Sunassee & Sewry, 2002). Al-Alawi, Al-Marzooqi, and Mohammed (2007) identified activities organisations can implement to cultivate a culture of knowledge sharing, such as building trust amongst employees through social events, improving office design to encourage interaction, and reducing boundaries between organisational levels.

The Knowledge Management Maturity Model assists an organisation to evaluate the level at which knowledge is managed in the organisation (Khatibian & Jafari, 2010). Khatibian and Jafari (2010) identified the following levels (Table 1) that measure the maturity of an organisation in implementing Knowledge Management.

Table 1: Knowledge Management Maturity measurement

Maturity level	Description
Level 1- Initial	Knowledge management happens in a disorganised manner.

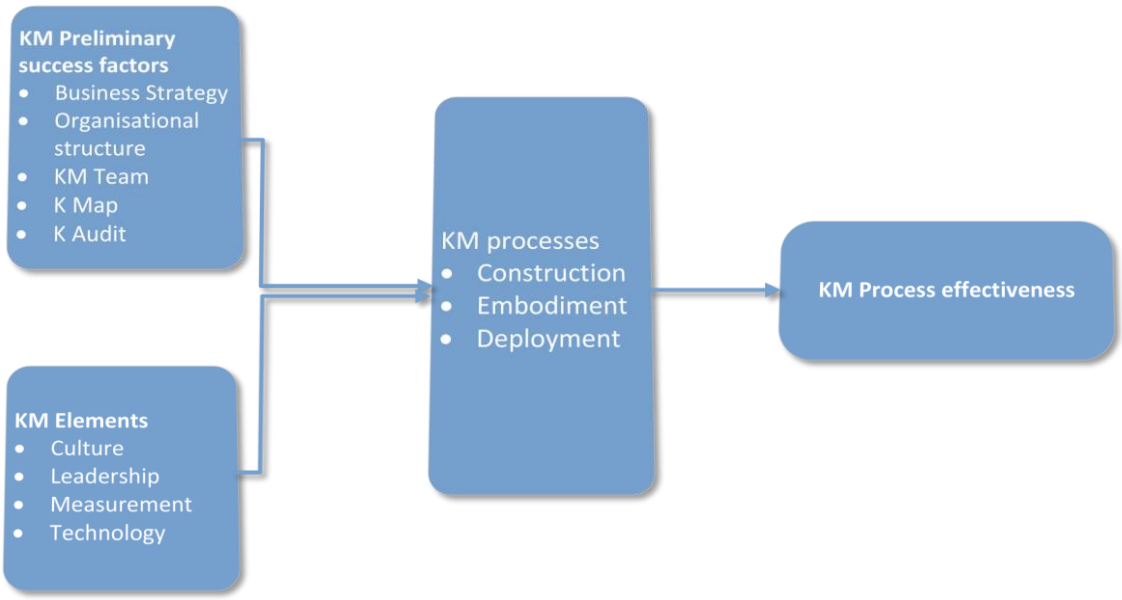
Level 2 - Managed	Knowledge assets are identified. Structures are implemented to manage knowledge.
Level 3- Defined	This level refers to strategy and human resources. Processes and policies have been documented.
Level 4 - Quantitatively managed	At this level, the organisation measures the impact of the Knowledge Management on their market share.
Level 5 -Optimising	The procedures of knowledge management are embedded in the culture of the organisation; Innovation is strengthened; Good systems in place for measurement of knowledge management; Culture of knowledge sharing

(Khatibian & Jafari, 2010, p. 64)

An implementation framework provides a strong theoretical guideline to assist organisations to successfully implement Knowledge Management (Wong & Aspinwall, 2004). A structured guideline is necessary as implementation is a complex task. It requires the maintenance of a technological infrastructure, a shift in organisational culture, and the oversight of various types of knowledge (Wong & Aspinwall, 2004). In implementing knowledge management, Sunassee and Sewry (2002) propose a model that looks at the management of three aspects: The organisation, the people and 3) the infrastructure and processes.

Chong and Chong (2009) recommend that organisations need to measure their Knowledge Management implementation and propose the below model (Figure 2) depicting success factors, Knowledge Management elements and processes.

Figure 2: Knowledge management (KM) success factors



(Chong & Chong, 2009, p. 144)

Knowledge sharing: Mazarodze and Buckley (2019) found that knowledge sharing was important and should be a priority for an organisation to remain competitive. Their research also revealed that a flat organisational structure is best in enhancing knowledge management. However, National government structures are hierarchical in nature, which hinders the flow of information. Muqadas, Rehman, Aslam, and Ur-Rahman (2017), found that the necessity of having power, influence, and promotion opportunities was revealed to be the root cause of knowledge hoarding. This in turn cause barrier to knowledge sharing. Flattening the organisational structure assists effective knowledge management (Mazarodze & Buckley, 2019).

Budget: Another challenge identified was lack of budget to support knowledge management initiatives (Mazarodze & Buckley, 2019). Lin , Wu , and Yen (2012) identified that barriers are different at each maturity level of the organisation. Maturity is the extent to which a specific process is defined, managed, measured, controlled, and effective (Lin et al., 2012, p. 11). To effectively implement Knowledge Management, it is very important for organisations to understand the barriers that hinder progress (Lin et al., 2012). established that at every maturity level, there are barriers. Most barriers were determined by the behaviour of everyone in the organisation. In essence, how employees interact with each other affects implementation.

Lack of knowledge regarding knowledge management: Thoben, Weber, and Wunram (2002) identified lack of knowledge management awareness within the organisation as a barrier. Lack of knowledge about knowledge management has been identified amongst government employees (Mkhize, 2013). Information sharing was not done formally, and different departments were at different levels of implementation. Maphoto and Matlala (2021) found that challenges in implementing awareness of knowledge management were lack of skills, financial resources, IT infrastructure investment, and policy. Awareness is constrained when the culture of knowledge sharing is absent and technological advancement to support knowledge management lacking. This echoes Mello and Fombad (2018) findings that lack of information sharing is heightened by a paucity of systems to organise and store knowledge.

Nevertheless, it is acknowledged that some departments implement knowledge management informally, like the KwaZulu-Natal Department of Public Works (Nenungwi & Garaba, 2022). To enhance knowledge management, Nenungwi and Garaba (2022) recommended that the KwaZulu-Natal Department of Public Works implement awareness, employ knowledge management professionals, and invest in ICT tools. In order for knowledge management to be assimilated effectively into organisational culture and practice, the benefits of knowledge management need to be spoken about in the whole organisation (Cong & Pandya, 2003).

Studies regarding knowledge management in the public sector have found that implementation remains a challenge across the whole public sector, although some departments are progressing better than others. Abu-Shanab and Shehabat (2018), studied the impact of knowledge management on e-government services by interviewing South African government employees. Their findings were that there was a significant need to invest in IT infrastructure. Most authors agree that IT is a very important enabler (BenMoussa, 2009). However, technology can also serve as a barrier since technology alone cannot make people share information.

"The main challenges to successful knowledge sharing in the public sector include lack of management recognition, few rewards for knowledge sharing behaviour, and inadequate organisational IT infrastructure" (Denner & Blackm, 2013 as cited by Mc Evoy et al. (2019, p. 39). Public sector organisations need to tailor-make their strategies

to suit their environment and move with the time in ensuring proper management of resources (Mc Evoy et al., 2019). Furthermore, strategies require planning where the organisation must include end-users when setting goals for knowledge management initiatives. Therefore, knowledge management goals need to be planned and specific to the organisation (BenMoussa, 2009).

Lack of awareness of knowledge management in the public sector is a recurring theme (Cong & Pandya, 2003). Furthermore, government departments need to build and preserve organisational memory (Butler & Murphy, 2007). Without awareness and implementation of knowledge management, the benefits of implementing knowledge management, such as improved performance and efficiency in services, cannot be leveraged (Cong & Pandya, 2003).

Low or no motivation to share knowledge can also impede knowledge management (Hong et al., 2011; Wang & Noe, 2010). Even with the greatest technologies, workers might still not share knowledge, and workers must be motivated to share the knowledge they have. A culture of hoarding information becomes a barrier to sharing information (BenMoussa., 2009; Nor, Khairi, Rosnan, Maskun, & Johar, 2020).

CONCLUSION

Proposition 1: Barriers to knowledge management

Assessment of pertinent literature revealed there are a number of barriers that affect effective implementation. The majority of authors cited leadership, organisational culture, information technology, policy, lack of knowledge sharing, constrained budgets, lack of awareness of knowledge management, unmotivated individuals, weak teams, and lack of incentives or rewards (Bergeron, 2003; Cong & Pandya, 2003; Hong et al., 2011; Mazarodze & Buckley, 2019; Mkhize, 2013; Mutula & Mostert, 2010). Table 2, depicts barriers of knowledge management, as drawn from literature:

Table 2: Barriers to knowledge management

Knowledge management barrier	Reference

Leadership	(Al-Alawi et al., 2007; Amari et al., 2020; Bergeron, 2003; Butler & Murphy, 2007; Donate & de Pablo, 2015; Green, 2008; C Lakshman, 2007; Chandrashekar Lakshman, 2009; Singh, 2008; Sunassee & Sewry, 2002)
Organisational culture	(Butler & Murphy, 2007; Cong & Pandya, 2003; Hong et al., 2011)
Information technology	(Bergeron, 2003; Bharadway et al., 2015; Cong & Pandya, 2003; Maphoto & Matlala, 2021; Mutula & Mostert, 2010)
Policy	(Cong & Pandya, 2003; Mc Evoy et al., 2019; Wiig, 2000)
Lack of knowledge sharing	(Amayah, 2013; BenMoussa., 2009; Karamat., Shurong., Ahmad., Waheed., & Khan., 2018; Lin et al., 2012; Mazarodze & Buckley, 2019; Muqadas et al., 2017)
Constrained budgets	(Mazarodze & Buckley, 2019)
Lack of awareness of knowledge management	(Maphoto & Matlala, 2021)
Unmotivated individuals and weak teams	(Hong et al., 2011; Wang & Noe, 2010)
Lack of incentives or rewards	(Butler & Murphy, 2007; Cong & Pandya, 2003)

Proposition 2: Significant barriers of knowledge management

Based on the frequency with which they are cited in literature, the most significant barriers are leadership, organisational culture, technology infrastructure, and knowledge sharing Table 3, depicts significant barriers to knowledge management.

Table 3: Significant barriers to knowledge management

Knowledge management barrier	Reference
Leadership	(Al-Alawi et al., 2007; Amari et al., 2020; Bergeron, 2003; Butler & Murphy, 2007; Donate & de Pablo, 2015; Green, 2008; C Lakshman, 2007; Chandrashekar Lakshman, 2009; Singh, 2008; Sunassee & Sewry, 2002)
Organizational culture	(Butler & Murphy, 2007; Cong & Pandya, 2003; Hong et al., 2011)
Technology infrastructure	(Bergeron, 2003; Bharadway et al., 2015; Cong & Pandya, 2003; Mutula & Mostert, 2010)
Knowledge sharing	(Amayah, 2013; BenMoussa., 2009; Karamat. et al., 2018; Lin et al., 2012; Mazarodze & Buckley, 2019; Muqadas et al., 2017)

3. METHODOLOGY

Research Paradigm / Design

This research study follows a Positivism Paradigm. A Positivism paradigm is used to investigate, confirm and predict patterns based on what can be objectively measured (Taylor & Medina, 2011). A quantitative study was chosen for this study. According to Rahi (2017, p. 2) "The quantitative method is a scientific method that focuses on data collection in accordance with the problem from large population, and analysis of data." Due to the objectives of this study, a need to generalise the results necessitated a quantitative study using a survey. According to Sukamolson (2007), utilising scientific sampling and questionnaire design, survey research measures population characteristics with statistical precision.

A quantitative research study, utilising a survey questionnaire, was conducted to identify barriers that hinder knowledge management implementation in government departments in South Africa. Data was collected from National Department of Transport employees through an online-survey questionnaire. The study through non-probability, purposive sampling targeted 150 employees who are knowledge workers or subject matter experts to participate in the study. Eighty-six participants responded to the survey, only 75 responses were valid. Eleven response were considered invalid and were excluded from the study. A seven-point Likert scale was used for each survey item. The 75 valid responses constituted 50% of the planned sample size and therefore the data was considered sufficient for analysis. The research instrument comprised 35 statements categorised from "strongly disagree" to "strongly agree" on a 7point Likert scale. The survey questions were adapted from Nenungwi and Garaba's (2022) recent study conducted in a government department in South Africa, and therefore were applicable to the context in which this research study was conducted. The knowledge sharing and barriers to knowledge sharing section of the questionnaire was adapted from Al-Alawi et al. (2007), who utilised this survey in the context of Bahraini society where employees from private and public sector were surveyed.

Principal Component Factor analysis was conducted in order to study and reduce variables. Component analysis is a method that can be used to accurately report and analyse a large number of variables while retaining the dimensions of the data (Beavers et al., 2013). Reliability of the internal consistency of the measuring instrument was determined using the Cronbach Alpha test, with a score of greater than 0.7 deemed acceptable. The following analyses were performed:

- Frequencies to describe participants' demographic characteristics
- Data rescaling to normalise data for parametric statistical analyses
- Factor analysis to reduce the multiple question items into coherently themed dimensions
- Reliability of all components and their items to assess accuracy of the measurement tool
- Descriptive statistics for the derived components to allow evaluation of the component's significance as a barrier to allow evaluation of the component's significance as a barrier
- ANOVA and T tests to determine impact of demographic categories

Participant inclusion criteria:

- Employees who had 2 or more years working experience
- Knowledge Workers (Workers in the Knowledge Management unit)
- Experts (Workers who were experts in their field of work)

Participant exclusion criteria:

- Cleaners
- Drivers
- Physical security personnel

The study's respondents were described in frequency graphs according to demographic characteristic categories i.e. age, gender, role and experience. Factor analysis of questionnaire items was conducted and items aggregated per component. Descriptive statistics were conducted per questionnaire item as well as per component. Knowledge

management barrier components were ranked according to the mean responses, from most frequently stated as 'strongly disagree' to 'strongly agree', to rate the most significant barriers. Analysis of Variance (ANOVA) was used to determine effects of demographic characteristics on the components.

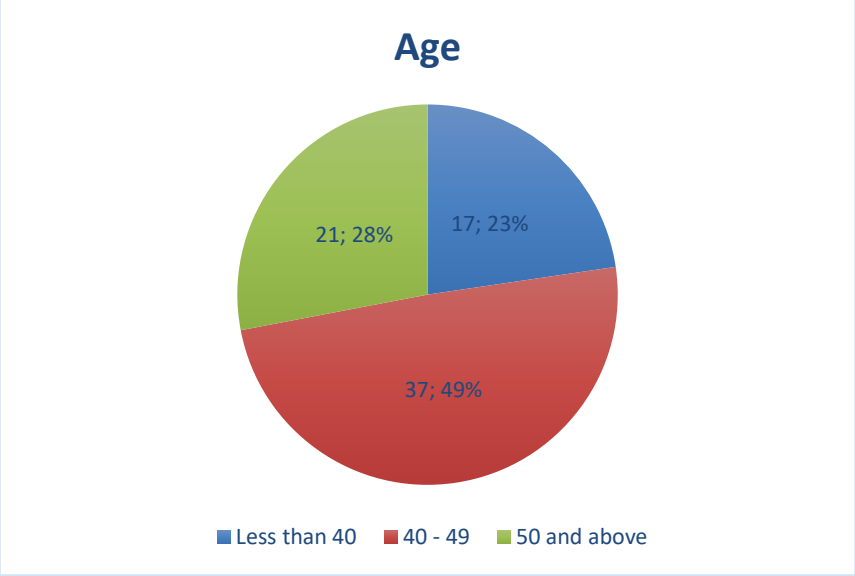
The research survey did not keep records of the names or personal identifiers of participants. All participants responded anonymously through a link to the survey questionnaire. The process was electronic. Participants were informed of their anonymity in the survey and that they could withdraw participation at any given time.

DEMOGRAPHICS

Age

Graph 1 depicts the age distribution of participants. Twenty-three per cent (23%) of participants were less than 40 years, 49% were between 40-49 years old and 28% were 50 years old and above.

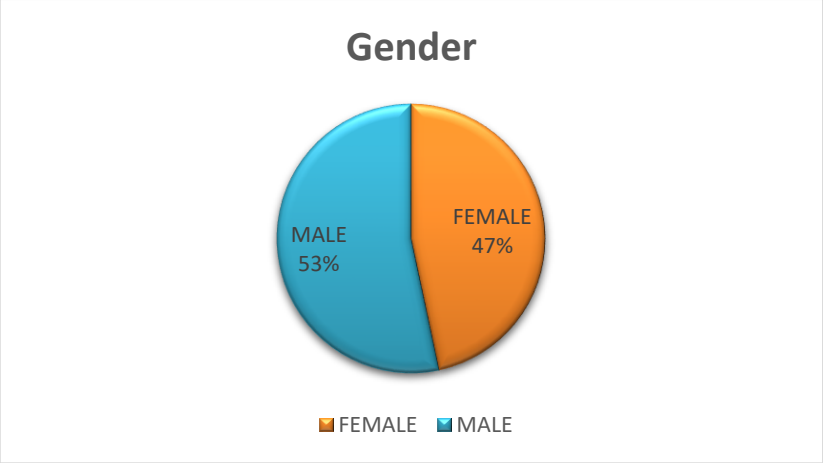
Graph 1: Age



Gender

Forty-seven per cent (47%) of the participants were males and 53% females (Graph 2).

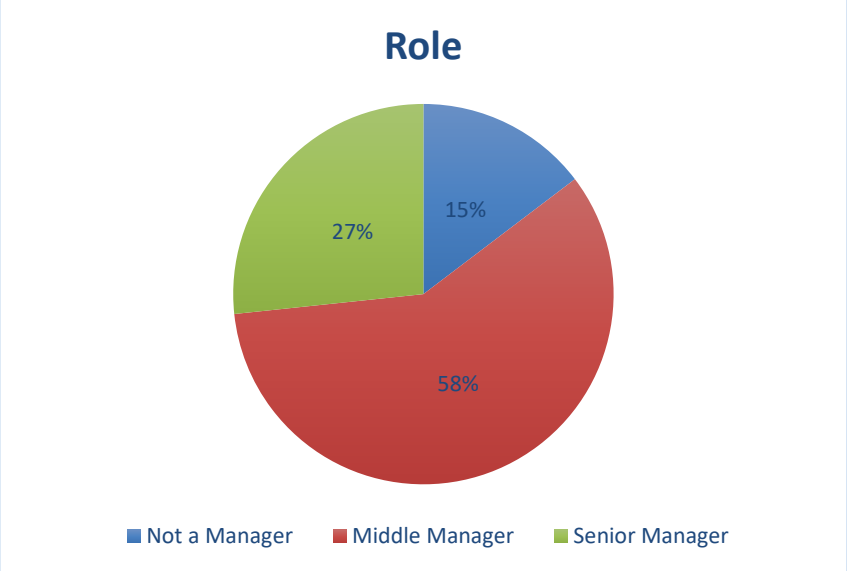
Graph 2: Gender



Role

Graph 3: depicts distribution between participants' roles in the Department of Transport. Fifteen per cent (15%) of participants were not managers, 58% were middle managers and 27% senior managers.

Graph 3: Role



Experience

Most participants (96%) had more than 5 years' experience, and 4% of participants had 2-5 years of work experience. Refer to Graph 4.

Graph 4: Experience



Rescaling ordinal survey data

Survey data was collected using 7-point Likert scale items. Likert scale data is ordinal in nature, and parametric statistical methods required data that is at least interval level (Stacey, 2005). Rescaling of the data to interval level was done in order to reduce statistical error when conducting statistical analysis. Data was rescaled before being subjected to statistical analysis by fitting of distributions approach to the survey data using x^2 contribution value. This method assists to ensure normality of the data and was done to improve the validity of the measurement scale. Authors in statistical research states the dependent variables must have a normal distribution, which means that they must be measured on an interval scale. Even though interval scales are better, many dependent variables use ordinal scales, in which the differences between values on the scale are not the same in terms of what is being measured (Harwell & Gatti, 2001). This means that scores can only be ranked. Re-scaling of ordinal Likert meant that requirements for parametric statistical tests, such as the assumption of a normal distribution, were met.

Without re-scaling, analysis could lead to skewed statistical results that make it hard to draw valid conclusions (Harwell & Gatti, 2001). Stacey (2005) adds that results may be flawed if ordinal data is merely assumed to be interval data during analysis and therefore recommends data rescaling. This is supported by Harwell and Gatti (2001). It has been found that rescaling maintains the relationship between the variables (Harwell & Gatti, 2001). X^2 contribution and solver functionality on Excel was used to calculate rescaled values with minimal error. Parametric tests were conducted because the method used the

normal distribution and estimated the population means and variances based on those estimates. The algorithm to minimise the x^2 statistic was executed by running Excel solver. The ordinal Likert scale responses were each given a numerical value equal to the expected value within the corresponding range. The values were standardised and therefore were a measure of the number of standard deviations from the overall mean. Refer to Table 4 for rescaled threshold.

Table 4: Rescaled Likert scale threshold used to analyse means

• -∞ to -1.28: "Strongly disagree"
• -1.28 to -0.69: "Disagree"
• -0.69 to -0.44: "Somewhat disagree"
• -0.44 to -0.08: "Neither agree nor disagree"
• -0.08 to 0.37: "Somewhat agree"
• 0.37 to 1.33: "Agree"
• 1.44 to ∞: "Strongly agree

4. DATA ANALYSIS AND RESULTS

The purpose of the research study was to identify barriers to implementing Knowledge Management processes and systems in national government departments in South Africa and to rate the most extent that they were significant barriers to knowledge management implementation. Reliability of the internal consistency of the measuring instrument was determined using the Cronbach Alpha test, with a score of greater than 0.7 deemed acceptable. The scale of measurement was reliable, at Cronbach alpha score of more than 0,7 for all components except level of teamwork at 0,546. Officials (75) who participated in the survey, 53% were males and 47% females. Participants with 2 to 5 years work experience constituted 4% and all other participants had more than 5 years' work experience. The majority 58% were middle managers, 27% senior managers, and 15% non-managers. The data analysis results are presented below:

4.1 Descriptive statistics of all items

The survey statements below were adapted from the (Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

Table 5 – Descriptive statistics

Descriptive Statistics			
	N	Mean	Std. Deviation
Employees are rewarded for sharing their knowledge and experience with their colleagues	75	-.9991	.7547
Leadership demonstrates value for Knowledge Management by including it as a standing agenda item at staff meetings	75	-.5544	.9644
Knowledge Management and sharing information are included in employee's performance contract as Key Performance Indicator	75	-.5304	1.0069
The problem of people hoarding (keeping) knowledge does not exist and most staff members are willing to share their knowledge freely	75	-.5137	.7205
Information flows easily throughout the organisation regardless of employee roles or other boundaries	75	-.4426	.8273
Knowledge Management strategy is actively promoted by my top management	75	-.3675	.9086
The technological tools available at the organisation for sharing knowledge are effective	75	-.3670	.8575
A considerable level of trust exists between co-workers in this organisation	75	-.3432	.7291
Certain rules and procedures exist to protect the person sharing his/her knowledge against harmful intentions of others	75	-.3389	.6928
There are mechanisms in place to transform expert tacit knowledge into an explicit (written / coded) format	75	-.3055	.9404
I know the best experts in the different domains of key knowledge within my section	75	-.2754	.9578

I am familiar with Knowledge Management policy of the Department of Transport	75	-.2746	.9601
Workers actively participate in the process of decision-making	75	-.2527	.6882
There are procedures to capture tacit knowledge of employees who are leaving the Department of Transport	75	-.1657	1.0546
I use bulletin boards or e-departmental notices to access information.	75	-.1605	1.0249
Knowledge sharing across branches is actively encouraged	75	-.1242	.9841
My manager advocates Knowledge Management on an ongoing basis	75	-.1033	.9263
The technological tools available at the organisation for sharing knowledge are effective	75	-.0749	.8511
I actively ensure that I store knowledge in a central place for other to have access	75	-.0131	.8532
I am aware of Knowledge Management initiatives in the Department of Transport	75	-.0056	.9833
Department of Transport has systematic processes for capturing and protecting key knowledge assets	75	.02865	.8568
Department of Transport encourages informal knowledge exchange	75	.0419	.9578
Co-workers commonly exchange their knowledge and experience while working	75	.0459	.8522
I use databases to access information.	75	.0651	.9356
I can find important information from the intranet.	75	.1189	1.0166
There is a high level of face-to-face interaction among colleagues in the workplace	75	.3245	.8621
There is Knowledge Management policy in the Department of Transport	75	.3373	.8270

I use Knowledge Management technological tools such as blogs, Facebook, Twitter and mobile phones to access information	75	.4329	1.0790
I feel comfortable using the knowledge sharing technologies available	75	.4343	.7582
I do not hesitate to share my feelings and perceptions with my fellow colleagues	75	.4557	.7697
There is Knowledge Management directorate that coordinates knowledge repositories to support key decision-making	75	.5210	.8658
I use Groupware software like email to access information.	75	.7533	1.0382
I use previous knowledge to make informed decision	75	.8213	.7070
Certain tasks are accomplished through teamwork and collaboration between employees	75	1.0057	.7226
Teamwork discussion and collaboration enhance communication between colleagues	75	1.0953	.8753
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

4.2 Factor Analysis

The research instrument comprised 35 statements categorised from “strongly disagree” to “strongly agree” on a 7point Likert scale. Principal Component Factor analysis was conducted to study and reduce variables. Factor analysis was done using rescaled values. Component analysis is a method that can be used to accurately report and analyse a large number of variables while retaining the dimensions of the data. This can be accomplished by employing fewer components (Beavers et al., 2013). In order to provide a clearer interpretation of the data, the factors are rotated (Yong & Pearce, 2013). For this study orthogonal rotation was used to ensure factors were correlated (Yong & Pearce, 2013). For factor loading, a variable must have a value of 0.30 or greater. Table 3 shows the six

components and loading value of each item. Naming of the components was done by considering items that scored higher and the general indicative meaning of all the items on that factor. Bartlett's test of sphericity was <0.001, Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.767 (Table 6). A factor with an item with eigen value > 1 was considered and those with <1 was dropped. On SPSS™, the following tests were done: Component matrix (refer to Annexure C), correlation matrix, eigen value scree plot and rotated component matrix. SPSS™ was used to perform frequencies, descriptive statistics, ANOVA and correlations between newly determined components, Cronbach Alpha was used to test the reliability of the instruments.

Table 6: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.767
Bartlett's Test of Sphericity	Approx. Chi-Square	1572.390
	Df	595
	Sig.	<,001

4.3 Reliability

Reliability of the instrument was determined by testing all items in each component using Cronbach Alpha test. A score of 0.7 and above was considered reliable. All items and items in each component scored above 0.7 except for the level of teamwork which scored 0.546. Refer to Table 7.

Table 7: Cronbach Alpha

Factors	Cronbach Alpha	No. of Items	Results
Strength of leadership	.898	12	Reliable
Departmental support of knowledge management	.891	8	Reliable
Employee interaction	.755	4	Reliable
Access to technology	.668	5	Reliable
Use of technology	.730	4	Reliable

Level of teamwork	.546	2	Unreliable

4.4 Component means

The means of all the components were calculated and compared. Table 6 depicts rescaled Likert scale category values. “Strength of knowledge management leadership” ranked the most negative of all components, with the lowest mean (-0.34) followed by the “level of employee interaction” with -0.18. However, respondents somewhat agreed with “departmental support of knowledge management” (0.27) and “use of technology” (0.16) and agreed with “level of team work” (1.05), and “accessibility of technology (0.43). Refer to Table 8.

Table 8: Components of knowledge management

Components	N	Mean	Std. Deviation	Threshold interpretation
Strength of knowledge management leadership	75	-.3420	.6136	Strongly-disagree
Level of employee interaction	75	-.1785	.5919	Disagree
Departmental support of knowledge management	75	.0274	.6955	Somewhat agree
Use of technology	75	.1592	.7324	Somewhat agree
Accessibility of technology	75	.4262	.5531	Agree
Level of teamwork	75	1.0505	.6655	Agree
valid n (listwise)	75			

Refer to Table 4 for rescaled values

4.5 ANOVA and departmental branches

Analysis of variance (ANOVA) is a helpful statistical model to test between-mean differences in more than two conditions simultaneously (Börner, Theriault, & Boyack, 2015). It was used to test if there were significant differences between means of three or more variables. A p value of smaller than or equal to 0.05 was set to determine statistical significance. The independent variable tested was departmental branches and dependent variables were the six identified components for knowledge management. Results showed

no statistical difference how on how different branches felt about knowledge management. (Table 9).

Table 9: ANOVA and departmental branches

			Sum of Squares	df	Mean Square	F	Sig.
Strength of KM leadership * New_Branch	Between Groups	(Combined)	.563	2	.281	.723	.489
	Within Groups		25.287	65	.389		
	Total		25.850	67			
Departmental support of KM * New_Branch	Between Groups	(Combined)	.097	2	.048	.093	.911
	Within Groups		33.761	65	.519		
	Total		33.858	67			
Level of employee interaction * New_Branch	Between Groups	(Combined)	.542	2	.271	.726	.488
	Within Groups		24.254	65	.373		
	Total		24.796	67			
Accessibility of technology * New_Branch	Between Groups	(Combined)	1.164	2	.582	1.976	.147
	Within Groups		19.148	65	.295		
	Total		20.312	67			
Use of technology * New_Branch	Between Groups	(Combined)	1.679	2	.840	1.518	.227
	Within Groups		35.949	65	.553		
	Total		37.628	67			
Level of team-work * New_Branch	Between Groups	(Combined)	.841	2	.421	1.034	.361
	Within Groups		26.455	65	.407		
	Total		27.296	67			

4.6 T-test

A comparison of means between two different groups can be accomplished through the use of a t-test known as an independent-group t test (Kim, 2015). A t-test was carried out to determine whether or not males and females held divergent viewpoints. Negative sentiments were expressed by both males and females regarding the effectiveness of knowledge management leadership and the level of interaction. Male employees had a positive perception toward the Department's support of knowledge management, whereas female employees had a negative perception. The ease of access to technology, level of teamwork, and level of technological use were all viewed favourably by both males and females. Table 10 represents the gender descriptive statistics.

Table 10: T-test descriptive statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Strength of KM leadership	Male	40	-.1539	.6327	.1000
	Female	35	-.5571	.5205	.0880
Departmental support of KM	Male	40	.1213	.7478	.1182
	Female	35	-.0800	.6237	.1054
Level of employee interaction	Male	40	-.0611	.6379	.1009
	Female	35	-.3126	.5109	.0864
Accessibility of technology	Male	40	.4939	.5570	.0881
	Female	35	.3488	.5463	.0923
Use of technology	Male	40	.2623	.7554	.1194
	Female	35	.0414	.6970	.1178
Level of teamwork	Male	40	1.0145	.7098	.1122
	Female	35	1.0917	.6188	.1046

The independent sample test revealed no significant variance between gender responses on the components, except for the strength of leadership, with significance p= 0.004. Table 11 reveals the difference between men and women's responses in that men were not conclusive (0.154: "neither agree nor disagree), whereas women scored "somewhat agree" (-0.5571) regarding the strength of leadership of knowledge management.

Table 11: T-test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean	Std. Error	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Difference	Difference	Lower	Upper
Strength of KM leadership	Equal variances assumed	.802	.374	2.987	73	.002	.004	.40318081	.13497319	.13417963	.672
	Equal variances not assumed			3.026	72.743	.002	.003	.40318081	.13322613	.13764573	.668
Departmental support of KM	Equal variances assumed	2.598	.111	1.256	73	.107	.213	.20132380	.16034544	-.11824421	.520
	Equal variances not assumed			1.271	72.847	.104	.208	.20132380	.15841152	-.11440111	.517
Level of employee interaction	Equal variances assumed	1.027	.314	1.866	73	.033	.066	.25149731	.13475431	-.01706764	.520
	Equal variances not assumed			1.894	72.469	.031	.062	.25149731	.13278125	-.01316798	.516
Accessibility of technology	Equal variances assumed	.065	.799	1.136	73	.130	.260	.14510013	.12776308	-.10953132	.399
	Equal variances not assumed			1.137	72.029	.130	.259	.14510013	.12759595	-.10925602	.399
Use of technology	Equal variances assumed	1.104	.297	1.310	73	.097	.194	.22093138	.16869326	-.11527381	.557
	Equal variances not assumed			1.317	72.781	.096	.192	.22093138	.16778014	-.11347093	.555
Level of team-work	Equal variances assumed	.559	.457	-.499	73	.310	.619	-.07724083	.15483070	-.38581796	.231
	Equal variances not assumed			-.503	73.000	.308	.616	-.07724083	.15341029	-.38298711	.228

4.7 ANOVA and Role

One-way ANOVA was conducted to test the independent variable role with knowledge management component dependent variables. There was no statistically significant relationship between employee's management role and Knowledge Management component responses. Refer to table 12.

Table 12: ANOVA results – Managerial role

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Strength of KM leadership * Role	Between Groups	(Combined)	1.646	2	.823	2.260	.112
	Within Groups		26.214	72	.364		
	Total		27.859	74			
Departmental support of KM * Role	Between Groups	(Combined)	1.887	2	.944	2.004	.142
	Within Groups		33.905	72	.471		
	Total		35.792	74			
Level of employee interaction * Role	Between Groups	(Combined)	.777	2	.388	1.112	.335
	Within Groups		25.148	72	.349		
	Total		25.925	74			
Accessibility of technology * Role	Between Groups	(Combined)	.267	2	.134	.430	.652
	Within Groups		22.369	72	.311		
	Total		22.636	74			
Use of technology * Role	Between Groups	(Combined)	2.294	2	1.147	2.208	.117
	Within Groups		37.396	72	.519		
	Total		39.689	74			
Level of team-work * Role	Between Groups	(Combined)	.265	2	.132	.293	.747
	Within Groups		32.513	72	.452		
	Total		32.778	74			

4.8 Correlation

A correlation coefficient test was conducted, results shown in table 13 to assess the correlation between the knowledge management components and age. There was a negative correlation score of -232, with sig of p= 0,46 between age and level of teamwork.

Table 13: Correlation of age and KM components

Correlations

			Age	Strength of KM leadership	Departmental support of KM	Level of employee interaction	Accessibility of technology	Use of technology	Level of team-work
Spearman's rho	Age	Correlation Coefficient	1.000	.047	.092	.149	.166	.074	-.232*
		Sig. (2-tailed)	.	.686	.433	.201	.155	.526	.046
		N	75	75	75	75	75	75	75
	Strength of KM leadership	Correlation Coefficient	.047	1.000	.697**	.496**	.262*	.558**	.113
		Sig. (2-tailed)	.686	.	<,001	<,001	.023	<,001	.335
		N	75	75	75	75	75	75	75
	Departmental support of KM	Correlation Coefficient	.092	.697**	1.000	.424**	.307**	.498**	.223
		Sig. (2-tailed)	.433	<,001	.	<,001	.007	<,001	.054
		N	75	75	75	75	75	75	75
	Level of employee interaction	Correlation Coefficient	.149	.496**	.424**	1.000	.151	.292*	.186
		Sig. (2-tailed)	.201	<,001	<,001	.	.195	.011	.109
		N	75	75	75	75	75	75	75
	Accessibility of technology	Correlation Coefficient	.166	.262*	.307**	.151	1.000	.315**	.275*
		Sig. (2-tailed)	.155	.023	.007	.195	.	.006	.017
		N	75	75	75	75	75	75	75
	Use of technology	Correlation Coefficient	.074	.558**	.498**	.292*	.315**	1.000	.179
		Sig. (2-tailed)	.526	<,001	<,001	.011	.006	.	.124
		N	75	75	75	75	75	75	75
	Level of team-work	Correlation Coefficient	-.232*	.113	.223	.186	.275*	.179	1.000
		Sig. (2-tailed)	.046	.335	.054	.109	.017	.124	.
		N	75	75	75	75	75	75	75

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

5 DISCUSSION

Data obtained from the survey were analysed and reported in the previous chapter. Analysis of the results and their discussion take up most of this chapter. The findings are interpreted in accordance with the study's objectives:

- Identify barriers to implementing knowledge management processes and systems in national government departments.

- Rate the extent these are significant barriers to knowledge management implementation

Identify barriers to implementing knowledge management processes and systems in national government departments.

There is ongoing research on the topic of knowledge management in government departments. This is due to the peculiar nature of how governments are run and more so in the South African context. The first objective of this study was to identify barriers in implementing knowledge management in Government Departments in South Africa. Participants rated low "disagree" on level of employee interaction and strength of knowledge management leadership, and scored 'somewhat agree" on use of technology and departmental support of knowledge management and rated "agree" on level of team work and accessibility of technology. Components that scored "strongly disagree", "disagree", "somewhat disagree", "neither disagree or agree" and "somewhat agree" were classified as barriers to knowledge management. ANOVA test revealed that there was no significant statistical difference between how departmental branches felt about knowledge management and in addition there was also no statistical difference between role of the participants and their views regarding knowledge management. The study found the barriers were the following 1) strength of knowledge management leadership, 2) level of employee interaction, 3) departmental support of knowledge management and 4) use of technology. The findings are discussed per knowledge management component below.

Strength of knowledge management leadership

Krogh, Nonaka, and Rechsteiner (2012) indicated the importance of leadership in knowledge creation. However the study of how leadership impacts knowledge creation was limited (Krogh et al., 2012). In this study the strength of knowledge management leadership includes employees being rewarded for sharing their expertise and experience with their co-workers, knowledge management being given a prominent place on the agenda at all staff meetings and that employees' performance contracts include key performance indicator that measure how well employees manage their knowledge and share information. These aspects are all signals from management that knowledge management is valued and prioritised by the organisation.

The strength of leadership domain also speaks to whether there is a problem of employees hoarding knowledge, and whether the vast majority of staff members are prepared to offer their expertise without restriction. It also includes upper management's commitment to advancing the strategy of knowledge management and effectiveness in facilitating the exchange of information using the various technological instruments made available by the organisation. This domain includes whether there are predetermined guidelines and protocols in place to shield those who share their expertise from potentially malicious actions of other individuals and the familiarity of employees with some of the most knowledgeable people in all of the relevant areas and whether there are processes in place to preserve the tacit knowledge of personnel who are leaving. Also included in this domain is when it is standard practice for co-workers to share their expertise and experiences with one another and the degree to which employees gain access to information through the use of databases. All these aspects group together to indicate whether on a continual basis, managers are promoting knowledge management.

This study revealed that most participants felt negative about the strength of knowledge management leadership in the organisation. This was rated most negatively as "strongly disagree" by the participants and both males and females reported negatively. The employee's role, years of experience, age and branch did not impact perceptions of strength of knowledge management leadership. According to literature, leadership is cited as an enabler of knowledge management (Krogh et al., 2012). This study revealed that strength of knowledge management leadership is a barrier in implementing knowledge management. Knowledge Management needs to be implemented from the top of the organisation (Analoui, Hannah Doloriert, & Sambrook, 2012). Managers need to be seen to advocate and promote its critical importance. The strength of knowledge management leadership also refers to the processes that are in place in order for successful implementation to occur including rewards for encouraging knowledge sharing and clear processes to capture tacit and explicit knowledge. This work supports the work of Bergeron (2003), who in his study emphasised the critical role that leaders play in implementing knowledge management. He further advises that executive leadership needs to champion knowledge management. This study further confirms and expands on the fact that strength of knowledge management leadership is lacking in government departments and this further hinders successful implementation of knowledge management.

Donate and de Pablo (2015) identified the leadership styles needed in order to foster knowledge management. They argued for a form of leadership known as knowledge-oriented leadership, which integrates aspects of both transformational and transactional leadership styles, as well as effective motivation and communication(Donate & de Pablo, 2015). Krogh et al. (2012) created a model that indicates that for knowledge management to flourish situational leadership needs to be applied. This supported by Analoui et al. (2012), that managers need to apply the transactional and transformational leadership style.

Level of employee interaction

The Department of Transport has several branches which focuses on different modes of transport. Branches need to interchange information and employees within a branch need to share information. Lin. (2011) found that there is a relationship between social interaction and level of knowledge management implementation. In this study the level of interaction included face to face interaction, and workers taking part in decision making. It also referred to trust between co-workers in the organisation and whether information flows easily. The level of interaction had the second lowest ranking, flagging it as relatively poorly performing domain. This indicates this as a barrier as interaction is shown to be a necessary catalyst of knowledge management.

This finding gives further insights into reasons why government departments struggle with implementation. Government departments are hierarchical in nature (Ncoyini & Cilliers, 2020) and therefore level of authority and positions take precedence. This hierarchical nature does not encourage interactions. Al-Alawi et al. (2007) identified activities that an organisation can do to build trust such as social events, improving office design and reducing boundaries between organisational levels. Trust was identified as important in sharing tacit knowledge. A greater amount of research could be done to better understand how interaction could be improved to facilitate the process of knowledge sharing. According to previous research, where there are barriers regarding knowledge sharing; knowledge management is hindered. However, this study provides more in-depth insight by demonstrating that there must be a very high level of interaction in order to enable knowledge sharing.

Departmental support of knowledge management

Knowledge management within an organisation is referred to as having departmental support when there is a knowledge management unit present. Departmental support is also evident based on employees' level of awareness regarding knowledge management initiatives, when sharing of knowledge between different departments is encouraged, and employees understand the knowledge management policy. This also refers to having a policy and system in place for managing the information and knowledge (Bharadway et al., 2015). Most participants somewhat agreed with departmental support being in place. Though the score was positive (somewhat agree), this component requires attention from the organisation. This is because the support provided by the department ought to be definitively felt by the entire organisation in order for it to be effective. Though the participants somewhat agreed with departmental support of knowledge management, there remains room for improvement.

Use of technology

The use of technology included access to tools for knowledge sharing, the ability to obtain information from electronic department notices or bulletin boards, and the utilisation of groupware to obtain information. Cong and Pandya (2003) identified technology as an enabler of knowledge management and this is supported by Kruger and Johnson (2010). The participants somewhat agreed on the use of technology in the organisation. This finding reveals that there is a level of use of technology, although limited and therefore suggests the use of technology in government departments can be improved. According to cited research, technology functions as an enabler; consequently, it is critical for departments to encourage and support the utilisation of technology to its fullest potential. The fact that the participants only somewhat agreed with the use of technology, a key enabler of knowledge management, flags this as a barrier.

Accessibility of technology

The second highest ranking (positive) component was accessibility of technology. This included storing knowledge in a central place, using tools such as blogs, Facebooks, Twitter and mobile phone to access information and feeling comfortable using technology. Participants were positive about accessibility of technology. The findings reveal that access to technology is not a barrier in government departments. While

accessibility of technology has been categorised as a barrier to knowledge management by many scholars, this research found that this is not the case. The result was not expected as government departments are known for being behind in technology and not having proper information technology infrastructure(Dikotla et al., 2014; Mutula & Mostert, 2010). Government departments are known to store information in a decentralised place and working in silos. Dikotla et al. (2014), found that information sharing and technological advancement to support knowledge management was lacking in Limpopo's municipalities. This echoes Mello and Fombad (2018) findings that lack of information sharing is heightened by a paucity of systems to organise and store knowledge. These findings suggest that government has taken some strides in improving access to technology. This gives insight into the access to technology that government is pushing in order to improve service delivery and points to progress made thus far.

The level of team work

Participants felt positive (agree) about the level of team work however the scale of measurement for this factor was not reliable.

Rate the extent to which these are significant barriers to knowledge management implementation

The components that received ratings of "strongly disagree" and "disagree" got the lowest score. Furthermore, those with the lowest scores are considered to be the most significant barriers to knowledge management. Throughout the analysis and interpretation, knowledge management leadership and level of employee interaction component received the lowest (negative) scores.

Strength of knowledge management leadership

When upper management supports and promotes knowledge management, that is a sign of the strength of knowledge management leadership. In which technology resources are made available for the purpose of sharing knowledge. It also refers to the existence of laws and processes to protect individuals who share their knowledge from the potential harmful intentions of other colleagues. When there are processes and guidelines in place to collect tacit knowledge from employees who are leaving an organisation. The place

where co-workers share their expertise while they are working. In the literature review, one of the significant barriers to knowledge management was lack of leadership.

The efficacy of knowledge management as a management technique in an organisation is directly related to the level of strength of its knowledge management leadership. As was mentioned, it examines a variety of processes that are necessary for the functioning of an organisation. Having standards and processes in place to protect individuals who are sharing knowledge. Government intervention might be required in ensuring policies that mandate departments to manage their knowledge assets (Wiig, 2000). The strength of knowledge management also includes creating an environment of knowledge sharing. Mazarodze and Buckley (2019), indicated that the knowledge sharing is very important for an organisation to remain competitive. Ensuring that there is knowledge sharing is part of the strength of knowledge management leadership. According to literature, lack of knowledge sharing and lack of leadership are amongst the barriers that were cited as the most significant. The findings of this study are consistent with the research that has been done, which proves that the lack of strength of knowledge management leadership is a real barrier for governmental departments.

Level of employee interaction

Employee interaction scored the second lowest (negative) score. It is also rated a significant barrier to knowledge management. The level of interaction between employees is defined as the ease with which information can flow throughout an organisation, irrespective of employee boundaries and functions. Moreover, it refers to the degree of trust that exists between employees of the same organisation. When there is intense interaction amongst co-workers.

Though employee interaction is important for sharing knowledge, the literature did not cite it as the most significant barrier. Since the covid-19, there has been a decrease in the amount of employee interaction in organisations. It is possible that this is the reason why fostering interaction between employees should be a top priority, especially now that most organisation are actively advocating that their employees work from home. This study rated the level of employee interaction as a significant barrier. Organisation need to keep employees connected in order that tacit knowledge can be shared.

Limitation of the study

This study used one department as a sample for all national government departments due to the fact that they operate in a similar way. Focused research on specific areas in knowledge management within specific government departments is encouraged.

6 CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to identify barriers to implementing knowledge management processes and systems in national government departments and rate the extent of the significance of these barriers to knowledge management implementation. The results revealed that the barriers of knowledge management in government departments are 1) strength of knowledge management leadership, 2) level of employee interaction 3) departmental support of knowledge management and 4) use of technology. The components that were rated as the most significant barriers of knowledge management were 1) strength of knowledge management leadership and 2) level of team interaction.

Following the discussion and findings the following are recommended:

a) The strength of knowledge management leadership

Managers need to consistently promote knowledge management in government departments. Leadership needs to show value for knowledge management and make it a regular topic of discussion during staff meetings. Top management must be seen promoting knowledge management. Rules and procedures should be instituted to keep colleagues who share work information safe from fellow colleagues with bad intentions. Employees who share their knowledge should be rewarded. Rewards encourage officials to share their knowledge, and extend beyond monetary, for example recognition awards. Alignment between the knowledge management strategy and the organisation's strategy is necessary in order for knowledge management initiatives to be supported by senior management (Butler & Murphy, 2007). Leaders in the public sector, especially National Government departments needs to demonstrate the value of knowledge management in their organisations.

b) Level of employee interaction

Government needs to improve the level of information flow within the organisation. Trust, a pre-curser to knowledge sharing, needs to be embedded in the organisational culture in order for knowledge management to be effectively implemented. Organisations can cultivate a culture of knowledge sharing, by building trust amongst employees through social events, improving office design to encourage interaction, and reducing boundaries between organisational levels (Al-Alawi et al., 2007).

c) Departmental support of knowledge management

Every member of the organisation has a responsibility to be aware of the mechanisms, such as policies, that are utilised to give guidelines and structure for the organisation. The incorporation of knowledge management into staff meetings as a standing agenda item would be beneficial to the process of developing a supportive atmosphere. Improvement of support could be accomplished through the appointment of knowledge management champions within departmental branches and through the promotion of knowledge management policies.

d) Use of technology

The department is required to maximize the use of technology by establishing a centralized repository in which information can be saved and exchanged. Access to this should be simple, and information should be easily retrievable. The organization's intranet and extranet should be utilized to their full potential in order to facilitate information sharing within and beyond the organization.

e) Recommendations for further research

From this study is has come clear that there are barriers that hinder knowledge management pertaining to government departments. Within government departments, there is a pressing need for additional study on leadership in the realm of knowledge management. Because of the hierarchical structure present in government departments, a specific sort of leadership is required in order to establish an environment that is conducive to the enhancement of knowledge management. Another subject worthy of investigation is the degree of collaboration that exists within the public sector. Interaction

enables knowledge sharing and therefore the ability to interact forms the foundation of knowledge sharing.

Contribution of this study

The findings demonstrate that government departments face barriers when managing knowledge. The results provided conclusive proof that particular barriers exist. The leadership of knowledge management and employee interaction were found to be significant barriers. According to these findings, it is recommended that future researchers concentrate their efforts on leadership challenges in government departments and employee interaction. This paper's findings highlight the difficulties faced by national government departments in South Africa, bringing to light the significant barriers to government knowledge management. In order for the government to successfully implement knowledge management, these issues will need to be prioritized and addressed. This research will aid managers in government departments regarding what aspects of knowledge management barriers they should concentrate on. This will also help government departments to reduce failure when implementing knowledge management. Research such as this one can assist in the development of strategies for increasing employee contact inside national government departments in order to increase the amount of knowledge that is shared. The government has the ability to establish the appropriate conditions for the exchange of knowledge. Governments will benefit by training employees on knowledge management. Government must devise a system that recognises and rewards the exchange of knowledge.

It is imperative that the management and sharing of information be incorporated as key performance indicators in employee performance contracts. There must be processes in place to collect the tacit knowledge of employees who are departing the organisation. It is essential that face-to-face interaction become ingrained in the culture of the organisation; only in this way can trust be established, and only then can an environment be cultivated in which information may be freely exchanged. Additional mechanisms to share knowledge, such as technology, need to be utilised to a far greater extent in order to make it simpler to share knowledge and to derive benefits from knowledge that has already been recorded. Consequently, the implementation of knowledge management will be successful, which will result in an improvement in performance for government departments.

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APPENDIX A – FREQUENCY TABLE - DEMOGRAPHICS

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 40	17	22.7	22.7	22.7
	40 - 49	37	49.3	49.3	72.0
	50 and above	21	28.0	28.0	100.0
	Total	75	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	40	53.3	53.3	53.3
	Female	35	46.7	46.7	100.0
	Total	75	100.0	100.0	

Role

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not a manager	11	14.7	14.7	14.7
	Middle manager	44	58.7	58.7	73.3
	Senior manager	20	26.7	26.7	100.0
	Total	75	100.0	100.0	

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 to 5 years	3	4.0	4.0	4.0
	More than 5 years	72	96.0	96.0	100.0
	Total	75	100.0	100.0	

Branch

	Frequency	Percent	Valid Percent	Cumulative Percent
Integrated Transport Planning	17	22.7	22.7	22.7
Public Transport	12	16.0	16.0	38.7
Operations	13	17.3	17.3	56.0
Finance	4	5.3	5.3	61.3
Rail	5	6.7	6.7	68.0
Road	7	9.3	9.3	77.3
Maritime	4	5.3	5.3	82.7
Civil Aviation	3	4.0	4.0	86.7
DG-Ministry	10	13.3	13.3	100.0
Total	75	100.0	100.0	

New Branch

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Integrated Transport Planning	17	22.7	25.0	25.0
	Rail_Road_Public Transport	24	32.0	35.3	60.3
	Operations_Finance_Ministry	27	36.0	39.7	100.0
	Total	68	90.7	100.0	
Missing	System	7	9.3		
Total		75	100.0		

Some of the branches had to be consolidated since there were not enough people participating in them. There was no statistically significant difference in how the various branches felt about knowledge management components, regardless of whether they were combined or not.

ANNEXURE B – COMPONENTS AND THEIR ITEMS

Questionnaire items (Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

Means (Factors and Items)

1. Strength of knowledge management Leadership

Descriptive Statistics			
Question items	N	Mean	Std. Deviation
Employees are rewarded for sharing their knowledge and experience with their colleagues	75	-.9991366	.75471294
Leadership demonstrates value for Knowledge Management by including it as a standing agenda item at staff meetings	75	-.5543537	.96437427

Knowledge Management and sharing information are included in employee's performance contract as Key Performance Indicator	75	-.5303678	1.00690423
The problem of people hoarding (keeping) knowledge does not exist and most staff members are willing to share their knowledge freely	75	-.5136594	.72048253
Knowledge Management strategy is actively promoted by my top management	75	-.3675424	.90855437
The technological tools available at the organization for sharing knowledge are effective	75	-.3670188	.85754351
Certain rules and procedures exist to protect the person sharing his/her knowledge against harmful intentions of others	75	-.3389212	.69283160
I know the best experts in the different domains of key knowledge within my section	75	-.2754292	.95780613
There are procedures to capture tacit knowledge of employees who are leaving the Department of Transport	75	-.1657186	1.05410586
My manager advocates Knowledge Management on an ongoing basis	75	-.1032701	.92634708
Co-workers commonly exchange their knowledge and experience while working	75	.0458992	.85224725
I use databases to access information.	75	.0650506	.93558533
Strength of knowledge management leadership	75	-.3420390	.61357496
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

2. Departmental support of knowledge management

Descriptive Statistics			
Question items	N	Mean	Std. Deviation
There are mechanisms in place to transform expert tacit knowledge into an explicit (written / coded) format	75	-.3054687	.94042915
I am familiar with knowledge management policy of the Department of Transport	75	-.2745671	.96014348
Knowledge sharing across branches is actively encouraged	75	-.1242432	.98411501
I am aware of Knowledge Management initiatives in the Department of Transport	75	-.0055581	.98326957
Department of Transport has systematic processes for capturing and protecting key knowledge assets	75	.0286549	.85678310
Department of Transport encourages informal knowledge exchange	75	.0418714	.95778553
There is Knowledge Management policy in the Department of Transport	75	.3373416	.82703787
There is knowledge management directorate that coordinates knowledge repositories to support key decision-making	75	.5209752	.86576453
Departmental support of knowledge management	75	.0273757	.69546450
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

3. Level of Employee interaction

Descriptive Statistics			
Question items	N	Mean	Std. Deviation
Information flows easily throughout the organization regardless of employee roles or other boundaries	75	-.4426267	.82725649
A considerable level of trust exists between co-workers in this organization	75	-.3431952	.72908387
Workers actively participate in the process of decision-making	75	-.2527435	.68820646
There is a high level of face-to-face interaction among colleagues in the workplace	75	.3245179	.86209117
Level of employee interaction	75	-.1785119	.59189311
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

c) Accessibility of Technology

Accessibility of Technology Descriptive Statistics			
Question items	N	Mean	Std. Deviation
I actively ensure that I store knowledge in a central place for other to have access	75	-.0130849	.85322243
I use knowledge management technological tools such as blogs, Facebook, Twitter and mobile phones to access information	75	.4329202	1.07902346

I feel comfortable using the knowledge sharing technologies available	75	.4342865	.75822867
I do not hesitate to share my feelings and perceptions with my fellow colleagues	75	.4557358	.76972919
I use previous knowledge to make informed decision	75	.8213219	.70695176
Accessibility of technology	75	.4262359	.55307943
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

d) Use of Technology

Use of Technology Descriptive Statistics			
Question items	N	Mean	Std. Deviation
The technological tools available at the organization for sharing knowledge are effective	75	-.3670188	.85754351
I use bulletin boards or e-departmental notices to access information.	75	-.1605237	1.02488114
I can find important information from the intranet.	75	.1188548	1.01658933
I use Groupware software like email to access information.	75	.7533395	1.03815717
Use of technology	75	.1591955	.73235188
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

e) **Level of Team-work**

Level of Team-work	**Descriptive Statistics**		
Question items	N	Mean	Std. Deviation
Certain tasks are accomplished through teamwork and collaboration between employees	75	1.0057415	.72264475
Teamwork discussion and collaboration enhance communication between colleagues	75	1.0953166	.87531093
Level of team-work	75	1.0505290	.66554140
Valid N (listwise)	75		

(Al-Alawi et al., 2007; Nenungwi & Garaba, 2022)

Descriptive statistics

Descriptive Statistics										
	N	Minimum	Maximum	Mean		Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
Level of team-work	75	-.50105	1.98857	1.0505290	.07685010	.66554140	-.260	.277	-.538	.548
Accessibility of technology	75	-.69701	1.63406	.4262359	.06386411	.55307943	.276	.277	-.557	.548
Use of technology	75	-1.79583	1.88108	.1591955	.08456471	.73235188	-.007	.277	.323	.548
Departmental support of KM	75	-1.53699	1.30963	.0273757	.08030532	.69546450	-.164	.277	-.516	.548
Level of employee interaction	75	-1.69155	1.47322	-.1785119	.06834593	.59189311	-.156	.277	.173	.548
Strength of KM leadership	75	-1.78295	1.19847	-.3420390	.07084953	.61357496	-.139	.277	.040	.548
Valid N (listwise)	75									

ANNEXURE C - COMPONENT MATRIX

Rotated Component Matrix - SORTED						
	Component					
	1	2	3	4	5	6

My manager advocates Knowledge Management on an ongoing basis	**0,74**	0,026	-0,01	0,099	-0,011	0,241
Leadership demonstrates value for Knowledge Management by including it as a standing agenda item at staff meetings	**0,725**	0,394	0,068	-0,121	0,18	0,125
Knowledge Management strategy is actively promoted by my top management	**0,658**	0,419	0,313	-0,144	0,206	0,006
The problem of people hoarding (keeping) knowledge does not exist and most staff members are willing to share their knowledge freely	**0,63**	0,114	0,431	-0,159	0,257	0
Certain rules and procedures exist to protect the person sharing his/her knowledge against harmful intentions of others	**0,58**	-0,035	0,417	0,12	0,186	-0,065
There are procedures to capture tacit knowledge of employees who are leaving the Department of Transport	**0,571**	0,467	0,015	0,245	-0,103	0,115
Employees are rewarded for sharing their knowledge and experience with their colleagues	**0,57**	0,39	0,143	-0,187	0,093	-0,238
I use databases to access information.	**0,538**	0,075	0,026	0,499	0,304	-0,184

The technological tools available at the organization for sharing knowledge are effective	**0,536**	0,261	0,323	0,194	0,344	-0,082
Co-workers commonly exchange their knowledge and experience while working	**0,49**	0,198	0,388	0,115	0,185	0,232
Knowledge Management and sharing information are included in employee's performance contract as Key Performance Indicator	**0,485**	0,205	0,277	-0,003	0,238	-0,224
I know the best experts in the different domains of key knowledge within my section	**0,445**	0,353	0,314	0,281	-0,226	0,059
I am aware of Knowledge Management initiatives in the Department of Transport	0,236	**0,755**	0,167	0,274	0,073	0,019
There is Knowledge Management policy in the Department of Transport	-0,007	**0,73**	-0,039	-0,008	0,169	0,023
Department of Transport encourages informal knowledge exchange	0,267	**0,694**	0,326	0,124	0,002	-0,019
Knowledge sharing across branches is actively encouraged	0,364	**0,664**	0,175	-0,107	0,088	0,185
There is Knowledge Management directorate that coordinates	0,097	**0,655**	0,003	0,063	0,183	0,34

knowledge repositories to support key decision-making						
I am familiar with Knowledge Management policy of the Department of Transport	0,288	**0,623**	0,346	0,15	0,123	-0,188
There are mechanisms in place to transform expert tacit knowledge into an explicit (written / coded) format	0,534	**0,557**	0,184	0,231	0,027	0,218
Department of Transport has systematic processes for capturing and protecting key knowledge assets	0,482	**0,511**	0,032	-0,071	0,353	0,006
There is a high level of face-to-face interaction among colleagues in the workplace	-0,008	0,297	**0,745**	0,093	0,193	0,135
Workers actively participate in the process of decision-making	0,203	0,067	**0,74**	0,084	-0,362	0,153
A considerable level of trust exists between co-workers in this organization	0,167	0,079	**0,662**	-0,188	0,244	-0,019
Information flows easily throughout the organization regardless of employee roles or other boundaries	0,384	0,128	**0,586**	0,066	0,22	0,027
I use Knowledge Management technological tools such as blogs, Facebook, Twitter and mobile phones to access information	0,051	0,005	-0,088	**0,702**	0,179	0,062

I feel comfortable using the knowledge sharing technologies available	0,062	0,062	0,137	**0,64**	0,092	0,263
I do not hesitate to share my feelings and perceptions with my fellow colleagues	-0,072	-0,012	-0,06	**0,633**	-0,049	0,066
I actively ensure that I store knowledge in a central place for other to have access	0,155	0,368	0,138	**0,531**	-0,256	-0,107
I use previous knowledge to make informed decision	-0,162	0,324	0,212	**0,457**	0,297	0,059
I can find important information from the intranet.	0,128	0,264	0,31	0,019	**0,703**	-0,056
The technological tools available at the organization for sharing knowledge are effective	0,196	0,041	0,347	0,224	**0,656**	0,155
I use bulletin boards or e-departmental notices to access information.	0,361	0,16	-0,048	0,079	**0,631**	0,056
I use Groupware software like email to access information.	0,292	0,161	-0,04	0,34	**0,368**	0,292
Teamwork discussion and collaboration enhance communication between colleagues	-0,042	-0,019	0,115	0,222	0,079	**0,756**

Certain tasks are accomplished through teamwork and collaboration between employees	0,123	0,199	0,06	0,035	-0,011	**0,744**

Component 1 – The strength of leadership

Component 2 – Departmental support of KM

Component 3 – Employee interaction

Component 4 – Accessibility to technology

Component 5 – The use of technology

Component 6 – Level of teamwork