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## KNOWLEDGE MANAGEMENT IN SANSA SPACE OPERATIONS.

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### Abstract

Knowledge management is a process that seeks to effectively manage an organisation's knowledge asset by creating value and meeting tactical and strategic requirements. It involves collection, organisation, dissemination and use of knowledge by those who can exploit it effectively (Hislop, 2013) [1]. Knowledge Management tools encompass both explicit knowledge which is codified and documented and the more elusive tacit knowledge and insights that resides in the minds of practitioners (Knowledge Management Tools, 2021) [2].

The organisation currently does not have formal strategies for capturing the tacit knowledge from the company's deep smarts and long-tenured employees and convert it to explicit knowledge. In this paper we will investigate the barriers that impede knowledge sharing in SANSA SO with the sole purpose of establishing a unique and well-suited Knowledge Management system that will be directly linked to the continual improvement, competitiveness and innovativeness of our organisation. We will also discuss the strategy for capturing the tacit knowledge from the company's deep smarts and long tenured employees and convert it to explicit knowledge and this result will close serious gaps that will hinder the organisation's ability to service it customers and operate optimally.

**Keywords:** (Knowledge Management)

### Acronyms/Abbreviations

SANSA- South African National Space Agency

SANSA SO- South African National Space Agency Space Operations

NASA- National Aeronautics and Space Administration

STADAN- Satellite Tracking and Data Acquisition Network

### 1. Introduction

The SANSA Space Operations facility is a premier space operations hub in the Southern Hemisphere, that boasts a rich history spanning over six decades. Established in the 1960s as part of NASA's Satellite Tracking and Data Acquisition Network (STADAN), the facility has evolved through various iterations, being taken over by CSIR and known as the Satellite Application Centre (CSIR-SAC) and ultimately becoming a critical component of the South African National Space Agency (SANSA). Today, SANSA Space Operations plays a vital role in supporting global space missions, leveraging its expertise and specialized equipment to deliver exceptional service to its clients. The organization has several high-tech equipment that is used to service its clients and some of these equipment dates back several decades and the company's staff has acquired knowledge to work with this equipment and most of the knowledge has not been properly documented.

Every organization has a hidden treasure trove of knowledge, know-how and best practices waiting to be tapped. SANSA Space Operations is no exception with its employ of long tenured, highly knowledgeable individuals possessing critical business knowledge. Having kept a low staff turnover and retaining older employees, SANSA still relies heavily on individual expertise to maintain decades old infrastructure. With the vast knowledge undocumented and residing solely in the minds of individuals, it poses a significant risk to our organisation should these individuals leave.

Effective Knowledge Management is very crucial for SANSA Space Operations due to several key factors.

- SANSA relies on a small group of long serving, highly knowledgeable experts that possess unique insights that need to be collected, organized and disseminated.

- SANSA services clients with contracts spanning many years. Therefore, a seamless transfer of business-critical knowledge across generations of employees is vital to ensure customer satisfaction, revenue growth and a competitive edge.

The organization currently lacks formal strategies for capturing and converting tacit knowledge from the company’s deep smarts into explicit knowledge, potentially leading to significant knowledge gaps that could hinder its ability to service clients and operate efficiently.

## 2. Material and methods

This study employed a purposive sampling technique where participants are selectively chosen based on their expertise, experience and relevance of the knowledge to the research topic. For this research specifically, employees from the technical and operations department in SANSA Space Operations were selected, as they possess critical knowledge essential to the organization’s operations. We’ve also ensured that the sampling reflects the diversity within the organisation, considering factors such as gender, ethnicity and years of service.

Table1 below represents the basic characteristics of the technical and operations team selected for this research at SANSA Space Operations.

**Table 1: Descriptive characteristics of sample.**

	Total	Gender		Ethnicity		Years of service
		M	F	B	W	
Top management	2	2		1	1	15-35years
Technical support	3	3		2	1	10-20 years
<b>Operations</b>	10	5	5	10		0-10 years
Team lead	3	2	1	3		5-15 years
Newly appointed technicians	3	1	2	3		0-5 years
Operations interns	4	2	3	4		0-5 years

### Data Collection

Data was collected through a combination of surveys, interviews, and observations. A survey questionnaire was shared with a total of 15 employees at SANSA Space Operations, representing various levels of seniority. The aim of this survey was to gather information on the current state of Knowledge Management, including the types of knowledge shared, the methods employed to share this knowledge, and the challenges faced in sharing knowledge within SANSA Space Operations.

### Interviews

Semi-structured interviews were conducted with 5 key informants, including long-serving employees, managers and newly appointed employees to gather more in-depth information on the current state of knowledge management and to identify strategies for capturing and converting tacit knowledge into explicit knowledge.

### Observations

Planned job observations were made of the physical work environment and the ways in which employees interacted with each other and with the organization's existing systems and processes.

### Data Analysis

The data collected was analysed using a combination of qualitative and quantitative methods. The survey data was analysed using descriptive statistics and inferential statistics, while the interview data was analysed using thematic analysis.

### Tools and Techniques

Several tools and techniques were used to support the data collection and analysis, including:

- Survey software (e.g. Google Forms)
- Interview recording equipment (e.g. audio recorder)
- Observation notes.

### Ethical Considerations

This study was conducted with the outmost regard for the rights and welfare of the participants. Prio to participation in the study all participants provided informed consent proving their willingness to take part in the research and acknowledging their understanding of the benefits associated with the participation.

The confidentiality of all participants is protected. All identifying material is omitted from all the data collected. This will make it impossible to link any response to any individual that has participated in the study. The approach used has also allowed participants to provide information confidentially and anonymously reducing potential risks of biases or influences that may have occurred if a more direct form of data collection was employed.

## 4. Results

This research aims to explore the complexities of Knowledge Management within SANSA Space Operations, seeking to gather valuable insights from the organization’s employees. The primary objective is to utilize these insights to inform the development of a comprehensive Knowledge Management policy or strategy that can be implemented within SANSA. To achieve this goal, this chapter presents a detailed analysis of the responses provided by study participants comprising of both technical and operational employees at SANSA Space Operations.

The participants responses to a set of semi- structured research questions asked in interviews were recorded. The individual responses include quotations from the interview data and limited references to the literature review to substantiate the points being made. The findings are presented below in a clear and concise manner highlighting key themes and patterns that emerged from the data collected. In this chapter the researcher has arranged all findings from the interviews, providing a detailed summary of the insights gathered that may be used in setting the stage for development of a knowledge management policy or strategy that can be customised to SANSA Space Operations unique needs.

**Table 2: Demographic Characteristics of Respondents**

ID	Gender	Race	Years of service
Responded 1	Male	Black	0-5
Responded 2	Male	White	10-20
Responded 3	Male	White	15-35
Responded 4	Male	Black	10-20
Responded 5	Male	Black	10-20
Responded 6	Female	Black	0-5
Responded 7	Male	Black	5-15
Responded 8	Male	Black	0-5
Responded 9	Female	Black	0-5
Responded 10	Male	Black	0-5
Responded 11	Female	Black	5-15
Responded 12	Female	Black	0-5
Responded 13	Male	Black	5-15
Responded 14	Female	Black	0-5
Responded 15	Female	Black	0-5

**Table 3: Presentation of results.**

<b>Question 1: How would you describe knowledge sharing within SANSO Space Operations?</b>	
<b>ID</b>	<b>Response</b>
Responded 1	Knowledge sharing in SANSO SO does not exist.
Responded 2	Lots of room for improvement. Individuals are still custodians of very critical information. A lot of knowledge remains undocumented.
Responded 3	Not documented but more a look and learn. Has worked for the years.
Responded 4	A lot of processes remain undocumented. If you are lucky, you will learn or else, you are on your own.
Responded 5	Very little knowledge sharing takes place.
Responded 6	Knowledge shared is very minimal, one must really learn on their own.
Responded 7	Only a few are willing to share knowledge, find and associate with them
Responded 8	Very little knowledge is shared and makes being a new bee very difficult.
Responded 9	Only bits and pieces from individuals, you will piece everything together.
Responded 10	Its all about sucking up to the more experienced guys. A lot of people are overprotective with what they know as a form of job security.
Responded 11	Not formalised, depends on who is your team.
Responded 12	Lots of room for improvement, very few individuals are willing to share knowledge with new employees.
Responded 13	There is nothing like that in SANSO Space Operations.
Responded 14	Below average.
Responded 15	Sansa Space Operations is not very good in sharing knowledge.

All respondents agree that the framework for sharing knowledge is non-existent. Indicating that knowledge sharing within SANSO Space Operations is underdeveloped and in need of improvement.

<b>Question 2: Do you believe SANSO Space Operations has effective ways of sharing knowledge across the business?</b>	
<b>ID</b>	<b>Response</b>
Responded 1	No.
Responded 2	Space Operations does not have the perspective or means to enforce knowledge sharing.
Responded 3	Yes, we have material available on our share drive.
Responded 4	The knowledge sharing is more of a "look and learn" and "ask" type of environment, so I don't deem it as effective.
Responded 5	No, there is no formal mechanism established for knowledge transfer.
Responded 6	SANSO does not have effective ways of sharing knowledge.
Responded 7	No, it doesn't.
Responded 8	No, it doesn't. Workers have tacit knowledge that exists only in their heads, and it's difficult to put into written words. Procedures are not documented, records and documents are lost, and new technologies render old ones obsolete.
Responded 9	Needs to be improved as they are not effective.
Responded 10	No.
Responded 11	The knowledge is there, but if people don't know it exists and how to access it, then whatever method you are using to share it is not effective.
Responded 12	What you will learn depends on who is assigned as your mentor, so no.
Responded 13	Solely depends on who you ask, so learnings is entirely up to an individual.
Responded 14	No, SANSO doesn't have effective ways of sharing knowledge.
Responded 15	People share as much as you want to know.

In response to this question, all but two respondents agree that knowledge sharing processes at SANSO Space Operations are ineffective and in need of improvement.

<b>Question 3: How supportive is the top management for new initiatives around knowledge transfer? Elaborate</b>	
<b>ID</b>	<b>Response</b>
Responded 1	The support is not enough. More can and should be done.
Responded 2	Very little is being done. People need to be willing to learn.
Responded 3	I prefer a natural process of knowledge gathering or sharing - ask for the knowledge and the person sharing it will feel good about their accomplishment. Lets not force feed.
Responded 4	Top management is very set in their ways, they have been with the organisation for a very long time, and change to them is a bit scary, so they don't support a lot of knowledge sharing.
Responded 5	To an extent. By supporting external training to gain new knowledge.
Responded 6	Some support and some don't.
Responded 7	Not very supportive. The culture in the organisation is very much one of "I have the knowledge, and I gained it myself through my experience", and the next person should also acquire knowledge through their own experience.
Responded 8	Minimal support from top management.
Responded 9	None of the managers are supportive if the initiative. There is still an issue of race, gender inequality and people trying to secure their jobs.
Responded 10	Top management knows where the critical knowledge lies, the individuals are not interested in sharing.
Responded 11	Not much support comes from them.
Responded 12	They don't even know that knowledge transfer is not effectively implemented.
Responded 13	They are supportive but with no formal strategy it becomes difficult to manage and keep track.
Responded 14	Some are, some are not. Departments with new interns from time to time have in place a knowledge sharing strategies.
Responded 15	They do support, just need to formalise everything.

Few of the respondents believe that top management is supportive whilst others believe there is no support. Management plays a crucial role in supporting initiatives that propel knowledge transfer in an organization.

<b>Question 4: What kind of organizational support (time, resources, money, etc) does SANSa Space Operations have for knowledge transfer initiatives?</b>	
<b>ID</b>	<b>Response</b>
Responded 1	Basic training is given on systems as new interns coming in.
Responded 2	SANSa has the resources; the employees lack the willingness.
Responded 3	Yes, it does.
Responded 4	SANSa has the resources, its matter of outing them to good use.
Responded 5	The resources are there, it's a matter of a culture change.
Responded 6	To some extent.
Responded 7	There are a few resources, their effectiveness needs to be measured, and relevant change be applied.
Responded 8	Very little is readily available for use.
Responded 9	The money is there just needs to be put to food use in establishing, implementing and sustaining knowledge management.
Responded 10	It's all about sucking up to the more experienced guys. A lot of people are overprotective with what they know as a form of job security.
Responded 11	Some resources are available.
Responded 12	Lots of room for improvement, very few individuals are willing to share knowledge with new employees.
Responded 13	None.
Responded 14	Below average or below average.
Responded 15	Sansa Space Operations is not very good in sharing knowledge.

<b>Question 5: Will you share knowledge with anyone in the organization if it will be helpful to the person or the organization?</b>	
<b>ID</b>	<b>Response</b>
Responded 1	Yes, I would.
Responded 2	I do and believe id continue.
Responded 3	Yes, I believe sharing knowledge will help the organization and then return to the growth of the business.
Responded 4	I would.
Responded 5	Yes, the more I share is the more I learn.
Responded 6	I would always share knowledge with my co-workers.
Responded 7	I’ve been doing it for the past couple of years and will still share.
Responded 8	Yes.
Responded 9	I will.
Responded 10	I will always share knowledge for the benefit of the organization.
Responded 11	Yes, and it will make me feel like I’ve accomplished something.
Responded 12	Yes, I would, I lose nothing in sharing.
Responded 13	Yes, I will.
Responded 14	Yes.
Responded 15	Most definitely.

100% of the participants positive response indicates a strong culture of knowledge sharing within SANSAs Space Operations sharing.

<b>Question 6: What will it take for you to share knowledge?</b>	
<b>ID</b>	<b>Response</b>
Responded 1	A simple question.
Responded 2	If asked I’ll respond.
Responded 3	Have the processes and tools of how it should be done.
Responded 4	Motivation. Make the employees that already doing it champions as to motivate all other staff.
Responded 5	An opportunity to contribute on training materials for the systems.
Responded 6	An environment that encourages the knowledge sharing culture.
Responded 7	Its already being done by fewer employees. Recognition will fuel all others to join in.
Responded 8	Encourage a culture of collaboration across all departments and watch how knowledge is shared.
Responded 9	It takes nothing to share my knowledge.
Responded 10	Needs time and training materials.
Responded 11	A clear and defined policy that outlines how to effectively share knowledge.
Responded 12	Policies and strategies of how to.
Responded 13	Establish a clear framework with defined processes and tools that outline how the organization wants knowledge sharing to be implemented. Identify and showcase employee role models who are already successfully sharing knowledge, as leading by example is crucial.
Responded 14	An opportunity is all I need.
Responded 15	Nothing really, but a policy.

The responses suggest that a combination of individual willingness, organisational support and enabling factors are necessary to encourage knowledge sharing among employees.

<b>Question 7: Do you believe SANSA Space Operations is ready to make knowledge transfer/sharing a culture in the organization? Elaborate.</b>	
<b>ID</b>	<b>Response</b>
Responded 1	No, a lot of underground work needs to be done.
Responded 2	SANSA is ready, it just needs to enforce it.
Responded 3	Yes, SANSA Space Operations has demonstrated an ability to evolve and grow, which indicates that it may be receptive to adopting new practices and cultural norms, including knowledge transfer.
Responded 4	No, it is not ready. It will need to undergo a huge cultural change.
Responded 5	If they put in the work, I believe they will be ready.
Responded 6	Yes, with the right strategies and support, employees may be receptive to sharing knowledge and collaborating with one another.
Responded 7	Yes, the organization has shown willingness to adapt and innovate, which suggests that it will embrace knowledge transfer as a cultural norm.
Responded 8	No, because there is a lack of necessary tools, technology, or processes in place to support knowledge transfer.
Responded 9	No, Space Operations is not ready because of existing silos, inadequate communication and lack of clear goals. Without addressing these underlying issues, it may be difficult to create a culture that values knowledge sharing.
Responded 10	It's all about sucking up to the more experienced guys. A lot of people are overprotective with what they know as a form of job security.
Responded 11	SANSA Space Operations is not ready, a lot of employees are set on their ways and don't accept change.
Responded 12	There might be resistance from employees who are accustomed to working in a certain way or who may be hesitant to share their knowledge. Overcoming this resistance needs strong leadership and a clear vision for the benefits of knowledge transfer for the organization.
Responded 13	There is potential but needs work. While the organization has some strengths that could support knowledge transfer, it also faces challenges that need to be addressed before moving forward.
Responded 14	There is a cultural shift with the newer guys coming in. It should be ready in a couple of years to fully embrace the culture of sharing.
Responded 15	At this given moment, no, but could be in the future.

The results above indicate a notable division in opinions amongst participants, with some expressing confidence in the preparedness of SANSA SO in implementing knowledge transfer, while others firmly believe the organization needs foundational work to facilitate effective knowledge transfer.

<b>Question 8: What are the barriers if any that need to be crossed before knowledge sharing can be adopted by SANSA Space Operations?</b>	
<b>ID</b>	<b>Response</b>
Responded 1	It's a trust issue for those who believe they are protecting their jobs.
Responded 2	There is a lack of interest to learn.
Responded 3	Lack of interest from staff to acquire knowledge Lack of accountability to staff to share/transfer knowledge.
Responded 4	Undocumented critical knowledge. No archives.
Responded 5	Very little knowledge sharing takes place.
Responded 6	Knowledge shared is very minimal, one has to really learn on their own.
Responded 7	Address the fears people have that forces them to hold on to their knowledge.
Responded 8	Job security.
Responded 9	There is no interest to learn, maybe due to cultural differences.
Responded 10	Leadership needs to support and actively encourage knowledge sharing initiatives.
Responded 11	Lack of collaborations within the teams. No teamwork.
Responded 12	Job security remains the main barrier. Build peoples confidence.
Responded 13	Lack of recognition can demoralise the staff morale.

Responded 14	Whole organizations culture must change and encourage collaborations and innovativeness.
Responded 15	Knowledge hoarding is a form of protecting jobs.

In this question all the respondents were free to express their opinion on barriers that exist and prevent the transfer of knowledge within SANSA Space operations.

These barriers can be categorised as follows:

Categories of Barriers

- Trust and job security: Trust issues, fear of job loss, and job security concerns.
- Motivation and interest: Lack of interest, lack of accountability, and lack of recognition.
- Organizational culture: Lack of collaboration, cultural differences, and limited knowledge sharing.
- Leadership and support: Lack of leadership support and encouragement.

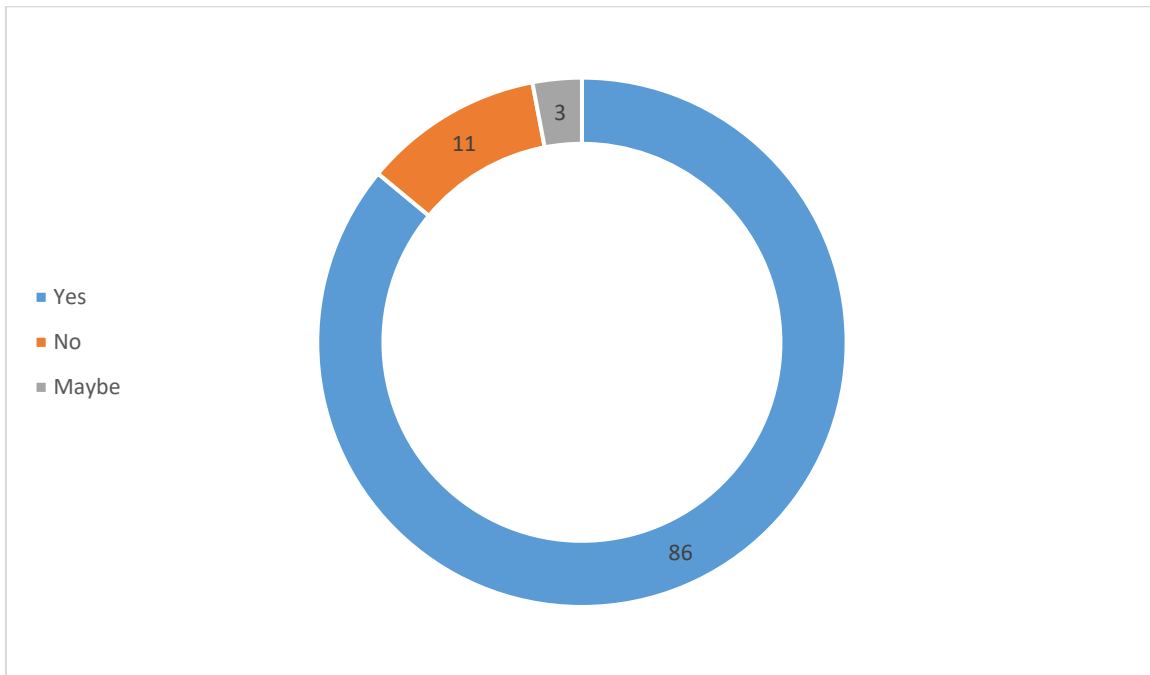
Ineffective knowledge transfer strategies can negatively affect knowledge creation and employee motivation (Heidi, 2020) [3].

<b>Question 9: Does age, culture and attitude of the employees play a role in the successful implementation of knowledge transfer in SANSA Space Operations? Elaborate.</b>	
<b>ID</b>	<b>Response</b>
Responded 1	Different backgrounds mean we view things differently. So, yes.
Responded 2	Yes, it does, although it shouldn't be the case.
Responded 3	Yes, depending on which era you come from knowledge sharing should not be spoon feeding.
Responded 4	Yes, how people interact with one another is influenced by the mentioned factors.
Responded 5	It does, some people are not willing to learn.
Responded 6	Yes, it influences the overall interaction between colleagues.
Responded 7	Younger employees may prefer to seek knowledge through digital channels, such as online tutorials or social media, rather than traditional methods like mentorship or formal training.
Responded 8	Yes, because people with a growth mindset and a willingness to learn are more likely to engage in knowledge sharing.
Responded 9	Very much so, different age groups approach things differently.
Responded 10	Older staff tends not to share knowledge, while the younger generation tends not to seek knowledge.
Responded 11	Yes, the older generation is more settled whilst the younger are still eager to learn.
Responded 12	Yes, especially culture.SA is a multi-culture country and that has a huge influence in how we work together.
Responded 13	I believe that if someone has the willingness to learn, they will demonstrate it to the knowledge transferrer. At the same time, it's the willingness of someone to share knowledge that was given to them to aid the goals and objectives set out by the organisation.
Responded 14	It does, as we are from different backgrounds, we might view thing differently, which often creates conflict.
Responded 15	It does as mentioned above.

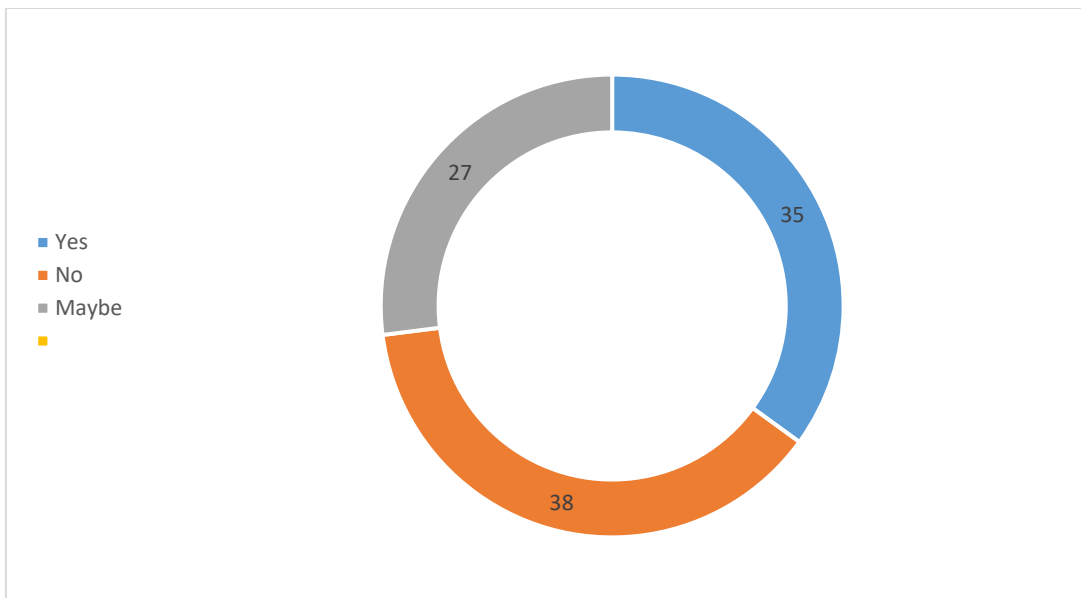
South Africa is a multi-cultural nation, and it's expected that South African workplaces will be multicultural as well. Multicultural workplace is defined as a workforce in which a wide range of cultural differences exist among the employees in the organization.... The most common traits used to identify the level of multiculturalism evident n a given workforce often boils down to age, sex, ethnicity, physical ability, race and sexual orientation (Kokemuller, 2020) [4].

The results from the second iteration of the study are shown in the figures below.

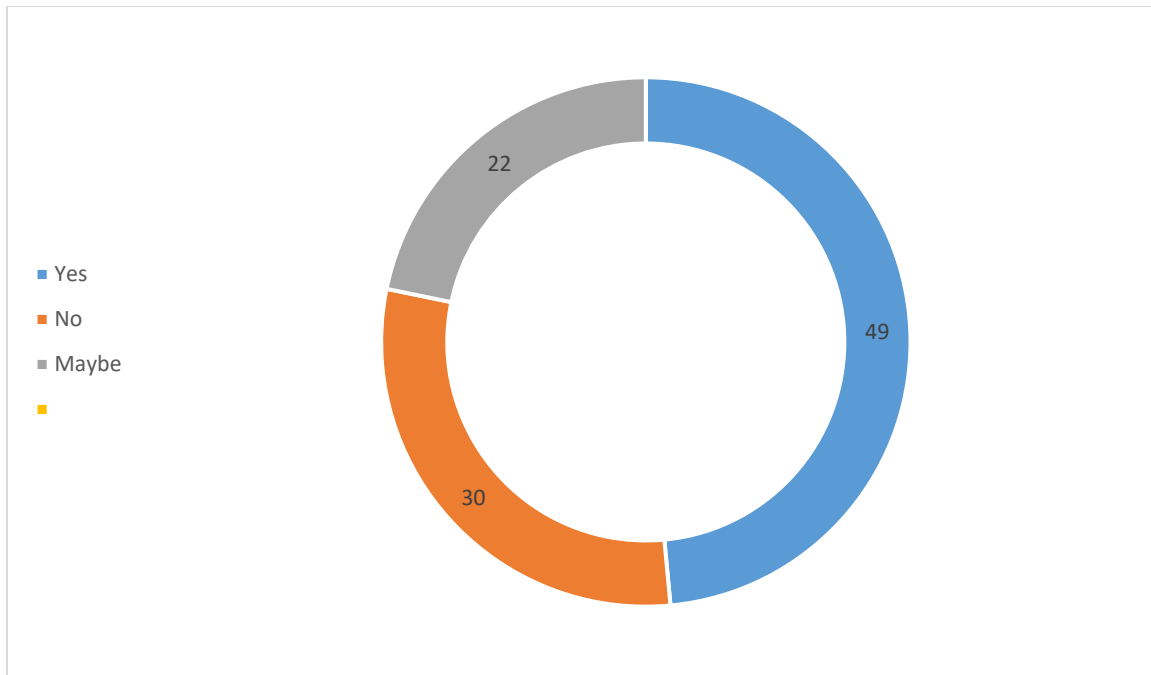
**Question 1: Do u understand what knowledge transfer is?**



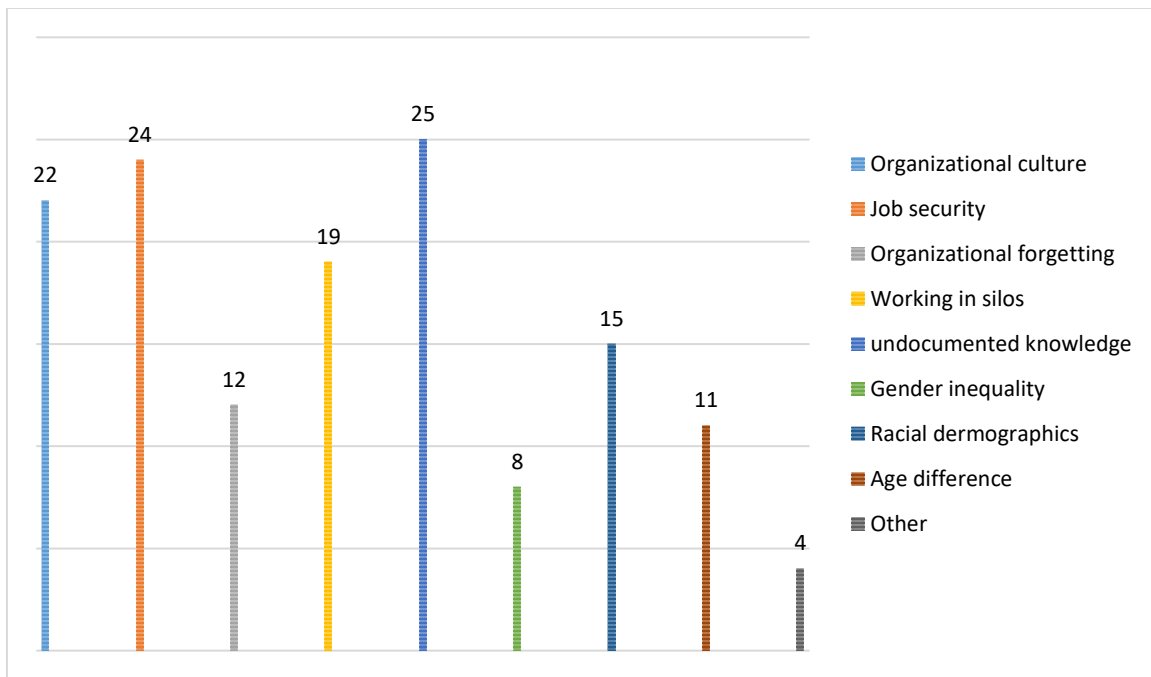
**Question 2: Do you think that organizational knowledge has been adequately shared with you?**



**Question 3: do you think the knowledge shared with you is sufficient for you to excel in your job?**



**Question 4: what do you think are the factors influencing knowledge transfer?**



This analysis explicitly reveals that undocumented knowledge is the primary obstacle hindering effective knowledge transfer within an organization. As initially asserted, the issue lies not in the absence of knowledge, but rather in the

inadequate collection, organization, and dissemination of critical knowledge and expertise. Furthermore, the second significant factor impeding knowledge transfer in an organization is job security that stems from a lack of trust.

#### Solutions to Enhance Knowledge Transfer

##### Undocumented Knowledge

1. Implement a knowledge management system: Create a centralized platform for documenting and storing knowledge, such as a wiki or document management system.
2. Conduct knowledge audits: Identify and document critical knowledge and expertise within the organization.
3. Establish a culture of knowledge sharing: Encourage employees to share their knowledge and experiences through regular meetings, workshops, or training sessions

##### Insecurity and Knowledge Hoarding

1. Foster a culture of trust and transparency: Encourage open communication and collaboration among employees.
2. Implement recognition and reward systems: Recognize and reward employees for sharing their knowledge and expertise.
3. Provide training on knowledge sharing: Educate employees on the benefits of knowledge sharing and how it can contribute to the organization's success.
4. Address job security concerns: Implement policies and procedures that ensure job security and stability, reducing the need for employees to hoard knowledge as a means of self-preservation.

**Table 3: Some results from the 2<sup>nd</sup> iteration of the study.**

Questions	Summary of response	Comments
What do you think should be done to enhance knowledge transfer in SANSA Space Operations?	Tacit knowledge and skill transfer must be encouraged, and the knowledge acquired must be documented and updated regularly.	38% of the responses emphasize that knowledge must be captured and documented.
What challenges do you anticipate in implementing knowledge transfer?	Resistance to safeguard jobs is anticipated as the most challenged in implementing knowledge transfer.	19% of the responses indicated that knowledge hoarding is because of job security.
What knowledge transfer system can be implemented in space operations to translate tacit knowledge from individuals into words, visuals, and processes that can then be shared with the team?	Extract tacit knowledge by assigning one/two personnel to work with the experienced knowledge carriers and document every activity and save it on cloud.	27% of the respondents alluded that tacit knowledge must be documented.
How can Space Operations manage its intellectual property/capital efficiently, i.e., knowledge?	Every knowledge acquired should be documented for reference and transferring purposes.	43% of the respondents suggested that knowledge should be documented and stored for future use.
Which existing system /platform can SANSA use effectively as a knowledge-based tool?	Microsoft Teams, as it is accessible by everyone, to store knowledge acquired and the maintenance system that can generate job cards as well as giving a person access to view previous work done and how it was done. Example: hbk-tsupport maintenance system for SANSA. Training must be provided to staff on how to use that system.	19% of the respondents mentioned that a system that can store the acquired knowledge and is accessible to staff, can generate job cards and give staff access to previous work done and how it was done, is required.

Sharing knowledge across the organization will have a positive impact, and in turn contribute to the sustainable growth and development of the business. By adopting a culture of collaboration and knowledge sharing, we can unlock the collective potential of our teams, drive innovation, and stay ahead of the competition. This, in turn, will enable us to expand our market share, explore new opportunities, and achieve long-term success.

## 5. Discussion

The results of the survey and interviews indicated that the organisational culture, job security, as well as a lack of policies and resources for knowledge transfer, were rated the highest factors influencing knowledge transfer in SANSO SO.

Some of the responses from the surveys and interviews indicated that the culture of the organisation does not encourage knowledge sharing, and certain staff might not be willing to share or transfer knowledge. Lack of trust and resistance can be foreseen as challenges anticipated in implementing knowledge transfer.

In summary, the study found that the strategies for capturing and transferring tacit knowledge in the organisation are lacking. The culture of the organisation was found not to support intentional tacit knowledge transfer. The study also revealed that diversity among employees, such as age, culture, attitude, race, etc., plays a role in hindering the transfer of knowledge.

The lack of formal knowledge management strategies was cited as the most significant barrier, with majority of respondents identifying it as a major obstacle. This finding suggests that SANSO SO needs to develop and implement formal knowledge management strategies to facilitate knowledge sharing and transfer.

The results also highlight the importance of documentation, knowledge mapping, and training and development in facilitating knowledge sharing and transfer. While these strategies were not universally effective, they were cited as being effective by a significant proportion of respondents. This finding suggests that SANSO SO should prioritize these strategies in their knowledge management efforts.

Currently, SANSO SO does not have a well-documented and formalised study to capture and transfer tacit knowledge. The following recommendations represent a crucial launching pad for management to consider, aiming to preserve critical tacit knowledge and facilitate a seamless succession plan process within SANSO SO.

### Recommendations

At the end of the study, the researchers are convinced that SANSO SO needs strategies and policies to transfer and share tacit knowledge. These strategies and policies need to cover not just the transfer but the whole suite of knowledge management.

#### Mentorship

- In SANSO SO, most employees do not have mentors within the organisation. Mainly, mentors are assigned to the Work-Integrated Learning trainers or the interns as part of their requirement for completing their studies. (Xu, et al., 2022) [5] cites (Kram, 1995 and Johnson, 1998), in defining mentoring as a process when “mentors provide all aspects of support to the participant, including a favourable guiding role in the process of instruction”. According to the authors, mentees gradually absorb and transfer knowledge, including explicit and tacit knowledge, such as fresh ideas and experiences from the mentors. This option incurs no additional costs, as the personnel are existing employees of the organisation. Nevertheless, both the mentor and mentee need to dedicate time. Careful consideration needs to be done for pairing to eliminate conflicts between the mentor and mentee that may occur because of improper pairing.

#### Authoring conferences /research papers

- SANSO SO engages in various conferences, not limiting international events, for an opportunity to disseminate knowledge and expertise. Knowledge transfer amongst staff members can be fostered by encouraging employees to author research papers, particularly in the technical domain. This can occur through direct collaborations, including joint research endeavours and information sharing, and can result in formation of new knowledge. An opportunity to author and present a paper can serve as motivation for employees, as these conferences are typically international, and SANSO SO covers the financial burden for authors whose papers have been accepted.

The study's findings have several implications for practice. Firstly, SANSO Space Operations should develop and implement formal knowledge management strategies to facilitate knowledge sharing and transfer. Secondly, SANSO Space Operations should prioritize documentation, knowledge mapping, and training and development in their

knowledge management efforts. Finally, SANSA Space Operations should recognize and reward employees for their contributions to knowledge sharing and transfer.

#### Limitations

This study has several limitations. Firstly, the sample size was relatively small, which may limit the generalizability of the findings. Secondly due to lack of participation from other employees, the researcher was forced to have more interns participating in the case study than permanent staff. Finally, the study did not examine the impact of knowledge management on organizational performance, which is an important area for future research.

#### 6. Conclusions

This study aimed to investigate the challenges and solutions of knowledge management in SANSA Space Operations. The results of the study highlight the importance of knowledge management in driving organizational performance and identify several barriers to knowledge sharing and transfer. The study's findings suggest that space organizations should prioritize knowledge management, develop and implement formal knowledge management strategies, and recognize and reward employees for their contributions to knowledge sharing and transfer.

The study contributes to the existing literature on knowledge management by providing insights into the challenges and solutions of knowledge management in space organizations. The study's findings have several implications for practice, including the need for space organizations to prioritize knowledge management, develop and implement formal knowledge management strategies, and recognize and reward employees for their contributions to knowledge sharing and transfer.

In conclusion, this study highlights the importance of knowledge management in space organizations and identifies several barriers to knowledge sharing and transfer. The study's findings have several implications for practice and future research and highlight the need for space organizations to prioritize knowledge management in their efforts to drive organizational performance.

#### Recommendations for Future Research

1. Further research is needed to explore the specific knowledge management strategies that are most effective in SANSA Space Operations.
2. Research is needed to examine the impact of knowledge management on organizational performance in space organizations.
3. Research is needed to develop and test knowledge management models that are tailored to the specific needs of SANSA Space Operations.

#### Recommendations for Practice

- 1 SANSA Space Operations should prioritize knowledge management in their efforts to drive organizational performance.
2. SANSA Space Operations should develop and implement formal knowledge management strategies to facilitate knowledge sharing and transfer.
3. SANSA Space Operations should recognize and reward employees for their contributions to knowledge sharing and transfer.

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