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Knowledge Management Strategy in Military Organization from a Socio-Technical Perspectives: A Royal Malaysia Navy Case Study

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ABSTRACT

This study examines the crucial role of Knowledge Management (KM) in enhancing organisational performance in Malaysian Armed Forces specifically within the Royal Malaysian Navy (RMN). Due to frequent staff rotations, significant expertise is often lost when experienced personnel transfer, retire, or leave the service. This loss can negatively impact fleet readiness and operational efficiency. Despite the importance of KM, the Malaysian Armed Forces, including the RMN, lack of comprehensive KM framework. The objective of this research is to develop a KM framework for the RMN, adopting a socio-technical approach that integrates people, processes, technology, and structure. This study employs a qualitative single-case research design and utilises semi-structured interviews with nine naval personnel onboard a ship at the Lumut Naval Base. Data from these interviews will be analysed using ATLAS. Ti software and themes will be identified through thematic analysis. Preliminary findings suggest that while certain KM initiatives are in place, overall KM implementation is rated as low to moderate. Additionally, the RMN lacks a structured KM Strategy and clear execution criteria. This study contributes to the development of a KM Strategy for the RMN which with the right leadership support, could facilitate its transition into a world-class navy and avoid knowledge loss.

Keywords: Military, Royal Malaysian Navy, Knowledge Management, KM Strategy, Socio-Technical Perspective.

1.0 INTRODUCTION

In the 21st century, KM is widely acknowledged as a tool for sustaining a competitive edge (Gupta & Chopra, 2018). Effective KM is crucial because, without it, organisations risk losing valuable expertise, insights, innovative solutions, and effective decision-making. The impact of knowledge loss on intellectual capital and human resources is significant at the individual, group, and organisational levels (Aslam et al., 2022). Identifying and capturing critical knowledge has now become essential for organisations due to the consistent loss of knowledge resulting from employees leaving (Massingham, 2018).

Similarly, for a military organisation, capturing domain expertise is vital for maintaining a competitive edge over adversaries (Mukesh & Vikas, 2020). Knowledge loss occurs when an individual with valuable expertise exits an organisation, negatively impacting organisational memory and leading to a decline in capability, output, and productivity (Ekundayo, 2022).

A major issue within the RMN is the lack of a structured strategy and technology for KM, as there are no established guidelines or references for its implementation. Furthermore, the Malaysian Armed Forces (MAF) faces a high personnel turnover rate (Roslan et al., 2019). Without a framework to document and share best practices, lessons learned, innovative approaches, and valuable insights gained over the years may be lost, resulting in inefficiencies and a decline in service quality.

Experienced professionals erode organisational information whenever they relocate to different departments or exit from employment. The research by Kianto et al. (2016) shows that successful KM leads to satisfied workers who deliver better organisational results. Knowledge loss causes the RMN to need more time and spending additional resources to manage operational problems. Personal mastery, together with knowledge retention and action learning, requires knowledge sharing, according to Mafabi et al. (2017). The departure of knowledgeable individuals produces the biggest adverse effect on MAF capabilities, which leads to decreased operational readiness alongside diminished readiness of existing fleets.

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The Royal Malaysian Navy, along with other modern forces, depends completely on protecting institutional knowledge and making full use of personnel experience. Essential to tackling the present complex battle space decisions are the accumulated battle-tested insights of military personnel. Failing to tackle knowledge management challenges leads directly to two major consequences where training expenses rise for recruits while mastery development extends for personnel development periods. Unfortunately, KM practices create a substantial obstacle that prevents the RMN from effectively executing its security protection responsibilities. The military needs a strong KM strategy which enables it to organise expert knowledge acquisition from seasoned personnel alongside sharing this knowledge with others, thus improving both operational performance and complete effectiveness. Keeping this knowledge base requires absolute priority.

1.1 Scope of the Study

The authors develop a KM strategy designed for the RMN during this research. The model draws its basis from the socio-technical perspective that stresses systems contain interrelated social and technical components. The framework acknowledges that people rely on technological systems to implement organisational processes effectively.

Within the military domain, the authors target the naval fleet as their research study site because its operational environment represents an intricate framework to analyse KM applications. Service operations within the naval fleet perform in vital domains that require quick technological progress along with well-informed decisions. A sophisticated KM system needs the evolution of knowledge to improve operational efficiency and decision-making capabilities within this setting.

The RMN faces failure as an effective armed force because unresolved KM challenges would render it unable to protect the country. Furthermore, knowledge loss in the military increases training and education costs for recruits extends the time needed to train competent personnel and creates additional operational inefficiencies. Developing a KM strategy enables military organisations to capture and retain the knowledge of experienced personnel, ensuring continuity, efficiency, and improved performance.

2.0 LITERATURE REVIEW

2.1 Knowledge Management (KM)

Knowledge Management (KM) is defined as the process of capturing, distributing, and effectively utilising knowledge (Al-Zoubi, 2018). On the other hand, Ehsan & Jafar (2019) elaborated on KM as a set of distinct and well-defined approaches aimed at identifying and managing both positive and negative critical knowledge functions across various operations. It also plays a role in identifying new products or strategies, augmenting human resource management, and achieving other highly targeted objectives.

Young (2018) defined KM as the discipline that enables individuals, teams, and entire organisations to collectively and systematically capture, store, create, share, and apply knowledge to better achieve their objectives. However, Fullwood & Rowley (2017) offered a different perspective, stating that KM involves making the right knowledge available to the right people at the right time. Due to the diverse perspectives on knowledge and knowledge management, there is no universally agreedupon definition of KM.

Knowledge is regarded as a valuable resource in the 21st-century global economy (AlHawamdeh, 2023; Gardner, Francesca, & Staats, 2012). Ananthram & Nankervis (2022) emphasised that knowledge, as an asset, and knowledge management, as a set of processes, have gained significant recognition in both strategic management and strategic human resource management literature. KM is considered a method to enhance performance and achieve a competitive business advantage.

Since knowledge is a crucial resource for organisations, it is essential to manage it effectively. Kianto et al. (2017) perceived KM as the integration of an organisation's cultural and technological processes. There are numerous benefits of KM for organisations, as it helps reduce operational costs and improve productivity. Furthermore, organisations can save time and manpower by avoiding the need to recreate existing knowledge and can easily access necessary information with the support of KM, organisations can make accurate and timely decisions without delays or obstacles.

Any organisation depends on tacit knowledge for both innovation development and competitive success. The persistent challenge in KM strategy involves the effective capture and distribution of tacit knowledge, according to Sensoy et al. (2020). The global academic community has developed multiple methods to resolve the problem at hand. Methods in KM differ based on organisational structure as well as cultural factors and workforce characteristics.

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Research defines KM as "a collection of infrastructure" used with processes, technology, and administrative tools that help organisations distribute knowledge internally and externally (Bounfour, 2023). Additionally, KM is viewed as "a continuous process of managing actionable knowledge that emerges through individual, team, and organisational learning to enhance performance" (Sunalai & Beyerlein, 2015). Dalkir (2013) defined KM as "the implementation of a comprehensive system to facilitate knowledge management within an organisation."

2.3 Socio-Technical Theory

The socio-technical theory is an approach to design that considers human, social, and organisational factors, along with technical factors, in the development of organisational systems. This theory extends throughout history to adhere to parallel analysis of system technical infrastructure and organisational operation. By implementing socio-technical methods, organisations gain an advanced comprehension of how people and social elements alongside organisational components determine work patterns together with the adoption of technical systems (Baxter, 2021).
The descriptive phrase "socio-technical" integrates the theoretical concepts of social and technical paradigms. This term established a wider organisational view of technology use that extended past both single paradigms' capabilities. Technology exists beyond its status as a technical artefact since individuals need to understand its nature through the social environment of operation (Rosmaini & Saufi, 2020). Knowledge management researchers show growing interest in organisational and social matters regarding information technology development and implementation and usage (Pan & Scarbrough, 2020).

The socio-technical theory implements a four-component model to create a connection between technology and processes along with people and organisational structure.

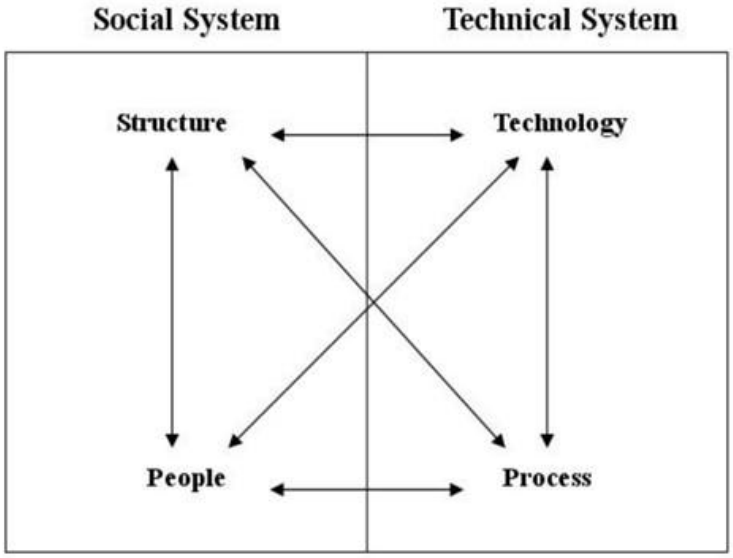

Figure 2.1: The Socio-Technical system theory

The four-component model within socio-technical theory establishes a connection between technology elements alongside people factors, process requirements, and organisational structure elements. An information system is classified as a socio-technical system that includes two distinct subsystems: first are technical elements that combine technology with processes, and second are social components that include structure and people. The steps an organisation follows to reach its objectives and fulfil its mission are referred to as a process, whereas technology represents the tools for collecting, processing, storing and spreading information. The system includes human resources personnel and all personnel who participate directly in maintaining the system together with human resources personnel who work toward efficiency improvement. Structure refers to the relationships among individuals within the people component and plays a crucial role in an information system, as systems often fail when they are resisted by their intended users (Laudon & Laudon, 2006).

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However, Tasmin & Saufi (2020) argue that when considering knowledge management in an organisation, a fifth component must also be considered: the environment in which the organisation operates. The environment affects how an organisation can be structured and determines the suitability of technology for that organisation. In the modern world, knowledge management has often been treated as an issue related to IT and information systems. Hubner (2022) emphasises that the "transformation of knowledge" is the most critical activity in a learning organisation, as only an organisation that continuously learns can truly manage its knowledge.

Numerous studies have applied socio-technical theory across various fields, including constructing knowledge and addressing foundational issues in engineering design, particularly where complexity challenges traditional design paradigms (Peter, 2020). Additionally, this theory has been widely used in smart city development in Europe (Luca et al., 2019) and even in military applications. As organisations continue to evolve, the socio-technical approach remains relevant in understanding and improving the interaction between human and technological systems.

2.4 Knowledge Management in Military Organization

In the military context, knowledge is defined as information that has been analysed to provide meaning, value, or insight into operational implications. It is also the comprehension gained through study, experience, practice, and human interaction that forms the foundation for expertise, skilled judgment, and precise decision-making (Sensoy et al., 2020). Military organisations have unique characteristics, including strict hierarchical structures, which require specialised methods to convert tacit knowledge into explicit knowledge. Recognising the potential of KM, some contemporary military establishments have taken steps to integrate KM into their doctrines and policies (Sullivan, 2021; Force, 2022). The North Atlantic Treaty Organization (NATO) has incorporated KM in its strategic vision, aiming to transform its military structure. The role of military personnel is gradually evolving, with knowledge workers becoming increasingly significant in military operations (McIntyre et al., 2023).

KM in military organisations involves a structured process that includes identifying, retrieving, evaluating, and sharing an organisation's knowledge to achieve mission objectives (Lis, 2014). Military institutions create doctrines, manuals, and other instructional materials to enhance training and education. One of the primary responsibilities of the armed forces is to maintain operational readiness in any given situation, making the capturing of domain expertise a fundamental requirement. This knowledge-centric approach has become a necessity for military organisations (Jabłonski & Lis, 2022). Notably, the Canadian Armed Forces (LFC2IS) and the Turkish Army (KARANET) have developed KM frameworks to enhance strategic knowledge management, ensuring operational superiority over adversaries (Champoux et al., 2015; Orhan, 2020).

Al Emran et al. (2018) argue that KM in military organisations encompasses the practices that generate and leverage knowledge, the technological infrastructure that supports knowledge capture and transfer, and an organisational culture that fosters knowledge sharing. Treating information and knowledge as valuable assets is critical in modern military strategy (Lausin et al., 2023; DiGiacomo, 2023). In the 21st century, military organisations worldwide must embrace KM as a strategic necessity to remain relevant and effective. Sminchise (2020) highlights that a significant proportion of skilled military officers leave service prematurely due to personal issues, limited career advancement, rigid hierarchical structures, and high-stress environments. However, when these officers depart, they take with them substantial institutional knowledge accumulated through years of personal and professional experience.

There are limited studies on KM within military organisations. A study conducted by the Department of National Defence and the Canadian Armed Forces suggests that while military KM aligns with corporate KM theories, it differs in terms of context, content, and pace (Rahman, 2019). Military KM is a strategic approach that leverages collective knowledge to achieve defence objectives through the processes of creating, gathering, organising, sharing, and transforming knowledge into action. The military operational environment necessitates a robust KM cycle that prioritises content quality and response speed. Research and development efforts in military KM must integrate these key elements for effective implementation.

KM has been identified as a critical growth area within Defence R&D Canada's Technology Investment Strategy (Defence R&D Canada, 2019). Three key factors have been identified to support knowledge superiority in military settings:

1. Advanced techniques and architectures for improved information and knowledge-sharing across military units.

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2. Knowledge modelling, discovery, and creation to enhance situational awareness through the study of human cognitive processes and effective knowledge representation.
3. Visualization and geospatial systems to improve the understanding of time- and space-related knowledge in complex environments.

These factors align with the KM cycle components, incorporating management, application, and personnel while addressing the unique demands of military KM. Current research highlights that KM solutions must extend beyond civilian frameworks, focusing on military-specific requirements such as resilience, precision, and speed. KM principles can significantly enhance situational awareness, sensemaking, and decision-making in military operations. By effectively structuring and managing knowledge, military organisations can create a common operational picture, improve interoperability, and refine intelligence gathering, training, and acquisitions. As a strategic initiative, KM will play a vital role in leveraging existing knowledge and transforming new insights into actionable strategies through the KM cycle.

The application of KM principles and methodologies in military environments influences both how new military technologies are utilised and how military doctrine evolves. Robust and effective KM implementation will require a combination of technological, cognitive, and socio-cultural solutions. Military organisations must recognise that KM is not just about information systems but also the transformation of knowledge into actionable intelligence. Commander Luoma (2020) states that in the 21st-century military landscape, KM will be a crucial enabler of organisational transformation. The U.S. military acknowledges the growing importance of knowledge superiority in Joint Vision 2020, emphasising information dominance as a core competency for future warfare (Joint Chiefs of Staff, 2000).

Several factors influence KM implementation in military organisations, including organisational culture, leadership commitment, technology adoption, governance structures, resource allocation, and external influences (Ejikeme et al., 2020). Ejikeme et al. (2020) further classify these influences into managerial, resource, and environmental factors. This study examines these three categories as key barriers to KM implementation in military settings. Given the challenges of military KM, research in this area must be tailored to specific sub-units within military organisations where KM initiatives or knowledge management systems are actively being implemented. The variability in KM approaches across different military branches—such as test & evaluation, medical services, and specialised combat units—provides a strong foundation for theoretical replication.
KM has become an indispensable strategy in modern military doctrine. Military organisations that successfully capture, store, and apply knowledge will gain a decisive advantage in future conflicts. Implementing a well-structured KM system ensures that valuable expertise remains within the organisation, strengthening operational effectiveness and maintaining strategic superiority in an evolving global defence landscape.

3.0 RESEARCH DESIGN

This research adopts a qualitative single-case study design focusing on the Royal Malaysian Navy (RMN). According to Yin (2017), “a case study is the method of choice when the phenomenon under study is not readily distinguishable from its context” (p.4). He further explains that a case study approach is appropriate when complex interactions occur between the phenomenon and its context. A case study design should be considered when: (a) the study aims to answer “how” and “why” questions;
(b) the researcher cannot manipulate the behaviour of participants; (c) contextual conditions are believed to be relevant to the phenomenon under study or (d) the boundaries between the phenomenon and its context are unclear.

The rationale for selecting a single-case study is that it allows the investigation to retain the holistic and meaningful characteristics of real-life events, such as individual life cycles, organisational and managerial processes, neighbourhood changes, international relations, and industrial developments (Yin, 2017). In this study, the focus is solely on one organisation—RMN. Baxter (2021) highlights that case study research goes beyond studying a single individual or situation. It can accommodate both simple and complex scenarios, allowing researchers to gather data from multiple sources and converge the data to illuminate the case.

This research also employs in-depth interviews with nine Navy personnel, including officers and sailors serving aboard a Navy warship at the Lumut Naval Base. A stratified sampling method was used to ensure representation across different ranks and roles. Participation in the interviews was voluntary, and respondents

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were provided with ethical approval information via consent forms, which they signed before participation. Participants were informed of their right to withdraw at any point if they felt uncomfortable.

A set of semi-structured questions based on socio-technical theory was developed to collect relevant data and insights for the study. The interviews were conducted one-on-one, and each session lasted approximately 45 minutes. A recording device was used to ensure accurate data collection. The respondents answered semi-structured queries about their understanding of KM in RMN as well as current KM initiatives and practices, knowledge capture processes and technology used for knowledge sharing, and other related elements throughout the interview sessions. The interview subjects received prompts to deliver expanded and detailed information, which enhanced the quality of the acquired information.

The interview sessions ended when the interviewees provided their responses, which were later transcribed and categorised. Open coding served as the initial stage before proceeding to thematic analysis for coding at the first level. Using open coding on the nine interview transcripts required a thorough analysis and assignment of codes to fragments of data such as words and lines and codes and examples. Analysis of coded data progressed with memos and interview notes that acted as the starting point for understanding code data relationships along with concept and category development while maintaining interpretive validity.The selected research design enables a thorough investigation of KM implementation in RMN, thereby producing an organised analysis of the studied phenomenon.

4.0 RMN KM FRAMEWORK

Figure 4.1 shows the KM framework for RMN. There are four major components in the framework, namely Navy personnel, Structure, Process and Technology.

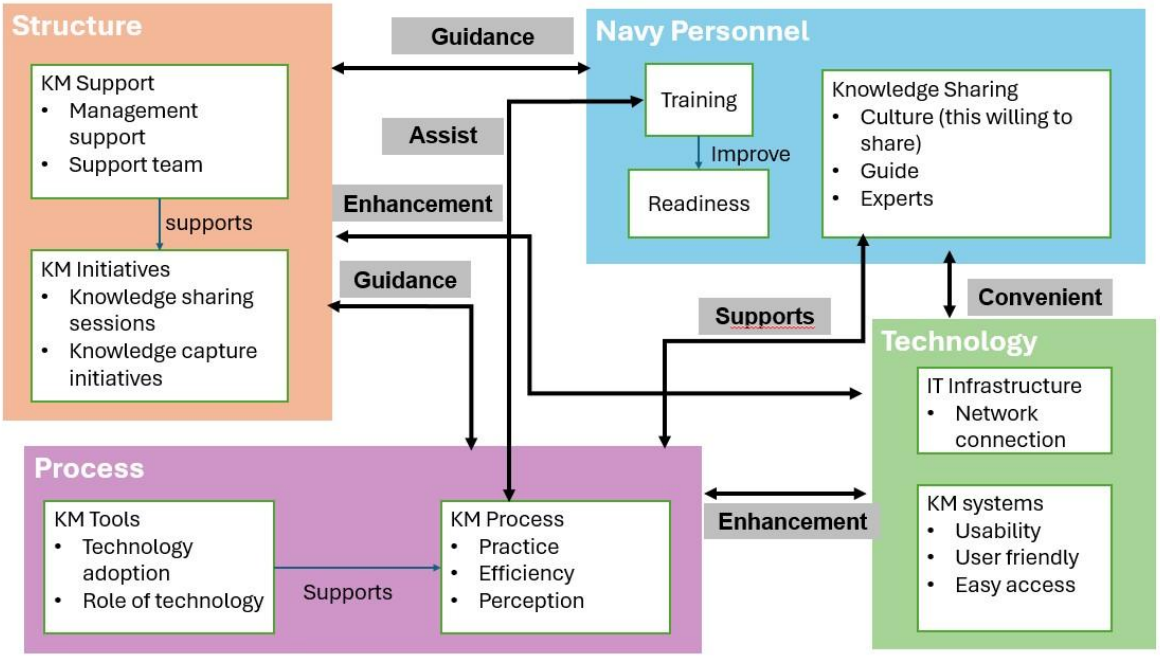

Figure 4.1: RMN KM Framework

4.1 Navy Personnel

Training with readiness and knowledge sharing defines the central scope of this framework due to its dedication to Navy personnel. Readiness enhancement through training programs prepares organisation members properly for their obligations. The organisation promotes knowledge sharing when personnel demonstrate a willingness to collaborate along with guided learning and professional expertise. Structure and Process together provide support to this section, while technology enables easier access to knowledge through modern technology systems. Navy personnel actively participate in maintaining a recurring cycle between readiness development and knowledge distribution.The Royal Malaysian Navy defines readiness through personnel along with equipment that executes operational tasks with high operational capabilities. The central task of training prepares personnel to face all operational challenges they might experience. The training provides naval personnel with all the essential technical proficiency and operational competencies needed to execute

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their responsibilities regardless of weapon systems management or navigational or communications system management. When training focuses on special skills, the resulting personnel proficiency reaches higher levels, which enhances their ability to execute tasks without errors during high-pressure events.

4.2 Structure

The Structure component implements KM management through its KM Support programs as well as KM Initiatives systems. KM Support consists of management backing and an organisational team that collaborates to advance both KM Initiatives as well as knowledge-sharing sessions and knowledge-capture initiatives. All elements of Navy Personnel, together with the KM Process, receive guidance and enhancement from this organisational framework.The goal is to create a supportive environment where knowledge can be effectively shared and retained within the organisation. Additionally, management support ensures the overall alignment of KM efforts with organisational objectives, while the support team facilitates KM activities such as knowledge-sharing sessions and knowledge-capture initiatives. Through structured relationships with other components, the structure provides KM processes and personnel with precise direction while constantly offering continued backing.The organisational structure remains vital for delivering smooth knowledge transmission that helps the Navy maintain and develop critical operational information.

4.3 Process

Implementation and effectiveness of KM take place through KM Tools and KM Processes, which form the Process component. KM Tools rely on technology adoption to manage knowledge, while technology roles determine knowledge management functions that enhance both KM Processes and operational practices and work efficiency and employee perception due to its links with Navy Personnel, this section creates improvements in training and knowledge-sharing capabilities for them. KM processes get their guidance from the Structure section while following organisational goals. The strategic goals of the Navy improve through efficient knowledge management practices, which lead to better operational effectiveness.

4.4 Technology

The KM system operates as a foundation through IT infrastructure and KM systems supplied by technology. Network connections within IT infrastructure grant proper functioning to KM systems. The systems emphasise usability together with user-friendliness alongside accessibility to make training and knowledge-sharing activities accessible to all Navy personnel. Through the Technology component, Navy Personnel can easily access knowledge management tools, which in turn boosts KM Processes and supports Navy Personnel activities. Integration of technology across knowledge management platforms allows the Navy to achieve streamlining of knowledge transfer as well as training effectiveness and readiness enhancement.

5.0 DISCUSSION

This framework presents structure together with process and navy personnel as well as technology in a systematic interaction to deliver effective knowledge management systems which boost training and preparedness and knowledge distribution capabilities of navy staff members. As a core component, the framework shows that knowledge management goes beyond storage, and it serves to enhance training quality together with readiness and decision-making abilities across the Navy. The organisation creates continuous learning and adaptive culture through aligned components, which ensures both personnel readiness and effective knowledge transfer for essential organisational tasks.

The framework's adoption will transform knowledge sharing into an effective improvement mechanism for the whole RMN organisation. Both RMN personnel and organisational members will work together to deploy comprehensive KM support projects through awareness programs as part of their defined KM structure. RMN personnel need a complete understanding of KM initiatives alongside their benefits for the plan to achieve success in implementation. The organisation will establish sharing platforms focused on Navy personnel involvement to enhance RMN performance through effective training, the KM process will become more efficient and enhance practices and perceptions, thereby improving organisational performance. The KM process applies various methods together with techniques which make knowledge management efficient. The required changes to these practices stem from technological progress, while organisational direction determines different final results KM received substantial support from both IT infrastructure and KM systems, which make KM accessible with greater convenience to all RMN Navy personnel. With the right technological support, the KM process and structure in RMN will be significantly enhanced.Furthermore, the organisational structure, as the top management of RMN, must make a strategic decision to implement KM with strong support and initiatives. By applying this framework, RMN will have a clear roadmap for optimising KM

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processes and guiding Navy personnel in effectively utilising knowledge to improve operational readiness and efficiency.

6.0 CONCLUSION

The findings from the case study and interviews indicate that while some KM initiatives are currently being practised in RMN, personnel perceive KM implementation as low to moderate. A key challenge identified is the lack of a structured KM strategy and clear execution guidelines, which hinders the effective application of knowledge management within the organisation. The outcome of this study is a KM strategy that RMN can adopt to enhance knowledge creation, sharing, usage, and management—all of which are critical to the organisation's success. This strategy provides a structured approach to capturing, storing, sharing, and utilising knowledge and information within RMN. McKinsey & Company research showed that businesses achieving successful KM practice operations reached 50% better employee productivity while getting 46% better employee engagement levels when compared to businesses without KM practice achievements.

As RMN implements a KM strategy, it enables the organisation to maintain valuable knowledge and distribute it among personnel, along with providing controlled access to necessary information. An effective KM strategy depends on steady procedures that link staff to useful information and enable teamwork, which allows RMN personnel to properly access existing expertise and content. The training schemes onboard Navy ships represent initial foundation stones for achieving wide-scale collaborative exchanges among RMN members.Success in Knowledge Management depends on organisational dedication to knowledge acquisition and sharing because its achievement requires technology frameworks together with collective organisational growth and individual staff conduct. The implementation of a successful KM strategy depends on organisational leadership alongside structured guidelines and an environment which supports knowledge sharing among its members.

The successful implementation of Knowledge Management in RMN requires an exact match of social components with procedural components, structural components, and information system components. For an environment of continuous learning to develop along with efficient knowledge sharing and collaborative work, an integrated alignment among these four elements is required. RMN achieves substantial operational readiness improvement through the integrated use of these components, which protects essential knowledge as well as enables its sharing and effective application for future organisational success.

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