Supply Chain Management within the South African Army

NM Hlatshwayo

orcid.org/0009-0000-2402-4283

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Supervisor: Prof J Meyer

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DECLARATION

I declare herewith that the assignment which I herewith submit to the North-West University in partial compliance with the requirements set for the Master of Business Administration (MBA) degree is my own original work, has been edited for professional communication standards, and has not already been submitted to any other institution for evaluation purposes.

Signature of student:	
Student initials and surname	N.M. Hlatshwayo
Student number	31555345
Date signed	27 November 2024

DEDICATION

This work is dedicated to my beloved family, whose unwavering support and encouragement have been my guiding light throughout this journey.

To my life partner, Samkelisiwe Trudy Nxumalo, thank you for your patience, love, and steadfast belief in me. Your encouragement has been my anchor during challenging times.

To my mother, Zodwa Madiba, and my sister, Palesa Madiba, thank you for your love and sacrifices, which have inspired me to persevere.

To my son, Senzo Zondani (Hlatshwayo), you are my motivation to create a brighter future. I hope this accomplishment serves as a foundation for you to build your own dreams.

This work is also dedicated to everyone striving to enhance our country's defense forces. May this study contribute in some way to the advancement of our military and inspire others to seek continuous growth and innovation.

Thank you all for being my strength and inspiration. This achievement is as much yours as it is mine.

PREFACE

The complexity and scale of military operations place significant demands on supply chain management (SCM), making it essential for ensuring operational readiness, efficiency, and resilience. In the context of the South African Army (SA Army), SCM encompasses procurement, storage, distribution, maintenance, and disposal of vital resources. These activities underpin the Army's capacity to respond effectively to both national security requirements and international peacekeeping mandates. However, the SA Army faces numerous challenges in maintaining an efficient and sustainable SCM system, especially within the framework of public sector regulations, budget constraints, and a dynamic security environment.

This study emerges from a critical need to evaluate and improve SCM practices in the SA Army, informed by both empirical insights and theoretical perspectives. Drawing on comparative analyses with leading global military supply chains, the study investigates the unique obstacles faced by the SA Army and explores innovative strategies to strengthen its SCM practices. Through a structured examination of current processes, including the challenges posed by resource dependency, regulatory pressures, and outdated infrastructure, this research provides an actionable framework for optimising SCM in the Army.

Conducting this study has highlighted the commitment and expertise of the personnel engaged in SCM within the SA Army, who contribute significantly to maintaining the Army's operational effectiveness despite various constraints. This research also underscores the importance of adopting global best practices and modern technologies to address SCM challenges comprehensively. I hope that the findings and recommendations presented here will contribute to building a more robust, transparent, and resilient supply chain system within the SA Army, ensuring it can meet both present and future demands effectively.

This study could not have been completed without the support and cooperation of various SA Army personnel and stakeholders. I express my deepest gratitude to all participants who provided valuable insights and feedback, and to my academic mentors who guided me throughout this research journey.

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ABSTRACT

This study investigates the challenges and opportunities for enhancing Supply Chain Management (SCM) within the South African Army (SA Army). Efficient SCM is essential for maintaining the SA Army's operational readiness, especially under budget constraints and complex logistical demands. Using a quantitative approach, data were collected from SA Army personnel involved in SCM activities across multiple units. Findings highlight key challenges, including budget limitations, procurement inefficiencies, outdated infrastructure, and a reliance on external suppliers. Comparative analysis with international military practices reveals potential areas for improvement, such as increased automation, streamlined procurement processes, and enhanced training. Recommendations emphasise adopting digital solutions, forming strategic alliances, investing in predictive maintenance, and implementing environmentally responsible disposal practices. By addressing these areas, the SA Army can strengthen its SCM operations and better meet the demands of modern military logistics.

Key Terms

Supply Chain Management (SCM): The management of the flow of goods, services, and information within the SA Army to ensure timely availability of resources.

Operational Readiness: The SA Army's ability to maintain prepared and functional forces capable of responding to various missions.

Procurement: The process of acquiring goods and services necessary for military operations, often subject to regulatory and logistical challenges.

Predictive Maintenance: Proactive maintenance strategy aimed at anticipating equipment failures to improve operational continuity.

Digital Transformation: The adoption of digital technologies within SCM to streamline processes and enhance efficiency.

Strategic Partnerships: Alliances with external suppliers and defense contractors to diversify resource availability and improve procurement.

Disposal Practices: Methods for managing the end-of-life of military assets, emphasising environmental responsibility and security.

Resource Dependency Theory (RDT): Theoretical framework examining how organisations rely on external suppliers and the strategic implications.

Institutional Theory: Theory that explores how regulatory environments impact SCM processes in the public sector.

Public Finance Management Act (PFMA): Legislation governing financial management in the public sector, affecting procurement processes within the SA Army.

This summary provides a concise overview of the study's aims, findings, and strategic recommendations for improving SCM in the SA Army, along with relevant key terms to aid understanding.

LIST OF ABBREVIATIONS

ASB	Army Support Base
B-vehicle	General service vehicles used by the military
DOD	Department of Defence
DLA	Defence Logistics Agency (U.S.)
DRC	Democratic Republic of Congo
GOC	General Officer Commanding
IDF	Israeli Defense Forces
IT	Information Technology
LCA	Life Cycle Assessment
MOU	Memorandum of Understanding
NATO	North Atlantic Treaty Organization
NCO	Non-Commissioned Officer
PFMA	Public Finance Management Act
PME	Primary Military Equipment
PSM	Procurement and Supply Management
R&D	Research and Development
RBT	Resource-Based Theory
RDT	Resource Dependency Theory
SA Army	South African Army
SANDF	South African National Defence Force
SCM	Supply Chain Management
SITA	State Information Technology Agency
TCT	Transaction Cost Theory
TSC	Technical Service Corps
UN	United Nations

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CHAPTER 1 INTRODUCTION

1.1. Background of the study

In the context of the military, Supply Chain Management (SCM) SCM is the systematic coordination of military goods, services, and information from suppliers to end-users, specifically military units. This process is critical for guaranteeing the timely availability of essential supplies, such as equipment, ammunition, food, and fuel, to effectively support military operations. SCM in the military includes various functions such as procurement, storage, distribution, and maintenance of materials necessary for both combat and peacetime operations. The logistics involved in military SCM are particularly intricate, as they must ensure operational readiness in a range of unpredictable and diverse environments (Sweeny, 2011:57).

As noted by Apte (2010:6), military supply chain management transcends conventional logistics roles by merging operational needs with logistical strategies, thereby facilitating the efficient and effective transportation of personnel and equipment in times of peace, conflict, and humanitarian efforts. The distinctive characteristics of military supply chains necessitate particular attention to aspects such as security, swift deployment, and the ability to adapt to constantly evolving operational requirements.

Military operations necessitate thorough planning and sufficient resources to support troops in the field. The effectiveness of any military endeavour is largely contingent upon a dependable supply of essential materials, including ammunition, fuel, food, and shelter. Inadequate logistics can undermine morale, discipline, and overall operational success, whereas a well-functioning logistics framework can confer a strategic advantage by ensuring that personnel at all levels are adequately equipped to function autonomously (Vos, 1994:2-1).

The notion of supply chain management (SCM) originated in the private sector as a vital strategy for achieving competitive superiority. A study by Deloitte and Touche (2002:271) revealed that 98% of respondents considered SCM crucial for cost reduction. In the public sector, effective SCM enables agencies to allocate resources efficiently, thereby enhancing value, lowering expenses, and improving customer satisfaction. This principle is equally relevant to the Department of Defence (DOD), where effective SCM can lead to substantial cost savings and enhanced service delivery (Lau et al., 2002:271).

In 1994, the Department of Defence (DOD) initiated the formation of a centralised logistics agency under the leadership of the Chief of Joint Support, with the objective of delivering comprehensive support across all DOD operations, both internally and externally. This initiative aimed to enhance

the efficiency of logistics management, which had previously been conducted by individual service branches that provided specialised assistance. The centralised logistics agency was tasked with responsibilities that included supply support, addressing domestic logistics needs, and facilitating support for both internal and external operations (Wessels, 2017:3).

The implementation of the Supply Chain Management (SCM) system across various government departments and public entities in December 2003 was designed to establish a uniform procurement strategy throughout the public sector. The Public Finance Management Act (PFMA) requires public sector organisations, including the DOD, to adopt comprehensive SCM practices that encompass demand management, acquisition management, logistics management, disposal management, risk management, and ongoing performance assessment (Framework for Supply Chain Management, 1999:2). Within this framework, the South African Army is tasked with ensuring a robust and effective logistics system that not only supports its operations but also adapts to contemporary challenges, thereby maintaining operational readiness in an evolving threat landscape (SA Army Vision 2045, 2017:1-2).

The maintenance system established within the South African Army was designed to facilitate the efficient transfer of goods from external suppliers to deployed forces via a network of depots. However, over time, disruptions in the supply chain have hindered deployed forces from fulfilling their operational responsibilities, underscoring the necessity for a dependable and effective logistics system within the South African Army. Effective supply chain management within the DOD can lead to cost savings and enhanced value, thereby contributing to the overall success of the South African Army's mission (Heizer et al., 2019:476; Lenzini, 2002:11; Vos, 1994:2-1).

To contextualize the scope of this research, it is important to note that the study is confined to the South African Army and specifically focuses on six core components of supply chain management: acquisition, procurement, storage, distribution, maintenance, and disposal. The research was conducted between October 2024 and November 2024 and included selected Army Support Bases (ASBs) and Maintenance Units under the command of the SA Army Support Formation, explicitly excluding other arms of service such as the SA Navy, Air Force, and Military Health Service. Respondent composition consisted of 495 participants, drawn from various ranks and units, who are directly involved in supply chain management processes such as logistics officers, procurement clerks, storemen, and maintenance personnel. Data was collected through a structured Likert-scale questionnaire distributed physically and electronically, ensuring both breadth and depth of responses. Furthermore, a comparative analysis was incorporated to benchmark the SA Army's SCM practices against those of leading global militaries such as the United States, United Kingdom, Israel, Germany, and Russia. The study emphasizes internal

SCM operations and does not extend to external suppliers or contractors beyond state-owned entities like Denel and ARMSCOR. As such, the findings and recommendations are intended to address logistical inefficiencies within the SA Army's landward operational environment, informed by the lived experiences of its SCM personnel.

1.2. Problem Statement

The South African Army (SA Army), an integral component of the South African National Defence Force (SANDF), is responsible for maintaining combat-ready units for both domestic and international missions. A fundamental aspect of achieving this objective is the effective management of its supply chain, which is essential for the prompt and economical procurement of goods and services necessary for deployed personnel. Despite the implementation of supply chain management (SCM) practices and outsourcing initiatives, the SA Army continues to encounter considerable obstacles in its procurement operations. These obstacles contribute to heightened procurement expenses, inefficiencies in the acquisition of goods and services, and a lack of transparency in procurement processes (Heizer & Render, 2008:434; Moeti et al., 2007:123).

Inefficiencies in procurement are intensified by heavy dependence on external organisations, such as ARMSCOR and private multinational companies, resulting in escalated costs. Although there have been attempts to adhere to the Public Financial Management Act (PFMA) and SCM guidelines, the SA Army has faced challenges in executing equitable, competitive, and cost-efficient procurement practices. Instances of these inefficiencies include the excessive pricing of personal protective equipment during the COVID-19 pandemic and the payment of leases for unoccupied office spaces, both of which contravene PFMA regulations (DOD Annual Report, 2022:162).

The logistics and distribution framework of the South African Army is further complicated by several factors, including inadequate personnel, insufficient infrastructure, and subpar equipment maintenance. These challenges are exacerbated by a lack of adequate funding, resulting in a mere 60% serviceability rate for logistics services and suboptimal customer service (Kruys, 2008:6). Furthermore, the maintenance and repair of obsolete equipment, which is ill-suited for peacekeeping operations, have led to financial setbacks for the South African Army, despite attempts at reimbursement from the United Nations based on the serviceability of the equipment (Kruys, 2018:9).

In addition, the disposal of military assets raises significant sustainability and environmental concerns. The frameworks of the "Triple Bottom Line" and Life Cycle Assessment (LCA) highlight

the importance of integrating economic, environmental, and social considerations in the equipment disposal process. The absence of comprehensive disposal strategies within the South African Army poses risks of environmental degradation and financial losses (Elkington, 1997:70; Graedel & Allenby, 2010:45).

Consequently, the supply chain management system of the South African Army encounters ongoing challenges in procurement, logistics, maintenance, and disposal, resulting in financial inefficiencies and operational difficulties. It is imperative to address these issues to improve the South African Army's capacity to effectively execute its mandate.

1.3. Research Questions

The South African Army (SA Army) is integral to maintaining national security, with its combat-ready units deployed both domestically and internationally. The successful execution of its responsibilities is significantly reliant on an efficient supply chain capable of procuring and delivering vital goods and services to its personnel promptly and economically. Despite the adoption of supply chain management (SCM) practices and outsourcing initiatives, the SA Army continues to face ongoing challenges in its procurement and logistics operations.

These issues have led to increased procurement expenses, operational inefficiencies, and disruptions, highlighting the necessity for a thorough examination of the supply chain management framework. The intricate nature of the Army's supply chain, coupled with various organisational, technological, and regulatory limitations, has raised several important questions that this research intends to explore. By pinpointing the primary challenges, analysing the facilitators and obstacles, and suggesting practical strategies for enhancement, this study aspires to offer insights that will improve the efficiency and effectiveness of the SA Army's supply chain management system. The following research questions will guide the study:

- What are the primary obstacles encountered in supply chain management within the South African Army?
- What factors contribute to the complexities and inefficiencies within the Army's supply chain processes?
- What are the underlying factors that exacerbate challenges within the supply chain management of the South African Army?
- How do the organisational structures, technological limitations, and resource constraints contribute to the difficulties faced in supply chain management?

- What factors hinder the smooth functioning of supply chain management in the South African Army?

- How do bureaucracy, communication breakdowns, and regulatory constraints impede the effectiveness of supply chain operations?

- What strategies can be implemented to address the identified obstacles and improve supply chain management within the South African Army?

- How can optimising processes, integrating technology, and collaborating with external stakeholders help overcome supply chain hurdles in the South African Army?

1.4. Research Objectives

The South African Army, an integral part of the South African National Defence Force, depends significantly on a robust supply chain to maintain its combat readiness for both domestic and international missions. Nevertheless, ongoing challenges such as procurement inefficiencies, logistical hurdles, and operational interruptions have consistently hindered the Army's capacity to fulfil its supply chain goals. These challenges, exacerbated by intricate organisational frameworks, technological shortcomings, and regulatory limitations, underscore the necessity for a comprehensive investigation into the underlying causes of these issues. In light of the research questions identified, a set of objectives has been established to steer this inquiry. These objectives are designed to examine the key impediments, contributing elements, and obstacles within the supply chain management system of the South African Army, while also pinpointing actionable strategies for enhancement. By tackling these issues and suggesting viable solutions, the study aims to improve the Army's supply chain management practices, thereby bolstering operational readiness and efficiency. The following objectives outline the focus of this research:

- To identify the primary obstacles encountered in supply chain management within the South African Army.

- To analyse the elements that contribute to the complexities and inefficiencies experienced in the Army's supply chain processes.

- To investigate the underlying factors that exacerbate the challenges within the supply chain management of the South African Army.

- To examine how organisational structures, technological limitations, and resource constraints contribute to difficulties in supply chain management.

- To assess the factors that hinder the smooth functioning of supply chain management in the South African Army.

- To explore how bureaucracy, communication breakdowns, and regulatory constraints impede the effectiveness of supply chain operations.

- To propose strategies that can be implemented to address the identified obstacles and improve supply chain management within the South African Army.

- To evaluate how optimising processes, integrating technology, and collaborating with external stakeholders can contribute to overcoming supply chain hurdles in the South African Army.

1.5 Scope of the Study/Delimitations

The study focused on Operations Management, with a particular emphasis on Supply Chain Management within the South African Army. It investigated the security cluster of the South African National Defence Force (SANDF), also referred to as the Department of Defence (DoD). Geographically, the study covered all nine provinces of South Africa.

1.6 Contribution of the Study

This study makes several significant contributions to the field of military logistics and supply chain management (SCM), particularly within the South African Army (SA Army). It provides valuable insights into the unique challenges faced by military SCM and offers actionable recommendations tailored to the specific needs and constraints of the SA Army. The study's contributions can be summarised as follows:

- **Insight into Military-Specific SCM Challenges**: This research sheds light on the distinct supply chain challenges faced by military organisations, which differ from those in the private sector due to factors such as operational unpredictability, stringent security requirements, and the need for quick adaptability in varied environments. By examining these unique challenges within the SA Army, the study contributes to a better understanding of military SCM and highlights the areas that require specialised approaches.

- **Identification of Operational Inefficiencies**: Through an in-depth analysis of the SA Army's SCM processes, this study identifies key areas of inefficiency, such as lengthy procurement cycles, outdated disposal practices, inadequate training, and reliance on a limited supplier base. These findings provide a clear picture of where improvements are needed, allowing the

SA Army and other military organisations to focus their efforts on addressing these specific inefficiencies.

- **Recommendations Grounded in Both Practical Experience and Comparative Analysis**: The study's recommendations are informed not only by general SCM theory and best practices from leading global militaries but also by firsthand feedback from SA Army personnel actively involved in supply chain operations. This dual approach enhances the practical relevance of the recommendations, ensuring that they address the real-world needs and constraints faced by SCM personnel.

- **Contribution to Policy and Strategic Planning**: The recommendations made in this study can serve as a foundation for policy changes and strategic planning within the SA Army and the broader South African National Defence Force (SANDF). For example, the proposed improvements in procurement transparency, budget management, and predictive maintenance can inform policy reforms aimed at modernising and streamlining SCM practices. The study also highlights the importance of interdepartmental collaboration and resource-sharing agreements, which can influence strategic partnerships at a government level.

- **Advancement of Knowledge in Military SCM Research**: Military SCM remains an under-researched area, especially in the South African context. This study adds to the limited body of knowledge on SCM within the SA Army, offering insights that could be valuable for future studies and providing a basis for comparison with other military organisations in Africa and beyond. The study also highlights gaps in the current research, suggesting areas for further investigation, such as the impact of digital transformation and sustainable practices on military SCM.

- **Practical Implications for Improved SCM Training and Development**: The study emphasises the need for enhanced SCM training and development programs tailored to the military context. By identifying skill gaps and recommending targeted training initiatives, this research contributes to the professionalisation of SCM personnel within the SA Army, ultimately leading to a more competent and effective workforce.

- **Guidance for Future Military SCM Innovations**: Finally, this study offers guidance on incorporating technology and modern SCM practices, such as predictive maintenance, sustainable disposal, and automated inventory management, within a military logistics framework. These insights encourage the SA Army to explore innovative solutions, adopt best

practices from other global militaries, and gradually transform its SCM operations to meet the demands of modern military logistics.

In summary, this study provides both theoretical and practical contributions to the understanding and enhancement of SCM within the SA Army. By addressing the unique challenges of military SCM and offering well-grounded recommendations, the study serves as a valuable resource for policymakers, military leaders, and SCM practitioners within the SA Army and other military organisations facing similar supply chain challenges.

1.7 Limitations of the Study

While this study provides valuable insights into supply chain management (SCM) practices within the South African Army (SA Army), it is not without limitations. Recognising these limitations is important as they provide context to the findings and highlight areas for caution in interpreting the results. The following limitations were identified:

- **Restricted Scope of Analysis**: This study focused exclusively on the SA Army's SCM operations, which may limit the generalisability of findings to other branches of the South African National Defence Force (SANDF) or international military organisations. The challenges and recommendations identified in this study may not fully apply to other military contexts or civilian organisations with different operational environments and logistical requirements.

- **Reliance on Respondent Feedback**: The study's recommendations were largely derived from the feedback of respondents actively involved in SCM within the SA Army. Although this feedback provided practical insights, it also introduced potential biases. Respondents' perceptions and personal experiences may not represent the full scope of SCM challenges or may have been influenced by individual frustrations or workplace dynamics. Consequently, the recommendations based on this feedback should be interpreted with caution.

- **Limited Access to Comprehensive Data**: The study was conducted under conditions where certain detailed and classified information on SCM practices, budgeting, and procurement processes could not be disclosed due to security restrictions. This limited access to comprehensive data may have resulted in an incomplete view of the SA Army's SCM operations. The lack of specific data may have also restricted the depth of analysis on certain SCM areas, such as budget allocation and procurement timelines.

- **Time Constraints on Data Collection**: Data collection for this study was conducted over a limited period, which may have impacted the depth and breadth of responses. The short

timeframe could have affected the ability of some respondents to provide thorough feedback, especially if they were in high-demand roles or were not able to reflect fully on their SCM experiences. A longer data collection period might have allowed for a more comprehensive dataset.

- **Use of Self-Reported Data**: Self-reported data, collected via questionnaires, introduces the possibility of response bias, as respondents may have tailored their answers to appear favorable or align with expected norms. This could impact the accuracy of the findings, particularly in areas where personal opinions or perceptions of SCM processes were central to the analysis.

- **Lack of Longitudinal Data**: The study provides a snapshot of SCM practices within the SA Army at a particular point in time, rather than a longitudinal analysis. As a result, the study does not capture the evolution of SCM practices or long-term trends, which may be relevant for understanding how SCM challenges and opportunities change over time.

- **Comparative Limitations with Other Militaries**: Although the study included a comparative analysis of SCM practices in other leading militaries, the comparison was limited to publicly available data and literature. The lack of direct access to SCM personnel in other militaries may have restricted the study's ability to draw nuanced comparisons, particularly in areas where proprietary or classified logistics practices are involved.

- **Limited Focus on Technological Integration**: While the study touched on the need for technological improvements in SCM, it did not delve deeply into specific technologies or digital transformation strategies, partly due to the scope of the study. As a result, the technological recommendations may lack detailed insights on specific digital solutions or software that could address the SA Army's logistical challenges.

- **Influence of Budgetary Constraints**: The study highlighted budget limitations as a significant challenge for SCM within the SA Army. However, the analysis did not extend to a detailed budgetary review, and thus could not provide specific guidance on optimal budget allocation or cost-saving measures. Further research with a financial focus could better address this area.

- **Potential Gaps in Respondent Representation**: Although the study aimed to include a diverse range of ranks and roles, it is possible that some segments within the SA Army's SCM personnel were underrepresented. This could have impacted the comprehensiveness of the

findings, as certain operational levels or functions within SCM may not have been fully captured.

Conclusion

Despite these limitations, the study offers valuable insights and practical recommendations for improving SCM in the SA Army. Acknowledging these limitations also highlights opportunities for future research to build upon this work. By addressing these gaps, future studies can provide a more comprehensive and nuanced understanding of SCM within military contexts, ultimately contributing to a more resilient and effective logistics framework for the SA Army and other defense organisations.

1.8 Layout of the Study

The study is organised into several chapters, each addressing key aspects of the research on supply chain management (SCM) within the South African Army (SA Army). This structure provides a logical flow from the initial conceptualisation of the study to the final recommendations and conclusions.

Chapter 1: Introduction

This chapter introduces the background of the study, establishing the importance of SCM in the SA Army. It includes the problem statement, research questions, research objectives, and the scope of the study. This chapter sets the context for the study and outlines the rationale for investigating SCM challenges within the SA Army.

Chapter 2: Literature Review

This chapter reviews relevant literature on SCM theories and practices, including Resource-Based Theory, Institutional Theory, Resource Dependency Theory, and Transaction Cost Theory. It also examines SCM in the public sector and military contexts, discussing unique logistical demands and operational challenges. The chapter includes a comparative analysis of SCM practices in leading global militaries to provide benchmarks for improvement in the SA Army.

Chapter 3: Research Methodology

This chapter outlines the research methodology used to investigate SCM challenges in the SA Army. It describes the research paradigm, approach, and strategy, as well as details about the population and sampling, data collection methods, and data analysis techniques. This chapter

also discusses the reliability and validity of the study, ethical considerations, and potential conflicts of interest.

Chapter 4: Findings and Discussion

In this chapter, the key findings from the data collected are presented and analysed. It provides insights into the current state of SCM within the SA Army, including challenges in procurement, storage, distribution, maintenance, and disposal. These findings are discussed in relation to the theoretical frameworks from the literature review, and comparisons are drawn with SCM practices in other militaries.

Chapter 5: Recommendations and Conclusion

This chapter offers practical recommendations for improving SCM within the SA Army, derived from the findings, observations, and comparative analysis. It includes recommendations based on respondent feedback and proposes policy and practice changes to address identified challenges. This chapter also includes sections on the limitations of the study, contributions of the study, and recommendations for future research.

References

A comprehensive list of all the sources cited throughout the study, following the Harvar method of referencing style.

Appendices

This section includes supplementary materials, such as the questionnaire used for data collection.

This structured layout facilitates a systematic exploration of SCM within the SA Army, leading from problem identification to actionable recommendations, while ensuring that each component of the study is comprehensively addressed.

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

Supply chain management (SCM) is a critical component of military operations, providing the necessary support to ensure forces remain equipped, mobile, and ready for deployment. For the South African Army (SA Army), SCM encompasses the acquisition, procurement, storage, distribution, maintenance, and disposal of military resources. However, various factors, including limited funding, dependency on external suppliers, and regulatory constraints, pose significant challenges to the Army's SCM effectiveness. Understanding and addressing these issues is essential to improving operational readiness and achieving strategic objectives (Cawthra, 1997:165; Defence Review, 2015: xii; Vision 2045, 2017:1-7).

This chapter reviews the theoretical frameworks and existing literature related to SCM in the public and military sectors, with a specific focus on the SA Army. The chapter begins by examining theoretical perspectives, including Resource-Based Theory (RBT), Institutional Theory, Resource Dependency Theory (RDT), and Transaction Cost Theory (TCT). Each framework provides a unique lens for analysing SCM challenges and identifying strategies to enhance performance. For instance, RBT emphasises leveraging internal resources and strategic alliances (Barney, 1991:99), while Institutional Theory highlights the impact of regulatory environments on SCM processes (DiMaggio & Powell, 1983:147).

Following the theoretical review, the chapter explores SCM practices within the public sector, noting the differences between public and private sector objectives (Harland et al., 2007:3). The review then delves into SCM in the military context, addressing the unique logistical, security, and operational demands that shape military supply chains. Further, the chapter investigates specific SCM challenges facing the SA Army, including financial constraints, infrastructure deficiencies, technological gaps, and issues in strategic planning and coordination (Kruys, 2008:22; DOD Annual Report, 2022:162; Defence Review, 2015: xi). The Vision 2045 strategic plan outlines the SA Army's goals for addressing these challenges through digitisation, infrastructure development, and strategic partnerships (Vision 2045, 2017:1-3).

To gain insights into potential improvements, the chapter conducts a comparative analysis of SCM practices among global militaries, including the United States, United Kingdom, Russia, Germany, and Israel. This comparison highlights best practices in provisioning, acquisition, storage, distribution, maintenance, and disposal that could inform enhancements within the SA Army's SCM framework (Smith, 2020:112; Johnson & Roberts, 2018:8; Ivanov & Petrov,

2021:57). Ultimately, this literature review establishes a foundation for understanding the current SCM landscape within the SA Army and identifies areas where the adoption of international best practices and theoretical insights could drive improvements in efficiency, responsiveness, and overall military readiness.

2.2. Theoretical Framework

The supply chain management (SCM) challenges faced by the South African Army (SA Army) can be better understood by examining various theoretical frameworks. These frameworks offer comprehensive insights into the complexities, inefficiencies, and strategic measures that can improve supply chain performance in the military context.

2.2.1. Resource-Based Theory (RBT)

The Resource-Based Theory (RBT), articulated by Barney (1991:99), posits that organisations can achieve and sustain competitive advantage by effectively utilising their valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities. In the context of the South African Army (SA Army), RBT implies that by optimising and leveraging its internal resources such as skilled personnel, depot infrastructure, and long-standing partnerships with state-owned defence suppliers like Denel and ARMSCOR the organisation can strengthen its supply chain. However, the Army's over-reliance on a limited set of internal assets and its constrained manufacturing capabilities present significant challenges. These limitations necessitate the pursuit of strategic partnerships with international defence firms to acquire specialised equipment and spares that cannot be sourced internally. Therefore, RBT not only advocates for better utilisation of existing assets but also supports the need to expand the Army's resource base through external alliances, thereby enhancing operational readiness and procurement efficiency.

2.2.2. Institutional Theory

Institutional Theory, as developed by DiMaggio and Powell (1983:147), examines how organisations conform to the formal and informal rules, norms, and expectations imposed by their institutional environments to gain legitimacy, stability, and survival. In the public sector—especially within the military—compliance with legislative frameworks like the Public Finance Management Act (PFMA), National Treasury Regulations, and other oversight mechanisms is critical. However, in the SA Army's SCM context, this compliance often comes at the cost of agility and responsiveness. Institutional pressures lead to bureaucratic procurement delays, reduced operational flexibility, and a culture of risk aversion. While regulatory adherence ensures transparency and accountability, it may also constrain innovation and adaptability in SCM

practices. Institutional Theory thus explains the balance the SA Army must maintain between meeting compliance requirements and seeking efficiency, particularly in time-sensitive and mission-critical operations.

2.2.3. Resource Dependency Theory (RDT)

Resource Dependency Theory (RDT), introduced by Pfeffer and Salancik (1978:40), posits that organisations are inherently dependent on external entities for critical resources, and this dependency shapes strategic decisions and power dynamics. For the SA Army, this theory is particularly relevant given its reliance on a few key suppliers most notably Denel and ARMSCOR for essential defence equipment and logistical support. Denel's financial and operational instability has, at times, resulted in procurement backlogs and jeopardised mission preparedness. RDT underscores the risks associated with supplier concentration and highlights the strategic importance of diversifying the supplier base to mitigate these vulnerabilities. The theory also supports the recommendation that the SA Army engage in proactive sourcing strategies and establish long-term, mutually beneficial relationships with a broader spectrum of domestic and international suppliers to safeguard operational continuity.

2.2.4. Transaction Cost Theory (TCT)

Transaction Cost Theory (TCT), advanced by Williamson (1985:45), explains organisational behaviour through the lens of minimising the costs incurred during transactions, including costs related to search, negotiation, monitoring, and enforcement. In military SCM, these costs are especially high due to the complexity, sensitivity, and regulatory oversight associated with defence procurement. The SA Army's procurement processes governed by rigid state protocols are frequently delayed by intricate approval chains, lengthy tendering procedures, and extensive auditing requirements. These inefficiencies not only inflate procurement costs but also compromise supply responsiveness and mission effectiveness. TCT provides a framework for understanding why these inefficiencies exist and suggests that streamlining procurement procedures, reducing contractual complexities, and embracing e-procurement platforms could lower transaction costs while preserving accountability and oversight.

Collectively, these frameworks guide the development of pragmatic, evidence-based strategies to enhance the SA Army's SCM effectiveness. They also justify many of the study's core recommendations, such as digital transformation, regulatory reform, increased training, and the expansion of strategic partnerships.

2.3. Supply Chain Management in the Public Sector

Supply chain management (SCM) in the public sector differs from that of the private sector due to its focus on achieving public policy objectives rather than profit maximisation. In the public sector, SCM is cantered on ensuring transparent procurement that adheres to regulatory frameworks and meets the needs of the populace (Harland et al., 2007:3). In South Africa, public procurement is regulated by the Public Finance Management Act (PFMA) and shaped by National Treasury directives, aimed at ensuring fair resource allocation and cost-effective service delivery (Moeti et al., 2007:123). However, public sector SCM often faces lengthy bureaucratic procedures and compliance challenges, leading to delays in procurement and elevated costs.

2.4. Supply Chain Management in the Military Context

In the military, supply chain management (SCM) is essential for ensuring that armed forces have access to the necessary resources, equipment, and logistical support for effective operations. Military procurement processes are typically complex, influenced by technical specifications, security concerns, and the extended lead times required for acquiring items such as weaponry and vehicles. Cilliers (1998:1) notes that military asset acquisitions, such as fighter jets, can take up to six years due to the complexity of negotiations and procurement processes. Furthermore, military supply chains must demonstrate flexibility to ensure forces are well-equipped during both peacetime and active missions, balancing operational readiness with cost-efficiency (RAND Corporation, 2020). Collaboration with international defence entities adds another layer of complexity to military supply chains.

2.5. Challenges in Supply Chain Management within the SA Army

This section explores the persistent and critical challenges affecting supply chain management (SCM) within the South African Army (SA Army). These challenges arise from financial limitations, logistical hurdles, technological gaps, and resource constraints, all of which impact the Army's operational readiness and effectiveness.

2.5.1. Financial Constraints in Defence Supply Chain Management

The South African National Defence Force (SANDF) faces significant budgetary limitations, with defence spending below 1.2% of GDP, affecting the SA Army's ability to maintain adequate operational readiness (Defence Review, 2015: x). The budget constraints impact various aspects of the supply chain, including procurement, maintenance, and logistical sustainability (Cawthra, 1997: 165). Reduced funding has compromised the SA Army’s capacity for sustained operations

and modernisation of its logistics systems, placing it at a disadvantage compared to other global defence forces (Vision 2045, 2017: 1-7).

2.5.2. Logistical and Mobility Challenges

One of the foremost logistical issues within the SA Army is its limited mobility, which hinders rapid deployment and the ability to sustain operations effectively. The Defence Review (2015) emphasises that insufficient mobility capabilities increase the risks to mission success, especially in time-sensitive operations. The vast geographical landscape of Africa requires robust logistical networks to support the movement and sustainment of forces over long distances, a capability that is currently lacking due to inadequate infrastructure and the absence of strategic lift capabilities (Vision 2045, 2017: 1-9).

2.5.3. Infrastructure and Maintenance Deficiencies

The SA Army's infrastructure supporting supply chain activities such as depots, magazines, and maintenance workshops requires substantial rejuvenation to meet operational demands. The Defence Review (2015: xi) notes that the current state of infrastructure contributes to logistical inefficiencies, which in turn limit the SANDF's operational capability. Insufficient maintenance funding also prevents the upkeep of critical equipment, further impacting mission readiness (DOD Annual Report, 2022: 162). This deficiency underscores the need for investment in both infrastructure and maintenance to ensure sustained operational capacity.

2.5.4. Technological Shortfalls in Supply Chain Management

Technological limitations within the SA Army's SCM systems contribute significantly to operational inefficiencies. The Defence Review (2015) highlights the lack of modern logistics and support systems as a barrier to effective SCM coordination. The Vision 2045 document (2017: 1-3) further emphasises that while there is a shift towards digitisation, the full transition to a digital supply chain has not yet been realised. This technological gap hampers real-time information management, coordination, and decision-making within the supply chain (Kruys, 2008: 22).

2.5.5. Resource Dependency and Supplier Challenges

The SA Army's reliance on a limited number of domestic defence suppliers, particularly Denel, has resulted in vulnerabilities within its supply chain. Financial challenges faced by Denel have led to procurement delays, impacting the Army's operational readiness (Kruys, 2008: 30). The GEAR policy has further strained the domestic defence sector, reducing its capacity to meet the

SANDF's demands (Cawthra, 1997: 165). The Resource Dependency Theory (Pfeffer & Salancik, 1978) suggests that the Army should diversify its supplier base to mitigate these risks.

2.5.6. Personnel and Skills Shortages

The shortage of skilled logistics personnel within the SA Army exacerbates SCM challenges. According to Kruys (2008: 35), the reliance on manual processes, due to a lack of adequately trained personnel, limits the efficiency of supply chain operations. The Defence Review (2015: xiv) echoes this concern, highlighting the need for improved training and development programs to equip personnel with the necessary skills to manage modern supply chains effectively.

2.5.7. Strategic Planning and Coordination Issues

Inadequate strategic planning and coordination within the SA Army further hamper the effectiveness of SCM. Kruys (2008: 42) points to the absence of cohesive strategic frameworks, which reduces responsiveness and creates coordination lapses during military operations. The Defence Review (2015) underscores the need for integrated strategic frameworks that facilitate synchronised logistics efforts and enhance decision-making across the supply chain.

2.6. SA Army Supply Chain Management Strategic Plan

The SA Army's Vision 2045 document outlines strategic plans to address existing SCM challenges. This section delves into the objectives and initiatives proposed to enhance SCM capabilities within the Army.

2.6.1. Digital Transformation and Technological Integration

One of the key goals of Vision 2045 is to achieve a fully digital landward battlespace, which would enhance the Army's ability to counter cyber threats and increase SCM efficiency (Vision 2045, 2017: 1-3). The plan emphasises the need for modernised command-and-control systems that can support real-time information flow and responsive decision-making, essential for effective supply chain operations (Vision 2045, 2017:1-5).

2.6.2. Strategic Mobility and Infrastructure Development

To improve logistical support and mobility, Vision 2045 proposes the establishment of forward sustainment bases, such as Forward Mounting Bases and Staging Bases, to support prolonged operations without dependence on external resources (Vision 2045, 2017: 1-9). Efforts to enhance strategic mobility are aimed at increasing the Army's agility in responding to diverse operational needs (Vision 2045, 2017: 1-9).

2.6.3. Enhancing Resource and Supplier Diversity

Vision 2045 acknowledges the need to reduce reliance on specific suppliers like Denel by exploring partnerships with international defence contractors. This approach aims to secure a stable supply of resources and mitigate the risks associated with dependency on a single supplier (Vision 2045, 2017: 1-7).

2.6.4. Developing Multi-Modal Warfare Capabilities

The strategic plan includes provisions for adapting to multi-modal warfare by integrating conventional and unconventional SCM strategies. This flexible approach is designed to ensure that the Army's SCM can support diverse operational requirements, from traditional combat scenarios to modern, asymmetric warfare (Vision 2045, 2017: 2-5).

2.7. The Role of Stakeholders in Supply Chain Management

The success of supply chain management (SCM) within the South African Army is significantly influenced by various stakeholders. Key players include government entities, private suppliers, ARMSCOR, Denel, and international defence contractors. The reliance on external suppliers like Denel and ARMSCOR introduces dependencies that can affect procurement timelines and increase costs. Furthermore, government oversight and regulations, particularly those from the National Treasury and Public Finance Management Act (PFMA), shape the procurement process, ensuring that public sector standards are met. To enhance procurement and logistics efficiency, it is vital to foster effective collaboration among stakeholders, minimising delays and optimising cost-effectiveness (Moeti et al., 2007:123).

2.8. Resource-Based Theory and Strategic Alliances

Resource-based theory (RBT) highlights the importance of an organisation's internal resources and capabilities in achieving a competitive advantage. In the context of military supply chains, RBT demonstrates how the South African Army, along with suppliers like Denel and ARMSCOR, can leverage internal assets to meet operational demands. Strategic alliances, particularly with international defence contractors, play a vital role in augmenting domestic capabilities and bridging resource gaps Barney (1991). These collaborations enable the South African Army to access advanced technology and specialised knowledge, enhancing the efficiency of procurement and logistics operations.

2.9. Institutional Theory and Legitimacy in SCM

Institutional theory emphasises that organisations operate within a structured environment characterised by formal rules, norms, and regulations. In the case of the South African Army, supply chain management (SCM) is heavily shaped by institutional elements, including government policies and public sector procurement legislation (DiMaggio & Powell, 1983). Compliance with the Public Finance Management Act (PFMA) and National Treasury guidelines is crucial for maintaining legitimacy in procurement activities. However, institutional pressures to adhere to these regulations may lead to inefficiencies, especially when bureaucratic processes hinder timely procurement or reduce flexibility in sourcing goods and services.

2.10. Resource Dependency Theory and SCM

Resource dependency theory (RDT) examines how organisations rely on external resources and how this dependence affects their strategic decisions. For the South African Army, dependence on external suppliers such as Denel and international defence contractors creates vulnerabilities in the supply chain. Financial challenges faced by Denel, for example, have led to procurement delays, adversely impacting operational readiness (Cawthra, 1997:165). Effectively managing these dependencies requires strategic foresight, which may involve diversifying suppliers and forming collaborations with international partners to mitigate potential risks.

2.11. Transaction Cost Theory in Supply Chain Management

Transaction cost theory (TCT) focuses on the expenses associated with economic transactions. In the context of military supply chain management (SCM), the South African Army faces significant transaction costs in negotiating, contracting, and monitoring supplier agreements, especially for long-term procurement contracts (Williamson, 1985). The complexity of military contracts, particularly those involving arms procurement, increases transaction costs and can lead to delays and cost overruns. Outsourcing to organisations like ARMSCOR and working with international suppliers further elevates transaction costs, necessitating stringent compliance and oversight to meet public sector procurement regulations.

2.12. Comparative Analysis of SCM Practices

Effective supply chain management is a critical determinant of military effectiveness, influencing operational readiness, sustainability, and responsiveness. This literature review focuses on the South African Army (SA Army) and compares its logistics capabilities with five militaries globally recognised for their advanced supply chain management: The United States Armed Forces, British Armed Forces, Russian Armed Forces, German Bundeswehr, and Israeli Defense Forces

(IDF). The selection of these countries is informed by their demonstrated excellence in logistics and innovation, serving as benchmarks for the SA Army to identify and address gaps in its supply chain management.

- **United States Armed Forces**: The U.S. military is distinguished by its extensive logistics network and advanced technological integration, enabling it to project power globally. According to Smith (2020:112), the U.S. Armed Forces employs a sophisticated supply chain management system that emphasises speed and efficiency, ensuring that troops are well-equipped to respond to diverse operational challenges.

- **British Armed Forces**: The UK military has a long-standing reputation for effective logistics, particularly in expeditionary operations. Johnson and Roberts (2018:8) highlight the British Armed Forces' use of comprehensive logistics frameworks that enhance coordination and adaptability during international deployments. This historical proficiency positions the UK as a leader in military supply chain management.

- **Russian Armed Forces**: Russia has made significant investments in modernising its logistics capabilities, focusing on rapid deployment and supply efficiency. As noted by Ivanov and Petrov (2021:57), the Russian military's logistics system is designed for flexibility and speed, enabling quick mobilisation and support for combat operations. This modernisation effort reflects a strategic priority on logistics to enhance military effectiveness.

- **German Bundeswehr**: The Bundeswehr is known for its precision and efficiency in supply chain management, particularly within NATO operations. Müller and Schmidt (2019:3) emphasise the German military's structured approach to logistics, which incorporates advanced planning and coordination to ensure effective supply lines during joint operations. This commitment to efficiency is crucial for maintaining operational readiness.

- **Israeli Defence Forces** (IDF): The IDF is recognised for its innovative logistics practices and rapid adaptability to changing operational circumstances. According to Cohen (2020:41), the IDF employs a Decentralised logistics model that empowers units to make swift decisions, enhancing their responsiveness in dynamic environments. This innovative approach to logistics underscores the IDF's effectiveness in diverse operational contexts.

The analysis of the SA Army's supply chain management in comparison to these top five militaries aims to identify areas for improvement and innovation. By understanding the logistics strategies and practices employed by these leading forces, the SA Army can implement changes to enhance its operational capabilities and close existing gaps. This comparative study will provide a

framework for evaluating the SA Army's logistics practices against global standards, ultimately ensuring that it remains competitive on the world stage.

Table 1: Comparative Analysis Military Supply Chain Management

Aspect	United States Armed Forces	British Armed Forces	Russian Armed Forces	German Armed Force	Israeli Defence Force
Provision	Global provisioning via the Defence Logistics Agency (DLA); utilises private partnerships and pre-positioned supplies for rapid deployment.	Emphasises domestic procurement and strategic alliances; has a strong network of domestic suppliers.	Centralised by state-owned companies; focuses on self-sufficiency and strategic stockpiling, particularly in regions like the Arctic.	Focuses on efficient allocation of resources; relies on NATO for part of its logistics.	Flexible system emphasising technological readiness and local production; relies on domestic suppliers and U.S. military ties.
Acquisition	Structured procurement process focusing on technological superiority, transparency, and cybersecurity.	Government-led procurement focusing on advanced technology and partnerships within NATO.	Emphasises indigenous production of advanced weapons systems but faces issues with corruption and inefficiency.	Prioritises technological innovation and indigenous production; heavy reliance on international suppliers, especially within the EU.	Emphasises technological innovation and self-reliance; benefits from U.S. military aid for high-tech acquisitions like Iron Dome.
Storage	Global storage system with automation and data-	Uses centralised storage and deployable	Sophisticated system with underground facilities for	Centralised storage system integrating	Secure storage in underground bunkers; modern

	driven management; pre-positioned equipment for rapid access.	logistics hubs; emphasis on flexibility for rapid deployments.	strategic resources; regional centres for rapid deployment.	automation; modernises its warehousing through NATO logistics networks.	inventory systems for readiness; distributed locations to mitigate attack risks.
Distribution	Global distribution network managed by DLA; uses a combination of air, sea, and ground transport.	Distribution focused on rapid deployment and expeditionary logistics; uses air and sea for global operations.	Relies on extensive rail and road systems for military distribution; frequent logistics exercises to maintain efficiency.	Strong logistical ties within NATO; air and rail transport support European missions.	Ground and air transport for quick-response distribution; close coordination with defence contractors for replenishment.
Maintenance	Comprehensive maintenance system; employs predictive analytics and preventative maintenance for equipment readiness.	Centralised maintenance capabilities with a focus on preventative repairs and NATO collaboration for complex systems.	Strong maintenance capabilities, but aging equipment and corruption cause inefficiencies.	Strong focus on preventive maintenance and innovation in maintenance technology; collaboration with NATO for high-end systems.	Efficient maintenance system linked to defence industry; focus on minimising equipment downtime and using local expertise.
Disposal	Follows strict environmental regulations; surplus equipment sold or recycled through the	Disposal process managed through EU and NATO regulations; emphasises	Involves recycling or selling decommissioned equipment; concerns over hazardous	Focus on sustainability in disposal; recycling and strict environmental guidelines	Strict disposal process to prevent leakage of sensitive technologies; decommissioned equipment is

	Foreign Military Sales program.	recycling and demilitarisation of old equipment.	material disposal remain.	within the EU.	often repurposed or scrapped.

Table 1 illustrates the comparative analysis of supply chain management practices among leading global militaries, highlighting significant differences in provisioning, acquisition, storage, distribution, maintenance, and disposal. The United States Armed Forces demonstrate a comprehensive approach with advanced global provisioning, structured procurement, and predictive maintenance systems, supported by their Defence Logistics Agency (Erwin, 2020:48). The British Armed Forces maintain strong domestic procurement and flexible storage with NATO collaborations (Bailey & Charman, 2020:113), while Russia emphasies self-sufficiency but faces inefficiencies and corruption challenges (Gady, 2018:98). The German Bundeswehr's reliance on NATO logistics networks ensures resource allocation and efficient maintenance (Heidenkamp et al., 2011:45). The Israeli Defence Forces prioritise domestic production, strategic mobility, and strict disposal practices supported by U.S. ties (Ben-David, 2019:12). These insights underscore key areas where the South African Army could improve by adopting global best practices, particularly in technology integration, strategic partnerships, and proactive maintenance frameworks.

2.12.1. Provisioning

Provisioning practices differ greatly among military forces. Both the United States and Russia have highly centralised systems; however, the U.S. focuses on global provisioning with the Defence Logistics Agency (Erwin, 2020:48), while Russia leans toward self-sufficiency and stockpiling for strategic regions such as the Arctic (Bendett, 2018:36). The British Armed Forces, on the other hand, emphasise domestic procurement with strong international alliances (Bailey & Charman, 2020:113), while Israel is heavily reliant on domestic production with technological readiness in mind, often benefiting from U.S. military ties (Ben-David, 2019:12).

2.12.2. Acquisition

Acquisition across the five militaries highlights a shared emphasis on technological superiority and self-reliance. The U.S. and Israel are particularly focused on leveraging technological innovation and partnerships, with Israel's Iron Dome standing as a significant example of such collaboration (Shapir & Perlov, 2018:20). Russia and China lean more towards indigenous production, but Russia's processes are plagued by inefficiencies and corruption (Gady, 2018:98).

The German Bundeswehr, while technologically advanced, relies heavily on international collaborations within the European Union (Heidenkamp et al., 2011:47).

2.12.3. Storage

Storage management is another area where the U.S. excels, with a global network using automation and pre-positioned resources (Erwin, 2020:50). Similarly, Russia employs sophisticated underground storage for strategic assets like nuclear weapons (McDermott, 2018:53), while the British Armed Forces maintain centralised and deployable logistics hubs (Bailey & Charman, 2020:119). Israel also utilises advanced inventory management, employing secure, distributed storage locations to minimise risks during conflict (Ben-David, 2019:18).

2.12.4. Distribution

Distribution networks vary significantly. The U.S. relies on a global distribution system managed by the Defence Logistics Agency, combining air, sea, and ground transport (Erwin, 2020:52). Russia has an extensive distribution system utilising rail and road, complemented by air transport for rapid deployment (Bendett, 2018:38). The British Armed Forces focus on rapid deployment through expeditionary logistics (Bailey & Charman, 2020:121), while Israel's system is designed for quick response through a combination of ground and air distribution (Ben-David, 2019:15).

2.12.5. Maintenance

Maintenance capabilities in the U.S. and Israel are notably advanced, with an emphasis on predictive and preventative strategies to minimise downtime (McLeary, 2020:78; Ben-David, 2019:22). In contrast, Russia's aging equipment and corruption issues create inefficiencies in maintenance (Gorenburg, 2020:75). The British and German forces benefit from collaborations within NATO to support maintenance of more sophisticated systems (Bailey & Charman, 2020:125; Heidenkamp et al., 2011:53).

2.12.6. Disposal

Disposal practices vary in terms of regulation and environmental considerations. The U.S. and Israel both enforce strict regulations to prevent leakage of sensitive technology and promote recycling (Erwin, 2020:54; Ben-David, 2019:24). Russia's disposal process, however, often faces challenges in managing hazardous materials (Gorenburg, 2020:77), while the British and German forces focus on recycling and sustainable practices under EU regulations (Bailey & Charman, 2020:128).

2.13. Conclusion

In this literature review, the theoretical frameworks and comparative practices surrounding supply chain management (SCM) in the military context have been explored to provide a comprehensive understanding of the challenges faced by the South African Army (SA Army). Theoretical insights from Resource-Based Theory (RBT), Institutional Theory, Resource Dependency Theory (RDT), and Transaction Cost Theory (TCT) offer a multifaceted perspective on the SA Army's supply chain issues, emphasising the role of internal resources, regulatory constraints, reliance on external suppliers, and economic inefficiencies (Barney, 1991:99; DiMaggio & Powell, 1983:147; Pfeffer & Salancik, 1978:40; Williamson, 1985:45). These frameworks collectively highlight areas for strategic improvement, such as optimising internal resources, forming strategic partnerships, and minimising dependency and transaction costs.

SCM in the public sector differs significantly from the private sector, primarily due to regulatory requirements and the focus on public accountability rather than profit. This distinction is particularly relevant to the SA Army, where SCM is influenced by public sector regulations, including the Public Finance Management Act (PFMA), which often introduces delays and additional costs due to bureaucratic oversight (Harland et al., 2007:3; Moeti et al., 2007:123). Military SCM, as compared with civilian SCM, must address unique logistical and operational demands, balancing flexibility with readiness (Cilliers, 1998:1; RAND Corporation, 2020).

The review also examined the specific SCM challenges faced by the SA Army, including financial constraints, logistical and mobility limitations, outdated infrastructure, technological gaps, resource dependency, personnel shortages, and strategic coordination issues (Defence Review, 2015: x; Kruys, 2008:22; Vision 2045, 2017:1-7). These findings align with broader challenges identified in military SCM literature and underscore the need for targeted reforms within the SA Army's supply chain processes.

Finally, a comparative analysis of SCM practices across global militaries, including the United States, United Kingdom, Russia, Germany, and Israel, revealed best practices in provisioning, acquisition, storage, distribution, maintenance, and disposal that could inform enhancements within the SA Army (Smith, 2020:112; Johnson & Roberts, 2018:8; Ivanov & Petrov, 2021:57). The analysis highlighted areas where the SA Army can adopt international best practices, particularly in technology integration, strategic partnerships, and proactive maintenance and disposal strategies.

In summary, the literature reviewed establishes a foundation for understanding the current SCM landscape within the SA Army, underscoring the critical need for improvements in efficiency,

responsiveness, and operational readiness. The insights from theoretical frameworks and global comparisons provide a strategic blueprint for enhancing SCM within the SA Army, aligning its practices with international standards and enabling it to better support military operations in an increasingly complex security environment.

CHAPTER 3 RESEARCH METHODOLOGY

3.1. Introduction

This chapter outlines the research methodology adopted to investigate the challenges associated with supply chain management (SCM) within the South African Army (SA Army). The methodology is systematically structured to cover the research paradigm, approach, strategy, population and sampling techniques, data collection instruments, and analytical methods. As suggested by Saunders, Lewis and Thornhill (2016), selecting a coherent research methodology is crucial for aligning the research objectives with valid empirical techniques.

The study is anchored in a positivist paradigm, which supports the use of observable, measurable data to derive objective knowledge. The methodological design is framed to investigate logistical inefficiencies, procurement delays, and warehousing challenges that compromise the effectiveness of the SA Army's supply chain. This chapter provides both the rationale for each methodological decision and the procedures undertaken to ensure research rigour, reliability, and ethical compliance.

3.2. Research Paradigm

This research adopts a positivist paradigm, which asserts that reality is stable and can be observed and described objectively through measurable properties (Creswell, 2014). Positivism is appropriate for this study because it emphasises structured methodology, objectivity, and quantifiable results (Bryman, 2016). The challenges in the SA Army's supply chain such as inefficiencies in procurement cycles, obsolete equipment, and inadequate storage conditions were investigated through empirical means rather than subjective interpretation.

According to Lincoln and Guba (1985), positivism assumes that phenomena can be understood through reason and logic, using a deductive approach. This fits the military environment's demand for empirical evidence to inform operational and policy reforms.

3.3. Research Approach

The research methodology of this study adhered to a systematic and comprehensive framework designed to effectively gather, analyse, and interpret data on supply chain management challenges within the South African Army (SA Army). The data collection process was strategically tailored to align with the unique characteristics and operational scope of the research issue. The research was conducted under the directives of the Chief of the South African Army, who tasked

the SA Army Support Formation with ensuring the establishment and maintenance of a robust land support and sustainment system. This system is pivotal for sustaining combat-ready land forces during peace, conflict, and wartime, ultimately contributing to the socio-economic stability and progress of South Africa. The SA Army Support Formation encompasses ten Army Support Bases distributed across the country, providing essential support services to designated military units.

3.3.1. Data Collection Strategy

A stratified random sampling method was adopted to ensure representation across various ranks and roles within SCM functions. This sampling technique is supported by Babbie (2020), who argues that stratification improves the precision of results by ensuring proportional representation of relevant subgroups.

Although the total population was initially estimated at 5,672, not all members were engaged in SCM roles. Therefore, the final sample was reduced to 485, ensuring that data were collected only from participants directly involved in logistics, procurement, warehousing or distribution.

3.3.2. Units Included in the Study

Data were gathered from the following ten units under the command of the General Officer Commanding SA Army Support Formation:

17 Maintenance Unit

102 Field Workshop

ASB Potchefstroom

ASB Limpopo

ASB Mpumalanga

ASB Garrison

ASB Johannesburg

ASB Kimberly

101 Field Workshop

16 Maintenance Unit

3.3.3. Data Collection Tools and Processes

A structured questionnaire, based on SCM functional domains (acquisition, storage, distribution, maintenance, and disposal), was developed. The use of Likert scales facilitates the conversion of subjective perceptions into quantifiable metrics, a method validated by Likert (1932) and widely applied in military and organisational studies.

While Google Forms were initially intended for digital data capture, 95.5% of respondents preferred manual forms, revealing institutional resistance to digitisation a finding aligned with Rogers' (2003) Diffusion of Innovations Theory on technology adoption.

3.3.4. Data Analysis and Challenges

Data from 485 respondents were compiled and entered into an Excel spreadsheet for initial cleaning before being re-captured into SPSS for comprehensive analysis. The analysis aimed to produce graphs and charts for data visualisation and interpretation. Challenges encountered during data collection included participant low morale, stemming from unfulfilled promises for improvements, which influenced the quality and depth of their responses. Despite these challenges, SPSS tools were used to generate meaningful visual representations for clearer insights.

3.3.5. Implications of Findings

The data analysis and participant feedback will be presented to highlight key challenges and potential areas for improvement within the SA Army's supply chain management. These findings aim to inform strategic changes that can lead to enhanced operational efficiency and better service delivery within the organisation.

3.4. Methodological Choice

This study employed a quantitative research methodology to investigate the challenges faced in Supply Chain Management within the South African Army. To achieve this, questionnaires specifically designed for Supply Chain Management were administered to gather relevant data. The research was conducted within the framework of the positivist research paradigm, as defined by Saunders et al. (2016:164), which emphasises the replication of methodologies akin to those utilised in the natural sciences. Adhering to the beliefs of positivism, the study followed established guidelines and techniques characteristic of natural science research.

The philosophical foundation of the research was firmly rooted in the positivist paradigm, concentrating on the quantitative dimensions of supply chain management in the South African Army. A deductive approach was adopted, where the study utilised pre-existing theories to guide the investigation. The primary method of data collection involved surveys, and the process was conducted over a brief duration, with participants given one month to complete the questionnaires. Data were collected from officials involved in supply chain management, and statistical analysis was conducted to interpret the data and identify relationships among various variables within the supply chain.

The quantitative research approach was chosen to objectively investigate supply chain management (SCM) challenges within the South African Army (SA Army) using structured, measurable data. This method enabled the collection of standardised responses across ten diverse units, ensuring reliable comparisons and generalisability of findings. Likert-scale questionnaires facilitated the quantification of perceptions across six key SCM domains acquisition, procurement, storage, distribution, maintenance, and disposal allowing for detailed statistical analysis. The approach was particularly suited to the military context, where data-driven decision-making is essential, and supported the use of inferential statistics to examine relationships and test hypotheses based on established theoretical frameworks, ultimately producing robust, evidence-based recommendations for SCM improvement.

3.5. Research Strategy

The research strategy outlined the fundamental elements of the investigation, encompassing the research topic, focal areas, design, and methodology. This study concentrated on Supply Chain Management within the South African Army, with particular emphasis on procurement, warehousing, and the distribution of goods to the end user. An assessment was conducted on the effectiveness and efficiency of the procurement process, alongside an evaluation of the adherence of warehousing practices to Occupational Health and Safety standards as mandated by the OHS Act of 1993.

Furthermore, the study scrutinised the distribution of commodities to the end user, including the transportation, maintenance, and repair of the South African Army's vehicle fleet. It also assessed the distribution mechanisms for forces deployed outside of South Africa engaged in peace support operations. The analysis revealed significant inefficiencies within the procurement process of the South African Army, characterised by prolonged turnaround times for the acquisition of goods and services. Moreover, instances of corruption within the procurement framework resulted in inflated prices that deviated from market norms.

3.6. Time Horizon

A cross-sectional design was selected, collecting data over a one-month period. This approach is appropriate for time-limited studies where the objective is to assess current practices rather than longitudinal trends (Creswell, 2014).

3.7. Study Population and Sampling

The study population consisted of SA Army personnel involved in SCM functions. Stratified sampling allowed for proportional representation across units and roles. A recalibration of the sample size from 3,272 to 485 ensured that only relevant participants were included, strengthening the internal validity of findings (Babbie, 2020).

3.8. Design of the Measuring Instrument

The questionnaire design was informed by existing SCM literature (Mentzer et al., 2001; Christopher, 2016), incorporating validated constructs such as procurement performance, warehousing efficiency, and disposal management. Each dimension was assessed using a 5-point Likert scale, enabling quantitative measurement of participant perceptions and experiences.

3.9. Data Collection Methods

The researcher personally distributed physical forms and QR codes linking to digital surveys. Ethical protocols were strictly followed, with participants receiving a consent letter and assurances of confidentiality. This aligns with ethical principles outlined by Israel and Hay (2006), including informed consent, privacy, and voluntary participation.

3.10. Data Analysis Methods

Data were analysed using SPSS. Descriptive statistics provided an overview of central tendencies and variances, while inferential statistics such as Pearson's correlations, ANOVA, and regression analysis were used to examine associations and predictors of inefficiency in the SCM process. Reliability was tested through Cronbach's alpha, and construct validity was assessed through exploratory factor analysis (EFA) (Pallant, 2020).

3.11. Reliability and Validity (Trustworthiness)

Reliability was ensured through standardised instruments and high Cronbach's alpha values (threshold ≥ 0.7). Face validity was established through expert review by the research supervisor,

while construct validity was validated through factor analysis. This is in line with the criteria proposed by DeVellis (2017) for quantitative instrument development.

To ensure the validity and reliability of the data, the study employed multiple methodological safeguards. Instrument reliability was confirmed using Cronbach's Alpha, with all SCM components exceeding the acceptable threshold of 0.7. Content and face validity were established through expert reviews by academic and military professionals, while construct validity was verified via Exploratory Factor Analysis (EFA), confirming logical item grouping under each SCM dimension. A pilot test refined the questionnaire, enhancing clarity and usability. Ethical integrity was maintained through anonymity, confidentiality assurances, and ethical clearance from North-West University. Stratified random sampling ensured representative participation across units and ranks, thereby enhancing both internal and external validity.

3.12. Ethical Considerations

The research adhered to the Protection of Personal Information (POPI) Act of 2013, ensuring lawful processing of personal data. Participants were fully informed about the purpose, risks, and benefits of the study, and data anonymity was strictly maintained. Ethical clearance was obtained from the North-West University's Ethics Committee, ensuring institutional oversight and compliance with research ethics norms.

3.13. Conflict of Interest

Recognising the potential conflict of interest due to the researcher's dual role as a senior SA Army officer, transparency was maintained by disclosing this status in the proposal and final report. An independent advisory committee reviewed the research process to ensure impartiality and objectivity.

Conclusion

This chapter has outlined the research methodology, firmly rooted in the positivist epistemological tradition, with a deductive, quantitative approach used to examine SCM challenges in the SA Army. The methodology was guided by established theories in logistics, procurement, and public sector management. By applying a rigorous sampling design, validated data collection tools, and appropriate statistical techniques, the study ensures credible, replicable, and actionable findings.

CHAPTER 4 FINDINGS AND DISCUSSION

4.1. Introduction

This chapter presents and analyses the key findings from data collected on the South African Army's supply chain management (SCM) practices. The analysis covers responses from a diverse group of ranks within the SA Army, providing insights into the operational challenges and perceptions of SCM across various hierarchical levels. The findings explore core SCM components, acquisition, procurement, storage, distribution, maintenance, and disposal through descriptive statistics, normality tests, and individual variable analyses. This chapter discusses the broader implications of these findings in the context of established SCM theories, including Resource-Based Theory (RBT), Institutional Theory, Resource Dependency Theory (RDT), and Transaction Cost Theory (TCT).

The study also compares the SA Army's SCM practices with those of leading global militaries to identify areas for improvement. Findings reveal that challenges such as bureaucratic delays, supplier dependencies, and technological limitations impede the efficiency of the SA Army's SCM. In contrast, international militaries have adopted advanced technologies and streamlined processes, suggesting pathways for the SA Army to enhance its SCM effectiveness.

In the discussion, this chapter contextualises the SA Army's SCM challenges against theoretical frameworks, offering insights into how strategic partnerships, technology integration, and policy reforms could address identified issues. These recommendations aim to support leadership in making informed decisions that align the SA Army's SCM practices with global standards, thus improving operational readiness and sustainability.

4.2. Overview of Data Collected

The data collected for this study offers a comprehensive view of responses across various ranks within the SA Army. This data includes feedback on key supply chain management processes, including acquisition, procurement, storage, distribution, maintenance, and disposal. Respondents provided insights based on their direct experiences, addressing issues such as budget constraints, training needs, technology gaps, and procedural inefficiencies. The responses reflect the perspectives of a wide range of ranks, from Private (Pte) to Lieutenant Colonel (Lt Col), ensuring a broad representation of the workforce involved in supply chain operations. This diverse input enriches the study, helping to identify systemic challenges and practical improvement suggestions relevant to each hierarchical level in the SA Army's supply chain management.

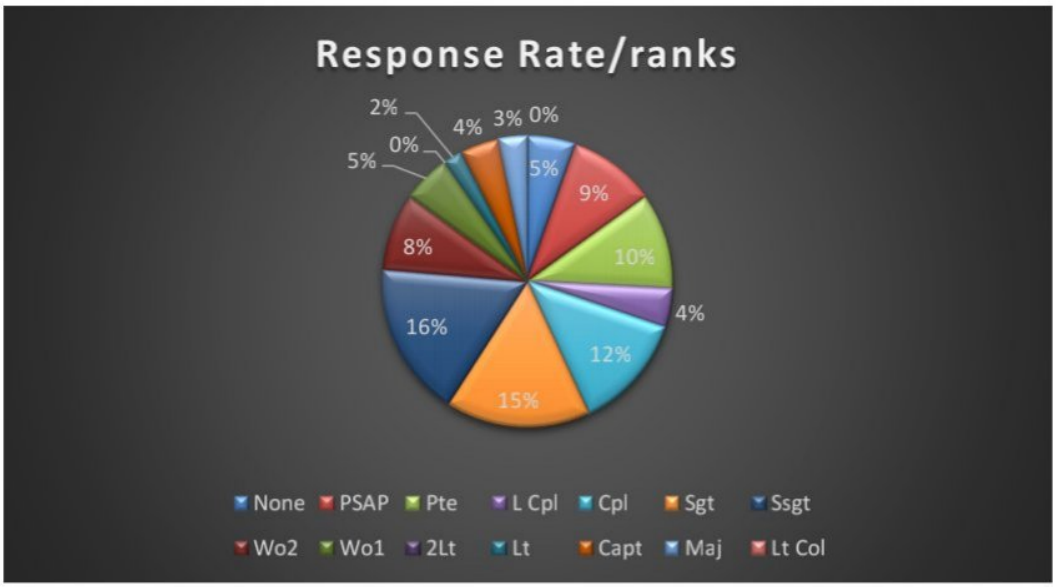


Figure 1 :Response Rate by Rank

Figure 1 illustrates the response rate across various ranks, showing a diverse representation in participation. The highest response rate is from participants holding the rank of Lt (16%), followed closely by Capt (15%) and Cpl (12%). Other notable contributions include PSAP (10%) and Pte (9%). Lower response rates were observed among higher ranks such as Lt Col (0%) and Maj (0%), indicating limited feedback from senior ranks. This distribution reflects a broad range of perspectives, predominantly from mid-level ranks, which may provide balanced insights into operational and procedural experiences within the organisation.

4.3. Descriptive Statistics

The descriptive statistics table provides insights into key dimensions (Acquisition, Procurement, Storage, Distribution, Maintenance, and Disposal) in the SA Army's supply chain management based on the respondents data. Here's an interpretation for each dimension:

Table 2: Descriptive Statistics

Dimension	Mean	Std. Deviation	Skewness	Kurtosis	Interpretation
Acquisition	2.7579	0.77586	0.144	-0.380	Moderate rating for acquisition processes, with responses fairly evenly distributed around the mean,

					indicating moderate satisfaction.
Procurement	2.8305	0.86987	0.282	0.057	Perceived moderately, with responses slightly skewed to the right, suggesting a somewhat positive
Storage	2.8109	0.93677	0.207	0.195	Moderate satisfaction, with responses clustered around the mean and a slight concentration towards higher values.
Distribution	2.6883	0.85260	0.123	-0.483	Slightly lower rating, with fewer extreme values around the mean, indicating a moderately balanced perception.
Maintenance	2.7555	0.91320	0.136	-0.451	Moderate rating, with a fairly even distribution and few extreme responses, showing consistent views.
Disposal	2.7818	0.97322	0.030	-0.696	Moderate perception, with a mostly symmetrical distribution around the mean, indicating general consistency with some variability.

The data reveals that the SA Army's supply chain management dimensions are viewed moderately, with **Procurement** scoring the highest mean (2.8305), suggesting a relatively more

favorable perception, while **Distribution** has the lowest mean (2.6883), potentially indicating it as the area with the most perceived challenges. Each dimension has moderate variability, showing consistent perceptions across categories with slight differences in skewness and kurtosis.

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4.4. Normality Tests

To validate these descriptive interpretations, tests for normality were conducted to assess the suitability of parametric statistical analyses. Table 3 outlines the results of normality tests using the Kolmogorov-Smirnov and Shapiro-Wilk tests. All six variables had p-values below 0.05, indicating that none of the data sets followed a perfect normal distribution. However, the deviations from normality were minor, and the distributions remained acceptable for practical analytical purposes. Moreover, given the large sample size (n = 480), parametric statistical techniques were still deemed appropriate. According to Pallant (2020), parametric tests such as ANOVA and Pearson's correlation are considered robust to moderate violations of normality when sample sizes are large, as the central limit theorem ensures the sampling distribution of the mean approximates normality. Therefore, further analyses proceeded using parametric methods with confidence in their validity and reliability.

Table 3: Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Acquisition	,041	480	,049	,993	480	,032
Procurement	,054	480	,002	,991	480	,004
Storage	,051	480	,005	,981	480	<,001
Distribution	,050	480	,006	,990	480	,002
Maintenance	,042	480	,039	,989	480	<,001
Disposal	,044	480	,027	,982	480	<,001

a. Lilliefors Significance Correction

4.5. Analysis of Individual Variables

To gain deeper insights into each supply chain component, the study analysed their individual response distributions. Statistical tools such as histograms, Q-Q plots, and box plots were used to assess patterns and perceptions. The components examined included Acquisition, Procurement, Storage, Distribution, Maintenance, and Disposal. Each analysis highlights key trends, central tendencies, and anomalies in respondents' evaluations of SCM effectiveness within the South African Army.

4.5.1. Acquisition

Figure 2 presents a histogram depicting the frequency distribution for the responses related to the Acquisition component of the supply chain management process. The mean score for Acquisition is 2.76, with a standard deviation of 0.776, and a sample size of 480 respondents. The distribution appears approximately symmetrical with a slight skew to the right, indicating a relatively balanced spread of responses around the mean but with a higher frequency of values concentrated between 2.0 and 3.5.

The histogram shows that most respondents rated Acquisition between 2 and 3, suggesting that the majority of respondents perceived this aspect as moderately effective. There is a noticeable tapering at the higher end of the scale (above 4.0), indicating fewer respondents rated Acquisition as highly effective. The presence of some low-frequency bars at the extremes indicates a few outliers or lower and higher scores, but the majority of the data falls within a central range, reinforcing the near-normal distribution pattern indicated by the data.

Figure 2: Acquisition Mean =2,76

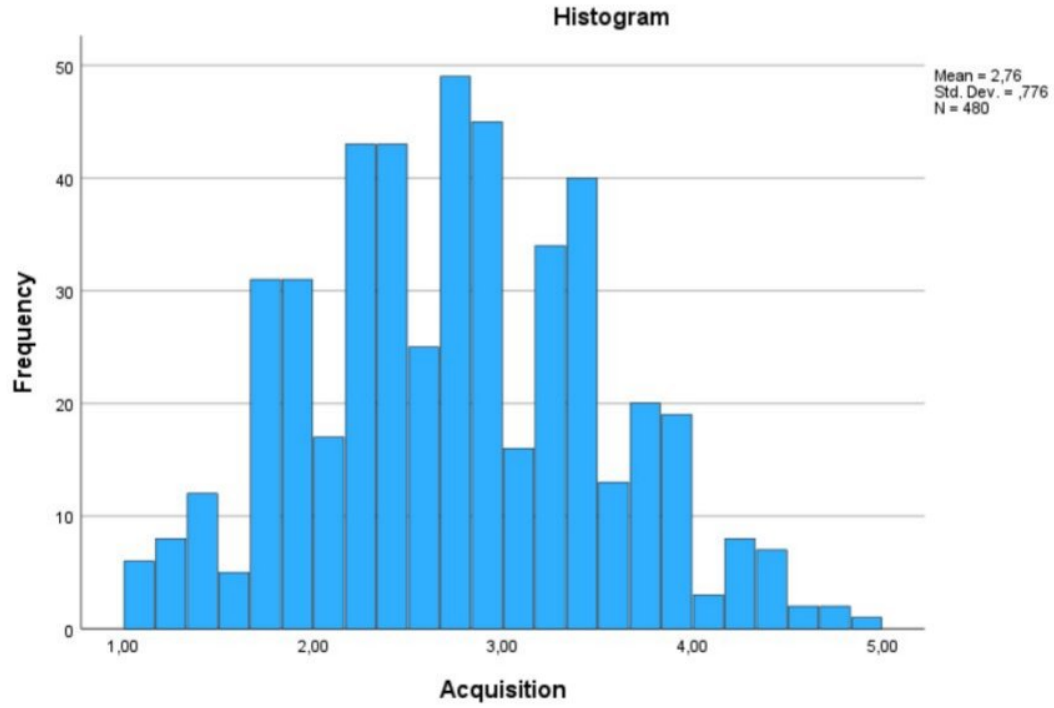


Figure 3: Normal Q-Q Plot of Acquisition

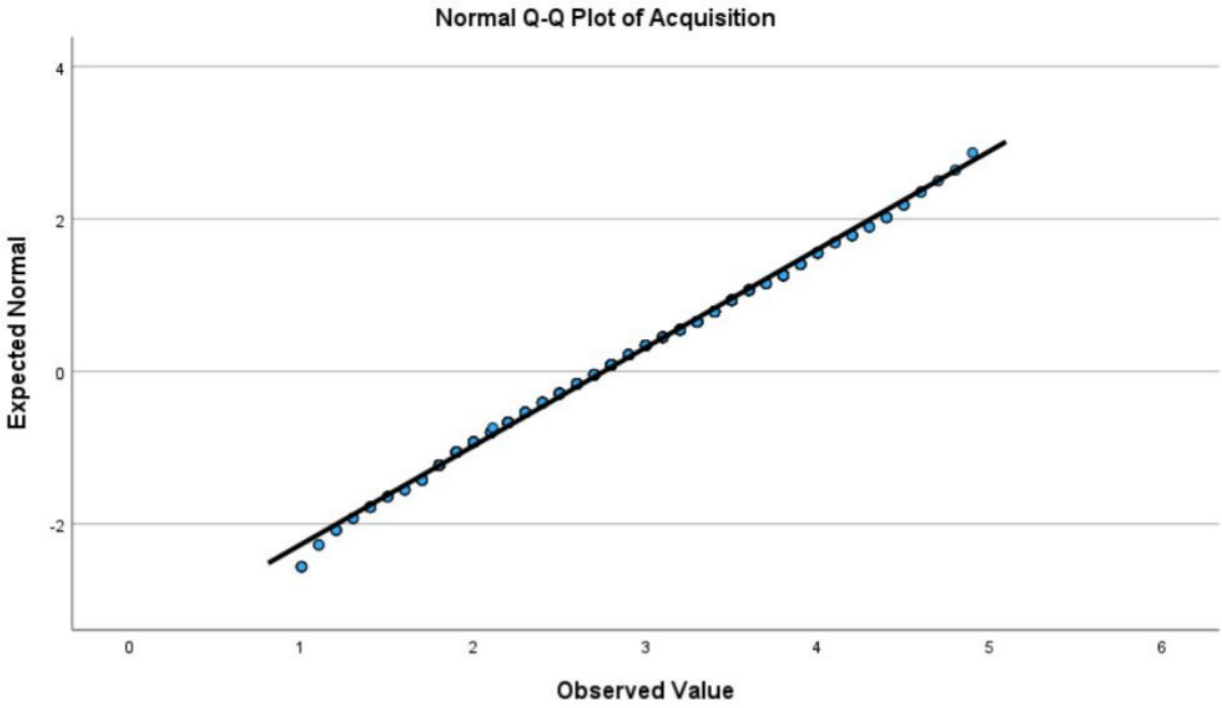


Figure 3 presents a normal Q-Q plot for the Acquisition component, depicting the distribution of observed values against the expected normal distribution. The plot shows that most data points align closely with the diagonal line, indicating that the distribution of the Acquisition responses is approximately normal.

There are minor deviations at the lower and upper ends of the plot, where a few points deviate slightly from the line, suggesting slight skewness or the presence of outliers. However, overall, the data points' alignment with the line indicates that the Acquisition component's responses adhere reasonably well to a normal distribution, supporting the interpretation that the sample data has a distribution pattern close to normality.

Figure 4: Detrended Normal Q-Q Plot of Acquisition

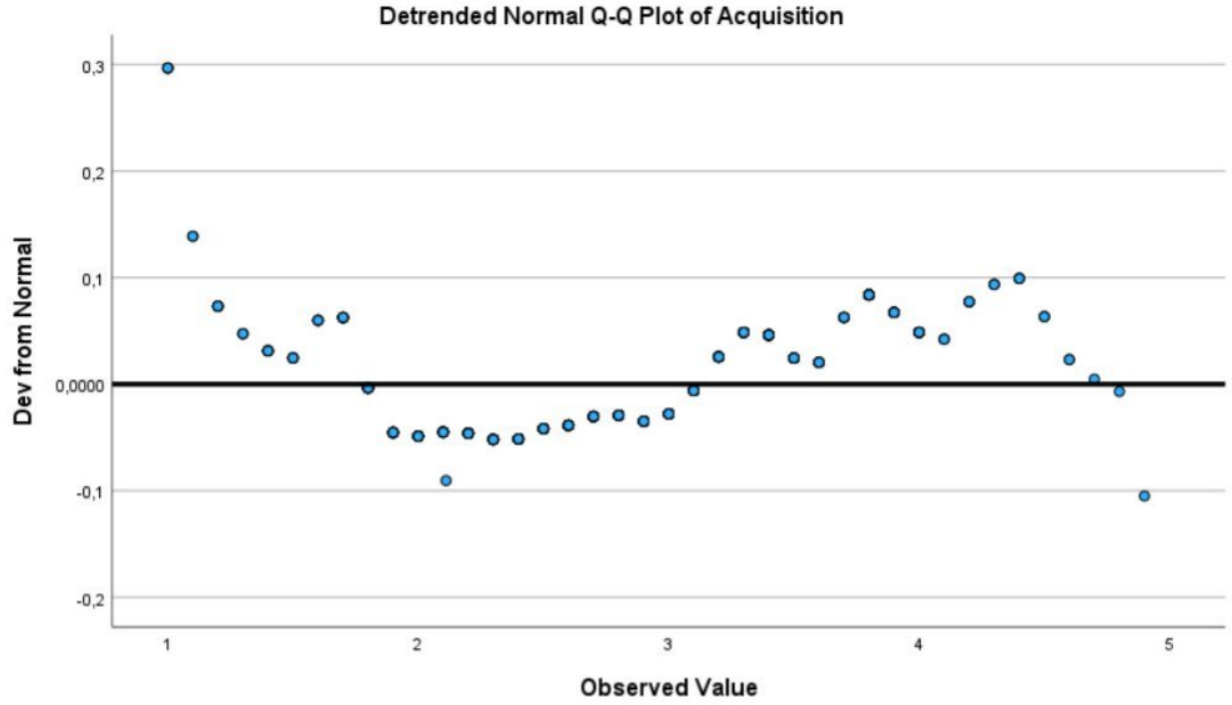


Figure 4 displays the detrended normal Q-Q plot for the Acquisition component, illustrating the deviations of observed values from the expected normal distribution line. In this plot, the points represent how much each observed value deviates from the normal reference line, with the x-axis showing observed values and the y-axis indicating the deviation from normality.

The plot shows that most points cluster near the horizontal line, indicating minimal deviations and supporting a general adherence to normality. However, some points, particularly on the ends of the plot, deviate more significantly from the line, suggesting slight skewness or the presence of outliers. The deviations are not substantial enough to indicate severe non-normality, but they highlight minor irregularities in the distribution of the Acquisition data. Overall, while the data distribution is relatively normal, these deviations point to potential areas where the data may diverge from perfect normality.

Figure 5: Box Plot Acquisition

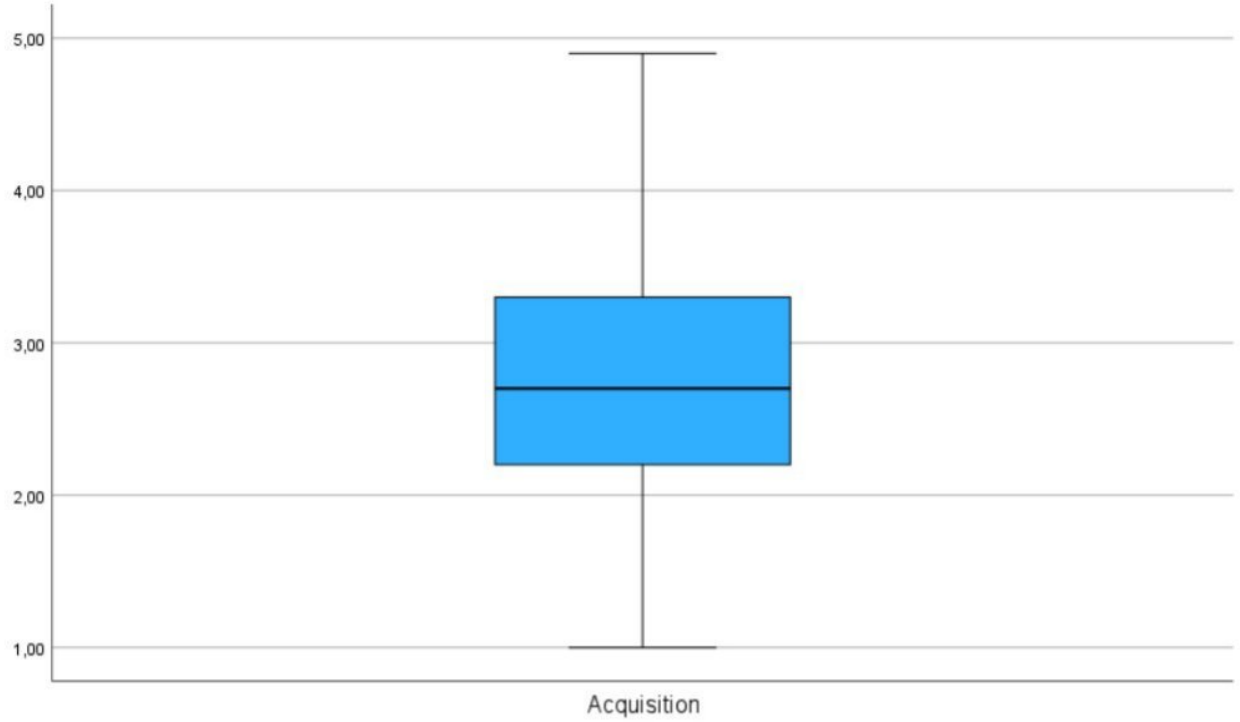


Figure 5 presents a box plot of the Acquisition component, showcasing the distribution of responses. The plot indicates that the median value is centrally positioned within the interquartile range (IQR), suggesting a balanced distribution of data. The lower whisker extends down to the minimum value of 1.0, while the upper whisker reaches up to the maximum value of approximately 5.0, indicating a wide range of data spread.

The IQR, represented by the box, encapsulates the middle 50% of the data and appears relatively wide, suggesting variability within this central range. The absence of visible outliers in the plot points to a dataset that does not include extreme values. Overall, the data for Acquisition appears symmetrically distributed with moderate variability, as evidenced by the equal length of the whiskers and the central position of the median within the box. This distribution aligns with the histogram and normal Q-Q plot observations, further supporting the normality assumption with minimal skewness.

4.5.2. Procurement

Figure 6 illustrates the histogram of the Procurement component, displaying the frequency distribution of responses from 480 participants. The histogram shows that the data is moderately skewed to the right, indicating that the majority of responses are clustered around a mean value

of approximately 2.83. The distribution has a standard deviation of 0.87, suggesting a moderate level of variability in the responses.

The bars show that most participants rated Procurement between 2.0 and 4.0, with the highest frequency occurring around the 3.0 range. There are fewer responses at the higher end of the scale, extending up to 6.0, indicating a decreasing trend in frequency as the scores increase. This pattern points to an overall perception that Procurement processes tend to be rated moderately, with some responses highlighting challenges that push scores to the lower or higher extremes.

Figure 6: Procurement Mean =2.83

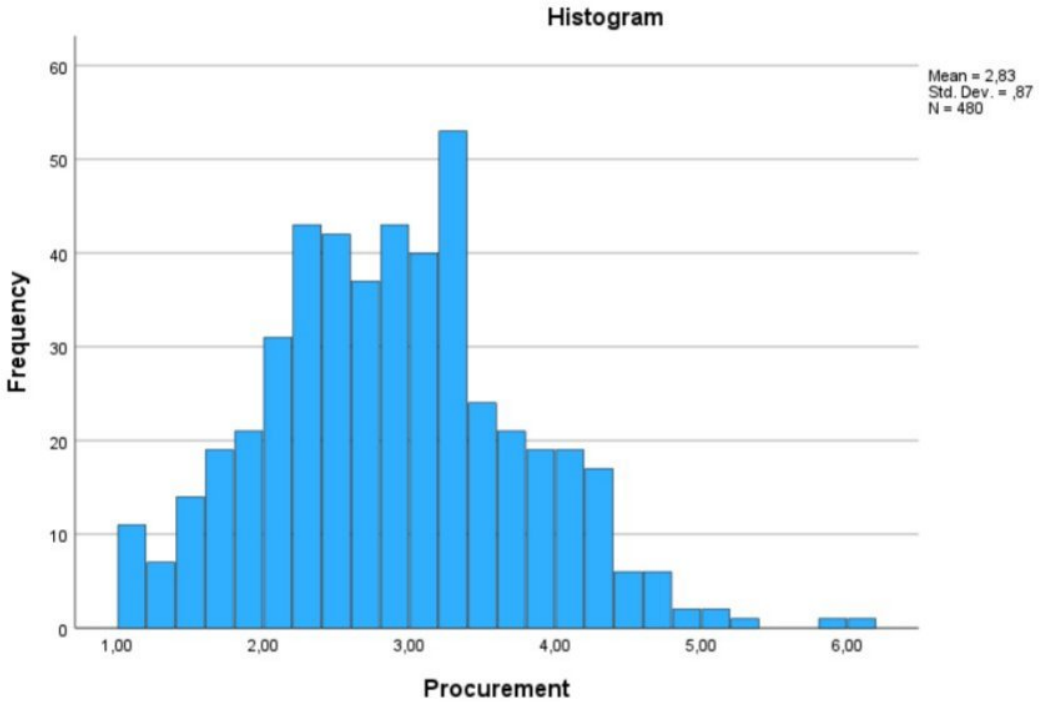


Figure 7: Normal Q-Q Plot of Procurement

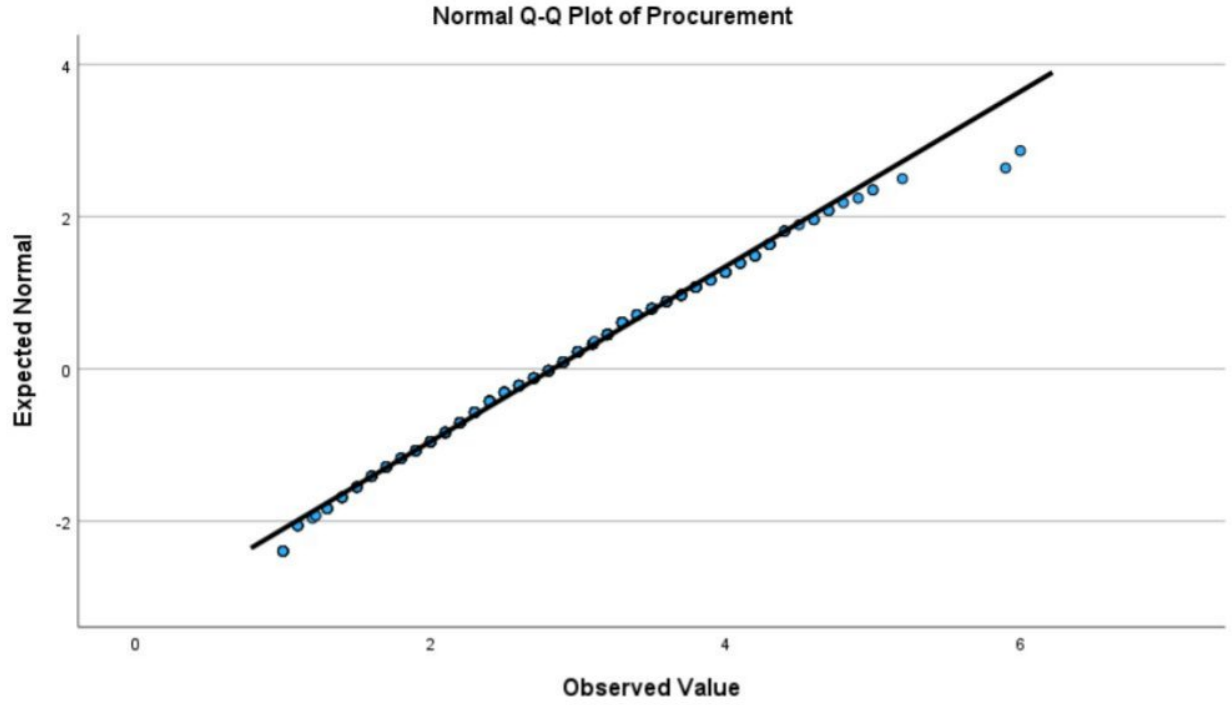


Figure 7 shows the normal Q-Q plot for the Procurement component, which assesses the normality of the distribution of responses from 480 participants. The plot reveals that the observed data points closely follow the expected diagonal line, particularly in the central part of the distribution. This alignment suggests that the data is approximately normally distributed in the middle range.

However, there is a slight deviation from the line at the extreme lower and upper ends, where some data points lie further away from the expected line. This deviation indicates minor skewness or potential outliers in the dataset. Overall, while the majority of data points align well with the normal distribution, the plot suggests that there may be slight non-normality due to deviations at the tails.

Figure 8: Detrended Normal Q-Q Plot of Procurement

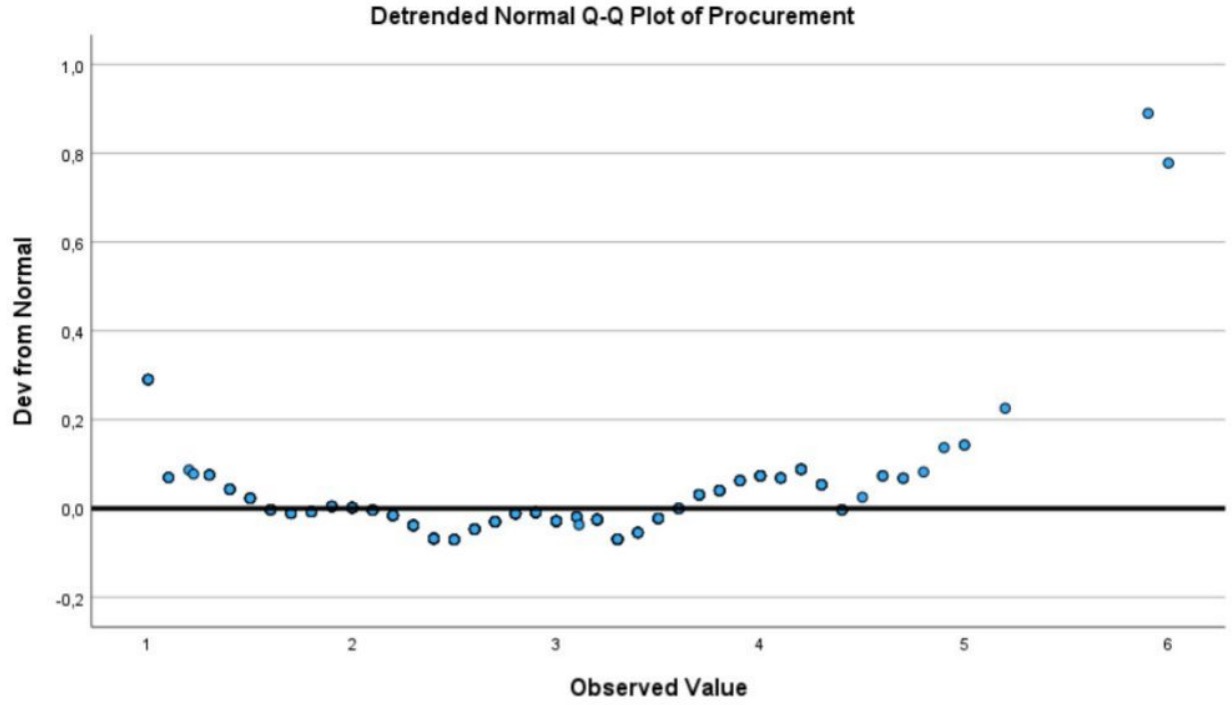


Figure 8 displays the detrended normal Q-Q plot for the Procurement component, which provides a visual representation of deviations from normality in the dataset. The data points indicate the deviation from the expected normal line, where the horizontal axis represents observed values and the vertical axis shows the deviation from normal.

In this plot, the data points in the middle range are close to the zero line, indicating minimal deviation from normality. However, there are noticeable deviations at both ends of the distribution. Specifically, a few data points at the upper end (observed values close to 6) show significant positive deviation from the normal line, suggesting the presence of outliers or skewness in the higher values. Similarly, some points at the lower end (around observed value 1) deviate positively, although to a lesser extent.

Figure 9: Box Plot Procurement

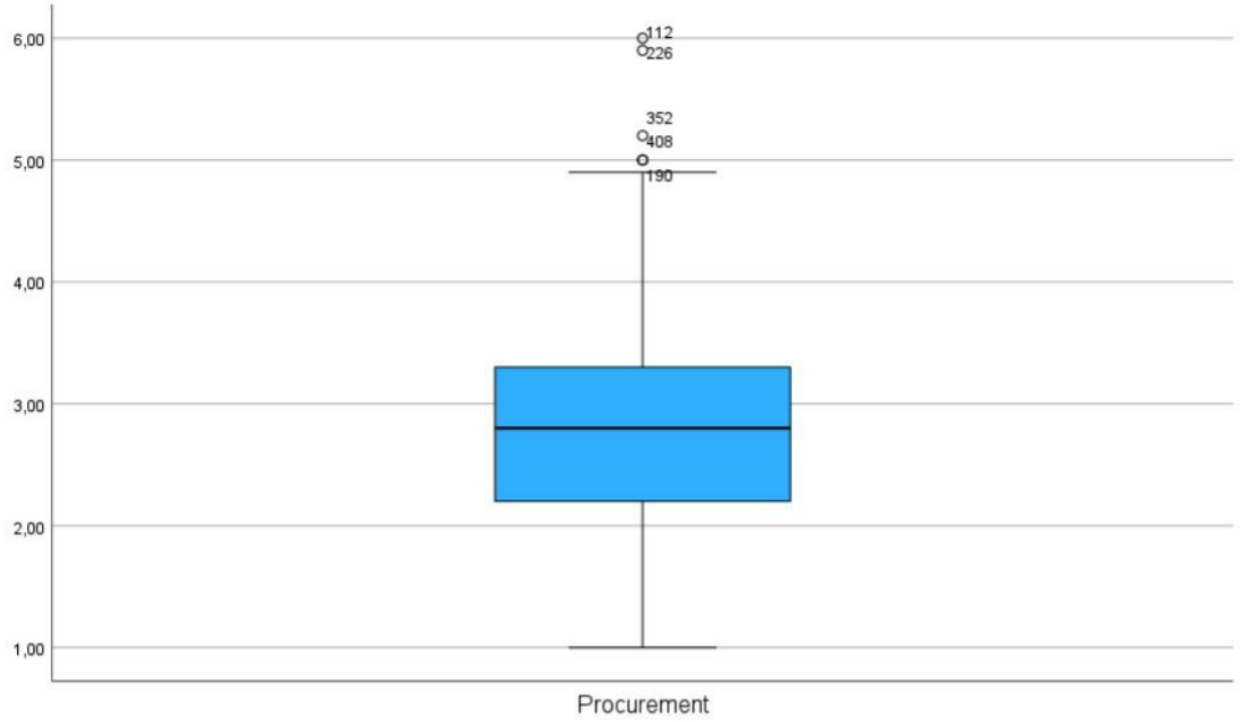


Figure 9 presents a box plot for the Procurement component, illustrating the spread and central tendency of responses related to procurement practices within the SA Army. The median value lies centrally within the interquartile range (IQR), indicating a balanced distribution of the middle 50% of responses. The box's length reflects moderate variability, while the whiskers extend to the minimum and maximum values, suggesting a normal spread of responses across the dataset.

An outlier is observed above the upper whisker at a value of 8, marked as "211", indicating a response significantly higher than the rest. This could reflect a particularly positive perception of procurement effectiveness from a respondent or possibly a data entry anomaly. The presence of such an outlier warrants further review to determine its origin and influence on the overall analysis.

4.5.3. Storage

Figure 10 presents a histogram depicting the distribution of responses related to the Storage component. The mean score is 2.81, with a standard deviation of 0.937, indicating moderate variability in the data. The histogram reveals a concentration of responses around the score of 3, which is the most frequent response, showing that a majority of respondents rated the storage aspect around this level.

The distribution appears slightly left-skewed, as there are fewer responses in the higher range (above 4) and a notable tail extending toward lower scores, which indicates that a number of respondents rated the storage component lower. The presence of isolated bars beyond 4 suggests some respondents provided higher ratings, but these occurrences were infrequent.

Figure 10: Storage Mean = 2.81

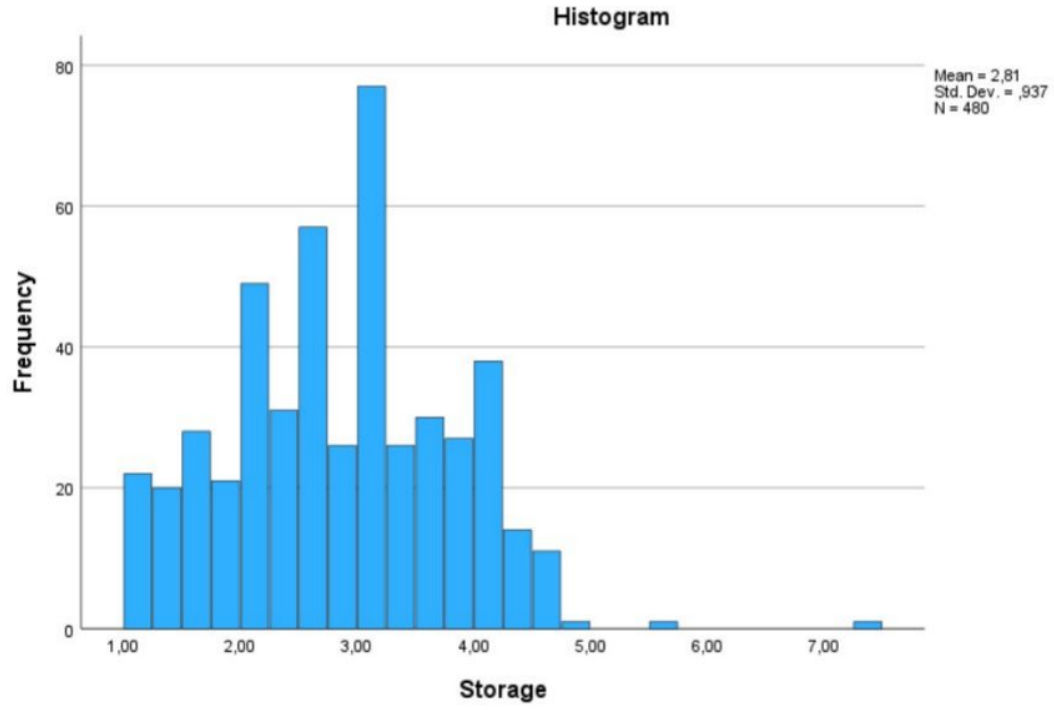


Figure 11: Normal Q-Q Plot of Storage

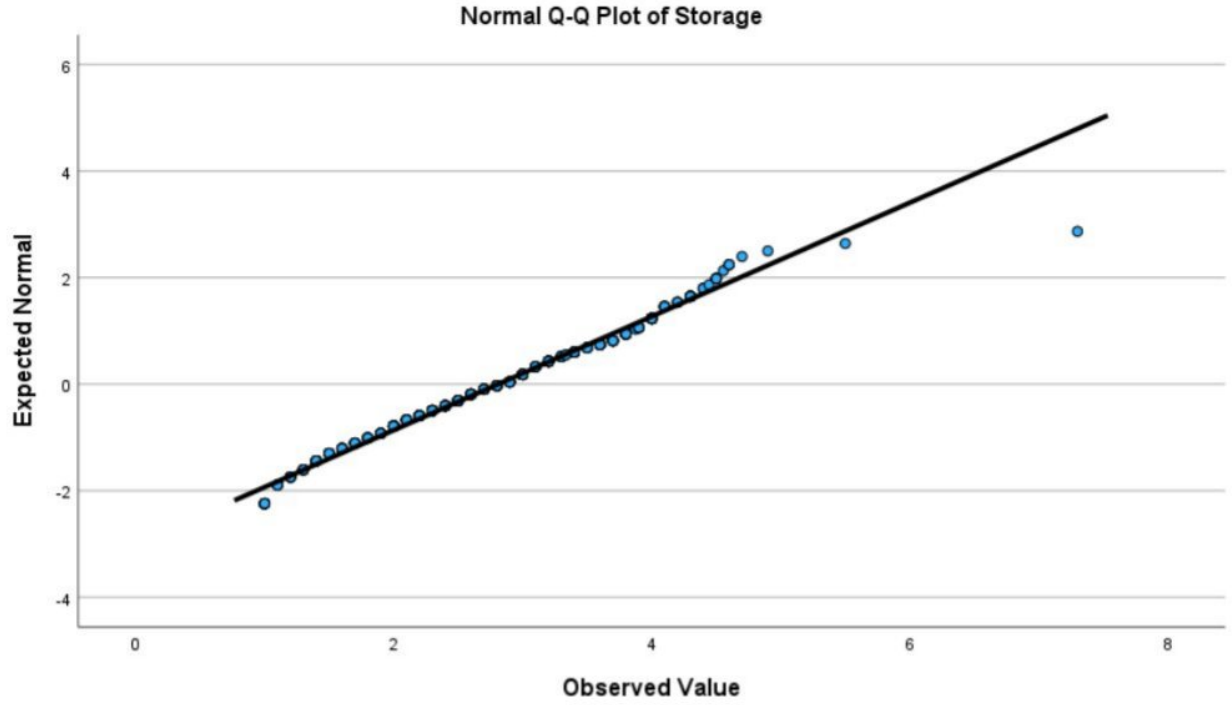


Figure 11 displays the Normal Q-Q Plot for the Storage component. The plot illustrates how the observed values of the data relate to the expected normal distribution. The points generally follow the diagonal line, indicating that the data are approximately normally distributed. However, deviations are present, particularly at the upper end of the distribution where some points diverge noticeably from the line, suggesting potential outliers or a skew in the higher values.

This pattern indicates that while the storage data roughly approximates a normal distribution, there are deviations that might affect the assumption of normality, particularly due to the presence of a few higher extreme values. This could imply a slight positive skewness in the data or isolated outliers impacting the overall distribution.

Figure 12: Detrended Normal Q-Q Plot of Storage

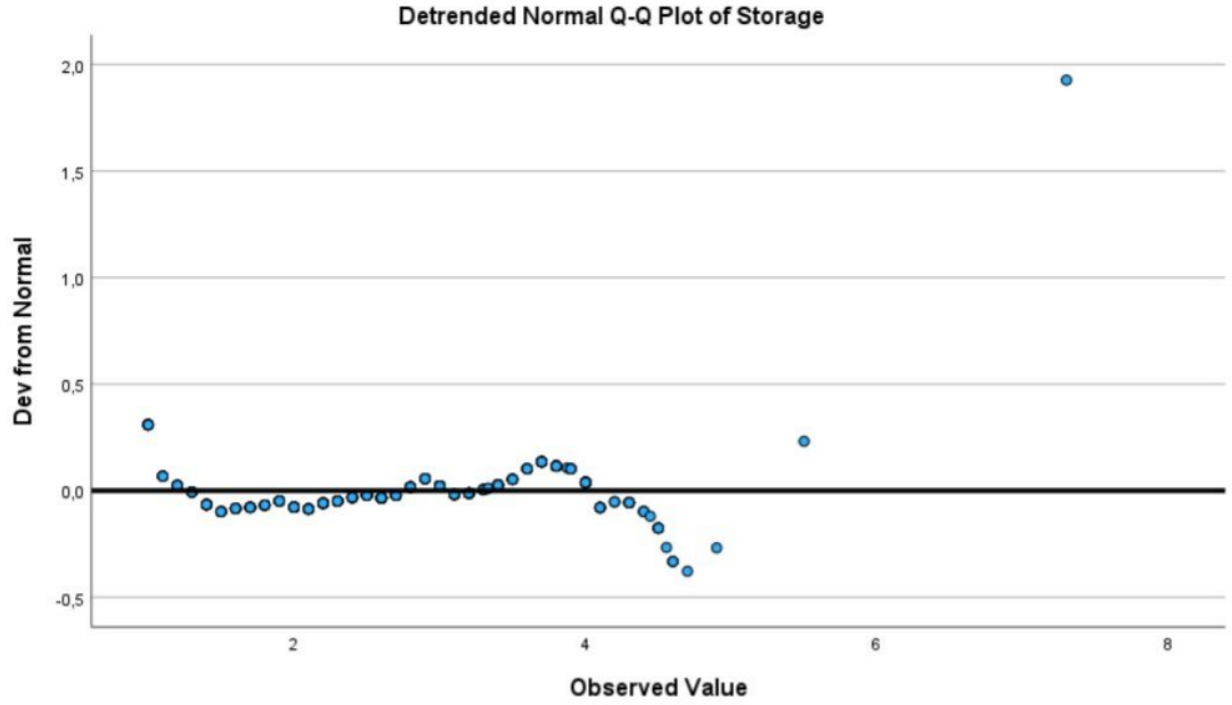


Figure 12 displays the Detrended Normal Q-Q Plot for the Storage data. This plot illustrates the deviations of the observed data points from the expected normal distribution. The points should ideally be scattered around the horizontal line at zero if the data are normally distributed.

In this plot, most of the data points remain close to the zero line, indicating that the data largely follow a normal distribution. However, there are some notable deviations, especially at the higher values where two points deviate significantly from the line. This suggests the presence of outliers or potential skewness in the distribution. The pronounced deviation at the upper end indicates that a few extreme values are impacting the overall distribution, which could imply potential issues with data normality due to these outliers.

Figure 13: Box Plot Storage

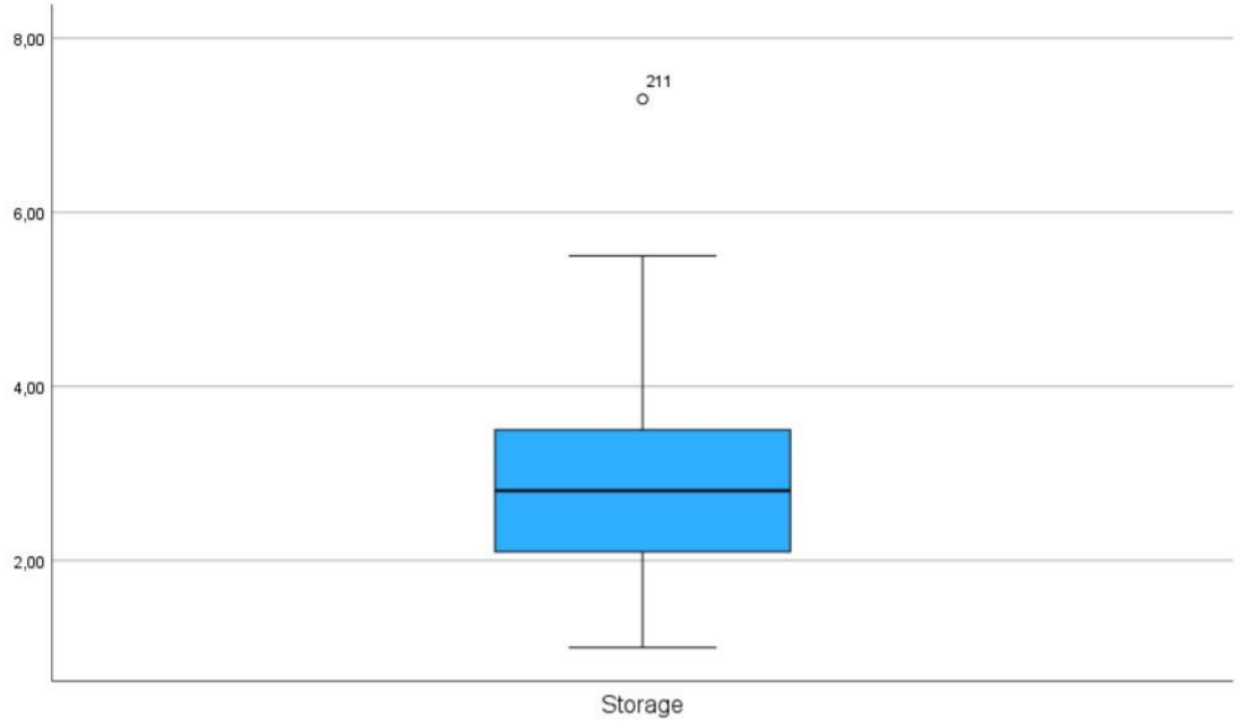


Figure 13 shows a box plot for the Storage data, indicating the spread and central tendency of responses related to storage practices. The plot demonstrates that the median value is centered within the interquartile range (IQR), showing a fairly symmetrical distribution of data within the middle 50%. The box's length indicates moderate variability in the data, and the whiskers extend to the minimum and maximum values within a reasonable range, suggesting a normal spread of responses.

However, there is an outlier identified above the upper whisker at a value of 8, marked as "211". This outlier suggests that there is at least one response significantly higher than the rest, which could indicate an unusual or extreme perception of the storage aspect among the respondents. The presence of this outlier should be further examined to understand if it is due to a specific factor or data entry error.

4.5.4. Distribution

Figure 14 is a histogram illustrating the distribution of responses for the Distribution component within the SA Army's supply chain management. The responses are primarily clustered between 2.0 and 3.0, with a calculated mean of 2.69. This indicates a slightly lower rating for distribution efficiency compared to other SCM components. The histogram exhibits a relatively uniform distribution with a subtle right skew, where fewer respondents assigned higher ratings above 4.0.

The standard deviation of 0.853 suggests moderate variability around the mean, indicating that while the overall perception of distribution is consistent, some respondents rated it significantly better or worse than the average. There are no extreme outliers in the data, but the spread reflects varying experiences, potentially due to logistical bottlenecks or inconsistent delivery practices across different units.

Figure 14: Distribution Mean = 2.69

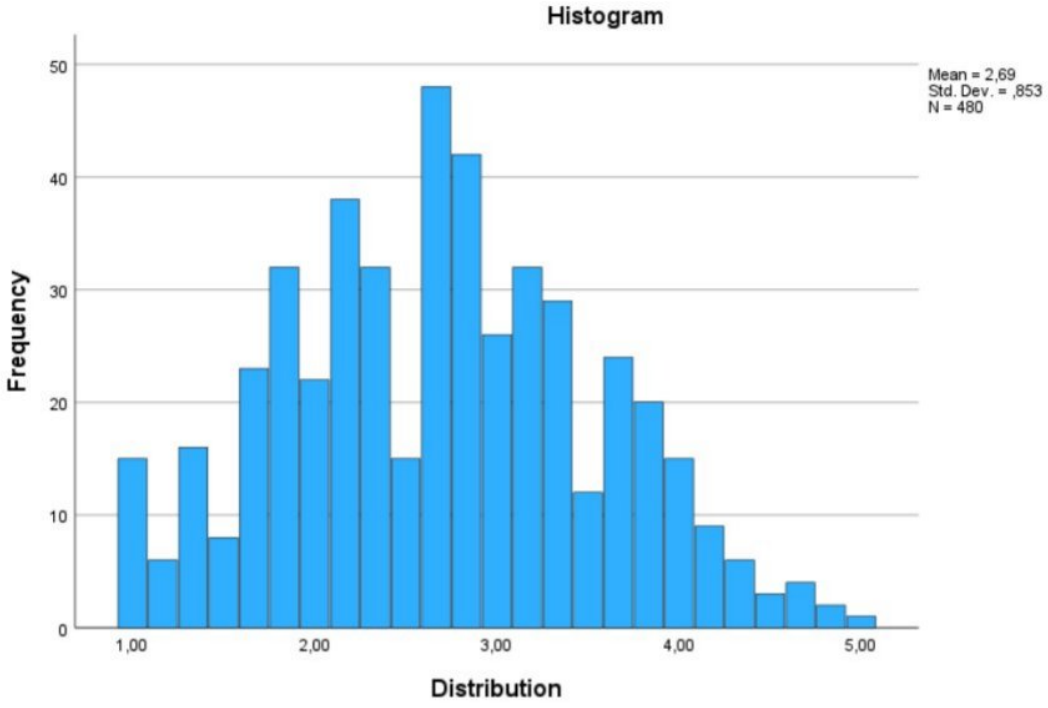


Figure 15: Noraml Q-Q Plot of Distribution

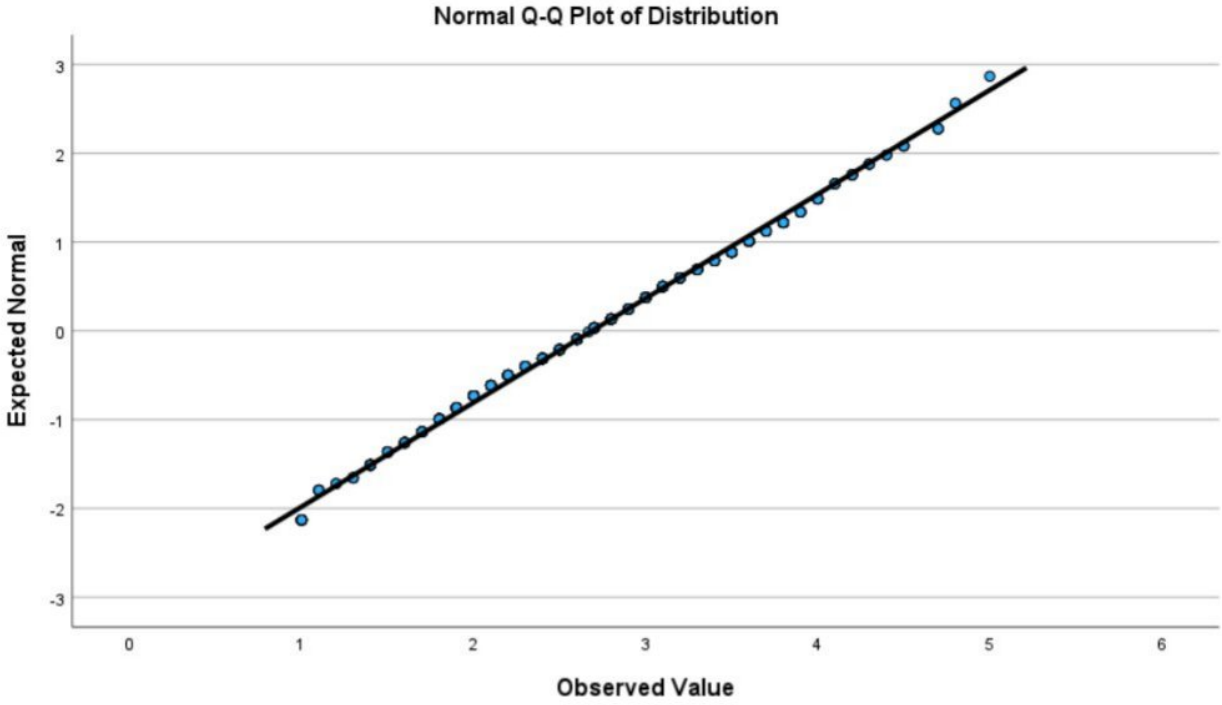


Figure 15 shows a normal Q-Q plot for the "Distribution" variable. The plot indicates how well the observed data for distribution aligns with a normal distribution. Most data points fall along the diagonal line, suggesting that the data is approximately normally distributed. However, there are slight deviations at both ends of the plot, with a few points above the line at the higher end (right side) and some below the line at the lower end (left side). These deviations indicate minor departures from normality, particularly at the tails of the distribution. Nonetheless, the overall alignment with the line suggests that the distribution of the data does not significantly deviate from normality and can be considered fairly normal for practical purposes.

Figure 16: Detrended Normal Q-Q Plot of Distribution

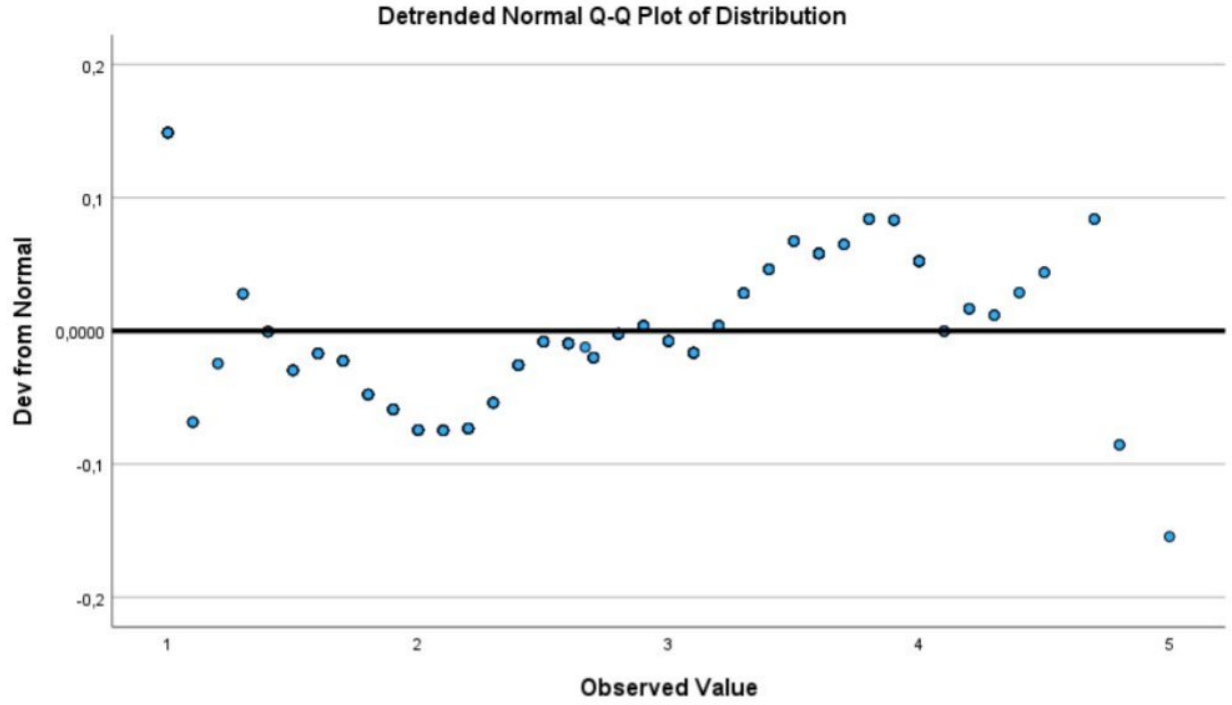


Figure 16 shows the detrended Q-Q plot for the "Distribution" variable, which displays the deviations of the observed values from a perfectly normal distribution. In this plot, data points are scattered around the horizontal line, representing zero deviation from normality. The plot indicates some deviations at the lower and upper ends of the distribution, with a few data points showing positive deviations at the higher range and negative deviations at the lower range. While most of the data points fall close to the zero line, suggesting that the distribution is approximately normal, these outliers show slight departures from normality, particularly in the tails. This implies that while the distribution is generally normal, there may be minor skewness or kurtosis present.

Figure 17: Box Plot Distribution

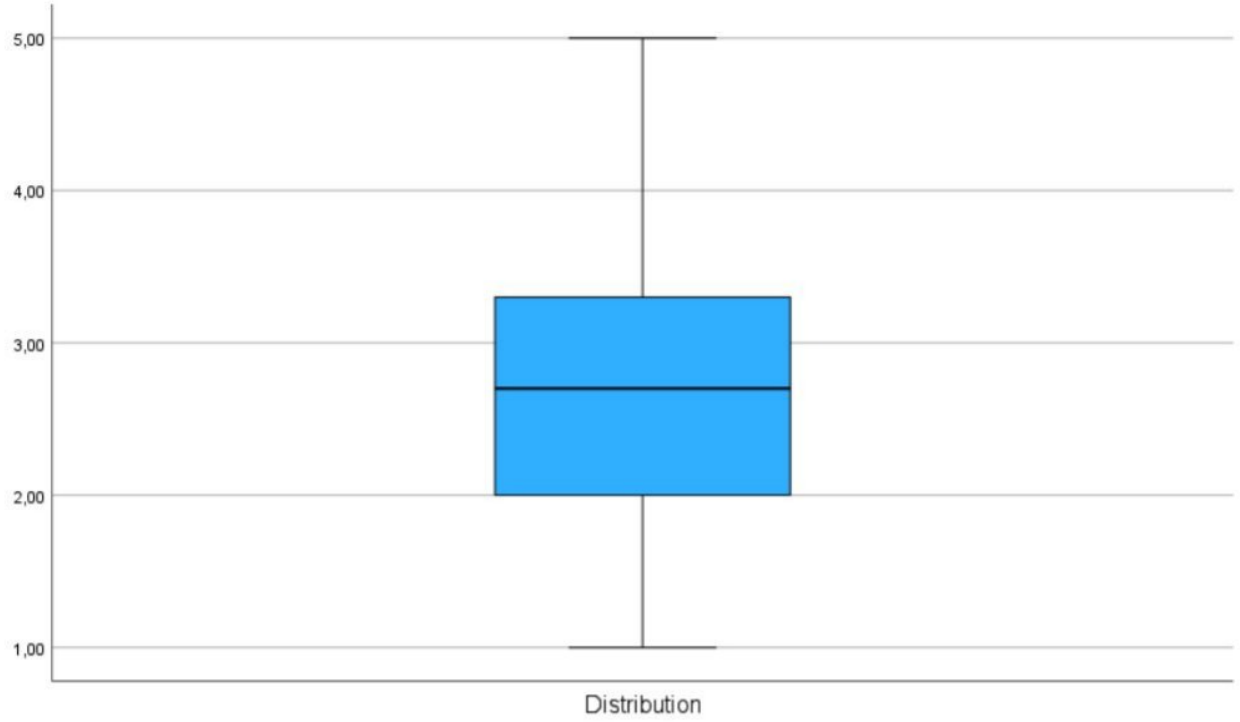


Figure 17 is a box plot representing the distribution of the "Distribution" variable. The plot shows that the median value is close to the center of the interquartile range (IQR), suggesting a fairly symmetric distribution. The IQR extends from approximately 2.2 to 3.8, indicating the middle 50% of the data falls within this range. The whiskers extend to the minimum and maximum values of the data set, which are approximately 1.0 and 5.0, respectively. There are no apparent outliers beyond the whiskers, suggesting that most data points fall within the expected range without extreme values. This distribution appears balanced, with no significant skewness, and suggests that the "Distribution" data is relatively consistent with minimal variability outside the interquartile range.

4.5.5. Maintenance

Figure 18 is a histogram depicting the distribution of responses for the "Maintenance" variable. The distribution shows that the majority of responses are centered around the 2.0 to 3.0 range, indicating a mean value of approximately 2.76. The distribution exhibits a slight positive skew, with a few data points extending towards higher values beyond 4.0. This suggests that while most responses cluster within the lower to mid-range, there are some instances of higher maintenance ratings. The standard deviation of 0.913 indicates a moderate spread of data around the mean. Overall, the distribution reflects a concentration of responses around the average with some variation extending into higher values, but without significant outliers.

Figure 18: Maintenance Mean = 2.76

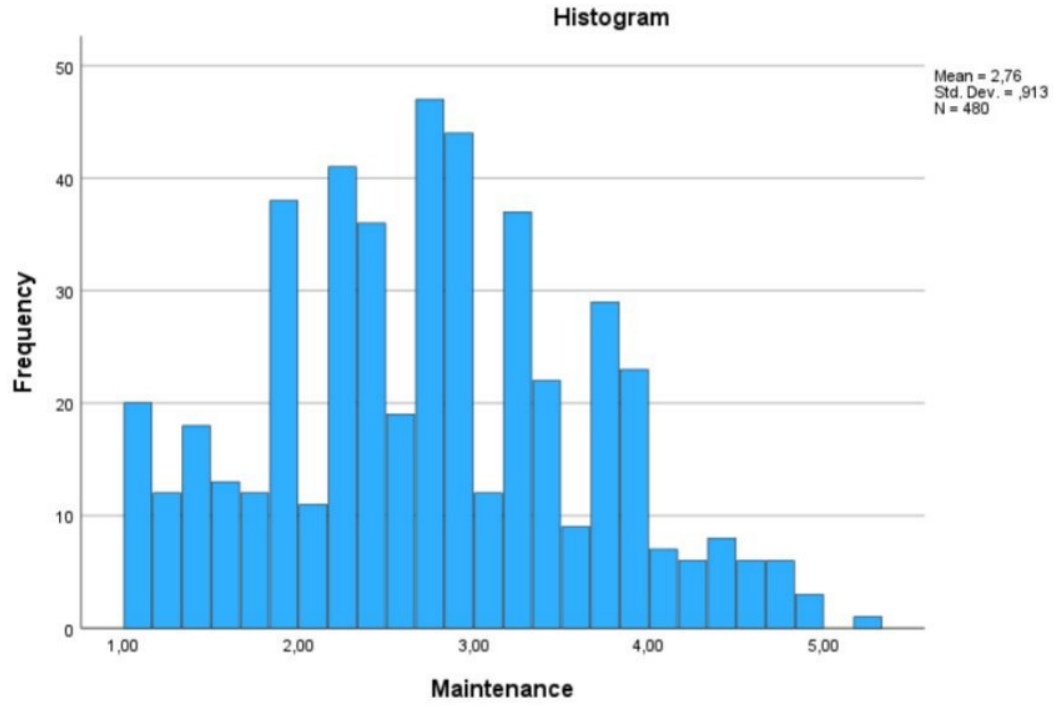


Figure 19: Normal Q-Q Plot of Maintenance

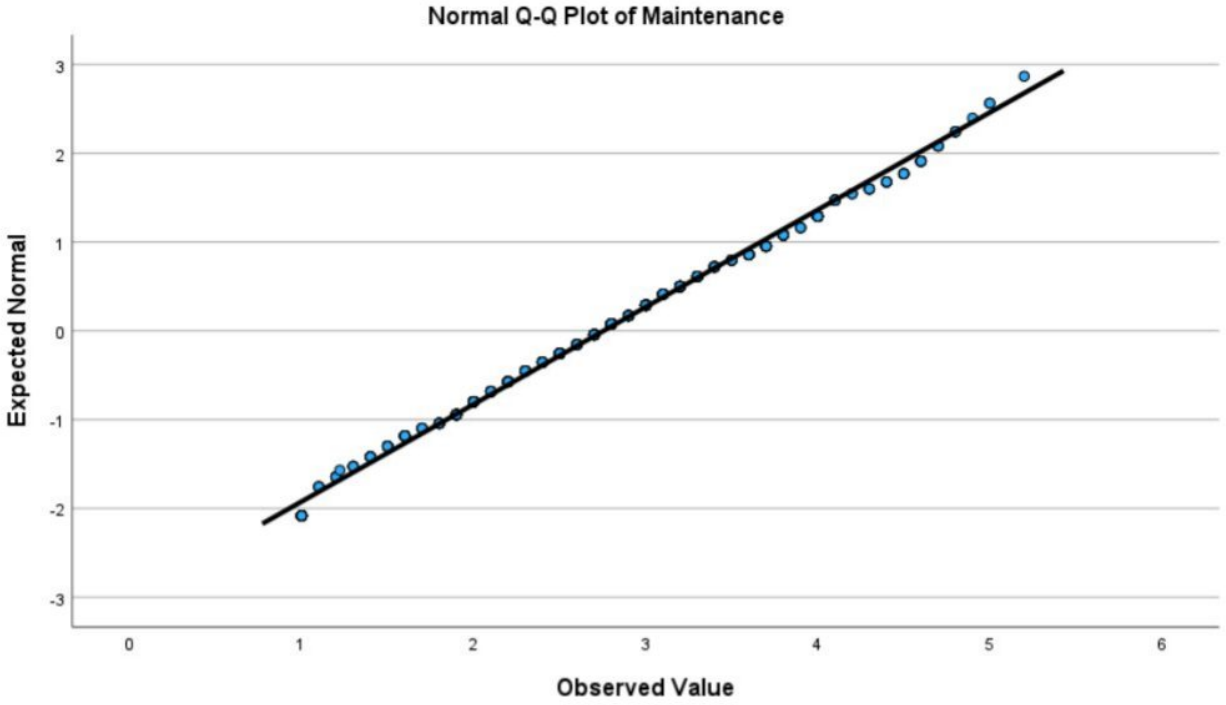


Figure 19 is a normal Q-Q plot for the "Maintenance" variable, illustrating how the observed data points compare to a theoretical normal distribution. The data points align closely with the diagonal line, indicating that the distribution of the "Maintenance" responses approximates normality, especially within the central range of values. Some slight deviations are observed at the lower and upper ends, suggesting minor departures from normality at the extremes. This implies that while the bulk of the data fits a normal distribution, there are slight variations at the tails that may indicate skewness or outliers. Overall, the plot suggests that the "Maintenance" variable distribution is approximately normal with some minor deviations.

Figure 20: Detrended Normal Q-Q Plot of Maintenance

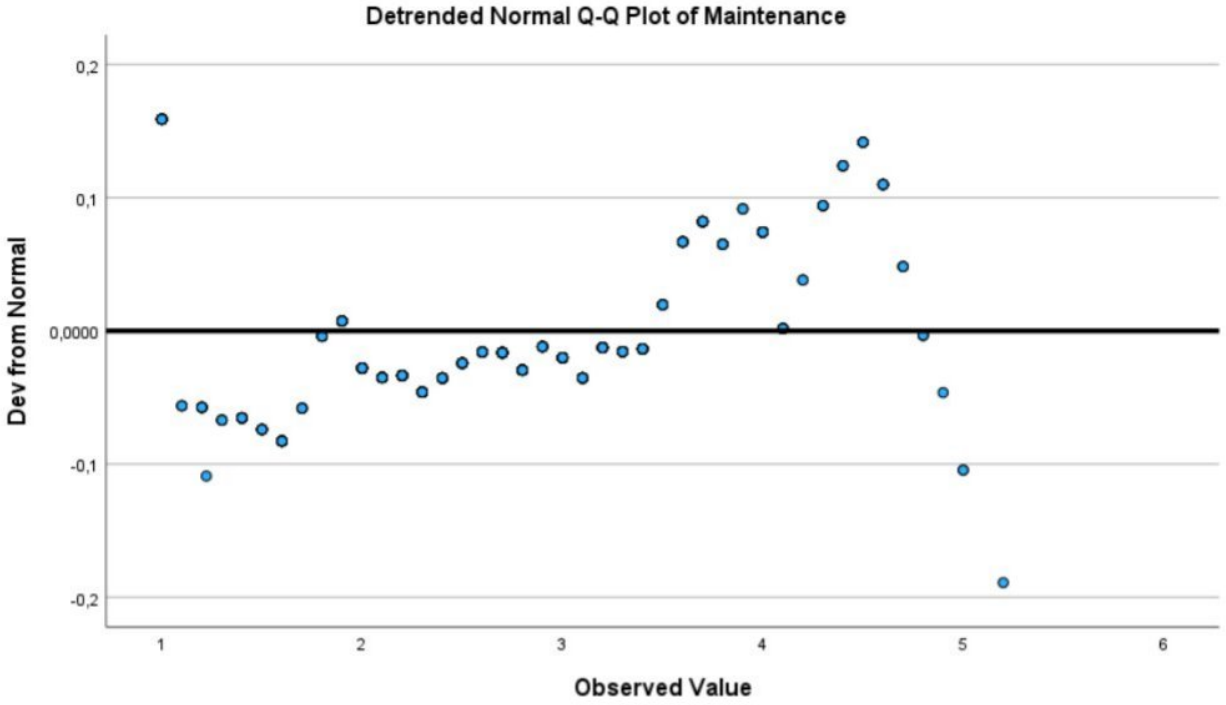


Figure 20 is a detrended Q-Q plot for the "Maintenance" variable, showing the deviations of the observed data from a theoretical normal distribution. The points are distributed around the zero line, with some clustering and minor deviations, especially at the higher values (above 4). This indicates that while most of the data points align reasonably well with a normal distribution, there are visible deviations at the upper end, suggesting some non-normality or the presence of outliers. The lower end of the plot shows smaller deviations. Overall, this plot highlights that while the data for "Maintenance" follows an approximately normal pattern, there are notable departures at the tails, which could indicate skewness or outliers affecting the distribution.

Figure 21: Box Plot Maintenance

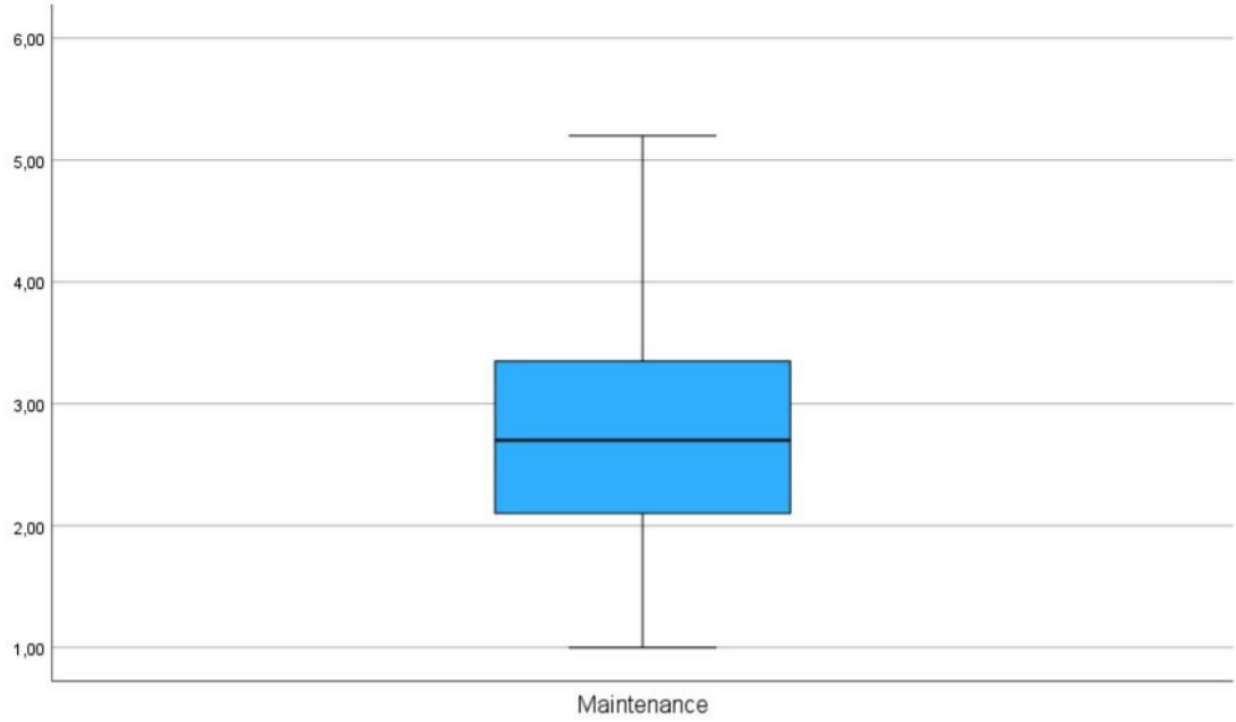


Figure 21 is a box plot for the "Maintenance" variable. The plot shows that the median value is around 3, with the interquartile range spanning from approximately 2.5 to 3.5. This indicates that most of the responses for maintenance are clustered around this range, demonstrating a moderate central tendency. The whiskers extend to the minimum and maximum values without indicating any significant outliers, suggesting that the data distribution is relatively symmetrical. The absence of extreme outliers in the plot supports the conclusion that while there is variability in the maintenance scores, it is within a controlled range. Overall, the box plot confirms that the "Maintenance" data is fairly consistent with a few higher values but no extreme deviations.

4.5.6. Disposal

Figure 22 is a histogram displaying the distribution of responses for the "Disposal" variable. The histogram reveals that the data is moderately spread, with a mean of approximately 2.78 and a standard deviation of 0.973. The distribution appears slightly skewed to the right, with most of the responses concentrated between 2 and 4. The highest frequency is observed at the value around 3, indicating that a significant portion of respondents rated the disposal process around this point. The spread of responses shows a range of variability but with fewer instances at the extremes (near 1 and above 4), suggesting that while there are some varied opinions on disposal processes, most responses are clustered around the average rating.

Figure 22: Disposal Mean = 2.78

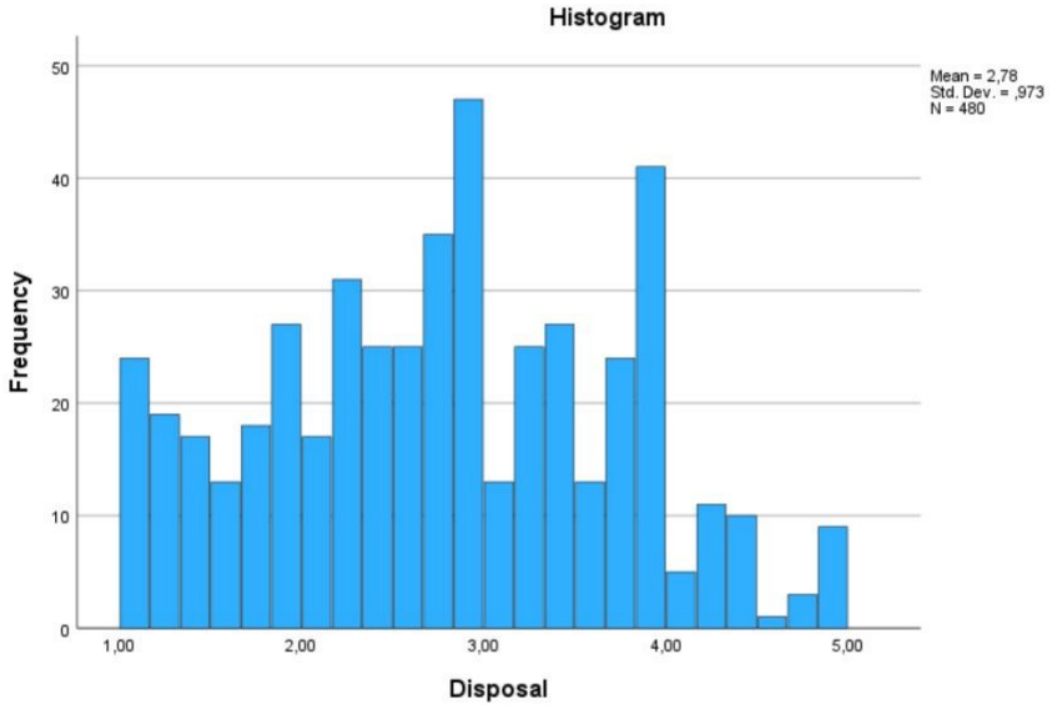


Figure 23: Normal Q-Q Plot of Disposal

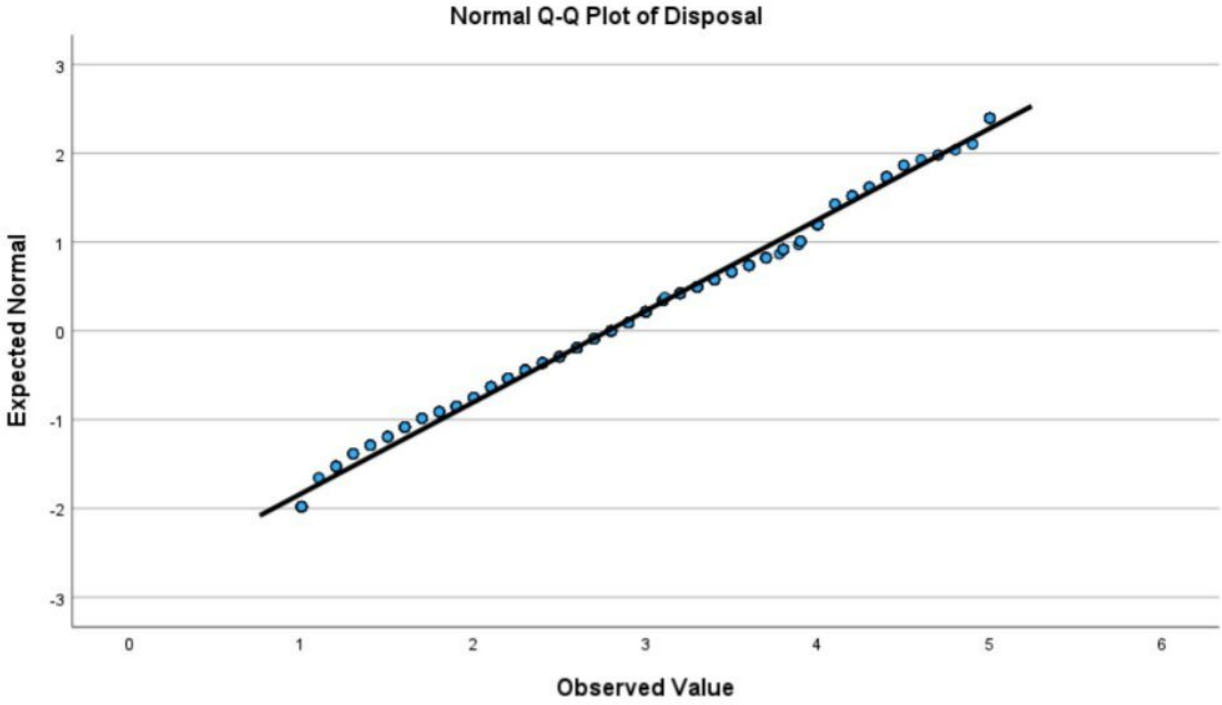


Figure 23 is a Q-Q plot of the "Disposal" variable, used to assess the normality of the data distribution. The data points generally follow the straight line, indicating that the distribution of the responses approximates normality. However, there are slight deviations at the extreme ends of the plot, particularly at higher observed values, which suggests minor skewness or potential outliers. Overall, the plot demonstrates that while the data largely adheres to the expected normal distribution, there may be some deviations that should be considered in further analysis.

Figure 24: Detrended Normal Q-Q Plot of Disposal

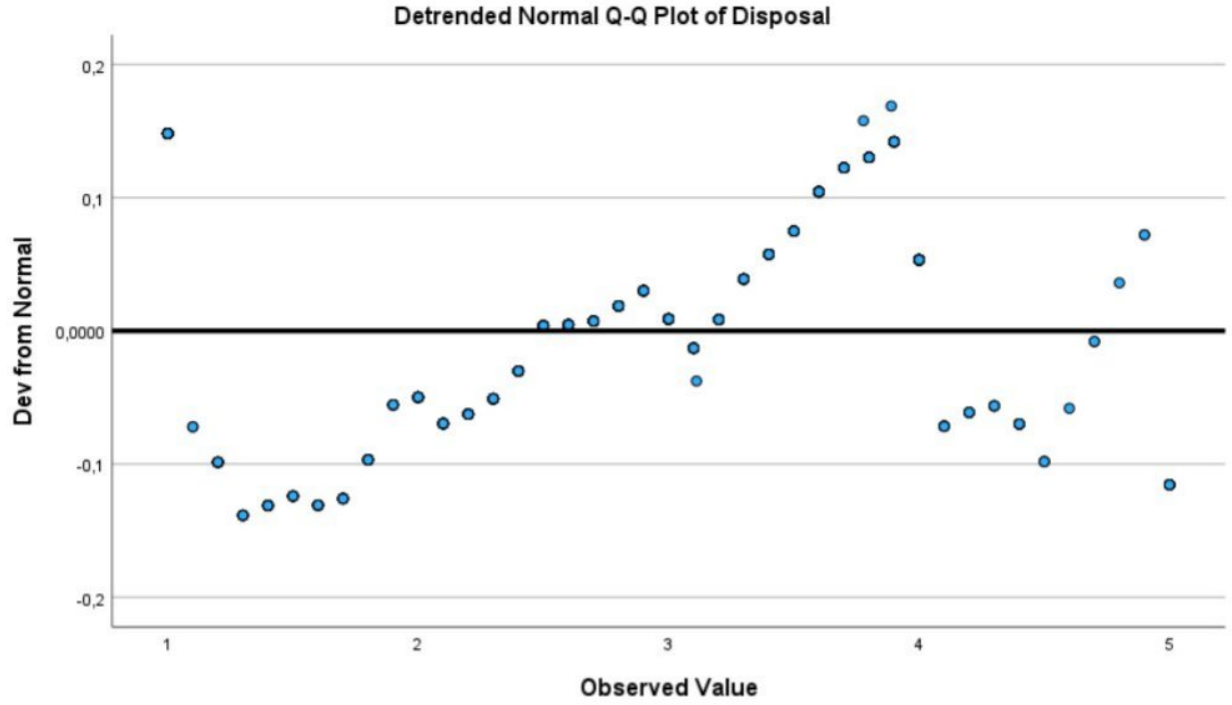


Figure 24 is a detrended Q-Q plot for the "Disposal" variable, illustrating deviations from the expected normal distribution. The plot shows that while many data points are clustered around the zero line, indicating minimal deviation from normality, there are noticeable departures at both ends of the scale. The right side, in particular, exhibits a higher concentration of points deviating positively, suggesting slight skewness or the presence of outliers. The spread on the left side also indicates minor negative deviations. This pattern highlights that while the data for "Disposal" broadly aligns with normality, there are significant deviations that may affect certain statistical analyses, such as parametric tests.

Figure 25: Box Plot Disposal

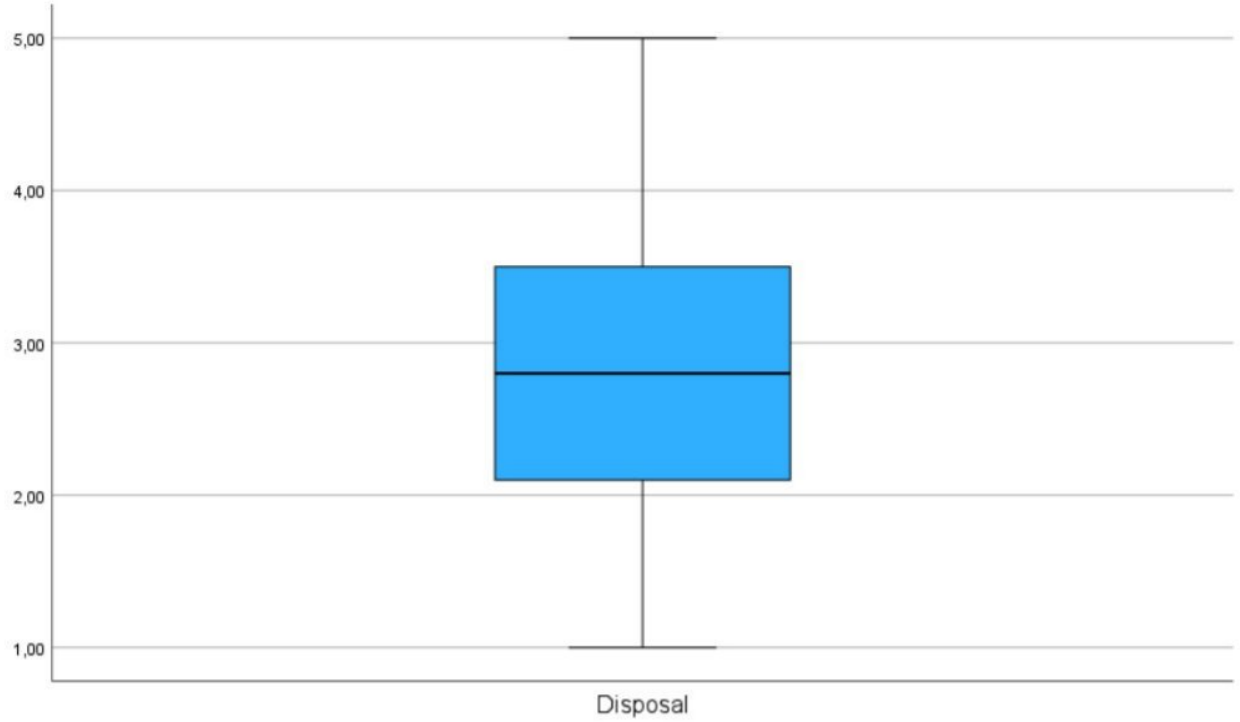


Figure 25 is a box plot representing the distribution of the "Disposal" variable. The box plot indicates that the data is symmetrically distributed with a median value centered within the interquartile range. The whiskers extend to the minimum and maximum values, showing no extreme outliers. The interquartile range, which spans from the first to the third quartile, captures the majority of the data points and indicates a moderate spread in the dataset. The relatively even length of the whiskers suggests that the distribution tails are balanced, supporting a roughly normal distribution with no significant skewness.

4.6. Discussion of Key Findings

The overall findings reveal that while the data does not perfectly adhere to normal distributions, the general responses are consistent across the supply chain components examined. The slight deviations and skewness, particularly in storage and procurement, indicate areas where operational challenges or varied experiences among respondents may be more pronounced.

Key areas identified for improvement include procurement and storage, as evidenced by higher variability and the presence of outliers. The consistent means across all variables suggest a uniform perception of challenges, with notable deviations indicating potential areas for targeted interventions. These findings can guide leadership in prioritising resource allocation, training, and process improvements within the SA Army's supply chain operations.

To contextualise these results, the following section interprets the findings using relevant SCM theories.

4.7. Comparison with Literature

4.7.1. Resource-Based Theory (RBT)

The empirical data highlighted that the SA Army's reliance on partnerships with domestic defence suppliers like Denel and ARMSCOR often limits its operational flexibility. This is consistent with Barney (1991) Resource-Based Theory, which emphasises that organisations achieve competitive advantage by effectively leveraging their internal resources and forming strategic alliances. The findings underscore that while the Army possesses internal competencies, these are not sufficiently optimised. Partnerships with international suppliers could supplement internal resources and streamline procurement processes. The limited internal resources found in the SA Army align with RBT's assertion that strategic partnerships can enhance overall supply chain effectiveness.

4.7.2. Institutional Theory

Institutional Theory, as proposed by DiMaggio and Powell (1983), outlines the constraints imposed by regulatory environments and societal norms. This theory is reflected in the SA Army's challenges with adherence to the Public Finance Management Act (PFMA) and National Treasury regulations, which were noted as contributing to procurement delays and inefficiencies. The findings confirm that compliance, while necessary for maintaining legitimacy, can hinder operational efficiency due to bureaucratic red tape. This supports the literature's view that regulatory frameworks, though designed to ensure transparency and accountability, may create barriers to timely procurement.

4.7.3. Resource Dependency Theory (RDT)

The findings revealed that the SA Army's dependence on a limited number of external suppliers, particularly Denel, has resulted in significant procurement delays and operational disruptions. This observation aligns with Pfeffer and Salancik's (1978) Resource Dependency Theory, which highlights the vulnerabilities that come with reliance on external resources. The literature emphasised that the Army's reliance on Denel, which has faced financial instability, creates a risk of procurement inefficiencies. The study's findings suggest that diversifying the supplier network and forming partnerships with international defence contractors could mitigate these vulnerabilities.

4.7.4. Transaction Cost Theory (TCT)

The findings also reflect the principles of Transaction Cost Theory (Williamson, 1985), which discusses the costs associated with economic transactions, including procurement. The SA Army's procurement processes were found to be subject to high transaction costs due to lengthy negotiations and compliance with public sector regulations. This aligns with the literature's assertion that military procurement, especially within the public sector, involves significant costs related to oversight and contract enforcement. These findings are consistent with Williamson's TCT, which suggests that when transaction costs rise due to bureaucratic complexity or weak institutional arrangements, organisational efficiency declines unless steps are taken to reduce those costs. The empirical evidence suggests that simplifying procurement processes and increasing oversight efficiency could reduce transaction costs and procurement delays.

4.8. Comparison with International Military Supply Chain Practices

The co

mparative analysis in the literature highlighted advanced SCM practices in countries such as the United States, United Kingdom, Russia, Germany, and Israel. These countries have adopted strategies that improve efficiency through technological integration, strategic partnerships, and proactive maintenance. The findings in this study indicate that the SA Army could benefit from adopting similar practices.

4.8.1. Provisioning

The U.S. military's global provisioning system, managed by the Defence Logistics Agency (DLA), ensures rapid deployment and readiness through pre-positioned supplies and partnerships (Erwin, 2020). The SA Army, by contrast, lacks a similarly efficient provisioning system. The findings suggest that adopting a more centralised provisioning model with advanced technological integration could enhance logistical support.

4.8.2. Acquisition

Acquisition processes in the SA Army were found to be constrained by bureaucratic procedures and regulatory compliance. The literature on the British and Israeli military acquisition processes points to the benefits of strong strategic alliances and technological innovation (Bailey & Charman, 2020; Ben-David, 2019). The SA Army could adopt similar strategies to streamline acquisition by forming international partnerships and leveraging technological advancements.

4.8.3. Storage and Distribution

The U.S. and Israeli storage and distribution systems emphasise automation and data-driven management (Erwin, 2020; Ben-David, 2019). In contrast, the findings indicate that the SA Army's current storage practices are less efficient, leading to logistical bottlenecks. Implementing automated inventory management and enhancing data-driven distribution channels could mitigate these issues.

4.8.4. Maintenance

The findings highlight the SA Army's challenges with equipment maintenance due to insufficient funding and outdated practices. This contrasts with the proactive maintenance strategies employed by the U.S. and Israeli militaries, which use predictive analytics to ensure equipment readiness (McLeary, 2020; Ben-David, 2019). The adoption of predictive maintenance tools could improve the SA Army's equipment reliability and operational readiness.

4.8.5. Disposal

Disposal practices in the SA Army were found to lack comprehensive environmental and security measures. The literature on U.S. and European military practices emphasises recycling and strict environmental regulations (Bailey & Charman, 2020; Erwin, 2020). Implementing similar disposal practices in the SA Army could enhance sustainability and prevent the loss of sensitive technologies.

4.9. Findings in Relation to Research Objectives

This section explicitly links the findings of the study to the original research objectives, ensuring clear alignment between the identified supply chain management (SCM) challenges, the theoretical underpinnings, and the proposed recommendations. By systematically addressing each objective, the study contributes to a comprehensive understanding of SCM inefficiencies and improvement strategies within the South African Army (SA Army).

4.9.1. Objective 1: To Identify the Key Challenges in SCM within the SA Army

This objective was achieved through a detailed analysis of survey responses, which revealed systemic issues such as procurement delays, limited technological integration, insufficient training, and dependence on a narrow supplier base. The findings also highlighted budget constraints and bureaucratic inefficiencies, particularly in the disposal process and outdated systems, which collectively impair operational efficiency.

4.9.2. Objective 2: To Examine the Impact of Regulatory and Procedural Constraints on SCM Efficiency

The findings supported this objective by showing that compliance with the Public Finance Management Act (PFMA) and related regulatory frameworks leads to significant delays and increased transaction costs. Respondents noted that these procedural hurdles restrict procurement agility, aligning with Institutional Theory's emphasis on the trade-off between compliance and operational efficiency.

4.9.3. Objective 3: To Evaluate the Role of Technology in SCM Processes

This objective was achieved through the identification of technological deficiencies across SCM operations. The study found that the SA Army lacks automated systems for inventory management, e-procurement, and predictive maintenance. Respondents called for digital transformation to enhance efficiency and align with international military best practices.

4.9.4. Objective 4: To Assess the Training and Development Needs of SCM Personnel

The findings supported this objective by showing that many personnel involved in SCM functions lack formal training in areas such as procurement procedures, inventory control, and transparency. Respondents consistently cited a need for structured capacity-building programmes to improve performance and readiness for modern supply chain demands.

4.9.5. Objective 5: To Compare the SA Army's SCM Practices with International Best Practices

This objective was achieved through a comparative analysis with top-tier militaries, including the United States, United Kingdom, Israel, Germany, and Russia. The findings revealed that the SA Army lags behind in critical areas such as automation, strategic provisioning, proactive maintenance, and environmentally compliant disposal. These comparisons underscore areas for strategic improvement.

4.9.6. Objective 6: To Develop Recommendations for Improving SCM in the SA Army

The findings supported this objective by informing practical and evidence-based recommendations. These include increasing budget allocations, adopting advanced technologies, implementing training initiatives, streamlining procurement processes, and forming strategic partnerships with international defence contractors. Collectively, these proposals aim to enhance the resilience, efficiency, and sustainability of the SA Army's supply chain.

By explicitly aligning the findings with the research objectives, this section illustrates how the study has comprehensively addressed the research problem. This ensures the validity of the conclusions and the relevance of proposed interventions for the SA Army's SCM landscape.

4.10. Implications of Findings

The findings of this study have significant implications for the South African Army's supply chain management strategies. Firstly, the need for strategic partnerships with international defence contractors underscores the importance of reducing reliance on a limited number of domestic suppliers. Diversification of the supplier base would not only minimise risks associated with supplier instability but also improve the availability of advanced military technologies.

Secondly, the integration of technology is a critical step forward. The findings indicate that leveraging automation and predictive analytics can optimise storage, distribution, and maintenance processes, leading to increased operational efficiency and readiness. This aligns with the practices observed in leading global militaries and suggests that adopting similar technologies could position the SA Army for improved logistics performance.

Thirdly, the regulatory and bureaucratic constraints highlighted in the findings imply that there is a need for policy reform. Streamlining procurement processes within the existing PFMA framework could reduce transaction costs and accelerate acquisition timelines, thereby mitigating the delays that currently impede military operations.

Finally, the study's emphasis on sustainable disposal practices has broader environmental and security implications. Implementing stringent disposal methods could prevent the leakage of sensitive information and align the SA Army's practices with international standards, promoting environmental stewardship and safeguarding critical technologies.

CHAPTER 5 CONCLUSION AND RECOMMENDATION

5.1. Introduction

The conclusion and recommendations chapter serves as the culminating section of this study, synthesising the key findings, insights, and contributions from the analysis of the South African Army's (SA Army) supply chain management (SCM). The chapter reflects on the systemic challenges uncovered during the research, examines their strategic implications, and proposes actionable recommendations for improvement. By combining theoretical insights, feedback from SCM personnel, and comparative analysis of global best practices, this chapter provides a roadmap for addressing inefficiencies and enhancing the SA Army's SCM capabilities.

The chapter begins with a summary of the study's key findings, offering a concise overview of the challenges and opportunities within the SA Army's SCM processes. These findings highlight critical areas such as procurement delays, budget constraints, technological gaps, and the need for improved accountability and transparency. The conclusions drawn from these findings emphasise the interconnected nature of SCM functions and the importance of a strategic, integrated approach to overcoming these challenges.

Building on these conclusions, this chapter outlines detailed recommendations aimed at improving SCM practices within the SA Army. These recommendations are informed by feedback from respondents actively engaged in SCM roles, the researcher's observations, and insights from international benchmarking. The recommendations address a range of issues, from enhancing training and technological integration to promoting sustainable disposal practices and fostering strategic partnerships.

The chapter also presents specific policy and practice recommendations to provide a framework for systemic reform within the SA Army. These proposals aim to institutionalise best practices, streamline processes, and align SCM operations with modern military standards. Additionally, areas for future research are identified to guide ongoing efforts to refine and optimise SCM practices within the military context.

The chapter concludes with a reflection on the study's contributions, acknowledging the complexity of SCM challenges and emphasising the importance of collaboration, innovation, and leadership in driving meaningful change. By addressing both immediate operational issues and long-term strategic goals, the recommendations presented in this chapter offer a comprehensive path forward for the SA Army to build a more efficient, transparent, and sustainable supply chain system.

5.2. Summary of Key Findings

Diverse Representation and Engagement: Data collection involved a broad representation across different ranks within the South African Army (SA Army), with a strong response from junior and mid-level ranks. This distribution provided comprehensive insights into the operational challenges within the supply chain.

Core SCM Components with Areas for Improvement: The study focused on six core SCM components: acquisition, procurement, storage, distribution, maintenance, and disposal. While responses across these components were consistent, procurement and storage were identified as areas with higher variability and operational challenges, suggesting the need for targeted improvements.

Data Deviations from Normality: Normality tests indicated that none of the datasets followed a perfect normal distribution. However, the deviations were minor, making the data suitable for practical analysis and highlighting variability within certain SCM functions.

Strategic Implications of SCM Theories:

- **Resource-Based Theory (RBT):** The SA Army's reliance on domestic defence suppliers (Denel and ARMSCOR) limits its flexibility. Strategic partnerships with international suppliers could enhance operational efficiency and reduce dependency.
- **Institutional Theory**: Compliance with the Public Finance Management Act (PFMA) and National Treasury regulations, though necessary, creates bureaucratic delays that hinder SCM efficiency.
- **Resource Dependency Theory (RDT**): Heavy reliance on external suppliers has made the SA Army vulnerable to procurement delays. Expanding the supplier network could mitigate these risks.
- **Transaction Cost Theory (TCT):** High transaction costs from complex procurement regulations and negotiations point to the need for streamlined processes to reduce inefficiencies.

Comparison with International Best Practices:

- **Provisioning**: Leading global militaries, like the U.S., use centralised and technologically integrated provisioning systems, which the SA Army lacks. Centralisation and technological improvements could enhance the SA Army's logistics support.

- **Acquisition and Procurement**: International militaries benefit from strategic alliances and advanced technologies. The SA Army could streamline its acquisition process by adopting similar strategies.

- **Storage and Distribution**: Automation and data-driven management in storage and distribution (as used by the U.S. and Israel) could improve efficiency and mitigate bottlenecks in the SA Army's current practices.

- **Maintenance**: Proactive maintenance, including predictive analytics used by the U.S. and Israeli militaries, could improve equipment reliability within the SA Army.

- **Disposal**: International disposal practices emphasise environmental and security measures. The SA Army could enhance sustainability and security by implementing comprehensive disposal procedures.

- **Technology Integration and Process Optimisation**: The study underscores the need for the SA Army to adopt technological advancements such as automation and predictive analytics to optimise SCM functions, improve readiness, and address current operational delays.

- **Need for Regulatory Reform**: Bureaucratic and regulatory constraints within the SA Army indicate the need for streamlined policies that could reduce transaction costs and improve procurement timelines.

- **Sustainable Disposal Practices**: Emphasis on sustainable disposal aligns with global standards. Implementing strict disposal practices could protect sensitive information and support environmental stewardship, aligning with international military practices.

In summary, these findings provide a roadmap for strategic partnerships, technological integration, policy reforms, and sustainable practices that could significantly enhance the SA Army's supply chain management capabilities. Adopting these recommendations would align the SA Army with international standards, ensuring enhanced operational readiness and long-term efficiency.

5.3. Conclusions Drawn from the Study

The extensive analysis of the South African Army's (SA Army) supply chain management (SCM) challenges, alongside comparative insights from global military practices and relevant theoretical frameworks, reveals several key conclusions:

5.3.1. Systemic Challenges in SCM Implementation

The SA Army faces persistent challenges across the SCM spectrum, including procurement, storage, distribution, maintenance, and disposal. These obstacles are compounded by bureaucratic inefficiencies, technological limitations, and regulatory constraints that inhibit timely and cost-effective operations. As evidenced in the procurement delays and dependence on external suppliers like Denel, these issues directly impact the Army's operational readiness and mission success.

5.3.2. Reliance on Limited Supplier Networks

Consistent with Resource Dependency Theory, the SA Army's reliance on a narrow pool of suppliers has exposed vulnerabilities in its supply chain, particularly in instances of financial instability among domestic suppliers. This dependency underscores the need to diversify supply networks, including partnerships with international defence firms, to enhance procurement flexibility and reduce risks associated with single-source suppliers.

5.3.3. Bureaucratic and Regulatory Constraints

Institutional Theory insights indicate that adherence to stringent public sector regulations, while necessary for transparency, often delays procurement processes. The findings suggest that the existing Public Finance Management Act (PFMA) compliance requirements create excessive transaction costs and prolonged acquisition timelines, restricting the Army's agility and responsiveness. Streamlining procurement policies within these regulatory frameworks could mitigate these inefficiencies.

5.3.4. Necessity of Technological Integration and Digitisation

Comparative analysis with global military practices highlights a stark gap in the SA Army's adoption of digital SCM technologies. The lack of automation in storage, maintenance, and distribution processes has led to inefficiencies that could be minimised through the integration of predictive analytics, automated inventory management, and real-time data processing. Such

enhancements would align the SA Army's SCM practices with modern military standards and boost operational performance.

5.3.5. Environmental and Security Implications of Disposal Practices

The SA Army's disposal practices require reform to align with international standards that emphasise environmental sustainability and the safeguarding of sensitive technologies. Adopting best practices in disposal could prevent environmental degradation and improve compliance with global military protocols, ensuring that the Army maintains secure and responsible disposal methods.

5.3.6. Strategic Partnerships and Supply Chain Resilience

Resource-Based Theory supports the notion that strategic partnerships, both domestic and international, can significantly bolster the SA Army's internal capabilities. Leveraging alliances with technologically advanced defence suppliers can enhance procurement effectiveness and provide access to specialised resources otherwise unavailable within the Army's current framework. These alliances are crucial for building a resilient and adaptable supply chain that supports diverse operational requirements.

5.4. Recommendations for Improving Supply Chain Management in the SA Army

The recommendations for improving supply chain management (SCM) in the South African Army (SA Army) outlined below were derived directly from feedback provided by respondents who completed the study questionnaire. These respondents, actively engaged in SCM roles within the SA Army, offered valuable insights and practical suggestions based on their first-hand experiences and observations. Their recommendations highlight the critical areas requiring attention to enhance the efficiency, transparency, and overall effectiveness of SCM within the organisation. This contextual approach ensures that the proposed improvements address real-world challenges faced by personnel at various levels of the SA Army's supply chain.

5.4.1. Recommendations for Improvement in SCM Based on Respondent Feedback:

5.4.1.1. Increase Budget and Improve Funding Management

Respondents emphasised the critical need for increased budget allocations specifically earmarked for SCM. This increase in funding would address shortages in essential resources such as equipment, vehicles, and uniforms. Proper management of allocated funds was also

highlighted as essential to prevent wastage and misallocation, ensuring that critical needs like fuel, uniforms, and vehicle maintenance are adequately met.

5.4.1.2. Enhance Training and Development Programs

To improve SCM competencies, respondents recommended implementing comprehensive training programs for personnel involved in SCM, procurement, and logistics management. Suggested training topics include e-procurement, transparency, and ethics, along with continuous learning opportunities to keep personnel up-to-date with SCM advancements. Enhanced training will enable personnel to manage SCM processes more effectively and align with best practices.

5.4.1.3. Upgrade Technology and Infrastructure

The need for modernisation in digital systems and infrastructure was highlighted. Respondents suggested investing in digital platforms for procurement, inventory management, and disposal processes. Modernising storage facilities by installing essential equipment—such as freezers, shelving, and secure bins—was recommended to improve efficiency and ensure the proper handling of resources.

5.4.1.4. Implement Transparent and Streamlined Procurement Processes

Delays in procurement were identified as a significant challenge. Respondents suggested decentralising and streamlining the procurement process to reduce lead times, particularly for routine supplies like uniforms and boots. A fair and transparent procurement process was recommended to create equitable opportunities for suppliers and reduce the risk of corruption within SCM.

5.4.1.5. Enhance Disposal Procedures

Respondents called for faster and more frequent disposal cycles to address the accumulation of outdated equipment and vehicles. A transparent disposal process that aligns with environmental guidelines was recommended to ensure accountability and promote sustainable practices within the SA Army.

5.4.1.6. Rotate Personnel and Improve Staffing

To mitigate risks of fraud and improve operational efficiency, respondents recommended implementing a system for regular rotation of procurement and logistics personnel. They emphasised the importance of appointing qualified personnel to SCM roles to ensure competent and efficient management of supply chain responsibilities.

5.4.1.7. Increase Transparency and Improve Communication

Respondents highlighted the importance of transparent SCM processes and open communication channels to build trust and foster collaboration. Improved communication within SCM operations was recommended to enhance coordination, promote accurate information sharing, and support a cohesive working environment.

5.4.1.8. Enhance Maintenance and Operational Readiness

Frequent vehicle servicing and timely maintenance of essential equipment were highlighted as priorities. Respondents recommended allocating a sufficient budget to support maintenance activities and infrastructure upkeep to ensure the continuous operational readiness of the SA Army.

5.4.1.9. Foster Accountability and Leadership in SCM

To strengthen accountability, respondents suggested periodic audits and inspections within SCM practices. They also recommended leadership involvement in SCM training to set an example and encourage a culture of accountability and continuous improvement across all levels of the organisation.

5.4.1.10. Adopt Modern SCM Practices and Benchmark Against Global Standards

Some respondents recommended that the SA Army benchmark its SCM practices against global military standards to identify and implement best practices. Adopting sustainable procurement and disposal practices and focusing on long-term strategic planning were suggested as ways to align SCM with global standards, enhancing both efficiency and sustainability.

5.4.2. Recommendations for Improvement in SCM Based on the Researchers Feedback:

- **Uniform Maintenance**: Increase production capacity by allocating more resources to uniform production. This will enable uniforms to be produced at a faster rate, thereby boosting both first-line and second-line stock reserves for future needs.

- **Vehicle Maintenance:** Revitalise the production of vehicle spares by revising the memorandum of understanding (MOU) with Denel, ensuring that B-vehicle spares are produced with the right materials, quality, and in sufficient quantities to meet depot stock requirements. Develop or select a standardised set of D-vehicles that utilise common spare parts. This will simplify maintenance and enable easier repairs by in-house personnel. The

fleet should be refreshed when it reaches 150,000 km. During this transition, retrain TSC members to equip them with the skills needed to maintain the updated fleet.

- **Office Furniture Maintenance**: Produce or procure standard office furniture in bulk to distribute across all military units, ensuring uniformity. This furniture can be categorised based on rank structure and unit requirements. The SA Army can consider partnering with the Department of Correctional Services to produce this furniture according to specific SA Army standards.

- **Production Brigade:** Establish a dedicated production brigade within the SA Army to manufacture essential supplies critical for self-sustainment, reducing dependency on external suppliers. This unit will enhance resilience and responsiveness to supply needs.

- **Interdepartmental Service Agreements:** Leverage other state departments for services already funded by the government, such as printing services from Government Printing Works, through signed service level agreements. This will maximise the utility of public resources and reduce costs.

- **Building Maintenance:** Prioritise the maintenance and repair of SA Army-owned buildings to minimise reliance on rented office space from the private sector. This measure will cut costs and promote self-reliance.

- **Research and Development (R&D) Activation:** Reactivate and fund the SA Army's R&D department to continually improve supply chain management practices. This department should remain operational at all times to ensure the SA Army keeps pace with the latest developments in SCM and logistics.

- **Enhanced Security Infrastructure:** Mandate the intelligence formation to oversee the production, installation, maintenance, and repair of all security hardware within the SA Army. Priority should be given to implementing standardised security features, including security cameras, facial and fingerprint access systems at entry points, and digital scanners capable of verifying vehicle licenses, military IDs, and driver's licenses.

- **IT and Communication Systems Maintenance:** Revise the structure and pricing model of the State Information Technology Agency (SITA) to improve response times and align pricing of IT equipment with market rates. Authorise the Signal Formation to repair and maintain IT equipment, minimising the cost of outsourcing and enhancing service continuity.

- **Strategic Partnerships**:Form alliances with international defense contractors to diversify the supplier base, improve procurement efficiency, and reduce reliance on a single supplier for critical components.

- **Technological Integration:** Invest in automated systems across provisioning, storage, and distribution to streamline processes and reduce human error. Digital SCM solutions can enhance the efficiency and agility of logistics operations, especially for inventory, maintenance, and distribution.

- **Regulatory Reforms:** Simplify compliance procedures within the Public Finance Management Act (PFMA) framework to reduce transaction costs and procurement delays. Streamlining these regulations will allow for faster acquisition and more efficient resource allocation.

- **Predictive Maintenance**: Implement predictive maintenance strategies to maintain continuous operational readiness of equipment. This proactive approach will reduce downtime and extend the lifespan of essential assets.

- **Sustainable Disposal Practices:** Adopt environmentally responsible disposal methods in alignment with international best practices. This approach will mitigate security risks associated with sensitive information and support ecological sustainability.

- **Enhanced Training for Personnel:** Provide specialised training to develop the digital literacy and SCM skills of logistics personnel. This will support the transition to a tech-driven logistics environment and improve the overall competence and effectiveness of SA Army supply chain management.

These recommendations aim to build a more efficient, transparent, and self-sustaining supply chain system for the SA Army. By adopting these strategies, the organisation can address current SCM challenges, reduce operational dependencies, and strengthen its readiness to meet both routine and emergency demands.

5.5. Policy and Practice Recommendations

To further enhance the effectiveness of supply chain management (SCM) within the South African Army (SA Army), the following policy and practice recommendations are proposed. These recommendations are derived from the findings of the study, general observations by the researcher, comparative analysis, and insights from respondents actively involved in the SA

Army's SCM operations. They are designed to address systemic issues and establish a framework for sustainable improvement in policy and daily practice.

5.5.1 Establish Clear Budget Allocation Policies for SCM

A policy should be instituted to ensure adequate and transparent allocation of funds specifically for SCM. This policy should define clear budgeting guidelines to prevent misallocation and ensure that resources are directed toward critical needs like uniform production, vehicle maintenance, and essential supplies. Regular reviews of budget utilisation should be mandated to enhance accountability and ensure that funding meets SCM requirements.

5.5.2 Institutionalise Comprehensive Training and Development Programs

To develop SCM competencies across the SA Army, a policy should mandate structured training programs for personnel involved in SCM, procurement, and logistics management. This training policy should include certification in e-procurement, transparency, and ethics, as well as regular skills upgrades to ensure personnel remain aligned with SCM best practices. A requirement for ongoing professional development in SCM should be included to enhance workforce capability and knowledge retention.

5.5.3 Modernise Technology and Infrastructure in SCM

The SA Army should adopt a policy promoting the integration of digital technology within SCM processes. This includes implementing digital procurement and inventory management systems to enhance efficiency, reduce human error, and streamline workflows. The policy should outline an infrastructure improvement plan, including the modernisation of storage facilities with appropriate equipment such as freezers, shelving, and secure storage bins.

5.5.4 Simplify and Decentralise Procurement Procedures

A policy reform is needed to simplify and decentralise procurement processes, reducing bureaucratic delays and enabling quicker responses to supply needs. This policy should outline a streamlined procurement framework that empowers units with the autonomy to procure routine supplies, such as uniforms, within predefined limits. This decentralised approach will increase efficiency and reduce bottlenecks in the procurement cycle.

5.5.5 Enforce Personnel Rotation and Placement Policies

To mitigate risks of fraud and foster operational efficiency, a policy should enforce regular rotation of procurement and logistics personnel. This rotation policy will ensure that individuals do not

remain in roles for extended periods, thus reducing potential conflicts of interest and improving exposure to diverse SCM processes.

5.5.6 Promote Transparency and Enhance Communication Practices

A transparency and communication policy should be implemented to foster open communication channels within SCM operations. This policy should outline protocols for information sharing, regular updates on SCM processes, and a communication strategy that enhances coordination between departments and ranks. The policy should promote an inclusive culture where personnel are encouraged to provide feedback and report SCM issues without fear of retribution.

5.5.7 Strengthen Accountability through Audits and Inspections

An accountability policy should enforce regular audits and inspections of SCM practices. This policy should outline the frequency and scope of audits, focusing on procurement, inventory management, and disposal procedures. Establishing clear lines of accountability will encourage adherence to best practices, reduce waste, and build a culture of integrity within SCM operations.

5.5.8 Align SCM Practices with Global Military Standards

A benchmarking policy should be introduced to align the SA Army's SCM practices with global military standards. This policy should mandate a periodic review of international SCM best practices and adopt relevant frameworks, including sustainable procurement, predictive maintenance, and long-term strategic planning. By aligning SCM practices with global standards, the SA Army can enhance efficiency, reduce costs, and promote sustainable logistics operations.

5.6. Recommendations for Future Research

To build on the findings of this study and address any limitations, the following areas are recommended for future research on supply chain management (SCM) within the South African Army (SA Army) and other military organisations:

5.6.1 Explore the Impact of Digital Transformation on SCM in Military Environments

Future research could focus on assessing the impact of digital transformation, such as the adoption of e-procurement, automated inventory management, and predictive maintenance systems, within military SCM. This research could explore how digitalisation influences operational efficiency, reduces lead times, and enhances overall SCM performance. It could also examine the challenges of implementing digital tools in resource-constrained environments like the SA Army.

5.6.2 Analyse the Effectiveness of Decentralised Procurement Models in Military SCM

As decentralisation of procurement was suggested as a recommendation, further research could investigate the effectiveness of decentralised procurement models within military supply chains. This study could analyse how decentralisation affects responsiveness, transparency, and control over procurement processes in military contexts. It would also be beneficial to identify potential risks and mitigation strategies associated with decentralised procurement.

5.6.3 Assess the Role of Strategic Partnerships with Local and International Suppliers

Given the recommendation to form alliances with international defence contractors, future research could examine the role and impact of strategic partnerships in military SCM. Such a study could assess how partnerships with both local and international suppliers affect procurement costs, resource availability, and supply chain resilience. It could evaluate the impact of these partnerships on the SA Army's ability to maintain operational readiness.

5.6.4 Investigate Training Needs and Development Programs in Military SCM

To further improve personnel competence, research could be conducted on the specific training needs and development programs required for SCM personnel in the military. This research could identify critical skills gaps, explore effective training methodologies, and propose comprehensive training programs tailored to military SCM. It could also investigate the impact of continuous professional development on the efficiency of SCM operations.

5.6.5 Study the Environmental and Security Implications of Military Disposal Processes

Considering the challenges identified in disposal processes, future research could focus on the environmental and security implications of disposal practices in military SCM. This study could explore how different disposal methods impact environmental sustainability, address security concerns regarding sensitive information, and identify best practices for responsible disposal within a military context.

5.6.6 Evaluate the Role of Predictive Maintenance in Enhancing Equipment Readiness

Future studies could examine the role of predictive maintenance strategies in improving equipment readiness and reducing downtime. This research could focus on the technical and logistical challenges of implementing predictive maintenance in the SA Army, as well as its cost-effectiveness and impact on operational readiness. The findings could help determine whether predictive maintenance is a viable solution for optimising asset longevity in military SCM.

5.6.7 Examine the Challenges of Budget Constraints on Military SCM

A future study could analyse the specific challenges that budget constraints impose on military SCM operations, particularly in areas such as procurement, maintenance, and infrastructure. This research could investigate how limited funding affects SCM performance, identify areas most impacted by budget limitations, and propose strategies for managing SCM within financial constraints.

5.6.8 Investigate the Role of Organisational Culture in SCM Efficiency

Further research could explore the role of organisational culture in influencing SCM efficiency within the SA Army. This study could examine how factors like leadership, accountability, communication, and transparency impact SCM performance. By understanding these cultural influences, the SA Army can work towards fostering a culture that supports efficient and effective supply chain practices.

5.6.9 Explore Benchmarking SCM Practices Against Leading Global Militaries

Future research could involve a detailed benchmarking analysis comparing the SCM practices of the SA Army with those of leading global militaries. This study could identify best practices in logistics, procurement, technology integration, and sustainability. The findings could provide a roadmap for the SA Army to adopt international standards and improve its SCM capabilities.

5.6.10 Assess the Impact of SCM Reforms on Operational Readiness

To understand the long-term effects of SCM improvements, future research could focus on evaluating the impact of SCM reforms on overall operational readiness. This research could track key performance indicators over time to assess whether changes in SCM practices directly correlate with enhanced readiness and mission success rates. Such studies would provide valuable insights into the effectiveness of SCM reforms.

5.7. Final Reflections

This study aimed to provide a comprehensive analysis of the challenges facing supply chain management (SCM) within the South African Army (SA Army) and to propose actionable recommendations to improve its effectiveness and efficiency. Through a detailed examination of the existing SCM practices, direct feedback from personnel, and a comparative analysis of SCM

practices in leading global militaries, the study identified key areas for improvement and provided recommendations based on both observed issues and best practices.

One of the central themes that emerged from this study is the critical importance of a well-functioning SCM system in maintaining the operational readiness of the SA Army. Without effective SCM, the SA Army risks compromising its mission success and the welfare of its personnel. The findings emphasise that SCM is not simply a support function but a strategic asset that underpins the Army's overall performance.

Reflecting on the research process, it is evident that the SA Army's SCM challenges are complex and multifaceted, encompassing budget constraints, procedural inefficiencies, technology gaps, and a lack of skilled personnel. While some of these challenges are unique to the military context, many are shared with other public-sector organisations, indicating broader systemic issues within public procurement and supply chain management in South Africa.

A significant insight from the study is the necessity of balancing military-specific requirements with contemporary SCM practices. For the SA Army to improve its SCM capabilities, it must adopt a dual approach: modernising its processes to align with industry standards while remaining responsive to the unique demands of military logistics. Embracing technological advancements, fostering strategic partnerships, and enhancing transparency and accountability are crucial steps in this direction.

The input from SCM personnel within the SA Army provided invaluable perspectives on the day-to-day realities of supply chain operations. Their recommendations reflect a strong desire for change and a commitment to improving SCM practices. This highlights the importance of engaging frontline staff in the decision-making process, as their insights often reveal practical solutions that may not be apparent to higher-level decision-makers.

In conclusion, this study reaffirms that addressing the SA Army's SCM challenges will require a collaborative effort across all levels of the organisation, supported by adequate resources and strong leadership. The proposed recommendations provide a roadmap for these improvements, but successful implementation will depend on a sustained commitment to change. It is the researcher's hope that this study will serve as a foundation for ongoing dialogue, further research, and continued progress towards a more efficient, resilient, and transparent SCM system within the SA Army.

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ANNEXURES A: QUESTIONNAIRE

Dear Madam/Sir.

Please take a few minutes to complete our anonymous questionnaire, which will be used for statistical reasons only. Your responses are a significant source of information for us and will help us explore the challenges of supply chain management (logistics) in the SA Army. We appreciate your availability and important participation. We will notify you of future activities to distribute and present study results after the survey.

For the closed-ended questions, the Likert scale should be read as follows:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

The respondent must "Mark with across (X)", his/her selection.

Demographic Information

1	Rank/Position in the Army (Private, Corporal, Sergeant, etc.)	
2	Years of Experience in Supply Chain Management (Logistics) (0-5 years, 6-10 years, 11-15 years, 16+ years)	
3	Department/Unit Name	

A: Acquisition (Planning)

Code	Description of statement	1	2	3	4	5

A-1	The current acquisition process is efficient in meeting operational requirements.					
A-2	There is sufficient transparency in the procurement process within the SA Army.					
A-3	The procurement procedures are straightforward and easy to follow.					
A-4	Communication between procurement officers and suppliers is effective and timely.					
A-5	The SA Army's acquisition process is adequately supported by technology and modern systems.					
A-6	There are frequent delays in the acquisition of essential supplies.					
A-7	The procurement staff is well-trained and knowledgeable about the acquisition process.					
A-8	The budget allocated for acquisitions is sufficient to meet the SA Army's needs					
A-9	The acquisition process adequately considers the quality of goods and services procured.					
A-10	The acquisition process is flexible enough to adapt to changing operational demands.					
B: Procurement						
Code	Description of statement	1	2	3	4	5
B-1	The procurement process within the SA Army is clear and well-defined.					
B-2	Procurement procedures are consistently followed by all relevant personnel.					

B-3	The SA Army's procurement process ensures timely delivery of goods and services.					
B-4	There is adequate communication between procurement officers and other departments involved in the process.					
B-5	The procurement process is quick and not slowed down by complicated rules or unnecessary paperwork.					
B-6	The current procurement process allows for flexibility to adapt to urgent and unforeseen needs.					
B-7	Procurement decisions are made based on comprehensive market analysis and research.					
B-8	The procurement process ensures fair competition among suppliers.					
B-9	There are adequate measures in place to prevent and address procurement fraud and corruption.					
B-10	The SA Army's procurement process is supported by modern technology and systems to enhance efficiency.					
C: Storage						
Code	Description of statement	1	2	3	4	5
C-1	The current storage facilities are adequate to meet the SA Army's needs.					
C-2	Storage conditions are properly maintained to ensure the durability of storage material or storage conditions are properly maintained to prolong the shelf life of stored material.					
C-3	There are effective inventory management practices in place.					

C-4	The storage process ensures easy and quick retrieval of items when needed.					
C-5	Stored items are adequately protected against theft and damage.					
C-6	There is sufficient training provided to personnel responsible for managing storage facilities.					
C-7	The storage process allows for accurate tracking and record-keeping of inventory.					
C-8	There is effective coordination between storage facilities and other departments for inventory management.					
C-9	Storage facilities are regularly inspected and maintained to ensure operational readiness.					
C-10	The current storage process is efficient in handling both routine and emergency supply needs.					
D: Distribution						
Code	Description of statement	1	2	3	4	5
D-1	The distribution process effectively meets the operational demands of the SA Army.					
D-2	Distribution routes are optimized for timely delivery of supplies.					
D-3	There is sufficient coordination between distribution centres and operational units.					
D-4	The current transportation infrastructure supports efficient distribution of supplies.					
D-5	Distribution personnel are well-trained and knowledgeable about their roles.					

D-6	The distribution process ensures the security of supplies during transit.					
D-7	There are adequate resources (vehicles, equipment) to support the distribution process.					
D-8	Distribution schedules are adhered to without significant delays.					
D-9	There is a clear process for handling and resolving distribution issues.					
D-10	The distribution process is regularly reviewed and updated to improve efficiency and effectiveness.					
E: Maintenance						
Code	Description of statement	1	2	3	4	5
E-1	The maintenance schedules are adequate to ensure operational readiness of equipment.					
E-2	Maintenance personnel are well-trained and skilled in handling the equipment.					
E-3	There are sufficient resources (tools, parts, etc.) available to carry out maintenance tasks effectively.					
E-4	The current maintenance process minimizes equipment downtime.					
E-5	There is effective communication between maintenance teams and operational units.					
E-6	Maintenance records are accurately kept and regularly updated.					
E-7	The maintenance process effectively addresses both routine and emergency repair needs.					

E-8	There is a clear process for reporting and addressing equipment issues.					
E-9	The Army's maintenance facilities are adequate to handle the volume of required maintenance.					
E-10	The maintenance process incorporates feedback from end-users to improve procedures and outcomes.					
F: Disposal						
Code	Description of statement	1	2	3	4	5
F-1	The disposal process for obsolete or damaged equipment is clearly defined and well-documented.					
F-2	The disposal process is efficient and timely in removing unwanted items from inventory.					
F-3	There are adequate facilities and resources for the proper disposal of equipment.					
F-4	The disposal process complies with environmental regulations and standards.					
F-5	The Army effectively tracks and documents all items designated for disposal.					
F-6	There is a clear process for assessing the condition and value of items before disposal.					
F-7	Disposal decisions are made in a transparent and accountable manner.					
F-8	There is effective coordination between departments involved in the disposal process.					
F-9	Personnel involved in the disposal process are adequately trained and knowledgeable.					

F-10	The disposal process is regularly reviewed and updated to improve efficiency and effectiveness.					
Suggestions for improvements in the supply chain management within the SA Army:						
1						
2						
3						
4						
5						