

INTEGRATING LIFECYCLE COSTING (LCC) INTO SUSTAINABLE DEFENCE PLANNING: LESSONS FROM INTERNATIONAL DEFENCE GOVERNANCE AND IMPLICATIONS FOR INDONESIA'S PERPRES 27/2019, MEF, AND NDIP

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Abstract

The study evaluates Lifecycle Costing (LCC) in defense governance and its potential applicability for Indonesia, focusing on LCC in Presidential Regulation (Perpres No. 27/2019, Minimum Essential Force (MEF) blueprints, and the National Defense Industry Policy (NDIP). With qualitative comparative methodology, six cases were selected: the United Kingdom, United States, Australia, Canada, NATO, and India. The analysis cases were organized into six dimensions: policy mandate, governance, methodology standardization, digital integration, industry engagement, digital integration, industry engagement and capacity development.

The findings reveal that LCC is lawfully instituted within well-developed defence organizations. These systems are complemented by centralized governance structures and cost integration systems, ensuring financial accountability through all phases of the lifecycle. Conversely, Indonesia defends management systems that are acquisition-centric and fragmented, with policy and institutional mechanisms focused on total ownership cost management.

The study recommends establishing a legal and institutional foundation for LCC, supported by digital cost management tools, standardized procedures, and professional training programs. Implementing these measures would enable the transition process toward a lifecycle-based defence governance model that enhances fiscal transparency, supports sustainable modernization, and aligns with global best practices.

Keywords: Sustainable Cost, Defence Policy, Lifecycle Cost, Framework

1. INTRODUCTION

Lifecycle Costing (LCC) has become an important concept in modern defence management; it enables governments to comprehend the total cost of ownership of military systems from acquisition to final disposal. The concept of LCC originated in the 1950s through studies by the United States Department of Defence (DoD) that focused to control long-term maintenance and support costs rather than focused only on acquisition budgets. Over time, LCC has become widely recognized as a key principle for attaining cost transparency, sustainability practice, and accountability in defence governance (Harrison, 2024; NATO, 2020).

Several countries have successfully included LCC into of their defence policy frameworks. The United Kingdom adopts it in its Through-Life Capability Management (TLCM) approach under the Joint Service Publication (JSP 507), making LCC a mandatory component in defence decision-making. The United States has

institutionalized LCC under Life Cycle Sustainment Plans (LCSPs) as required by the DoD Instruction 5000.91, ensuring that each acquisition program includes sustainment cost projections (U.S. DoD, 2022). Australia has integrated LCC into its Capability Life Cycle (CLC), combining financial accountability with readiness outcomes (Australian DoD, 2023). Canada and NATO also establish strong regulations and digital structures to manage cost data, linking LCC practices with industrial collaboration and capability planning (Giordano, 2019; Velevski, 2025).

These cases demonstrate that mature defence organizations treat LCC not merely as an accounting method, but as a strategic governance tool for linking fiscal discipline with operational performance and sustainability. However, this institutional maturity is not yet implemented in many developing defence systems. For example, India incorporates LCC considerations into the Defence Procurement Procedure (DPP 2020), but their application remains limited due to a lack of standardized methodology and enforcement mechanisms.

Indonesia currently does not have a specific and unified LCC framework for its defence sector. The governance regulations in our national defence resources are guided mainly by three key policies: Presidential Regulation (Perpres) No. 27/2019, which outlines the national defence policy and strategy; the Minimum Essential Force (MEF) blueprint, which focuses on capability fulfilment targets; and the National Defence Industry Policy (NDIP), which directs defence industrial development. While these policies are important, they do not explicitly address lifecycle cost analysis or more importantly, sustainment planning and total ownership cost management. As a result, defence spending in Indonesia remains heavily acquisition-oriented, leaving long-term maintenance and repair costs underestimated (Siahaan et al., 2022; Suherman et al., 2020).

Recent studies have emphasized that without an integrated LCC approach; countries may encounter budget inefficiencies, higher sustainment costs, and reduced readiness levels (Korkmaz, 2024; Duarte & Barbalho, 2024). In Indonesia's case, this gap has strategic implications: as the defence budget grows under the MEF and NDIP programs, the absence of lifecycle governance can threaten fiscal sustainability and undermine modernization goals (Setiawan, 2025).

Based on these issues, this study aims to analyse and compare international LCC frameworks specifically from the United Kingdom, United States, Australia, Canada, NATO, and India by specifically examining their structural arrangements, institutional features, and methodological approaches. Additionally, this study seeks to identify how these specific principles and mechanisms can inform Indonesia's defence governance. The analysis focuses on extracting sustainability lessons that could be adapted to Indonesia's defence policy under Perpres 27/2019, MEF, and NDIP.

The objectives of this study are to:

- a. Examine how advanced defence institutions implement LCC in their governance and policy systems.

- b. Compare these international frameworks to Indonesia's current defence governance instruments, and
- c. Formulate cost sustainability recommendations for integrating LCC principles into Indonesia's defence management framework.

The benefits of this comparison study are in two main areas. Theoretically, it enriches academic discussions on lifecycle cost governance in emerging defence economies by providing comparative insights grounded in policy analysis. Practically, it offers a policy roadmap for Indonesian defence institutions to strengthen fiscal accountability, optimize sustainment planning, and align defence modernization efforts with long-term financial sustainability.

LITERATURE REVIEW

Concept and Role of Lifecycle Costing in Defence Governance

Lifecycle Costing (LCC) refers to a structured method of estimating all costs associated with an asset throughout its entire lifespan, from design, acquisition, operation, maintenance, and final disposal. In defence organizations, LCC provides a framework to identify the financial implications of capability decisions long before acquisition begins. Rather than focusing solely on purchase phase, it helps decision-makers evaluate sustainment and modernization costs that often dominate the total ownership cost of military systems. Economists widely agree that LCC improves transparency and fiscal accountability, allowing defence planners to align limited budgets with long-term readiness goals (Harrison, 2024; Korkmaz, 2024).

The core value of LCC lies in its two purposes: first, it acts as a financial assessment tool and secondly it functions as a governance instrument. From a financial perspective, it provides early warnings of cost drivers across a system's lifecycle, while from a governance perspective; it enhances policy coherence between procurement, sustainment, and disposal. Duarte and Barbalho (2024) argue that integrating LCC into defence management strengthens institutional accountability by linking strategic planning with measurable fiscal outcomes. This broader governance role positions LCC not only as a budgeting method but also as a foundation for responsible defence capability and sustainability development.

Implementation of LCC in International Defence Frameworks

In many well-developed defence institutions, LCC has transformed from an initial cost analysis into a regulatory requirement for procurement decisions and sustainment policy. The United Kingdom's Ministry of Defence embeds LCC through the Through-Life Capability Management (TLCM) model, where Joint Service Publication (JSP) 507 provides standardized guidance for applying lifecycle analysis in all major defence programs. The United States Department of Defence also requires Life Cycle Sustainment Plans (LCSPs) for each major acquisition, ensuring that cost considerations remain integrated from initial design until final disposal (U.S. DoD, 2022). These regulatory instruments demonstrate that successful LCC implementation depends on clear policy mandates supported by higher institutional authority.

Australia's Capability Life Cycle (CLC) approach further shows how LCC can be embedded within an integrated governance model. The Australian Department of Defence uses LCC to not only control spending but also it serves as an instrument for assessing equipment's operational efficiency and accessibility (Australian DoD, 2023). Consequently, in line within this approach, Canada incorporates lifecycle analysis into its Defence Procurement Strategy for enhanced collaboration among governmental entities and private sector counterparts, simultaneously; NATO promotes the LCC Code of Practice (AC/327) as an interoperability standard across allied forces (Velevski, 2025). These examples underline three shared characteristics of effective LCC frameworks: (1) clear legal or procedural mandates; (2) institutional ownership through dedicated cost-analysis bodies; and (3) the use of digital cost databases and modelling tools that enable real-time sustainment forecasting. Together, these factors establish LCC as a permanent component of defence governance rather than an optional analytical activity.

Indonesia's Defence policy Context in LCC

Indonesia has started to recognize lifecycle costing concept within academic and professional area. However, it has not to be formally institutionalized in policy. The management of defence programs is guided primarily by three instruments, Presidential Regulation (Perpres) No. 27/2019, which outlines national defence policy and strategy; the Minimum Essential Force (MEF) blueprint, which specifies capability targets; and the National Defence Industry Policy (NDIP), which governs industrial collaboration. Despite covering aspects such as strategy, execution, and manufacturing levels, these models fail to provide an explicit method for assessing costs over time cycles or developing maintenance strategies. As a result, defence resource management tends to prioritize acquisition outputs rather than through-life affordability and long-term operational readiness (Siahaan et al., 2022; Suherman et al., 2020).

According to recent studies (Setiawan, 2025; Humaidi & Rahmadanti, 2023), the lack of a specific LCC framework weakens the ability to plan for asset maintenance and modernization and causes financial uncertainty. Although it frequently appears as part of defence funding discussions, cost-effectiveness remains disconnected from the organized approaches used by advanced military structures. Through aligning MEF capabilities with the NDIP's industrial goals through unified cost-management strategies, Indonesia can effectively fill its defence sector deficiencies using LC principles. Viewed through an administrative lens, integrating Local Content Compliance into Perpres No. 27/2019 enhances sustainable practices, encourages a commitment towards life cycle management among defence agencies, and boosts financial oversight efficiency.

2. METHODOLOGY

2.1 Study Design

This study uses a comparative qualitative approach to investigate the architecture and application of Life Cycle Costing (LCC) frameworks in diverse defence governance systems. The study mostly relies on documentary analysis, examining the regulations governing procurement, formal defence policy papers, and publications from respectable defence organizations. A comparative approach is appropriate since it enables us to identify institutional patterns, policy instruments, and lessons that may be applied to Indonesia's defence governance framework.

The study examines six reference organizations that reflect different stages of institutional readiness in implementing LCC: the United Kingdom, the United States, Australia, Canada, and NATO. India represents the developing country, while all those bodies are examples of high standards. Contextual comparisons center on Indonesia. The study may capture both established practices and transitional experiences relevant to Indonesia's policy environment thanks to this choice.

2.2 Data Collection

This study relies on secondary data from cost-analysis handbooks, procurement manuals, defence white papers, official papers such as international standards like the NATO LCC Code of Practice and the U.S. DoD Instruction 5000.91, institutional reports, and academic journals. Academic publications released between 2019 and 2025 are also examined in order to determine the most current understandings of how LCC applications are used in defence governance. Indonesian data comes from academic study, relevant ministerial regulations, Perpres No. 27/2019, the Minimum Essential Force (MEF) plan, and the National Defence Industry Policy (NDIP). Each source is evaluated for contextual significance and reliability in order to ensure the correctness of interpretations. To guarantee the accuracy of interpretations, each source is assessed for reliability and contextual significance as well as the evaluation for credibility and contextual relevance to ensure the accuracy of interpretations.

2.3 Analytical Framework

This study uses a six-dimensional analytical framework created from earlier policy and governance literature to arrange and compare the results. Each dimension reflects a crucial area that affects the institutionalization of LCC in defence organisations. The framework prioritizes qualitative assessment through descriptive and structural comparison rather than numerical maturity scores.

Table 1: Qualitative Evaluation on LCC Implementation Frameworks.

Dimension	Focus of Analysis	Illustrative Questions	Key Indicators Examples
Policy Mandate and Legal Foundation	The degree to which LCC is recognized and enforced through formal defence laws, regulations, or strategic documents.	Does the country have explicit LCC clauses or directives?	Existence of LCC regulations, procurement guidelines, or legislative mandate
Governance and Institutional Ownership	How responsibilities for LCC oversight are distributed among defence agencies or ministries.	Which institution coordinates lifecycle cost analysis?	Dedicated cost analysis units, inter-ministerial committees, or centralized governance bodies.
Methodological and Technical Standardization	The presence of consistent procedures, models, or cost breakdown structures supporting LCC application.	Are there standardized cost templates or methodological handbooks?	National or institutional LCC manuals, cost classification systems, evaluation tools.
Data and Digital Integration	The extent to which digital systems or analytical tools are used to collect, process, and manage lifecycle cost data.	Are there digital platforms or data repositories for sustainment costs?	ERP systems, digital twins, integrated defence logistics or cost databases.
Industry and Supplier Engagement	The role of defence industries and contractors in contributing to LCC-based management.	How are through-life contracts or cost-sharing mechanisms implemented?	Long-term service agreements, cost transparency clauses, industrial collaboration frameworks.

3. FINDINGS AND DISCUSSION

This study conducts a comparative analysis on the implementation of Lifecycle Costing (LCC) throughout the six defence governance systems (United Kingdom, United States, Australia, Canada, NATO, and India). The analysis of each case is based on a six-dimensional framework that includes policy mandate, governance, methodological standardization, digital systems, industry engagement, and capacity development. The results show a number of shared trends and particular contextual factors that, taken together, illustrate how LCC has changed over time as a tool for managing defence.

3.1 United Kingdom

The United Kingdom demonstrates one of the most comprehensive LCC frameworks in the defence sector.

- **Policy and Governance:** LCC is embedded within the Through-Life Capability Management (TLCM) policy, supported by *Joint Service Publication (JSP) 507* which provides mandatory guidance for all procurement and sustainment projects. The programme is under the joint management of the Ministry of Defence (MoD) and its the Defence Equipment and Support (DE&S) agency to provide institutional oversight over programmes lifecycles.
- **Standardization:** The UK applies consistent cost breakdown structures and detailed templates that link technical design and cross-referenced to technical design, performance, and sustainment costs.
- **Digital Integration:** The MoD employs digital platforms such as the MODCAD and Defence Equipment Plan Portal to manage lifecycle data.
- **Industry and Capacity:** Through-life support contracts and partnerships with industry are standard practice, with training programs delivered via the Defence Academy and Cranfield University. Collectively, these mechanisms make the UK a benchmark for embedding LCC within both operational and financial governance.

3.2 United States

The United States incorporates LCC as a statutory element of defence acquisition and sustainment.

- **Policy and Governance:** The framework is defined under DoD Instruction 5000.91 and the Life Cycle Sustainment Plan (LCSP), both mandatory for every major acquisition category. The oversight is then centralized through the Office of the Secretary of Defence (OSD) and monitored by the Government Accountability Office (GAO).
- **Standardization:** The U.S. implements a unified cost analysis structure under the Cost Assessment and Program Evaluation (CAPE) office, ensuring methodological consistency across services.
- **Digital Integration:** Advanced tools such as Cost Data Repository (CARD) and Product Support Manager (PSM) systems are used to analyse sustainment performance and predict total ownership costs.
- **Industry and Capacity:** Collaboration with contractors is guided by cost-sharing mechanisms and performance-based logistics (PBL). Universities and defence institutions provide continuous professional education in cost engineering and sustainment analysis. The U.S. case highlights how regulatory clarity and digital capability underpin sustainable lifecycle governance.

3.3 Australia

Australia's LCC implementation reflects an integrated, capability-based management philosophy.

- **Policy and Governance:** The Capability Life Cycle (CLC) model administered by the Capability Acquisition and Sustainment Group (CASG) within the Department of Defence mandates cost analysis at every phase of capability development.

- **Standardization:** LCC practices are standardized through internal policy documents such as the Defence Capability Manual and Smart Buyer Framework, which connect financial and operational metrics.
- **Digital Integration:** Australia is progressing toward a unified digital environment for sustainment monitoring through its One Defence ERP program.
- **Industry and Capacity:** Through-life support contracts are now the norm, encouraging industry partners to share cost data transparently. The Australian Defence College provides structured training in LCC and logistics management, contributing to a well-established culture of lifecycle accountability.

3.4 Canada

Canada's defence establishment exhibits strong alignment between LCC and sustainability objectives.

- **Policy and Governance:** LCC is institutionalized within the Defence Procurement Strategy (DPS), managed by the Department of National Defence (DND) in coordination with Public Services and Procurement Canada (PSPC) also Integrated Cost and Schedule Analysis method ensures consistent evaluations of long-term affordability.
- **Digital Integration:** Canada emphasizes data-driven analysis with cost modelling software and digital repositories managed by Defence Study and Development Canada (DRDC).
- **Industry and Capacity:** Canada actively promotes transparency by requiring suppliers to provide cost data over a system's life and linking LCC with environmental sustainability targets. Continuous learning programs for defence financial analysts are maintained through partnerships with academic institutions.

3.5 India

India represents a developing case in the evolution of LCC adoption.

- **Policy and Governance:** The Defence Procurement Procedure (DPP 2020) includes references to lifecycle costs but lacks mandatory enforcement or centralized oversight.
- **Standardization:** Efforts remain fragmented; some branches of the armed forces apply cost evaluations individually without a common methodology.
- **Digital Integration:** India has begun exploring digital sustainment systems but faces challenges in integrating cost data across agencies.
- **Industry and Capacity:** While the Defence Study and Development Organisation (DRDO) and selected public sector units have initiated cost-awareness programs, LCC-related expertise and industrial collaboration remain limited. India's case shows gradual progress toward structured lifecycle governance, yet significant institutional gaps persist.

3.6 NATO

NATO plays a unique role by setting transnational standards for LCC application among member states.

- **Policy and Governance:** The NATO LCC Code of Practice (AC/327) provides overarching principles and terminology for lifecycle cost management. While it

does not enforce specific procedures, it harmonizes definitions and encourages consistency across national systems.

- **Standardization and Digitalization:** NATO supports shared cost databases and collaborative tools, particularly for multinational acquisition programs.
- **Industry and Capacity:** It promotes cooperative industrial models where member nations share development and sustainment data. Training initiatives and knowledge exchanges through the NATO Support and Procurement Agency (NSPA) enhance collective expertise. NATO's model illustrates how standardization and cooperation can strengthen fiscal transparency beyond national boundaries.

3.7 Discussion Policy Mandate and Legal Foundation

The comparative findings reveal that while many advanced defence bodies have fully integrated Lifecycle Costing (LCC) into their governance frameworks, Indonesia remains at an early stage of adoption. Although defence modernization and industrial development are well explained through Presidential Regulation (Perpres) No. 27/2019, the Minimum Essential Force (MEF) blueprint, and the National Defence Industry Policy (NDIP), these documents do not yet provide a unified mechanism for lifecycle cost management. Using the six analytical dimensions, this section evaluates Indonesia's current position and identifies key opportunities for policy adaptation.

3.8 Policy Mandate and Legal Foundation

Indonesia's current legal system is mostly concerned with industrial development and capacity goals. However, clear LCC legislation does not yet support the financial sustainability of these initiatives over the long term. Spending choices run the risk of prioritizing immediate acquisition over lifetime worth if there is no legal foundation linking acquisition to operation, maintenance, and eventual disposal.

Establishing an LCC clause under Perpres 27/2019 would embed sustainability thinking into defence planning, ensuring that each investment considers carbon footprint, material reuse, and total lifecycle affordability. Legally recognizing LCC would also align defence expenditure with Indonesia's Rencana Pembangunan Jangka Panjang Nasional (RPJPN), which prioritizes efficiency and green budgeting across government sectors or the opportunity lies in supplementing Perpres 27/2019 with a ministerial regulation or guideline that formalizes LCC requirements within defence acquisition and sustainment processes. Establishing a legal foundation would be the first step toward institutionalizing lifecycle-based accountability.

3.9 Governance and Institutional Ownership

At present, neither the Ministry of Defence nor the Indonesian Armed Forces possesses a specific division/department responsible for managing the expenses related to equipment during its entire life cycle. Various departments carry out the management of budgeting and purchasing. This division results in programs that overlap and costs for maintenance that are uncertain. From a sustainability viewpoint, inadequate coordination hinders the effective use of resources, including energy usage, the recycling of spare parts, and the efficiency of the supply chain.

In contrast, nations such as the United States Australia oversees LCC through dedicated departments, specifically the Cost Assessment and Program Evaluation (CAPE) office and the Capability Acquisition and Sustainment Group (CASG), which bring together financial, technical, and operational information. Indonesia might consider implementing a comparable approach by creating a Defence Lifecycle Cost Center (DLCC) or a specific Lifecycle Cost (LCC) unit within the Ministry of Defence. This unit would work together with the MEF and NDIP task forces to align budget planning, capability development, and industrial support throughout the entire lifecycle of the system.

3.10 Methodological and Technical Standardization

Currently, Indonesia does not have a standardized approach or reference manual for conducting lifecycle cost analysis. Each procurement program tends to use its own cost structure, often limited to acquisition expenses. The MEF provides quantitative capability targets, but these do not include cost breakdowns for sustainment or disposal. Without a national standardized cost framework, it is difficult to compare how affordable of different systems are over time or to decide between maintenance and modernization.

Other countries use consistent cost breakdowns and methods similar to NATO's LCC Code of Practice (AC/327) which aim to sets out standard definitions and cost groups, making comparisons and joint work easier. Indonesia could make its own National Lifecycle Cost Handbook. This would match global standards but also fit our local defence budget rules. This book would give project offices templates and ways to figure out costs, leading to better consistency and choices.

3.11 Data and Digital Integration

Indonesia does not have a standardized method for conducting lifecycle cost analysis. At present, each procurement project creates its own cost framework, typically addressing only the initial purchase expenses. Although the Minimum Essential Force (MEF) specifies the capability needs, it does not provide information about the costs related to continuous support or disposal. The lack of a national cost framework makes it difficult to assess the long-term affordability of various systems or to decide between keeping current equipment and improving it.

In comparison, different countries utilize standardized pricing structures and procedures. For instance, NATO's LCC Code of Practice (AC/327) establishes standard definitions and categories for costs, which makes it easier to compare and work together. Indonesia has the potential to develop its own National Lifecycle Cost Handbook. This would be in accordance with global standards and take into account our local defence budget regulations. Such a manual would enable planners to assess not only direct expenses but also external impacts of sustainment, including energy use, emissions, and waste production.

3.12 Industry and Supplier Engagement

The NDIP highlights industrial independence and domestic production targets but does not explicitly require defence industries to provide cost data throughout the product lifecycle. Contracts are often limited to production and initial support phases, leaving long-term sustainment costs unclear. This approach contrasts sharply with

international practices, where through-life support contracts and cost-sharing mechanisms are common.

To align with these practices, Indonesia could incorporate LCC-based clauses into defence procurement and industrial agreements. For example, contracts could mandate suppliers to report annual sustainment costs, reliability data, and component lifespans. Over time, this data would contribute to a national cost database that supports better forecasting and budgeting. Such measures would not only enhance cost transparency but also strengthen accountability across government and industry partners.

3.13 Capacity and Knowledge Development

The capacity of human resources continues to be a significant obstacle to the implementation of LCC in Indonesia. Although defence economics and logistics management are part of certain training programs, there is currently no specific certification or professional course that concentrates on lifecycle cost analysis. Without specialized knowledge, project teams frequently regard LCC as an abstract idea instead of a useful instrument.

Defence organizations globally allocate significant resources for training activities. For instance, the Defence Academy of the United Kingdom and the Defence College of Australia offer various courses in cost analysis, logistics, and strategic planning over the long term. Indonesia may collaborate with defence universities and its Defence Industry Policy Committee to establish a training and certification program focused on life cycle costing for both military and civilian personnel. This would provide them with the necessary analytical abilities to assist in implementing policy changes.

4. CONCLUSION

This study examined the application of Lifecycle Costing (LCC) across different defence systems and its relevance to the defence policy of Indonesia. An examination of practices in the United Kingdom, United States, Australia, Canada, NATO, and India indicates that life cycle costing (LCC) is most effective when it is completed with solid legal support, strong dedication from organizations, established procedures, unified digital systems, participation from industry, and continuous training for staff. These nations view LCC as more than simply a financial mechanism; they consider it a key governance concept that links financial management with operational requirements.

Indonesia's defence system, directed by Presidential Regulation No. As of 27/2019, the Minimum Essential Force (MEF) plan and the National Defence Industry Policy (NDIP) do not currently possess a clear and cohesive structure for managing life cycle costs. Our examination of six important areas indicates that while Indonesia has effective strategies and industrial plans, it lacks a system to manage all expenses related to ownership. In the absence of established procedures, digital cost tracking, and adequately trained personnel, it becomes challenging to strategize for the ongoing costs of sustainability maintenance and to determine what expenditures the country can sustain over an extended period.

According to our findings, we propose several recommendations to address these issues. Initially, Indonesia must establish a legal structure for low-cost carriers to begin addressing the issue of sustainability in costs. This may be accomplished through a government order or defence guideline that explicitly incorporates lifecycle cost analysis into our purchasing and future maintenance processes. Secondly, the Ministry of Defence may consider establishing a dedicated unit specifically focused on overseeing lifecycle costs. This section will manage the collection, analysis, and reporting of data for the MEF and NDIP programs. Third, the development of a National LCC Handbook along with a digital platform for cost management would aid in standardizing our practices and enhancing transparency in our defence budget. Finally, collaborating with defence universities and industry will be essential for developing our skilled workforce and enhancing our capacity for lifecycle analysis.

In general, adopting LCC in Indonesia's defence management would enhance financial responsibility and aid in sustainable modernization and the resilience of the nation. By studying international methods and adjusting them to fit local policy tools, Indonesia can transform from a system that primarily focuses on acquisitions to a holistic defence management approach based on lifecycle principles, promoting a balance between developing capabilities and ensuring long-term sustainability.

Limitations

This study offers a comparison of Lifecycle Costing (LCC) frameworks used in various countries and explores their effects on defence governance in Indonesia. Nevertheless, it is important to recognize various limitations.

Initially, the study primarily relies on information that is publicly accessible, including official documents, scholarly articles, and reports from various organizations. Although these sources are reliable, we were unable to obtain confidential or internal defence spending data. This restricted our capacity to completely evaluate how things are implemented. Furthermore, our approach is based on comprehending policy instead of simply calculating figures. The analysis reveals trends in the organization and operation of items, yet it does not quantify their value for money. Ultimately, the comparison examines several selected countries that are at various levels of effectiveness in managing life cycle costs. Although these examples provide valuable information, they may not fully encompass all aspects of defence systems across the globe.

To enhance this study, future investigations should collect first-hand data by conducting interviews, observing in the field, or collaborating with defence organizations to verify the actual application of LCC. Incorporating additional developing defence economies in Asia or the Middle East may provide us with a broader perspective on how policies are modified. Despite the existing limitations, this study offers a solid foundation for individuals seeking to enhance Indonesia's efforts in managing defence over its entire life cycle.

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