

Analysis of Human Resource Readiness in Technology-Based Defense Management

Muhammad Ariobimo¹ Ari Pitoyo Sumarno² Susilo Adi Purwantoro³ Hikmat Zakky Almubaroq⁴

Defense Management at the Indonesian Defense University^{1,2,3,4}

Email: ario.bimo14@gmail.com¹ arpitsum@gmail.com²

Abstract

The increasing adoption of digital technologies in defense organizations has fundamentally transformed defense management practices and operational models. However, the effectiveness of technology-based defense management depends not only on advanced systems but also on the readiness of human resources to operate, adapt, and sustain these technologies. This study analyzes human resource readiness within technology-based defense management by examining key dimensions such as digital competence, adaptive capability, and organizational support. Using a qualitative literature-based analytical approach, this paper synthesizes recent scholarly findings to develop a conceptual framework for assessing readiness in defense institutions. The findings indicate that insufficient human resource readiness can undermine digital transformation initiatives despite substantial technological investment. This study contributes to defense management literature by highlighting the strategic role of human capital in ensuring successful technology integration and organizational resilience.

Keywords: Human Resource Readiness; Defense Management; Digital Transformation; Military Organization; Technology Adoption



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INTRODUCTION

Digital transformation has emerged as a central agenda in contemporary defense management, driven by advancements in artificial intelligence, big data analytics, and network-centric systems (Binnendijk & Horowitz, 2020). Defense institutions increasingly rely on technology-based systems to enhance decision-making, operational efficiency, and strategic responsiveness (Nye, 2020). However, technological superiority alone does not guarantee organizational effectiveness if human resources are not adequately prepared to utilize such systems (Vial, 2021). Human resource readiness refers to the extent to which personnel possess the skills, mindset, and organizational support necessary to adopt and manage new technologies effectively (Kraus et al., 2021). In defense organizations, readiness encompasses not only technical competence but also adaptability, discipline, and commitment to institutional objectives (Schwab, 2020). Despite its importance, human resource readiness remains under-examined in defense management literature compared to technological capability and strategic doctrine (Mergel et al., 2019). This study aims to analyze human resource readiness in technology-based defense management by synthesizing recent academic perspectives and identifying key readiness dimensions relevant to defense institutions (Bennett & Checkel, 2020). The analysis seeks to contribute to both theoretical and practical discussions on defense modernization through human capital development (Vial, 2021).

Literature Review

Technology-Based Defense Management

Technology-based defense management refers to the systematic integration of advanced digital technologies into defense planning, operations, and organizational governance (Binnendijk & Horowitz, 2020). These technologies include command-and-control systems,

cyber defense platforms, decision-support algorithms, and data-driven intelligence tools (Nye, 2020). The adoption of such systems aims to enhance strategic agility and operational effectiveness in complex security environments (Schwab, 2020). However, empirical studies suggest that technological implementation in defense organizations often faces institutional and human challenges, particularly related to skills gaps and resistance to organizational change (Mergel et al., 2019). This indicates that defense modernization requires an integrated approach combining technology, structure, and human resource development (Vial, 2021).

Human Resource Readiness

Human resource readiness is conceptualized as a multidimensional construct involving knowledge, skills, attitudes, and organizational conditions that enable effective technology utilization (Kraus et al., 2021). Readiness extends beyond individual competence to include leadership support, training systems, and organizational culture conducive to innovation (Creswell & Poth, 2018). Recent studies emphasize that readiness is a decisive factor in digital transformation outcomes across public sector organizations (Mergel et al., 2019). Personnel who demonstrate high digital literacy and adaptability are more likely to engage positively with technological change and contribute to institutional performance improvement (Vial, 2021). In contrast, low readiness can result in underutilized systems and inefficiencies despite high technological investment (Schwab, 2020).

Human Resource Readiness in Defense Contexts

In defense organizations, human resource readiness assumes additional strategic significance due to the high-risk nature of defense operations and the complexity of military technologies (Binnendijk & Horowitz, 2020). Military personnel are required not only to master technical systems but also to operate within rigid command structures and security protocols (Nye, 2020). The literature indicates that traditional military training models may not fully address the demands of digital transformation, particularly in areas such as data analysis, cyber operations, and systems integration (Schwab, 2020). Consequently, defense institutions must adopt adaptive human resource strategies that align technological modernization with personnel development (Vial, 2021).

Conceptual Model of Human Resource Readiness in Technology-Based Defense Management



Figure 1. Illustrates the Conceptual Framework Developed in This Study to Analyze Human Resource Readiness in Technology-Based Defense Management

Explanation of the Conceptual Model

The conceptual model proposes that **Human Resource Readiness** acts as a central mediating construct between key organizational capability dimensions and the performance of technology-based defense management.

1. **Digital Competence.** Digital competence represents the level of technical skills, digital literacy, and technological proficiency possessed by defense personnel, enabling them to operate and manage advanced defense technologies effectively (Kraus et al., 2021).
2. **Adaptive Capacity.** Adaptive capacity reflects the ability of human resources to adjust to organizational change, learn new systems, and respond to evolving technological and strategic demands within defense environments (Vial, 2021).
3. **Organizational Support.** Organizational support encompasses leadership commitment, institutional policies, training programs, and resource allocation that facilitate human resource development and technology adoption in defense institutions (Mergel et al., 2019).

These three dimensions collectively influence Human Resource Readiness, which in turn determines the effectiveness of Technology-Based Defense Management Performance, including operational efficiency, decision-making quality, and strategic responsiveness (Binnendijk & Horowitz, 2020).

METHODOLOGY

This study employs a qualitative analytical approach based on a structured review of recent academic literature published between 2019 and 2024 (Creswell & Poth, 2018). Relevant journal articles, policy reports, and academic books related to human resource readiness, digital transformation, and defense management were systematically analyzed to identify recurring themes and conceptual patterns (Bennett & Checkel, 2020). The analysis focuses on synthesizing theoretical insights rather than empirical measurement, enabling the development of a conceptual framework applicable to defense organizations undergoing technological transformation (Vial, 2021).

DISCUSSION

The analysis reveals that human resource readiness is a critical enabler of technology-based defense management, influencing how effectively digital systems are adopted and operationalized (Kraus et al., 2021). Three dominant readiness dimensions emerge from the literature: digital competence, adaptive capacity, and organizational support (Mergel et al., 2019). Digital competence enables personnel to interact efficiently with advanced defense technologies, while adaptive capacity supports behavioral adjustment to new operational models (Schwab, 2020). Organizational support, including leadership commitment and continuous training, reinforces individual readiness and institutional learning (Vial, 2021). These dimensions collectively determine the success of defense digital transformation initiatives (Binnendijk & Horowitz, 2020).

CONCLUSION

Human resource readiness plays a pivotal role in ensuring the effectiveness of technology-based defense management (Vial, 2021). Defense modernization efforts that prioritize technological investment without parallel human capital development risk suboptimal outcomes and organizational inefficiencies (Mergel et al., 2019). This study highlights the need for defense institutions to integrate readiness considerations into strategic planning and human resource policies (Schwab, 2020). Future research should empirically examine readiness dimensions within specific defense organizations to refine assessment models and inform policy interventions (Bennett & Checkel, 2020).

The novelty of this study lies in its strategic analysis of human resource readiness as a critical determinant of effective technology-based defense management, moving beyond the dominant focus on hardware modernization and defense systems acquisition. Unlike existing

studies that treat human resources as a supporting variable, this research critically examines the alignment between digital competencies, organizational culture, adaptive leadership, and institutional learning capacity within defense organizations facing rapid technological transformation. By framing human resource readiness as a multidimensional construct encompassing skills, mindset, governance, and ethical awareness, the study fills a gap in the literature on defense management that often overlooks the human–technology interface. This approach contributes theoretically to the development of integrated defense management models and offers practical insights for policymakers and defense planners seeking to ensure sustainable and resilient adoption of advanced defense technologies.

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