Leadership as a performance multiplier of logistics operations in VUCA environments

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Abstract. This article aims to analyze the role of leadership as a performance multiplier in military logistics operations within VUCA environments. Although logistics are usually viewed through technical and procedural lenses, research suggests that performance stems from the interaction of organizational, human, and decision-making factors, especially in contexts of high uncertainty and interdependence. Methodologically, this study employs a narrative review of scientific literature, complemented by a conceptual analysis, to identify causal mechanisms and critical leadership skills. The results demonstrate that leadership influences logistics execution through practices such as prioritization, network coordination, risk management, and fostering a culture of discipline and learning. Additionally, leadership shapes organizational mediators such as information quality, flow coherence, and adaptability. The study presents a conceptual leadership model for logistics performance. It concludes that leadership is a critical factor in logistics effectiveness and essential to the reliability, resilience, and readiness of forces. Therefore, leadership should be included in the training of logistics professionals and in logistics doctrine.
Keywords: cross-functional collaboration, leadership skills, logistics performance, military leadership, risk and resilience management.

1. Introduction

Contemporary military operations unfold in environments that are volatile, uncertain, complex, and ambiguous (VUCA) within an increasingly chaotic and dynamic operational context (Cascio et al., 2025). In such environments, sustaining forces on the ground is as important as their combat capability. Logistics plays a central role in creating readiness, maintaining operational pace, and preserving freedom of action. However, the growing complexity of supply chains, interdependency among multiple stakeholders, and exposure to hybrid threats present challenges that extend beyond the technical efficiency of logistics processes.

Traditionally, logistics performance has been analyzed from a technical perspective, focusing on optimizing flows, managing resources, and improving cost, cycle time, and service-level indicators. This approach, strongly influenced by the evolution of supply chain management in the civilian sector, emphasizes process integration, information visibility, and coordination among partners as critical performance factors (Christopher, 2016; Mentzer et al., 2001). In military environments, however, which are characterized by disruption, high risk, and time pressure, technical efficiency alone is insufficient to ensure the continuity and reliability of logistics support (Uttley & Kinsey, 2012).

Gattorna and Pasmore (2022) argue that logistics chains should be understood as complex, dynamic socio-technical systems in which physical, technological, and human components interact. In this

context, performance emerges from the quality of interactions among the system's various elements, not just the efficiency of each isolated component. These systems are particularly sensitive to coordination failures and delays in the flow of information due to functional interdependence, the existence of multiple decision points, and the variability inherent in demand (Mentzer et al., 2001). In a military context, these characteristics are exacerbated by threats, infrastructure degradation, and the need to operate in multinational and culturally diverse environments.

The dynamic and uncertain nature of military operations requires a logistics management approach that goes beyond static process optimization. Adaptability, operational flexibility, and resilience become central dimensions. Logistics resilience, defined as the capacity to predict, withstand, and recover from disruptions, has been extensively discussed in the literature as a pivotal factor in crisis and disruption contexts (Kovács & Tatham, 2009; Shishodia et al., 2023). This perspective implies incorporating redundancies, diversifying routes and suppliers, and creating mechanisms for rapidly responding to unexpected events.

Van Creveld (2004) emphasizes that operational success depends on the availability of resources and the ability to translate those resources into tangible outcomes. These observations are supported by operational accounts, such as the Gulf War, where effective logistics leadership proved decisive in translating resources into operational outcomes (Pagonis & Krause, 1992). Historical studies demonstrate that logistics failures often originate from deficiencies in coordination, planning, and execution rather than a scarcity of resources. These findings reinforce the idea that logistics performance depends more on the quality of management and leadership than on the quantity of available resources.

In this context, logistics flows—whether material, informational, or decisional—are of central importance. According to the literature, visibility throughout the supply chain, information quality, and speed of decision-making are crucial for system effectiveness (Christopher, 2016). However, information is often incomplete, ambiguous, or outdated, particularly in degraded operational environments. Therefore, the ability to interpret imperfect signals and make decisions under conditions of uncertainty is a critical performance factor.

Rather than an individual attribute, leadership can be understood as a set of organizational practices that influence how systems operate under pressure (Marion & Uhl-Bien, 2001). In complex contexts, leadership reduces ambiguity, aligns actions, and creates a common understanding of the situation. In the context of high-reliability organizations, Weick and Sutcliffe (2015) emphasize the importance of practices such as paying attention to detail, being reluctant to oversimplify, and being sensitive to operations. These practices enable organizations to operate safely in high-risk environments.

Marion and Uhl-Bien (2001) demonstrate that leaders influence organizational performance by setting goals and creating conditions that facilitate coordination and adaptation. Yukl and Gardner III (2020) emphasize that effective leadership depends on adjusting behaviors to meet contextual demands while promoting clarity of objectives and flexibility in execution. Similarly, Northouse (2025) emphasizes the importance of leadership in uniting teams, resolving conflicts, and fostering trust—all of which are essential in high-pressure environments. In logistics, this translates to the ability to establish clear priorities, coordinate multiple stakeholders, and manage trade-offs between competing objectives, such as efficiency versus resilience, or speed versus safety. Thus, leadership acts as an integration mechanism, aligning different functions and hierarchical levels around a common goal. This function is especially important in joint and multinational operations, where diversity in procedures, organizational cultures, and information systems increases coordination complexity.

In addition to coordination, leadership plays a fundamental role in risk management. Pournader et al. (2020) emphasize the importance of risk management, including identifying vulnerabilities, assessing probabilities and impacts, and implementing mitigation measures. However, these activities depend heavily on human decision-making, which often occurs under pressure and with incomplete information. The ability to consciously take risks and establish objective limits for action is a critical dimension of leadership in logistics.

Another relevant aspect is fostering an organizational culture that prioritizes safety, learning, and continuous improvement. In complex systems, errors are inevitable. What distinguishes effective

organizations is how they manage these errors and transform them into learning opportunities. Weick and Sutcliffe (2015) emphasize the importance of a culture that encourages reporting failures and critical reflection to avoid the normalization of deviation. This perspective is particularly relevant in military logistics, where minor failures can have significant operational consequences.

Despite the growing body of evidence highlighting the importance of leadership in complex contexts, Yukl and Gardner III (2020) point out gaps in the explicit connection between leadership practices and performance. Leadership is often treated as an implicit or contextual factor, without detailed analysis of its influence on outcomes. This limits the ability to develop robust conceptual models and translate theoretical knowledge into practical guidelines.

In this context, it is crucial to analyze leadership as both a desirable attribute and a causal factor that affects critical logistics system variables such as information quality, cross-functional coordination, execution discipline, and adaptability. Understanding these mechanisms is essential for improving performance in VUCA environments, where predictability is limited and the ability to respond quickly is crucial.

Thus, this study aims to analyze the role of leadership as a performance multiplier by identifying the mechanisms through which leadership practices improve the reliability, resilience, and readiness of logistics systems. The overarching research question is: How does leadership influence logistics performance in military operations in VUCA environments?

The approach adopted is based on a review of relevant scientific literature and an interpretive analysis that identifies patterns and explanatory mechanisms. This conceptual study integrates theoretical contributions and applies them to operational contexts. Unlike previous approaches, which treated leadership as a contextual or diffuse variable, this article explicitly conceptualizes leadership as a set of causal mechanisms that directly affect critical variables in the military logistics system.

The article is structured as follows: First, the introduction presents the research problem and context. Next, the main results are presented, including the causal mechanisms and the core competencies of the logistics leader. Next, the results are discussed in light of the literature. Finally, the conclusions are presented, including practical implications and lines of future research.

2. Methods

This study uses a qualitative, exploratory, and conceptual approach, which is ideal for analyzing complex, interdependent phenomena such as the relationship between leadership and logistics productivity in uncertain operational environments. The objective of the methodology is to identify and structure the causal mechanisms that explain this relationship based on established theoretical evidence.

The methodological strategy is based on a structured narrative literature review favoring peer-reviewed scientific articles and leading academic books on leadership, logistics, supply chain management, complex systems, and risk management. Sources were selected based primarily on their theoretical relevance and applicability to challenging organizational contexts, including the military when possible.

The analytical process was developed in three stages. First, key concepts associated with logistics fulfillment rate and leadership in complex contexts were identified. Next, a thematic analysis was performed to categorize the literature's contributions. Finally, an analytical integration was performed to explain the causal mechanisms linking leadership practices to observable logistics results.

Professional experience in military logistics informed critical reflections that contextualized and reinforced the applicability of the results. However, these reflections do not claim to be empirical generalizations. Rather, professional experience was used as a heuristic tool for contextualization, not as a primary empirical source.

Limitations include the absence of direct empirical validation and the interpretive nature of the review, which may introduce subjectivity. Nevertheless, the consistency of the analyzed contributions and the coherence of the developed conceptual framework lend robustness to the adopted approach.

3. Results

Through a literature review, we identified consistent causal mechanisms through which leadership influences logistics management in VUCA environments. We also identified a set of core competencies that operationalize this influence. These results should be understood as interdependent elements acting on critical logistics system variables, such as information quality, cross-functional coordination, execution discipline, and adaptability.

3.1. Causal mechanisms between leadership and logistics performance

3.1.1. Definition of priorities and management of commitments

One of the most direct ways leadership affects logistics fulfillment rate is by clarifying priorities. In environments with limited resources and competing demands, an absence of clear priorities results in dispersed efforts, internal competition, and increased system variability. Effective logistics systems translate objectives into clear operational criteria that guide decisions throughout the entire chain (Christopher, 2016).

Leadership involves defining "what should be done" and "what can be sacrificed," making explicit the trade-offs between speed and safety, and between efficiency and resilience. This need to establish clear priorities under conditions of scarcity is well illustrated in military operations. During the Gulf War, effective logistics leadership required continuous prioritization of resources and missions, ensuring alignment between operational intent and logistical execution (Pagonis & Krause, 1992). This clarification reduces ambiguity and accelerates the decision-making process, which is important in contexts where information is incomplete. Yukl and Gardner III (2020) emphasize that defining clear and consistent objectives is one of the main functions of effective leadership and contributes to aligning organizational behaviors.

In these contexts, effective leadership requires adjusting the intervention style based on the level of autonomy, competence, and experience of the team while avoiding excessive centralization and premature delegation. This approach aligns with situational leadership principles, which emphasize adapting leadership behavior based on task demands and subordinate maturity (Hersey et al., 2013).

3.1.2. Network coordination and synchronization

Cross-functional coordination is a critical mechanism. Supply chains comprise multiple interdependent actors, and their performance depends on the quality of interconnections among them. Integrating processes and sharing information within the supply chain are crucial for system efficiency and reliability (Mentzer et al., 2001). In this context, leadership acts as an integrating element that promotes the synchronization of activities, the coherence of decisions, and the unity of effort among the different actors. The absence of coordination often leads to "silo" phenomena, in which each unit optimizes locally at the expense of overall performance. Weick and Sutcliffe (2015) emphasize that sensitivity to the objectives of the operation as a whole and the ability to coordinate in real time are essential for avoiding systemic failures in complex systems. Historical evidence reinforces this perspective. The large-scale coordination achieved during coalition operations in the Gulf War required the integration of multiple actors, systems, and national contingents, highlighting the central role of leadership in synchronizing complex logistics networks (Pagonis & Krause, 1992).

Synchronizing operational rhythms, defining decision points, and fostering shared situational awareness reduces delays, eliminates redundancies, and enhances the predictability of logistics flows.

3.1.3. Risk management and building resilience

Risk management is an essential mechanism, especially in environments marked by disruption and uncertainty. Pournader et al. (2020) define resilient supply chains as those that can anticipate disruptions, withstand their impact, and swiftly recover. However, implementing these measures often necessitates costly compromises, such as adding redundancies to supply lines or maintaining safety stocks.

Leadership is instrumental in defining the acceptable risk level and activating mitigation measures. Kovács and Tatham (2009) emphasize that the ability to respond to disruptions hinges on formal structures and the quality of decisions made under pressure. In operational environments, risk decisions

are rarely theoretical. Commanders must continuously balance speed, security, and resource allocation, as illustrated by logistics operations in the Gulf War, where uncertainty and scale demanded adaptive and risk-informed leadership (Pagonis & Krause, 1992).

Effective leaders establish warning indicators, define contingency plans, and promote a proactive stance toward risk. These efforts contribute directly to maintaining logistics support continuity, reducing the system's vulnerability, and enhancing its ability to adapt to unexpected events.

3.1.4. Execution discipline and organizational culture

Execution discipline is an essential yet frequently overlooked mechanism for ensuring the reliability of the logistics system. Consistency in applying procedures, attention to detail, and fostering a safety culture are key to preventing failures in highly reliable organizations (Weick & Sutcliffe, 2015).

Effective leadership impacts this domain by setting clear standards, reinforcing desired behaviors, and aligning incentives with operational objectives. Without discipline, however, deviation becomes normalized, and inadequate practices become acceptable, increasing the risk of critical failures. An organizational culture based on transparency, accountability, and continuous learning improves the quality of information and confidence in the system. This is especially important in military logistics, where errors can directly compromise force safety and personnel lives.

3.1.5. Continuous learning and adaptation

The capacity for organizational learning is central to improving performance in dynamic environments. Effective logistics systems transform experience into concrete improvements by continuously adjusting processes and practices. The literature emphasizes the importance of short feedback loops and controlled experimentation to promote adaptation (Weick & Sutcliffe, 2015).

Leadership plays a critical role in creating conditions that encourage gathering and analyzing information, communicating failures, and implementing corrective actions. Without learning, errors are repeated and the ability to respond to changes in the operational environment is lost. This mechanism is directly associated with resilience because systems that learn quickly can better anticipate and mitigate future disruptions.

3.1.6. People management and human factors

People management is a cross-cutting mechanism that influences all previous factors. Organizational performance depends on team motivation, competence, and cohesion (Northouse, 2025). In logistics contexts where the work is repetitive but the environment is volatile, the human factor is especially important.

Effective leadership involves clarifying purpose, developing skills, and managing factors such as fatigue and stress. Motivated and aligned teams can better maintain quality execution and handle unforeseen situations. Conversely, demotivation and a lack of cohesion increase the likelihood of errors and reduce the system's effectiveness. The performance of a logistics system depends on processes and technologies as well as the ability to mobilize people to act in a coordinated and effective manner.

3.2. Core skills of the logistics leader

Identifying causal mechanisms allows us to determine a set of core competencies that leaders must possess to effectively influence logistics management. These skills interact with each other, reflecting the multifaceted nature of leadership. Systemic thinking is essential because it allows one to understand the logistics system as an interdependent whole. This allows one to identify cause-and-effect relationships and avoid local optimizations that compromise overall performance. As Christopher (2016) emphasizes, effective supply chain management requires an integrated view of the flows and interactions between its elements.

Making decisions under conditions of uncertainty is a critical skill. Leaders must be able to act with incomplete information, balancing speed and accuracy while consciously taking risks. Yukl and Gardner III (2020) emphasize that effective leadership depends on the ability to make timely decisions, even in ambiguous situations.

Another essential competency is operational communication, which fosters a shared understanding of the situation and ensures the coordinated execution of tasks. Clearly conveying intentions, responsibilities, and deadlines is fundamental to reducing errors and increasing efficiency.

Additionally, the ability to influence and coordinate without formal authority is particularly relevant in multinational and interorganizational contexts. The effectiveness of supply chains depends on collaboration between multiple partners, often outside the formal chain of command (Mentzer et al., 2001).

Digital and data literacy is an increasingly important competency because it is associated with the ability to interpret complex information and use technological tools to support decision-making. Endsley (2016) emphasizes that situational awareness depends on integrating information from various sources to maintain an updated understanding of the operational context.

Figure 1 summarizes the above and presents the conceptual model of leadership for logistics performance. In this model, leadership acts as a structuring mediating variable between the VUCA context and operational performance through logistics activity. Leadership's influence is indirect and occurs through organizational mechanisms that shape the quality of coordination, information, and execution. This enables the logistics system to maintain readiness and resilience in highly uncertain environments.

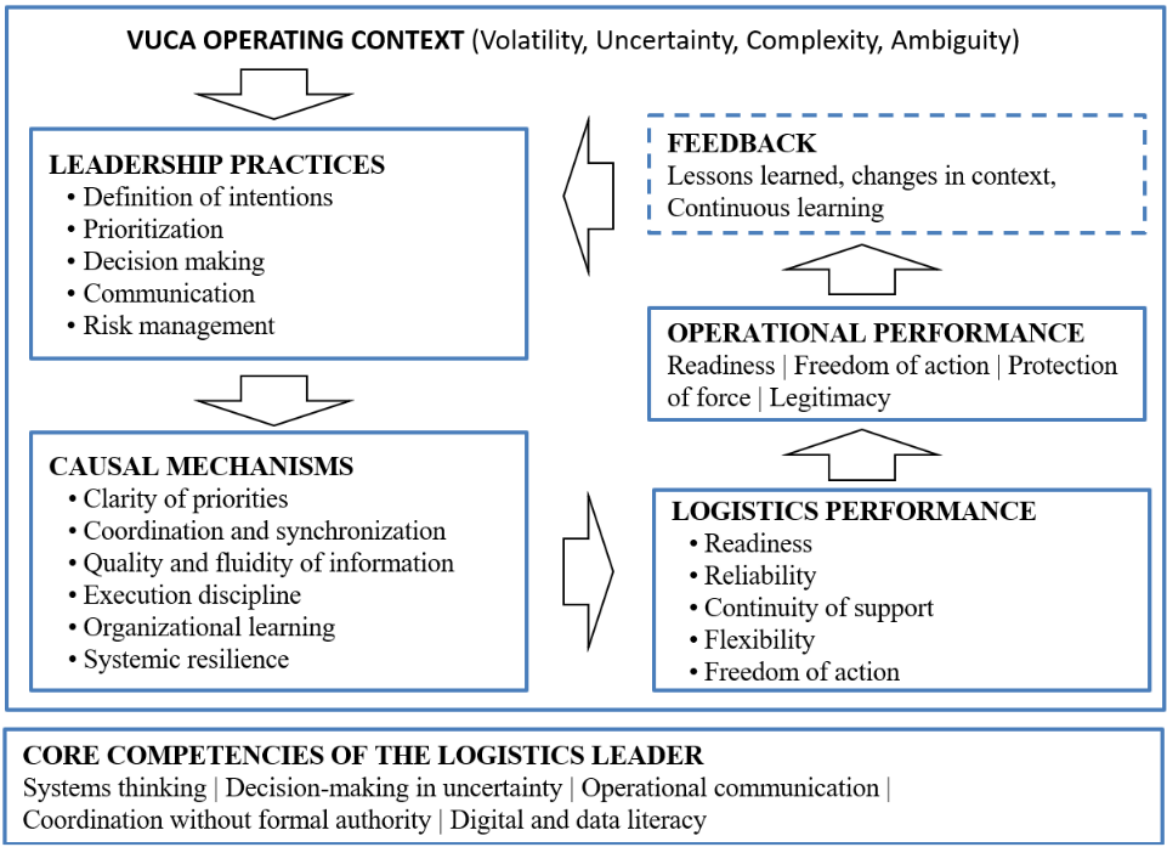

Figure 1: Conceptual model of leadership for logistics performance (LEADLOG)
Source: The authors

Leadership affects logistics effectiveness through an integrated set of mechanisms that act on critical system variables. Specific competencies operationalize these mechanisms, enabling leaders to act effectively in environments characterized by uncertainty, interdependence, and time pressure. Understanding these relationships is a fundamental step in developing conceptual models and organizational practices that reinforce the readiness and resilience of logistics operations.

4. Discussion

The presented results reinforce the idea that logistics effectiveness in VUCA environments is not solely explained by technical or structural factors, but rather is an emergent phenomenon resulting from the interaction between processes, people, and decisions. In this context, leadership emerges as a critical mediating variable that acts directly on the organizational mechanisms conditioning the effectiveness of the logistics system.

The performance of supply chains depends on integration and coordination (Christopher, 2016; Mentzer et al., 2001). However, this integration does not occur automatically or exclusively through formal structures or information systems. Rather, it depends on the ability of leaders to align priorities, establish decision-making rhythms, and ensure consistency between intention and execution. This perspective aligns with the sociotechnical systems view, in which organizational behavior stems from the interaction between technical and human components.

Identifying specific causal mechanisms, such as setting priorities, coordinating networks, and managing risks, provides a deeper understanding of how leadership influences logistics management. Rather than acting through abstract or indirect relationships, leadership shapes logistics performance through concrete practices that shape the quality of information, execution discipline, and system adaptability. This approach helps bridge the gap in the literature, which widely recognizes the importance of leadership yet rarely operationalizes it in terms of observable effects.

The importance of resilience as a key aspect of logistics efficiency is also evident. In environments characterized by disruption and uncertainty, maintaining continuity of support is as important as—if not more important than—efficiency. The literature on risk management and resilience emphasizes anticipating disruptions and building robust, adaptable systems (Pournader et al., 2020; Kovács & Tatham, 2009). This study found that leadership underpins a decisive role in operationalizing these principles by defining acceptable risk levels, creating redundancies, and activating response mechanisms.

Another relevant aspect relates to execution discipline and organizational culture. These results align with the principles of high-reliability organizations, which emphasize consistency, attention to detail, and continuous learning (Weick & Sutcliffe, 2015). Leadership directly influences these factors by defining behavioral standards, aligning incentives, and promoting a culture of safety and accountability. In military logistics contexts, where errors can have serious consequences, this dimension is particularly important.

An analysis of core competencies reveals that effective leadership in logistics demands more than technical proficiency. Critical competencies reflecting the complexity and interdependence of logistics systems include systems thinking, decision-making under uncertainty, and coordinating without formal authority. These findings align with literature on leadership in complex contexts, which emphasizes adaptability and flexibility (Yukl & Gardner III, 2020; Northouse, 2025).

It is important to note that leadership effectiveness depends on context. Practices that yield positive outcomes in one setting may be ineffective in another, particularly in multinational or interorganizational operations where cultural, institutional, and technological disparities can hinder coordination. Thus, leadership should be understood as a contingent practice that requires adjustments to specific situational demands (Hersey et al., 2013).

From a practical standpoint, the results have relevant implications for training and developing leaders in military contexts. Training should emphasize acquiring technical knowledge and developing decision-making, communication, and team management skills in high-pressure environments. Furthermore, leadership must be explicitly integrated into logistics processes, doctrine, and operational procedures to effectively implement identified mechanisms.

In short, the discussion confirms that effective leadership is essential for optimal logistics performance. Leadership acts as a multiplier, simultaneously influencing the quality of decisions, the coordination of actions, and the adaptability of the system. This perspective contributes to a more integrated understanding of military logistics, in which processes and leadership are inseparable in building operational readiness and resilience.

5. Conclusions

This study analyzed how leadership influences logistics performance in VUCA environments and identified the causal mechanisms explaining this relationship. The findings indicate that leadership is an integral part of the logistics system and directly influences priority setting, cross-functional coordination, risk management, execution discipline, organizational learning, and people management. In response to the study's objective, we conclude that logistics effectiveness depends on process efficiency, resource availability, and the quality of leadership practices that guide decision-making and execution in complex and uncertain contexts.

This study contributes to the literature by framing leadership as a causal, structuring mechanism of logistics management rather than a contextual or supplementary factor, making it original and valuable. Explicitly integrating leadership and performance surpasses traditional approaches that focus solely on processes. This highlights that leadership acts on critical system variables and functions as a true performance multiplier. This perspective reinforces the need to understand military logistics as a socio-technical system, recognizing that decisions, behaviors, and interactions are as important as material resources.

It is important to highlight the study's limitations. This conceptual and exploratory study relies on literature reviews and analytical interpretations rather than direct empirical validations. While this approach limits the ability to generalize the results, it does not compromise the internal coherence or analytical usefulness of the proposed model.

Future research should include conducting empirical studies in real or simulated operational contexts, such as military exercises and case studies, to test and refine the identified mechanisms. Additionally, researchers should develop quantitative models to measure the relationship between leadership practices and logistics performance. They should also explore integrating emerging technologies, such as artificial intelligence and advanced data analysis, to improve logistics decision-making.

From a practical standpoint, the results have significant implications for the training and education of military leaders. The results emphasize the importance of developing skills such as systems thinking, decision-making under uncertainty, and cross-organizational coordination. Furthermore, the study underscores the necessity of explicitly integrating leadership into logistics doctrine, planning, and execution processes to align operational intent with logistics execution.

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