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THE CONCEPT OF DIGITAL-BASED MILITARY LOGISTICS SUPPLY CHAIN MANAGEMENT: STRENGTHENING ACCURACY AND SPEED AS WELL AS TRANSPARENCY AND ACCOUNTABILITY

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ABSTRACT
Logistics supply chain management in the military context, especially in the Indonesian Navy, has not fully adopted the Logistics Supply Chain Management system. This paper aims to develop a digital-based military logistics supply chain management concept to strengthen accuracy and speed as well as transparency and accountability in a clear and realizable framework. The research method used is the qualitative descriptive analysis by building a digital-based military logistics supply chain management concept based on an in-depth analysis of reliable factors and strategies. This research produced findings in the form of a digital-based military logistics concept with significant factors, namely technology, and infrastructure, trained human resources, standardized processes, security and privacy, as well as effective collaboration and communication, all of which contribute to increasing accuracy, speed, transparency, and accountability. The final result of this research is to obtain strategies that include applying advanced technology, human resource development, process standardization, and collaboration between internal and external parties. By adopting these strategies, digital-based military logistics supply chain management can increase accuracy, speed, transparency, and accountability, strengthening operational readiness and overall military mission effectiveness.

KEYWORDS: Military Logistics, Supply Chain Management, Digital Concept Strategy.

1. INTRODUCTION

The development of an uncertain strategic environment at the global and regional levels has had a significant impact at the national level, especially in the field of a country's defense. Global uncertainty creates complex challenges that affect the way countries plan, implement, and maintain their defense policies. At the global level, international conflicts, changes in the policies of major powers, and economic uncertainty can change the dynamics and forms of state defense throughout the world. This ultimately forces countries to adjust a country's defense strategy, evaluate alliances and cooperation, and identify potential threats that arise from geopolitical and geostrategic shifts. At the regional level, geopolitical and geostrategic dynamics and relations between countries can create uncertainty regarding regional threats that may be faced. Countries may need to design defense policies that accommodate these dynamics and ensure that they can adapt to changes in the region. Meanwhile, specifically in the defense sector, technological developments, including advanced military technology, and changes in the character of threats such as cyber-attacks, terrorism, or non-conventional threats, can change the national defense paradigm. Countries must update their defense capabilities to address these new threats and ensure better resilience to various scenarios (Aitel et al, 2022)

Apart from that, the presence of the VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) era plays a central role in determining the success of achieving national defense goals and interests. High levels of volatility create uncertainty in global political, economic, and security dynamics. A high level of uncertainty makes planning and implementing defense policy more complicated because challenges cannot be predicted. The complexity and ambiguity of today's strategic environment also add a layer of difficulty in identifying threats and opportunities that may emerge. So in general, the uncertainty of the international strategic environment directly or indirectly greatly influences each country's efforts to guarantee national defense, especially national defense interests (Acero et al, 2019).

For this reason, the Indonesian National Army (TNI), which is an integral part of the state institution and has duties in National Defense based on Law number 34 of 2004 concerning the Indonesian National Army in Article 7 has the main task of upholding state sovereignty, defending the territorial integrity of the Unitary State of the Republic Indonesia which is based on Pancasila and the 1945 Constitution of the Republic of Indonesia, and protects the entire nation and all of Indonesia's blood from threats and disturbances to the integrity of the nation and state. The main tasks as intended in paragraph (1) are carried out by: (a) military operations for war; (b) military operations other than war. "In carrying out these duties, as stated in Articles 8, 9, and 10, the implementation of national defense duties is carried out by 3 (three) TNI forces, namely the Army, Navy and Air Force.

The Indonesian Navy, which is one of the TNI Organizational units, has the main duties as intended in article 9, namely as follows: "carrying out TNI maritime duties in the defense sector; enforce the law and maintain security in the maritime area of national jurisdiction following the provisions of ratified national law and international law; carry out Navy diplomacy duties to support foreign political policies determined by the government; carrying out TNI duties in the construction and development of maritime forces; carry out the empowerment of maritime defense areas". From its duties, it is clear that the Indonesian Navy has a role in maintaining the defense and security of Indonesia's maritime areas and protecting all of Indonesia's bloodshed from threats, interference, and challenges from external parties, both direct and indirect. Carrying out these tasks is carried out through military operations for war and military operations other than war.

Supporting the implementation of the Indonesian Navy's duties, certainly requires qualified military logistical support, in terms of speed, accuracy as well as transparency, and accountability. Qualified military logistical support plays a central role in ensuring that the Indonesian Navy has the resources and support needed to carry out operational and non-operational tasks effectively and efficiently. Apart from that, the importance of qualified military logistical support for the Indonesian Navy can be seen from several aspects, namely:

First, military logistics ensures the availability and smooth running of supplies needed by the Indonesian Navy. These supplies include food, water, fuel oil and lubricants, individual and unit equipment, ammunition, medical equipment, ship spare parts, and various other necessities. With good logistical support, the Indonesian Navy can ensure that warships, aircraft, combat, and non-combat vehicles as well as supporting equipment or equipment as well as Indonesian Navy troops and units have adequate supplies to carry out national defense operations in Indonesian maritime areas. This is very helpful in maintaining high readiness and operational capacity to face various challenges in protecting Indonesia's maritime areas.

Second, logistical support is very important in supporting the mobility of the Indonesian Navy. With an effective transportation management system in the logistics support system, it is possible for troops and the main weapons systems and equipment of Indonesian Navy units to be moved quickly, precisely, and efficiently from one place to another. This is especially important in monitoring and securing maritime area operations which involve the movement of ships, defense equipment, and Indonesian Navy personnel to various strategic locations. Good mobility allows the Indonesian Navy to respond quickly and effectively to developing situations at sea.

Third, logistical support is also needed to support health and welfare service activities for Indonesian Navy personnel. Proper logistical support, especially in the medical field, and adequate supplies of medical equipment are very important in maintaining the health and fitness of personnel involved in the duties of the Indonesian Navy. Logistics support also includes the provision of equipment, protective equipment, and other welfare facilities necessary to maintain the physical and mental condition of personnel.

Finally, logistical support has a vital role in the maintenance, repair, and overhaul of the main and non-main equipment and tools of the Indonesian Navy's weapon systems. This involves providing spare parts, maintenance equipment, and technical support for ships, aircraft, vehicles, and weapons systems. With good maintenance, the Indonesian Navy can ensure that existing equipment is in optimal condition and ready to be used in any situation. So, logistics support has a very important role and therefore requires competent military logistics supply chain management. A capable military logistics supply chain can only be obtained if all activities in the supply chain process have been transformed into digital form. This will of course involve various activities including planning, procurement, management, and distribution of necessary resources, including personnel, equipment, fuel, and ammunition, to ensure readiness and smooth maritime operations. Meanwhile, military supply chain management in the Indonesian Navy currently refers to the Regulation of the Chief of Naval Staff Number Perkasal/69/XI/2010 dated 2 November 2010 concerning the main manual for the logistics development of the Indonesian Navy as well as Regulation of the Chief of Naval Staff Number Perkasal/103/ XII/2010 dated December 31, 2010, concerning Administration Guide to the Development of the Navy's Briefing. Where the regulation regulates the development of supplies for the Indonesian Navy which includes the development of material supplies and the development of provision support, which is an elaboration of the Master Guidebook for the Development of the Logistics Sector of the Indonesian Navy, which is a harmonious arrangement of all its functions to support supplies for maintenance and repair of material. others, provision for operational readiness, and personnel provision.

However, to date, regulations related to logistics supply chain management within the Indonesian Navy have not undergone changes or updates by the concept of modern, digital-based logistics supply chain management. This change is important considering advances in information technology and the concept of digitalization which can have a positive impact on accuracy and speed as well as transparency and accountability in the logistics supply chain process. Adoption of digital-based supply chain management principles can open up new opportunities to improve performance, minimize errors, and speed up responses to changing dynamics in military logistics operations. Therefore, regulatory updates that reflect the development of modern supply chain management concepts are expected to provide a stronger foundation for the Indonesian Navy to face today's logistics challenges and demands.

Logistics supply chain management in a military context, especially in the Indonesian Navy, currently has not fully adopted the system or term Logistics Supply Chain Management. This can be noted as an indication of

the differences in principles between military logistics and general practices in supply chain management in the civilian sector. Even so, there is consistency that underlies close relationships with users in the current logistics process. Despite differences in principles, these common threads suggest that a focus on user needs and engagement remains at the core of the military logistics process.

User involvement in every operational phase provides the basis for effective adaptation to changing requirements and situational dynamics, which is a critical aspect of military operations. Even though the terms and concepts may be different, the principles of logistics supply chain management can still be adapted to the military context to increase efficiency, involvement, and responsibility in supporting the Indonesian Navy's logistics operations. By identifying these common threads, further steps can be taken to integrate supply chain management principles in more detail, thereby improving the Indonesian Navy's military logistics capabilities to respond to and respond to ever-changing needs.

Supply chain management itself is the process of moving information and raw materials to the company's manufacturing and service processes. These processes include logistics processes that physically move products and warehousing and storage processes that control the location of products so they can be sent quickly. Ahmad, N.B. (2024) discusses current strategies and practices in supply chain management. He highlighted the importance of collaboration, transparency, and adaptability in facing modern supply chain challenges, including the integration of information or digital technology in the process of activities. Meanwhile, Michael Hugos provides a basic understanding of supply chain concepts, including the role of digital information technology in increasing efficiency and timeliness in logistics operations (Haelig, 2023). Based on the opinions of experts regarding the logistics supply chain, there is a core regarding the logistics supply chain which is very closely related to military activities in carrying out its main tasks which include logistics management processes and the use of digital technology with the hope of realizing speed and accuracy as well as transparency and accountability in the chain. logistics supplies.

Therefore, this research will discuss the two dimensions of the military logistics supply chain, namely to find out the role of logistics management concerning the extent to which the use of digital technology has increased speed and accuracy as well as transparency and accountability in the TNI's military logistics supply chain. The Navy is a vital element in supporting the implementation of the Indonesian Navy's duties. This is related to the effective operation of the Indonesian Navy's military and non-combat defense equipment, whether in the form of warships, aircraft, combat and non-combat vehicles, and other equipment.

Meanwhile, the role of logistics management concerning the extent to which digital technology has been used in increasing speed and accuracy as well as transparency and accountability in the military logistics supply chain, the Indonesian Navy needs to make innovative and adaptive breakthroughs by utilizing technological developments in the era of the industrial revolution 4.0 to achieve this. established goals. The use of a digital system aims to be the main media in the administration of logistics supply chain management, especially the logistics supply chain for fuel oil and lubricant materials, which up to now still uses a manual system. Apart from that, to realize efficiency, transparency, and accountability in the management of the TNI and real-time data control and monitoring systems, making it easier to check their use.

However, in its implementation, several problems were still found including human resource support factors which play an important role in managing logistics management, supporting infrastructure factors, collaboration factors between units and institutions, as well as periodic ongoing evaluation and monitoring. So to address the problems related to the extent to which digital technology is used in increasing speed and accuracy as well as transparency and accountability in the Indonesian Navy's military logistics supply chain as stated above, researchers see the need to strengthen the military logistics supply chain management to increase accuracy and speed as well as transparency and accountability by paying attention to human resource components, supporting infrastructure, collaboration and holistic evaluation and monitoring to address problems that arise.

So that the analysis carried out is more focused and follows the problems discussed, the problem formulation in this research is:

a. How to implement digital-based military logistics supply chain management to increase accuracy and speed as well as transparency and accountability in logistics support?
b. What are the influencing factors in implementing digital-based military logistics supply chain management to increase accuracy and speed as well as transparency and accountability?
c. What strategies can be used to implement digital-based military logistics supply chain management to increase accuracy and speed as well as transparency and accountability?

Based on the identification and problem formulation above, the aim of this research to be achieved is to examine the extent of success or failure in implementing digital-based military logistics supply chain management for the Indonesian Navy to increase accuracy and speed as well as transparency and accountability, especially in the material logistics supply chain. Apart from that, it is also to find out what factors influence the implementation of digital-based military logistics supply chain management for the Indonesian Navy to increase accuracy and speed as well as transparency and accountability, especially in the material logistics supply chain.

2. MATERIAL AND METHODS

2.1. Management

Kirkpatrick & Damp (2003) stated that management is the process of collaborating between individuals and groups and other resources in achieving organizational goals as a management activity; Managerial activities are carried out by managers so that they can encourage personnel resources to work utilizing other resources so that mutually agreed upon organizational goals can be achieved; In other words, managerial activities are only found within an organization, be it a business organization, government, school, industry and others.

Sobb, Turnbull & Moustafa (2020), state that management is the science and art of managing the process of utilizing human resources and other resources in an organization effectively and efficiently to achieve a certain goal. Furthermore, Chu (2022), stated that the development of management theory is increasingly providing various approaches that contribute to the development of human life. The implementation of various management approaches has been widely used in various fields and functions in organizations such as marketing, motivation, leadership, strategy, and making important decisions.

2.2. Logistics

Logistics is the art and science of moving goods, energy, information, and other resources, such as products, services, and people, from production sources to markets to optimize the use of capital. Logistics also includes information integration, transportation, inventory, warehousing, reverse logistics, and packaging. Etymologically, logistics comes from ancient Greek and consists of two syllables, namely "Logic" which means rational, reasonable, and accountable. The second syllable is "Thios" which means thinking. If the meanings of the two syllables are combined, they have the meaning of thinking rationally and being accountable Chu (2022).

As time progresses, the meaning of logistics has shifted. Etymologically, logistics comes from ancient Greek and consists of two syllables, namely "Logic" which means rational, reasonable, and accountable. The second syllable is "Thios" which means thinking. If the meanings of the two syllables are combined, they have the meaning of thinking rationally and being accountable (Cha, 2022). As time progresses, the meaning of logistics has shifted.

According to Egan et al (1991), "Logistics is all the materials, goods, tools and facilities needed and used by an organization to achieve its goals and various targets". The opinion above is reinforced by the opinion of Zheng & Carter (2015), who state "Logistics is anything or objects that are tangible and can be handled physically (tangible), whether used to carry out main activities or supporting activities (administration)". Meanwhile, Sobb, Turnbull & Moustafa (2020) see logistics from the business world perspective, namely "Logistics is part of the supply chain process which functions to plan, implement, control effectively, efficiently the process of procurement, management, storage of goods, services and information starting from the starting point (point of origin) to the point of consumption (point of consumption) to meet consumer needs.

2.3. Logistics Management

Melnyk et al (2022) define Logistics Management as follows: "Logistics management is part of Supply Chain Management which plans, implements and controls the flow of goods effectively and efficiently, including transportation, storage, distribution, and services as well as related information starting from the place of origin of the goods to the place of consumption to meet customer needs. Meanwhile, according to Zheng & Carter (2015), logistics management is "a series of planning, organizing and supervising activities for procurement, recording, distribution, storage, maintenance, and disposal of logistics to support effectiveness and efficiency in efforts to achieve organizational goals".

In this research, based on the expert's opinion, it can be concluded that logistics management is "goods flow activities which are divided into two, namely managerial activities and operational activities. Managerial activities of logistics include planning, organizing, and monitoring. Meanwhile, logistics operational activities include procurement, recording, storage, distribution, maintenance, and disposal of goods, both goods to be sold to consumers to meet customer needs and equipment that constitutes inventory for the company. "In logistics activities there is also information about company logistics which can make it easier for companies in their activities and also includes services to consumers directly in selling goods to consumers."

2.4. Supply Chain Management

Supply Chain Management is “the process of moving information and raw materials to a company's manufacturing and service processes. These processes include logistics processes that physically move products and warehousing and storage processes that control the location of products so they can be sent quickly” (Zheng & Carter, 2015). Meanwhile, Martin Christopher (1998), defines "Supply Chain Management (MRP) is a network of organizations involved in a business, through upstream and downstream linkages, in different processes and activities to produce value in the form of products and services into the hands of primary consumers". Furthermore, in Supply Chain Management, Christopher (1998) "highlights the importance of collaboration, transparency and

adaptability in facing modern supply chain challenges, including the integration of information technology". Meanwhile, Michael Hugos provides a basic understanding of "supply chain concepts, including the role of information technology in increasing efficiency and timeliness in logistics operations" (Hugos, 2003).

Based on the opinions of experts regarding the logistics supply chain, there is a core regarding the logistics supply chain which is very closely related to military activities in carrying out its main tasks which include logistics management processes and the use of digital technology with the hope of realizing speed and accuracy as well as transparency and accountability in the chain. logistics supplies.

2.5. Research Methods

In the realm of military logistics, the shift towards digital-based supply chain management requires a robust conceptual framework. Qualitative descriptive analysis serves as a vital methodological approach in shaping this framework by delving into nuanced aspects that quantitative methods may overlook. This method focuses on comprehensively describing and interpreting qualitative data to derive meaningful insights and inform strategic decisions.

Qualitative descriptive analysis involves a systematic exploration of textual or visual data to identify patterns, themes, and relationships. Unlike quantitative approaches that emphasize numerical measurement, qualitative methods prioritize depth and context. In the context of developing a digital-based logistics supply chain management concept, this method allows researchers to:

a. Capture Complexities: By engaging with stakeholders, including military personnel, suppliers, and technology experts, qualitative analysis captures diverse perspectives and contextual complexities. This holistic view is crucial for understanding the multifaceted challenges and opportunities in digital logistics.
b. Identify Key Themes: Through techniques such as thematic analysis, qualitative researchers identify recurring themes and patterns in data. These themes can range from operational efficiencies and technology integration to logistical resilience and cybersecurity.
c. Inform Conceptual Frameworks: Qualitative findings provide foundational insights for constructing conceptual frameworks. These frameworks outline the interconnected elements of digital logistics, such as data analytics platforms, real-time monitoring systems, and agile supply chain strategies tailored to military requirements.

Steps in Qualitative Descriptive Analysis

To effectively utilize qualitative descriptive analysis in developing a digital-based military logistics supply chain management concept, researchers typically follow these steps:

- Data Collection: Conduct interviews, focus groups, and document reviews to gather rich, qualitative data. Ensure diverse representation across military units, logistics providers, and technology vendors to capture comprehensive perspectives.
- Data Coding and Analysis: Employ coding techniques to categorize and organize qualitative data. Explore relationships between codes to uncover underlying themes and insights relevant to digital logistics management.
- Theme Development: Identify emerging themes and sub-themes through iterative analysis. Validate findings through member checking and peer debriefing to enhance credibility and reliability.
- Conceptual Integration: Integrate qualitative findings into a coherent conceptual framework for digital-based logistics supply chain management. Emphasize interoperability, scalability, and security considerations within military operational contexts.

Advantages of Qualitative Descriptive Analysis

- Rich Contextual Understanding: Provides in-depth insights into the human factors, organizational dynamics, and technological requirements influencing digital logistics.
- Flexibility and Adaptability: Allows researchers to adapt methodologies based on evolving research questions and emergent findings.
- Strategic Decision Support: Equips military planners and policymakers with evidence-based insights to optimize logistics operations, enhance resource allocation, and mitigate operational risks.

3. RESULT AND DISCUSSION

3.1. Framework Research

To increase speed and accuracy as well as transparency and accountability in the Indonesian Navy's military logistics supply chain, the Indonesian Navy needs to strengthen the role of digital-based military logistics supply chain management, especially in the era of Industrial Revolution 4.0 towards the era of society 5.0. Because in that era, military strength was not only determined by aspects of physical strength but also by the ability to manage information and technology. Strengthening the role of digital-based military logistics supply chain management is crucial for increasing speed and accuracy as well as transparency and accountability in the

Indonesian Navy's military logistics supply chain. So, to know what indicators according to the author's perception are not in line with expectations, it is necessary to carry out an analysis of the problems. which exists through research with a direct interview mechanism conducted with competent research informants library sources and other references such as articles, journals, or documentation. Based on this description, the thinking framework model in this research can be depicted schematically in the figure below:

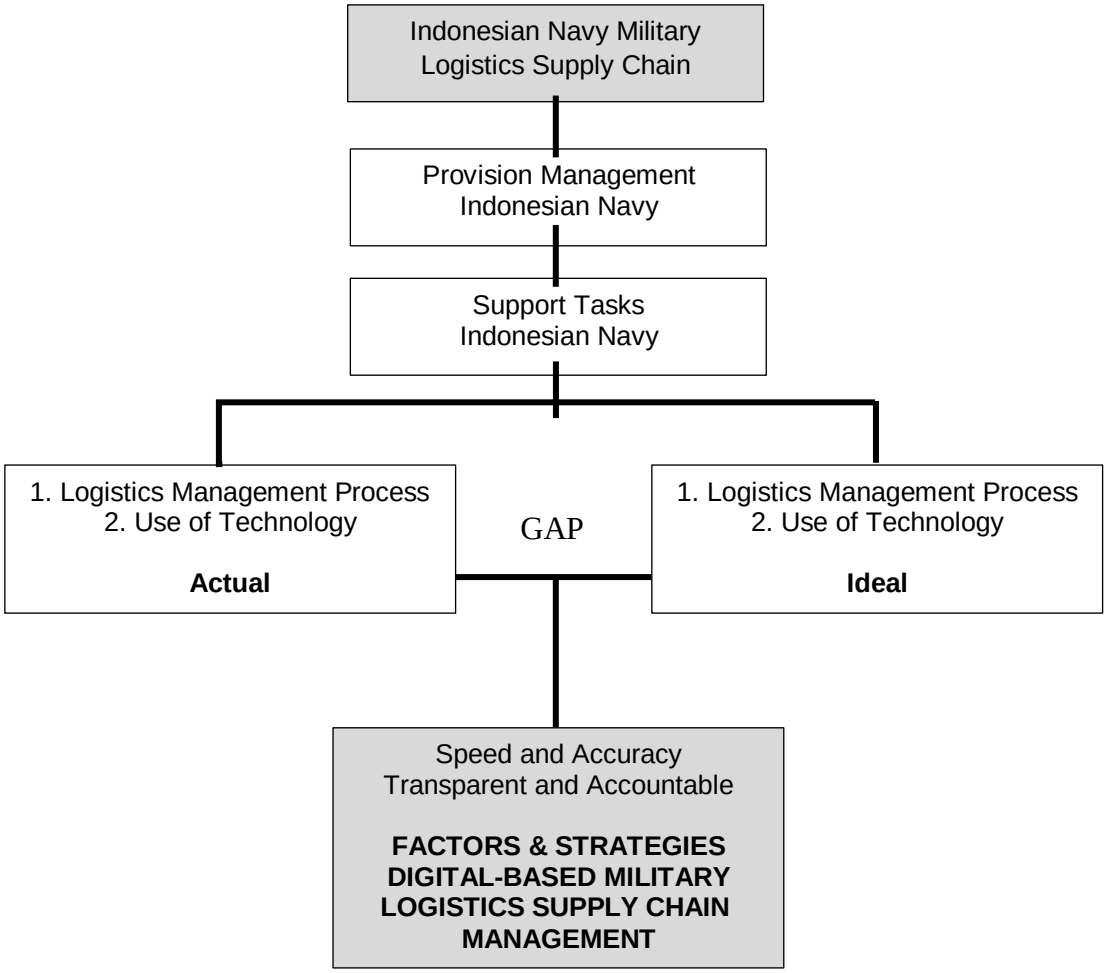

Figure 1. Research Framework

3.2. Key Components of Digital Military Logistics Supply Chain Management

Based on the results of this research, effective logistics management is crucial for ensuring operational readiness, responsiveness, and efficiency. The advent of digital technologies offers transformative potential for military logistics, enhancing precision, speed, transparency, and accountability. This article explores the implementation of digital military logistics supply chain management and the strategies that can be employed to achieve these benefits. **The Key Components of Digital Military Logistics Supply Chain Management:**

a. Integrated Information Systems
   - Enterprise Resource Planning (ERP): An ERP system integrates various logistical functions, providing real-time visibility and coordination across the supply chain. This integration facilitates seamless operations from procurement to distribution.
   - Logistics Management Systems (LMS): LMS tools help manage inventory, track orders, and monitor shipments, ensuring timely and accurate logistical operations.

b. Internet of Things (IoT)
   - Real-Time Tracking: IoT devices equipped with sensors can monitor the location and condition of equipment and supplies in real time. This capability improves the accuracy and speed of logistical responses.
   - Predictive Maintenance: Data from IoT sensors can be used to predict maintenance needs, preventing unexpected equipment failures and ensuring continuous operational readiness.

c. Big Data Analytics
    - Predictive Analysis: Leveraging big data analytics allows for the prediction of logistical needs based on historical trends and real-time data, ensuring that resources are available when needed.
    - Supply Chain Optimization: Analytics tools can identify inefficiencies within the supply chain and suggest optimizations, leading to cost savings and improved performance.
d. Blockchain Technology
    - Transaction Transparency: Blockchain provides a secure and immutable ledger for recording all logistical transactions, enhancing transparency and accountability.
    - Data Security: The decentralized nature of blockchain enhances data security, reducing the risk of data tampering and unauthorized access.
e. Human Resources Development
    - Continuous Training: Regular training programs for personnel on the use of digital tools and systems are essential. This ensures that they are proficient in utilizing new technologies effectively.
    - Competency Development: Focus on developing technical and analytical competencies among logistics personnel to handle digital systems efficiently.
f. Standardized Processes and Procedures
    - Process Standardization: Standardized procedures facilitate the integration of digital technologies and ensure consistent operational practices.
    - Security Protocols: Implementing robust security protocols to protect data and systems from cyber threats is critical in a military environment.
g. Cybersecurity Measures
    - Cybersecurity Strategies: Employing stringent cybersecurity measures, including encryption, firewalls, and intrusion detection systems, to safeguard the integrity and confidentiality of logistical data.
    - Risk Mitigation: Identifying potential risks associated with digital transformation and developing mitigation strategies to address them.
h. Mobile Technology
    - Mobile Applications: Develop mobile applications for field personnel to access logistical information, track shipments, and communicate efficiently.
    - Real-Time Communication: Utilizing mobile technology to enhance real-time communication across different levels of the military hierarchy.
i. Collaboration with Technology Providers
    - Partnerships: Collaborating with technology companies to develop tailored solutions for military logistics.
    - Research and Development: Investing in R&D to explore new technologies that can be applied to logistics management.
j. Continuous Evaluation and Improvement
    - Performance Monitoring: Regularly monitoring the performance of digital logistics systems to identify areas for improvement.
    - Feedback Mechanisms: Collecting feedback from users to understand challenges and opportunities for enhancement.

3.3. Factors Influencing the Implementation of Digital Military Logistics Supply Chain Management

Based on the results of this research, the successful implementation of digital military logistics supply chain management hinges on several critical factors. These factors collectively contribute to enhancing accuracy, speed, transparency, and accountability within the logistics framework. Here are the key factors, in Figure 2.

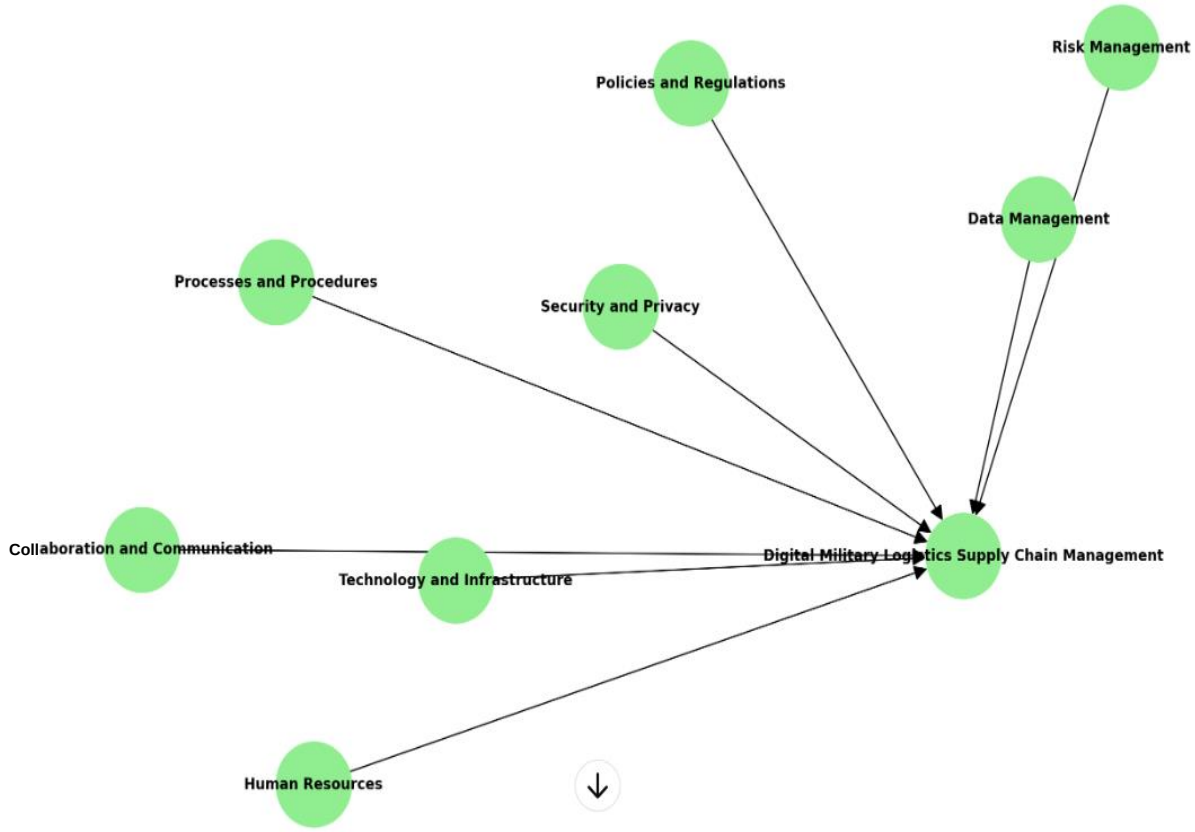

Figure 2. The Key of Factors -Digital Military Logistics Supply Chain Management
(Researcher Analysis, 2024)

a. Technology and Infrastructure
   - Integrated Information Systems: Adoption of Enterprise Resource Planning (ERP) systems that integrate various logistical functions, providing real-time visibility and coordination across the supply chain.
   - Internet of Things (IoT): Utilization of IoT devices to monitor and track equipment and supplies in real-time, ensuring precise and timely logistical operations.
   - Blockchain Technology: Implementation of blockchain for secure, transparent, and immutable transaction records, enhancing accountability and reducing the risk of data manipulation.
   - Connectivity and Network: Reliable and secure communication networks that support the seamless transfer of data and ensure constant connectivity between different logistical components.
b. Human Resources
   - Competence and Training: Continuous training programs to enhance the technical skills and competencies of logistics personnel, ensuring they are proficient in utilizing digital tools and systems.
   - Organizational Culture: Cultivating a culture that embraces innovation and the adoption of new technologies, facilitating smoother transitions and effective utilization of digital solutions.
c. Processes and Procedures
   - Standardization of Processes: Developing standardized procedures that facilitate the integration of digital technologies and ensure consistency across all logistical operations.
   - Security Procedures: Implementing robust security protocols to protect data and systems from cyber threats, ensuring the integrity and confidentiality of logistical information.
d. Security and Privacy
   - Cybersecurity Measures: Deploying comprehensive cybersecurity strategies, including encryption, firewalls, and intrusion detection systems, to safeguard against cyber threats.
   - Data Privacy: Ensuring that sensitive data is protected from unauthorized access and breaches, maintaining the confidentiality of logistical information.
e. Collaboration and Communication

- Interdepartmental Integration: Fostering effective collaboration between different departments to ensure seamless information flow and coordinated logistical efforts.
- Effective Communication: Establishing clear and efficient communication channels across all levels of the military hierarchy to facilitate quick decision-making and response times.

f. Data Management
- Data Quality: Ensuring that data used in logistical operations is accurate, up-to-date, and reliable, which is critical for effective decision-making.
- Data Analytics: Leveraging advanced data analytics to gain insights, predict logistical needs, and optimize supply chain operations.

g. Policies and Regulations
- Leadership Support: Securing commitment and support from military leadership to drive the adoption and implementation of digital logistics solutions.
- Regulatory Compliance: Ensuring that digital logistics operations comply with relevant regulations and standards, maintaining legal and operational integrity.

h. Risk Management
- Risk Identification and Mitigation: Proactively identifying potential risks associated with digital logistics and developing mitigation strategies to address them.
- Incident Response: Establishing robust incident response protocols to quickly address and resolve any disruptions in the logistics chain.

3.3. Strategies for Implementing Digital Military Logistics Supply Chain Management

Based on the results of this research, implementing a digital military logistics supply chain management system requires a strategic approach to ensure the enhancement of accuracy, speed, transparency, and accountability. Here are key strategies to achieve these goals, Figure 3.

Figure 3. Strategies for Implementing Digital Military Logistics Supply Chain Management (Researcher Analysis, 2024)

a. **Adopt Integrated Information Systems**
- Enterprise Resource Planning (ERP): Implement ERP systems to integrate various logistical functions, providing real-time visibility and seamless coordination from procurement to distribution.
- Logistics Management Systems (LMS): Utilize LMS for inventory management, order tracking, and shipment monitoring to ensure precise and timely logistics operations.

b. **Leverage Internet of Things (IoT) Technology**

- Real-Time Tracking: Deploy IoT devices with sensors to monitor the location and condition of equipment and supplies, enhancing logistical accuracy and responsiveness.
- Predictive Maintenance: Use data from IoT sensors to predict maintenance needs, preventing unexpected equipment failures and ensuring continuous operational readiness.

c. **Utilize Big Data Analytics**
- Predictive Analysis: Implement big data analytics to forecast logistical needs based on historical and real-time data, ensuring resources are available when needed.
- Supply Chain Optimization: Analyze data to identify inefficiencies within the supply chain and optimize processes for cost savings and improved performance.

d. **Implement Blockchain Technology**
- Transaction Transparency: Use blockchain to create a secure, immutable ledger for recording logistical transactions, enhancing transparency and accountability.
- Data Security: Leverage blockchain's decentralized structure to enhance data security, reducing the risk of tampering and unauthorized access.

e. **Enhance Human Resource Capabilities**
- Continuous Training: Conduct regular training programs to improve personnel skills in using digital tools and systems, ensuring effective utilization of new technologies.
- Competency Development: Focus on developing technical and analytical competencies among logistics personnel to handle digital systems efficiently.

f. **Standardize Processes and Procedures**
- Process Standardization: Develop and implement standardized procedures to facilitate the integration of digital technologies and ensure consistent operations.
- Security Protocols: Establish robust security protocols to protect data and systems from cyber threats, ensuring the integrity and confidentiality of logistical information.

g. **Strengthen Cybersecurity Measures**
- Cybersecurity Strategies: Implement comprehensive cybersecurity measures, including encryption, firewalls, and intrusion detection systems, to safeguard against cyber threats.
- Risk Mitigation: Identify potential risks associated with digital logistics and develop strategies to mitigate them, ensuring the resilience of logistical operations.

h. **Utilize Mobile Technology**
- Mobile Applications: Develop mobile apps for field personnel to access logistical information, track shipments, and communicate efficiently.
- Real-Time Communication: Use mobile technology to enhance real-time communication across different levels of the military hierarchy, facilitating quick decision-making and response times.

i. **Foster Collaboration with Technology Providers**
- Partnerships: Collaborate with technology companies to develop tailored solutions for military logistics.
- Research and Development (R&D): Invest in R&D to explore new technologies that can be applied to logistics management, ensuring continuous improvement and innovation.

j. **Continuous Evaluation and Improvement**
- Performance Monitoring: Regularly monitor the performance of digital logistics systems to identify areas for improvement and ensure they meet operational requirements.
- User Feedback: Collect feedback from system users to understand challenges and opportunities for enhancement, ensuring the system evolves to meet user needs.

4. CONCLUSION

Based on the results of this research, the following conclusions were obtained :

a. Implementing digital-based military logistics supply chain management brings many significant benefits, ranging from operational efficiency to increased security and rapid response to emergencies. By addressing existing challenges through innovative solutions and appropriate training, militaries can leverage digital technologies to improve their operational performance and readiness. Digitalization of the logistics supply chain is an important step toward a more efficient, responsive, and reliable military future.

b. The qualitative descriptive analysis method is a very effective tool for developing digital-based military logistics supply chain management concepts. With a holistic and in-depth approach, this method allows the development of systems that not only suit operational needs but can also adapt to changes and challenges in the field. Digital transformation in military logistics not only increases the efficiency and effectiveness of operations but also provides strategic advantages in supporting overall military missions and objectives.

c. Implementing digital-based military logistics supply chain management involves various interrelated factors. Technology and infrastructure, trained human resources, standardized processes, security and privacy, and effective collaboration and communication all contribute to increased accuracy, speed, transparency, and

accountability. By understanding and managing these factors, the military can maximize the benefits of digital transformation in logistics supply chain management.

d. Strategies include applying advanced technology, human resource development, process standardization, and collaboration with external parties. By adopting these strategies, digital-based military logistics supply chain management can increase accuracy, speed, transparency, and accountability, thereby strengthening operational readiness and overall military mission effectiveness.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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