RE-2022-187493-plag-report

by Aayush Somankar

Submission date: 30-Nov-2023 07:00AM (UTC+0000)
Submission ID: 271701347671
File name: RE-2022-187493.pdf (515.56K)
Word count: 4136
Character count: 25842

A Review on Military Supply Chain Security

Balak Dawar
AIT-CSE, IS
Chandigarh University, Mohali, Punjab, India
20bcs3696@cuchd.in

Krishnendu Rarhi (Program Leader)
AIT-CSE, IS
Chandigarh University, Mohali, Punjab, India
xyz@cumail.in

Harti Jangra
AIT-CSE, IS
Chandigarh University, Mohali, Punjab, India
20bcs3669@cuchd.in

Aakash Somankar
AIT-CSE, IS
Chandigarh University, Mohali, Punjab, India
20bcs3641@cuchd.in

Ankan Bose
AIT-CSE, IS
Chandigarh University, Mohali, Punjab, India
20bcs3576@cuchd.in

Ankit Garg (Associate Prof.)
AIT-CSE, UCRD
Chandigarh University, Mohali, Punjab, India
ankit.e14961@cumail.in

***Abstract*— Military logistics in India spans diverse terrains and states, rendering it one of the most expansive logistical systems worldwide. characterized by intense yet brief conflicts, the imperative for field forces is to execute rapid and impactful operations while continuously adapting to evolving circumstances.[1] An effective military operation demands suitable supply chain management in all three chains.: fast and light stores, heavy equipment and deployment/movement of soldiers.[2] Compromise in a single chain can disrupt the entire supply chain lifecycle process. Thus, ensuring the security of these resources becomes paramount for the seamless functioning of ongoing theater, engagement, or strike operations. This paper conducts a comprehensive review of the diverse methodologies and strategies proposed globally for optimizing military logistics. The review is based on the examination of bibliographic records, comparative analysis and analyzing the effectiveness of the emerging technologies being used/proposed for supply chain management. The study aims to identify research gaps, explore the existing empirical study, evaluate real-world impacts, and discover cross-functioning trends that can be applied in this field of study. The study aims to uncover the emerging technological trends in the domain of army logistics and discuss the utilization of blockchain, digital twins and other cutting-edge techniques.**

Overall, Indian Army military supply chain security has various echelons and aspects due to varied scope and coverage and needs technically advanced, agile, and responsive strategies to cope with the demands of combat forces, disaster response, and humanitarian evacuations/aids. Least logistics pause, agile support systems, no bureaucratic delays, and proper coordination among the army units can be facilitated through the adoption of technologies like Distributed Ledger Technology (DLT), which have the potential to optimize the entire supply chain cycle.

Keywords*— *Supply Chain Management, Blockchain, DLT, Logistics, Digital Twin

I. Introduction

The comprehensive management of the army supply chain involves multiple corps, including the Army Ordnance Corps, Indian Army Service Corps, Military Farms Service, and Army Medical Corps, among others, which aid in providing logistics support by delivering essential items such as food, medicine, clothing, equipment, and ammunition to army personnel. [3] In the supply chain process, units often follow a contractor-bidding system wherein government-authorized and unit-elected suppliers, engage local suppliers for production and delivery of goods to inward posts in army-controlled areas. Contracts for ammunition and weapons are awarded to private companies or signed with foreign countries, with army personnel responsible for transporting these goods to forward posts via air, water, or land. Forward posts, strategically located close to the military's forward edge of defence (FEBA), heavily rely on the Army Ordnance Corps or army personnel for supply chain management.

Recently Army Ordnance Corps has undergone several significant transformations with the ongoing modernization efforts and depot upgrades, reshaping the supply chain lifecycle processes. Simultaneously, exercises focused on Joint Humanitarian Assistance and Disaster Relief (HADR) have also been conducted to fortify preparedness in managing the supply chain during natural calamities. Moreover, the vital role of entities like the Border Roads Organisation (BRO) cannot be overlooked, as they navigate through challenging terrains to construct and maintain critical routes essential for the smooth transportation of supplies, by constructing more than 50,000 km of roads, 500+ major permanent bridges and transforming various single lanes to double lanes since 1960. [4]

However, recent scrutiny, notably from the Comptroller and Auditor General (CAG) report of 2019 on the Directorate of Ordnance, has shed light on critical issues affecting the Indian Army's supply chain efficiency, such as 33% overheads on the allotted budget, a mere 49% achievement of production targets, with 52% of goods left unused within the year, and a significant 32% still under production, leading to extensive delays in fulfilling orders dating back over a decade. [5] In response to such inefficiencies, the government dissolved the Ordnance Factory Board (OFB) into seven new government-owned corporate entities to enhance efficiency and competitiveness within the defence manufacturing sector, ultimately bolstering the overall supply chain process. [6]

Collaborations with international partners, such as France for logistics support and companies like M/s BEL and OLF

for surveillance needs, are underway to streamline the overall supply chain processes. However, delays in the contract fulfilments still persist due to bureaucratic impediments, geopolitical tensions, funding shortages, and other multifaceted factors. Recent geopolitical conflicts, such as the Russia-Ukraine tensions, have significantly impacted India's arms imports, necessitating a shift towards self-reliance in defence logistics. With arms imports dwindling and a renewed focus on local suppliers due to global uncertainties, India faces a pressing need to fortify its self-sufficiency in defence manufacturing and logistics. [7] Furthermore, as China advances its logistical capabilities through platforms like LOGINK, with huge data of vast amounts of land, sea, and air cargo movements, India is still in its nascent stage of gaining similar control over logistics. The lack of such digital logistics control poses vulnerabilities, especially in predicting and managing critical logistics operations. China's utilization of blockchain in commercial logistic companies and major shipping entities like COSCO has prompted the U.S. Air Force to integrate blockchain across their Defence Department's ERPs, aiming to consolidate and decentralize systems to reduce vulnerability to potential disruptions or delays in critical logistics operations. [8]

In response to these challenges, it is critical for the Indian Army to adopt emerging technologies like DLT and expand both its physical and digital logistical reach. Various compendiums have emphasized the need for technological advancements to fortify resilience against potential disruptions. Solutions such as Blockchain, DAG and Digital Twins can help optimize resource allocation, enabling efficient tracking, and effectively managing the complex lateral and reverse flows intrinsic to military logistics, thereby, serving the purpose.

India has already begun to incorporate blockchain in various sectors. The integration of blockchain technology in military logistics can offer real-time visibility for inventory management, providing rapid response capabilities, early warning systems for potential disruptions, providing constant threat intelligence sharing through a managed information system. Moreover, leveraging blockchain can facilitate the optimisation of contract amendments, order changes and legal delays through the utilization of automated and self-executing smart contracts to avoid information asymmetry amongst the stakeholders and streamline the process. The decentralized nature of blockchain technology also presents an opportunity for seamless coordination among the units during joint operations, fostering enhanced joint logistics while maintaining secure communication channels using hashing algorithms, thereby fortifying the overall security of the overall supply chain process.

Many researchers have shared their theories and studies on the application of blockchain, DAG and digital twins in the domain of military supply chain. Some of them delved into the scalability of the blockchain integration in the UAVs using sharding while some emphasized the importance of Digital Twins for the simulation and real-time tracking of the cargos. In addition to this, various security layers like geofencing, satellite communication, route reconnaissance, checkpoint inspections, emergency response plans, etc. can also be incorporated to aid the blockchain-enabled system further. RFID tags, FPGA and advanced software systems can be used in addition with blockchain and cryptographically secured networks to maximize the impact.

This review paper aims to analyse the integration of emerging technologies in military supply chain security and comprehend the diverse actors in the logistics process. By understanding the root causes of failed battles and evacuation/aid operations, one can identify challenges and address them to streamline research effectively. The primary objective of this review is to upgrade the military supply chain security system in line with technological advancements, utilizing different approaches by analysing them based on several quantitative and qualitative measures.

II. RELATED WORKS

Earlier proposed solutions for military supply chain security includes case and fuzzy reasoning for risk evaluation [9], proactive measures for pre-emptive resilience like backup protection, joint forecasting, digital twin, internet of military things [10], utilising civil supply chain management best practices to reduce bullwhip effect and backward flows.[11] Many publications also suggested the use of blockchain technology such as the utilization of consortium blockchains for military supply chains. The study by Sharifah Saadiah and Syarifah Bahiyah Rahayu (2021) emphasizes the benefits of consortium blockchains in enhancing the transparency and traceability of military supply chain operations. [12] This approach involves multiple stakeholders collaborating within a permissioned blockchain network, ensuring that sensitive information is shared securely among authorized participants. Such a system minimizes the risk of counterfeit goods, improves inventory management, and streamlines the procurement process. To address the challenges of integrity and security in military logistics, Demertzis, Kikiras, and Iliadis(2022) propose a blockchained architecture. This system aims to safeguard the authenticity of military logistics operations by keeping an immutable record of transactions. [13] By utilizing blockchain's cryptographic features, the proposed architecture ensures data integrity, reducing the likelihood of tampering and unauthorized access. Furthermore, the deployment of blockchain technology in military communications and battlefield management is explored in many studies. Ahmad et al.(2021) discusses the opportunities and challenges of integrating blockchain in aerospace and defence. [14] Blockchain's decentralized nature can enhance secure communication channels and enable secure sharing of critical information in real time. In the realm of unmanned vehicles and autonomous systems, Ghimire et al. (2021) propose a sharding-enabled blockchain. This system addresses scalability concerns by dividing the blockchain into smaller segments, or shards, allowing for increased transaction throughput. [15] The application of such technology in software-defined internet of unmanned vehicles on the battlefield can improve coordination and data exchange between autonomous units. The integration of blockchain in military logistics is not limited to supply chain operations. It extends to repair parts management as well. Rahayu et al. (2021) presents a conceptual model for utilizing blockchain to manage repair parts in military supply chains. [16] By providing a decentralized and transparent ledger, this model enhances the tracking of repair parts, reduces downtime, and ensures the authenticity of replacement components. The U.S. Department of Defence and its NATO allies have also begun to pay attention to the potential application of blockchain technology in defence, including automatic execution of smart contracts, secure storage of sensitive files, and reduction of

errors and interruption. The U.S. Navy has also availed the blockchain technology to improve the security of additive manufacturing systems.

Sani S. et al. (2022) delved into the realms of Digital Twins and highlighted how they can be utilised for simulation of the cargos, enabling real-time tracking. [17] Tan C. et al. (2023) took the study further by proposing digital twin-enabled remote data sharing for IoVs leveraging game theory based incentive mechanism to run the system. [18] Some studies also showcased the use of DAG-based DLT for SDN control in the military applications. [19]

III. METHODOLOGY

This paper follows a systematic approach to conduct literature review using bibliometric analysis wherein bibliographic data is analysed using various parameters to establish correlations through quantitative analysis. Such an approach aids in evaluating the performance of articles within a specific field of study, identifying central research themes, and finding potential research gaps that could steer future investigations. [20]

1) Data Collection: The data collection phase involves exploring earlier publications that elocate for securing military supply chains and utilizing emerging technologies such as blockchain, DLT, and digital twin. Given the covert nature of military operations, available online research within this domain is notably scarce compared to other fields of study. To broaden the scope of the study, the search process is initiated by identifying related papers using Google Scholar and Litmaps, a tool for finding related research articles by using known articles as seed articles for literature exploration. This approach allows for a more expansive examination of related literature, enhancing the depth and breadth of the study's insights.

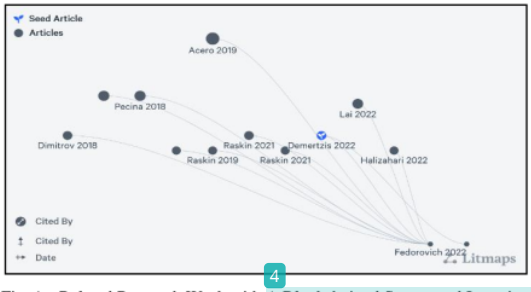

Fig. 1. Related Research Work with A Blockchained Secure and Integrity-Preserved Architecture for Military Logistics Operations as Seed Article

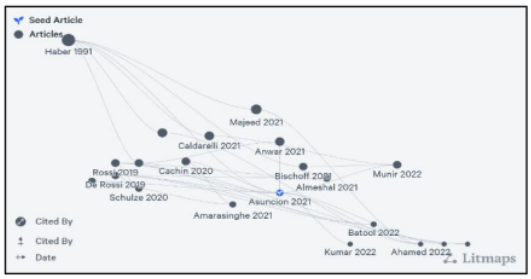

Fig. 2. Related Research Work with Connecting Supplier and DoD Blockchains for Transparent Part Tracking as Seed Article

Furthermore, to enhance the depth and breadth of the study, a comprehensive multidisciplinary scientometrics database known as Scopus was utilized to export bibliographic data of the papers obtained using Litmaps and Google Scholar. [21] These papers are then mapped using VosViewer, a bibliometric analysis tool, to establish correlations among co-occurring keywords within these documents yielding additional keywords to further search for articles online, enriching the breadth of literature considered in the study for a thorough examination and a more nuanced understanding of the research landscape in the context of military supply chain security and emerging technologies.

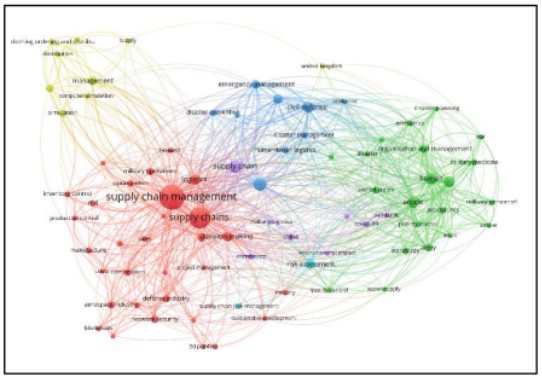

Fig. 3. Mapping of co-occuring keywords using VosViewer

Utilizing Boolean operators such as 'military OR army OR defence AND (supply AND chain) OR (supply AND chain AND management) OR transport OR mobility' in query strings helped extract a substantial number of articles. To further refine the results, the scope is limited to Article Title, Abstract and Keywords. Thereafter, the articles are filtered based on several parameters to align the results with the objective and domain of the review. Limiting the results to only 'Articles' published in 'Journals' helped in refining the results to ensure high peer review and research quality for relevancy and accuracy. The resulting documents are further analysed bibliographically to identify the research gaps prevalent in the research field of military logistics.

TABLE I. REVIEW FILTERING PARAMETERS

Filtering Parameters	Action	Results
String Query	Using boolean operators and related keywords obtained by VosViewer Text Data Map	36,475
Scope	Searching within Article Title, Abstract and Keywords	959
Document Type	Filtering the review to only Articles	747
Source Type	Limiting source to only Journal	366
Keyword	Limiting the search to particular keywords that are relevant to the study	231

2) Bibliometric Analysis: Quantitative analysis to measure the level of impact of the published documents and find the correlation among these documents using tools like VosViewer, Excel. It helps in identifying patterns and reveal trends. [ref] Initially, a citation analysis is performed using co-citation. This analysis depicted the major researchers in this field that are frequently cited together.

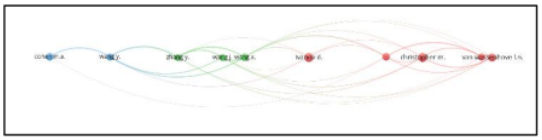

Fig. 4. Citation Analysis using Co-citation in VosViewer

Furthermore, the number of citations were analysed using Excel and the most cited paper related to this domain turned out to be 'Ensuring Supply Chain Resilience: Development of a Conceptual Framework' (Pettit T.J. et al.); cited by 787 research articles as per the bibliographic dataset exported by Scopus, forming the basis of content analysis, given the increasing research in this domain.

TABLE II. NUMBER OF CITATIONS

Research Article	Cited by
Ensuring supply chain resilience: development of a conceptual framework	787
Big data analytics and organizational culture as complements to swift trust and collaborative performance in the humanitarian supply chain	229
A geography of logistics: Market authority and the security of supply chains	140
Responding to disruptions in the supply network-from dormant to action	125
Grounding Supply Chain Management in Resource-Advantage Theory: In Defense of a Resource-Based View of the Firm	101
Collaborative relationships between logistics service providers and humanitarian organizations during disaster relief operations	101
Towards a humanitarian logistics knowledge management system	71
Additive manufacturing in military and humanitarian missions: Advantages and challenges in the spare parts supply chain	59

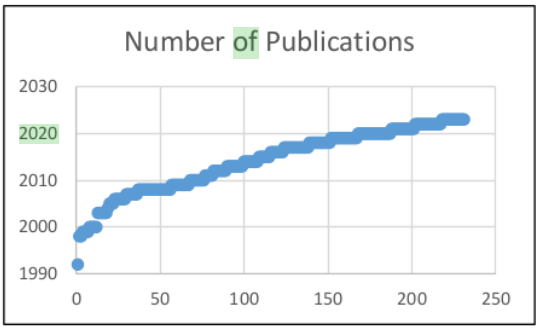

Fig. 5. Chart depicting the increasing research (Using Excel)

3) Case Studies Review: Many case studies of failed battles are analysed during the review process. It includes the 1944 Battle wherein Japanese troops tried to invade India, and even though the army moved boldly and swiftly, their operation failed due to a lack of supplies as the campaign progressed. [22] These case studies are thereafter analysed using simulations.

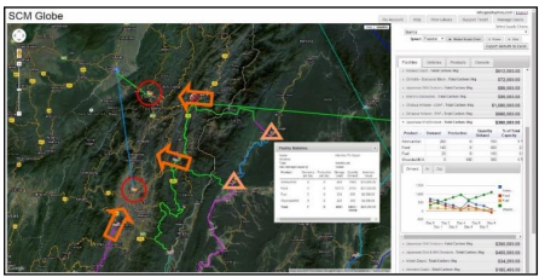

Fig. 6. (Operation U-Go and Supporting Supply Chain Simulation) Burma Campaign Case Study on SCM Globe [22]

Fig. 7. Supply Chain Performance Displays[22]

As evident from the figures, the supply chain management is uneven across the various fronts. The Mandalay supplies are dropping down and the Rangoon ones are piling up. If this simulation can be done in real-time using Digital Twin or Blockchain, one can easily identify the requirements and manage the inventory efficiently. Real-time data monitoring can help in optimizing inventory levels by enabling predictive analytics and data-driven decision making. Dynamic monitoring and analysis using the digital representation can help identifying imbalances and proactive decision making. Implementing blockchain can facilitate traceability of goods throughout its lifecycle. Leveraging the early information, rapid responses and early warning systems can be initiated to neutralize or mitigate the effects of disruptions, ensuring minimal impact on the supply chain. Blockchain can further help in managing potential disruptions by neutralizing adversary's base stations in a timely fashion.

4) Comparative Analysis: The suggested technologies in the existing publications are thoroughly compared for analysis and the understanding the root problems they are supposed to address.

TABLE III. COMPARATIVE ANALYSIS

Parameters	Digital Twins	Blockchain	RFID	GIS
Working	Virtual replicas of physical assets or systems and dynamic digital representations used for analysis	Decentralized, distributed ledger technology for recording and validating transactions.	Wireless technology using electromagnetic fields for automatic identification and tracking of tags attached to objects.	Framework for collecting, storing, analysing, and managing geographical data, visualizing spatial information, and performing spatial analysis.
Technology	Simulation and modelling technology	Distributed ledger technology	Wireless technology for identification and tracking through tags.	Geospatial software and tools enabling data visualization and analysis based on geographic coordinates.
Functionality	Simulation, predictive analysis, monitoring, predictive maintenance	Secure, immutable record-keeping of transactions, transparent, and tamper-resistant.	Automatic identification, real-time tracking, and inventory management.	Spatial data analysis, visualization, mapping, and decision-making based on geographical data.
Data representation	Real-time representation of physical assets	Cryptographic hashing and linking of data blocks	Identification and transmission of data through tags	Visualization of spatial information, maps, and geographic features.
Scope of application	Predictive analysis, operational optimization, real-time monitoring, maintenance	Secure data sharing, traceability in supply chain, smart contracts execution.	Inventory management, asset tracking, authentication.	Military asset tracking, terrain analysis, situational awareness, route planning.
Security Features	Limited security features; focused on data access control and monitoring.	High security through cryptographic mechanisms, immutability, consensus mechanisms.	Limited security features, potential vulnerability to interception or cloning.	Provides data security through access control, encryption, and secure data storage.
Consensus Mechanism	Not applicable; reliant on data analysis and model simulation	Consensus protocols (e.g., Proof of Work, Proof of Stake) ensure agreement on transactions.	Not applicable; operates through read/write operations without a decentralized ledger.	Not directly related to consensus mechanisms but may integrate with distributed systems.
Scalability	Scalable for simulations and models	Scalability challenges with increased transaction volume	Scalability limitations in handling large-scale operations.	Scalable for managing large volumes of spatial data and conducting complex analyses.
Interoperability	Potential interoperability challenges with various systems and platforms	Potential interoperability issues between different blockchain networks or protocols.	Compatibility concerns between various RFID systems and frequency ranges.	Interoperability with various data formats, data sources, and software systems.
Vulnerabilities	Vulnerable to cyber threats due to reliance on digital infrastructure and data integrity	Susceptible to 51% attacks, private key compromises, and smart contract vulnerabilities.	Vulnerable to interception, data alteration, and unauthorized cloning.	Vulnerable to cyber threats, potential data breaches, and privacy concerns.

IV. RESULTS

The results of the bibliographic analysis show a significant focus on the integrity of the military supply chain management and sufficient study to support the use of blockchain technology. This review identified critical gaps and practical observations within the realm of blockchain application in military supply chain management (SCM). Firstly, a prominent gap exists due to the scarcity of empirical studies specifically focusing on blockchain-based SCM models for logistics. This scarcity contrasts with the presence of some empirical analyses focusing on surveillance technologies in similar contexts, indicating a discrepancy in the depth of research within these related fields.

Secondly, an evident disparity emerges regarding the integration of RFID (Radio Frequency Identification) technology within blockchain-enabled military supply chain models. Disagreements and varying viewpoints among experts regarding the seamless integration and utilization of RFID within the blockchain framework pose a noteworthy gap, signifying a lack of consensus or standardized approach in this aspect.

Moreover, a practical gap is discernible between the extensive academic study and the actual implementation of blockchain technology in defence logistics. Despite substantial scholarly attention and research dedicated to exploring blockchain's potential in military supply chains, the real-world implementation remains limited. Notably, while studies and discussions around blockchain's application are prolific in academic and research circles, its adoption and utilization in defence logistics lag behind. An additional observation highlights that while there's minimal implementation in defence logistics, Chinese commercial logistics have already begun incorporating blockchain technology, marking a practical gap between different sectors' adoption rates.

Moreover, there has been significant empirical study found for the utilization of digital twins for surveillance purposes. Combining the two, this review suggests the researchers to focus on empirically analysing the integration of blockchain and digital twins for the military logistics.

ACKNOWLEDGMENT

The entire review paper can be prepared due to the sincere efforts of the team, people who contributed to the successful completion of the paper and the authors whose publications have been reviewed. This project could not have begun without the unwavering support of Dr. Krishnendu Rarhi, Program Leader of the Department of Computer Science Engineering, IBM Information Security at the University. He has been a pillar of strength throughout the lifecycle of the project and greatly enriched our knowledge of the subject matter by sharing resources, engaging in discussions, patiently listening to the ideas proposed by the team and his invaluable suggestions.

REFERENCES

[1] Indian Army Supply Chain Management Model- Present Day Relevance https://dras.in/indian-army-supply-chain-management-model-present-day-relevance/

[2] Army Ordnance Corps (India) https://www.wikiwand.com/en/Army_Ordnance_Corps_(India)

[3] Gürtlich, G., Lampl, S. (2022). Resilience and Military Supply Chain Management. In: Kummer, S., Wakolbinger, T., Novoszel, L., Geske, A.M. (eds) Supply Chain Resilience. Springer Series in Supply Chain Management, vol 17. Springer, Cham. https://doi.org/10.1007/978-3-030-95401-7_29

[4] Using Civilian Supply Chain Management Best Practices to Improve Army Supply Chain Management Procedures https://apps.dtic.mil/sti/citations/AD1038783

[5] Sharifah Saadiah, Syarifah Bahiyah Rahayu (2021). Consortium Blockchain for military supply chain. Turkish Journal of Computer and Mathematics Education, 12(3), 1825–1831. https://doi.org/10.17762/turcomat.v12i3.1011

[6] Demertzis, K., Kikiras, P., & Iliadis, L. (2022). A Blockchained Secure and Integrity-Preserved Architecture for Military Logistics Operations. Springer. https://doi.org/10.1007/978-3-031-08223-8_23

[7] Ahmad, R. W., Hasan, H. R., Yaqoob, I., Salah, K., Jayaraman, R., & Omar, M. (2021). Blockchain for aerospace and defence: Opportunities and open research challenges. Computers & Industrial Engineering, 151, 106982. https://doi.org/10.1016/j.cie.2020.106982

[8] Ghimire, B., Rawat, D. B., Liu, C., & Li, J. (2021). Sharding-Enabled blockchain for Software-Defined internet of unmanned vehicles in the battlefield. IEEE Network,

[9] Rahayu, S. B., Jusoh, N., Halip, M. H. M., Taib, S. M., & Lee, M. G. (2021). A Conceptual Model of Military Blockchain for Repair Parts Supply Chain Management. International Conference on Computer & Information Sciences (ICCOINS). https://doi.org/10.1109/iccoins49721.2021.9497227

[10] Rahayu, S. B., RMN, N. J., Kamarudin, N. D., & Azahari, A. M. (2019). Military blockchain for supply chain management. Journal of Education and Social Sciences 9, 13(1).

[11] Mohamed, R., Abas, H., Yusof, F.M. (2022). Blockchain resilient communication in military: A systematic literature review. Open Internttional Journal of Informatics.

[12] Sharma, G., Sharma, D. K., & Kumar, A. (2023). Role of cybersecurity and Blockchain in battlefield of things. Internet Technology Letters. https://doi.org/10.1002/itl2.406

[13] Rahayu, S. B., Sharmelen, A., Vasanthan, L., Azahari, A. M., & Chai, J. (2021). Military Supply Chain Management and Blockchain Development. Journal of Education and Social Sciences. https://doi.org/10.5121/csit.2021.111608

[14] Angin, P. (2020). Blockchain-Based Data Security in Military Autonomous Systems. European Journal of Science and Technology. https://doi.org/10.31590/ejosat.824196

[15] Rashid, A., & Khan, A. U. R. (2022). Blockchain-Based autonomous authentication and integrity for Internet of battlefield things in C3I system. IEEE Access, 10, 91572–91587. https://doi.org/10.1109/access.2022.3201815

[16] Ahanger, T. A., Aldaej, A., Atiquzzaman, M., Ullah, I., & Yousufudin, M. (2022). Distributed Blockchain-Based platform for unmanned aerial vehicles. Computational Intelligence and Neuroscience, 2022, 1–16. https://doi.org/10.1155/2022/4723124

[17] Alladi, T., Chamola, V., Sahu, N., & Guizani, M. (2020). Applications of blockchain in unmanned aerial vehicles: A review. Vehicular Communications, 23, 100249. https://doi.org/10.1016/j.vehcom.2020.100249

[18] Y Zhu *et al* 2020 *J. Phys.: Conf. Ser.* **1507** 052018 A study of blockchain technology development and military application prospects. (Zhu et al.) https://doi.org/10.1088/1742-6596/1507/5/052018

RE-2022-187493-plag-report

ORIGINALITY REPORT

8%	5%	6%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Y Zhu, X Zhang, Zh Y Ju, Ch Ch Wang. "A study of blockchain technology development and military application prospects", Journal of Physics: Conference Series, 2020 Publication	1%
2	eprints.lincoln.ac.uk Internet Source	1%
3	Gaurav Soni, Satnam Singh Saini, Simarjit Singh Malhi, Bhupinder Kaur Srao, Ashim Sharma, Digvijay Puri. "Design and Implementation of Object Motion Detection Using Telegram", 2021 International Conference on Technological Advancements and Innovations (ICTAI), 2021 Publication	1%
4	www.researchgate.net Internet Source	1%
5	Muhammed Kamrul Islam, Paul J. Hazell, Juan P. Escobedo, Hongxu Wang. "Biomimetic armour design strategies for additive	<1%

	manufacturing: a review", Materials & Design, 2021 Publication	
6	onlinelibrary.wiley.com Internet Source	<1 %
7	dokumen.pub Internet Source	<1 %
8	C. Clifford Defee, Brent Williams, Wesley S. Randall, Rodney Thomas. "An inventory of theory in logistics and SCM research", The International Journal of Logistics Management, 2010 Publication	<1 %
9	autodocbox.com Internet Source	<1 %
10	ramics-sofia-2022.unwe.bg Internet Source	<1 %
11	www.science.gov Internet Source	<1 %
12	link.springer.com Internet Source	<1 %
13	www.dailypioneer.com Internet Source	<1 %
14	www.osti.gov Internet Source	<1 %

15	C. V. Suresh Babu, P. M. Akshara. "chapter 4 Virtual Threats and Asymmetric Military Challenges", IGI Global, 2023 Publication	<1 %
16	Surender Singh, Darpan Anand. "On the Application of Soft Computing Techniques for Energy Efficiency in WSN", 2021 Third International Conference on Inventive Research in Computing Applications (ICIRCA), 2021 Publication	<1 %
17	dras.in Internet Source	<1 %
18	ebin.pub Internet Source	<1 %
19	export.arxiv.org Internet Source	<1 %

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		