Blockchain for Military Supply Chain Security

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Outline

- Introduction
- Problem Formulation
- Objectives
- Methodology
- Results and Outputs
- Conclusion
- Future Scope
- References

Introduction to Project

- In the realm of national security and defense, the efficiency and reliability of the military supply chain play an important role in ensuring the operational readiness and effectiveness of armed forces.
- A well-functioning military supply chain is responsible for procuring, storing, and distributing a vast array of critical resources, including weaponry, ammunition, equipment, fuel, and medical supplies. The complexity and scale of these supply chains, often spanning global networks, present unique challenges that demand innovative solutions to enhance transparency, traceability, and security.
- In recent years, blockchain technology has emerged as a transformative tool with the potential to revolutionize how military supply chains are managed.

Introduction to Project

- By providing an immutable, decentralized, and transparent framework for recording and tracking transactions, blockchain can address issues such as fraud, counterfeiting, inefficiencies, and data manipulation within the military supply chain.
- This paper will highlight the advantages and disadvantages of using this technology and a thorough examination of how blockchain technology can be used to improve supply chain security for the military by looking at previous blockchain deployments and tests in military settings.

Problem Formulation

- Rapid changes in military scenarios demand agility in supply chain management. Traditional methods often fail to provide timely responses to dynamic operational needs, resulting in delays during critical situations.
- Manual and paper-based processes that characterize traditional supply chain management are prone to inefficiencies. Manual record-keeping, redundant data entry, and disjointed communication contribute to delays and operational inefficiencies. Moreover, the centralized databases and repositories used to store the information are vulnerable to data manipulation, tampering, or unauthorized alterations.

Problem Formulation

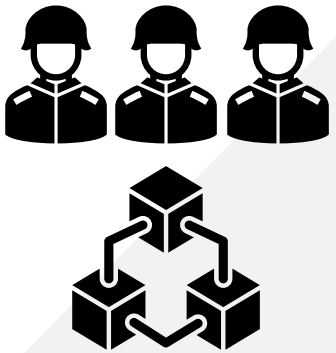
- Traditional supply chain systems often lack real-time visibility and transparency into the movement, status, and location of resources. Without robust tracking mechanisms, it becomes challenging to assign accountability for discrepancies, losses, or disruptions within the supply chain.
- The complexity and scale of military supply chains make them susceptible to fraudulent activities, including unauthorized access, theft, and counterfeiting of resources. The extensive documentation required for military procurement and distribution can become overwhelming. Traditional methods involve a multitude of paperwork, approvals, and verifications, leading to administrative burdens and potential errors.

Problem Formulation

- Reconciling inventory records across multiple units, bases, and locations is a laborious and error-prone process. These inaccuracies can lead to misallocation of resources. Moreover, sensitive military information and data are at risk of unauthorized access and cyberattacks, posing significant security threats to the entire supply chain ecosystem.
- Consequently, there is an urgent need for a transformative solution that not only addresses these vulnerabilities but also ensures the integrity, accountability, and timely delivery of critical resources and equipment.

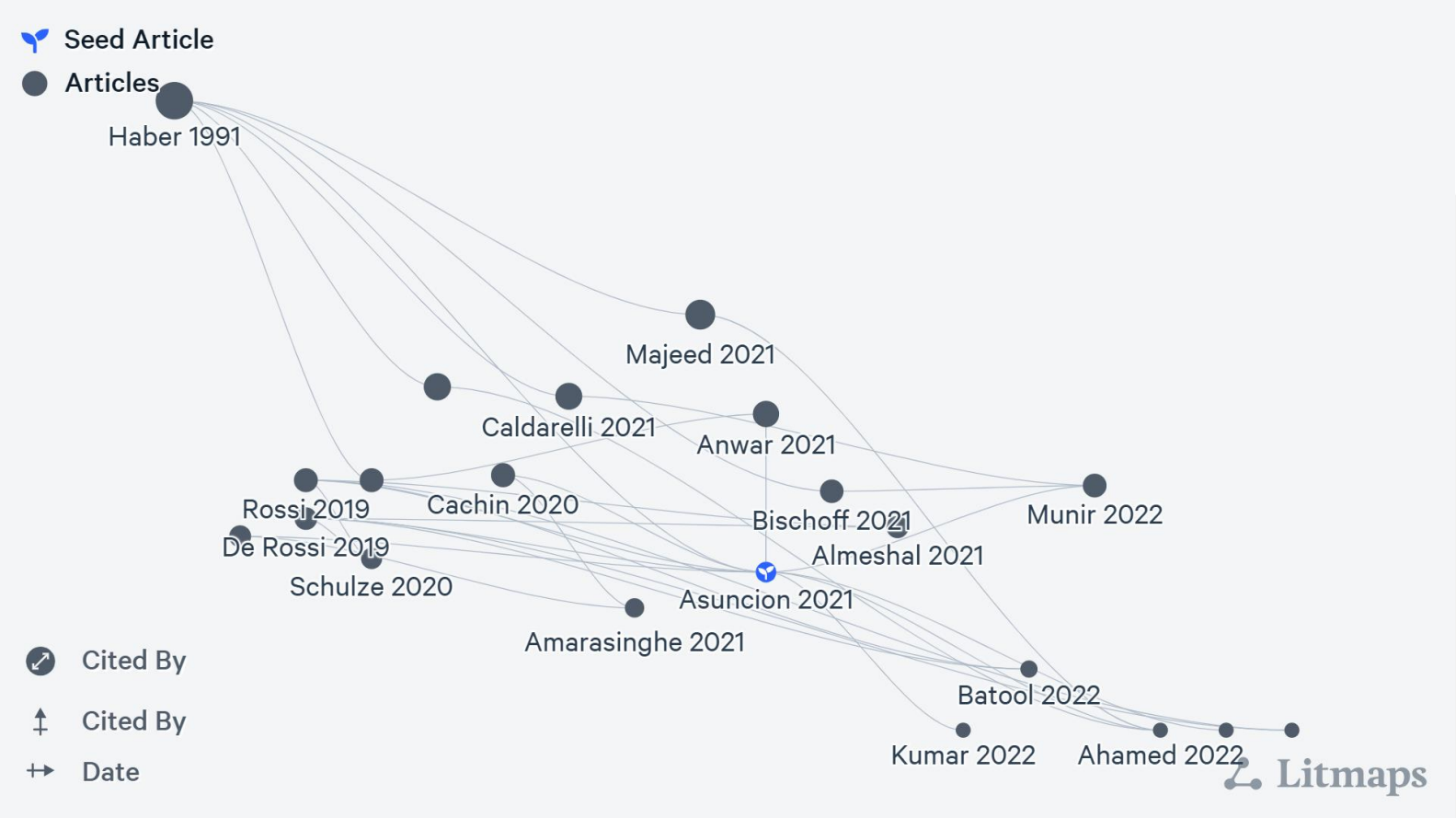
Objectives

- This study paper's main goal is to thoroughly examine how blockchain technology might improve supply chain security for the military. The motive is to investigate the viability, advantages, difficulties, and effects of using blockchain as a remedy for the weaknesses and inefficiencies that beset conventional military supply chain systems.
- By focusing on this, the research paper hopes to advance knowledge of how blockchain might transform the field of military supply chain security.

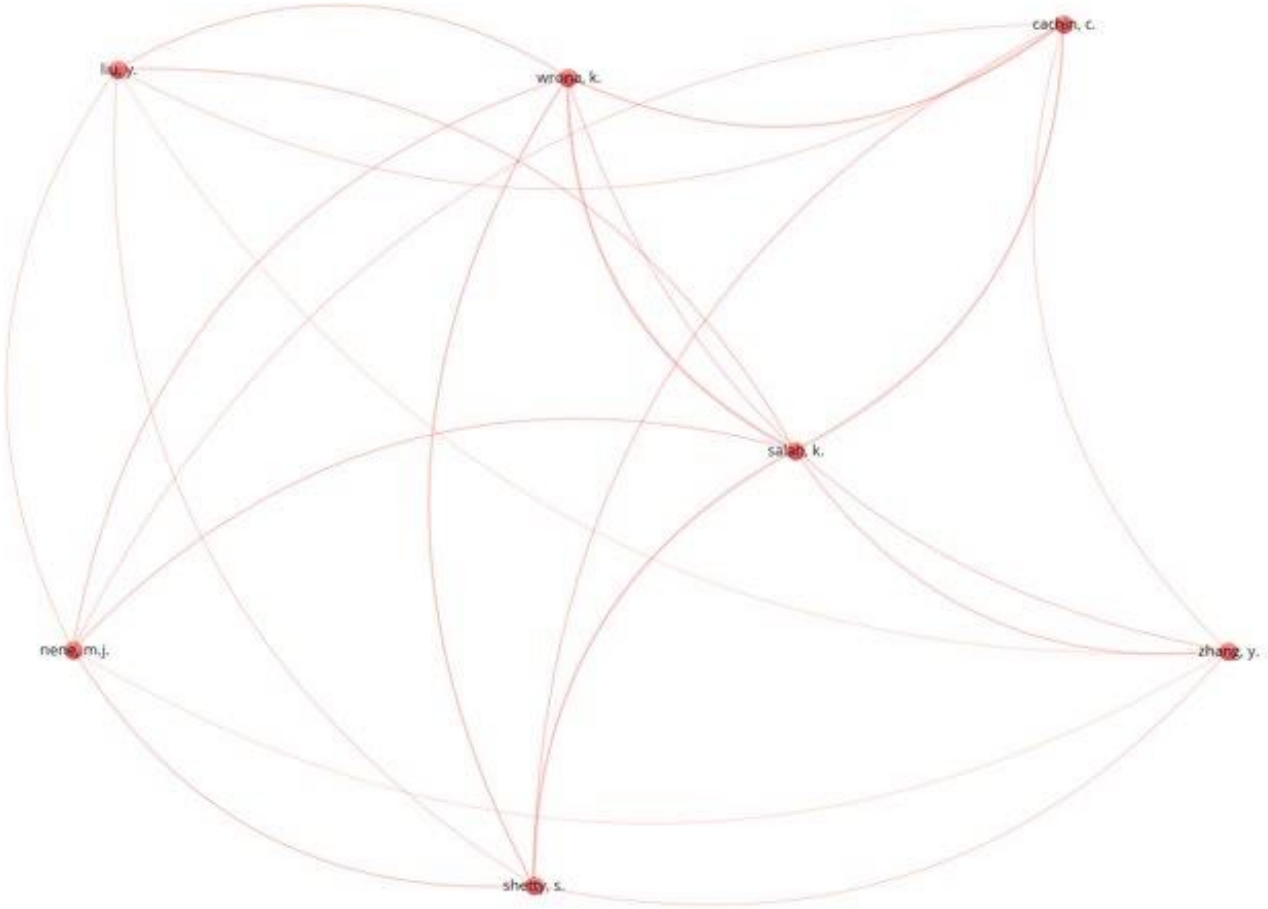


Feature Identification

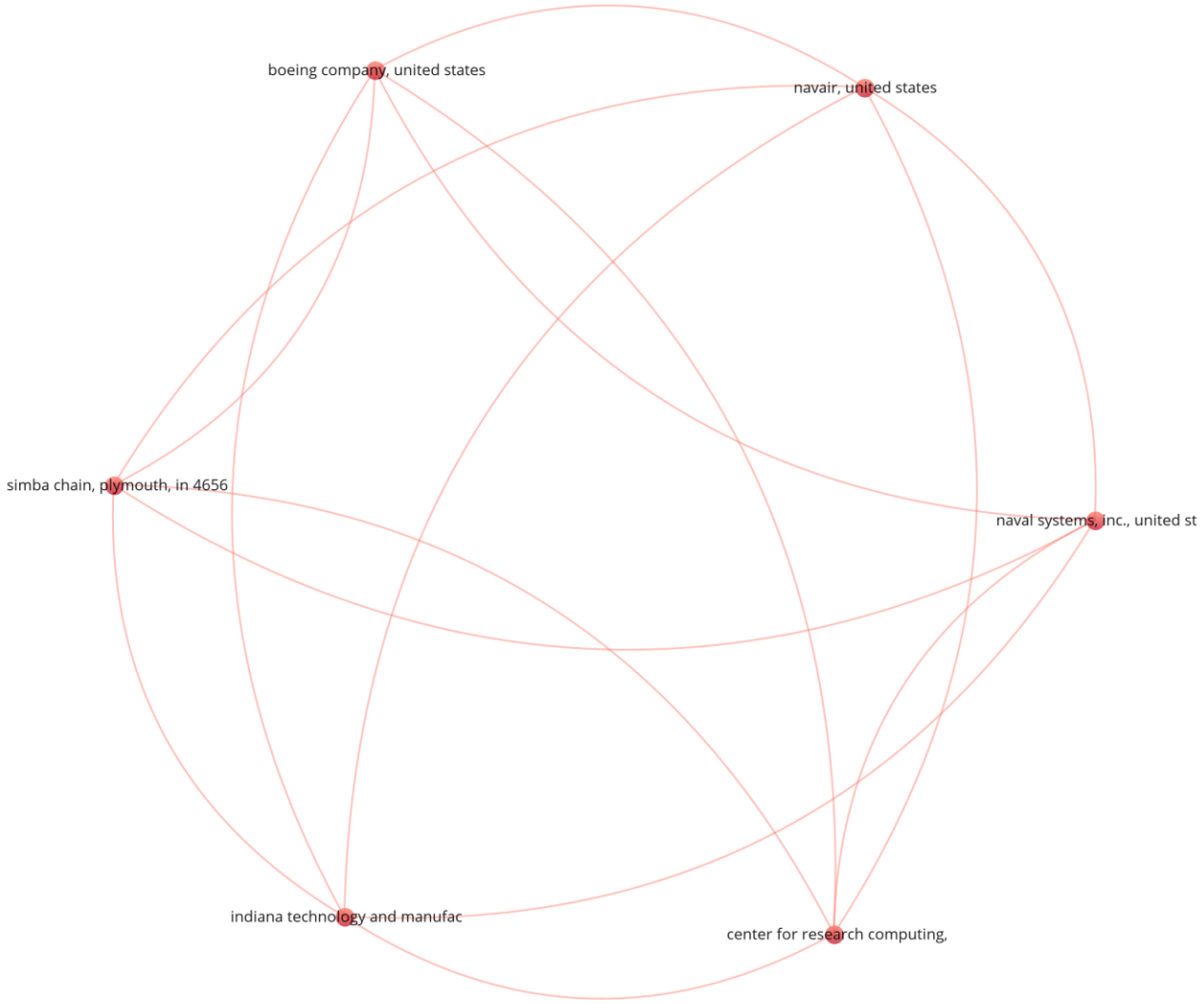
- For our review paper, we have carefully curated the data for analysis by using literature mapping tools and using seed papers to know more about the topic.
- The main aim of this paper to review these papers and answer questions based on volume, author and citation indicators using bibliometric analysis



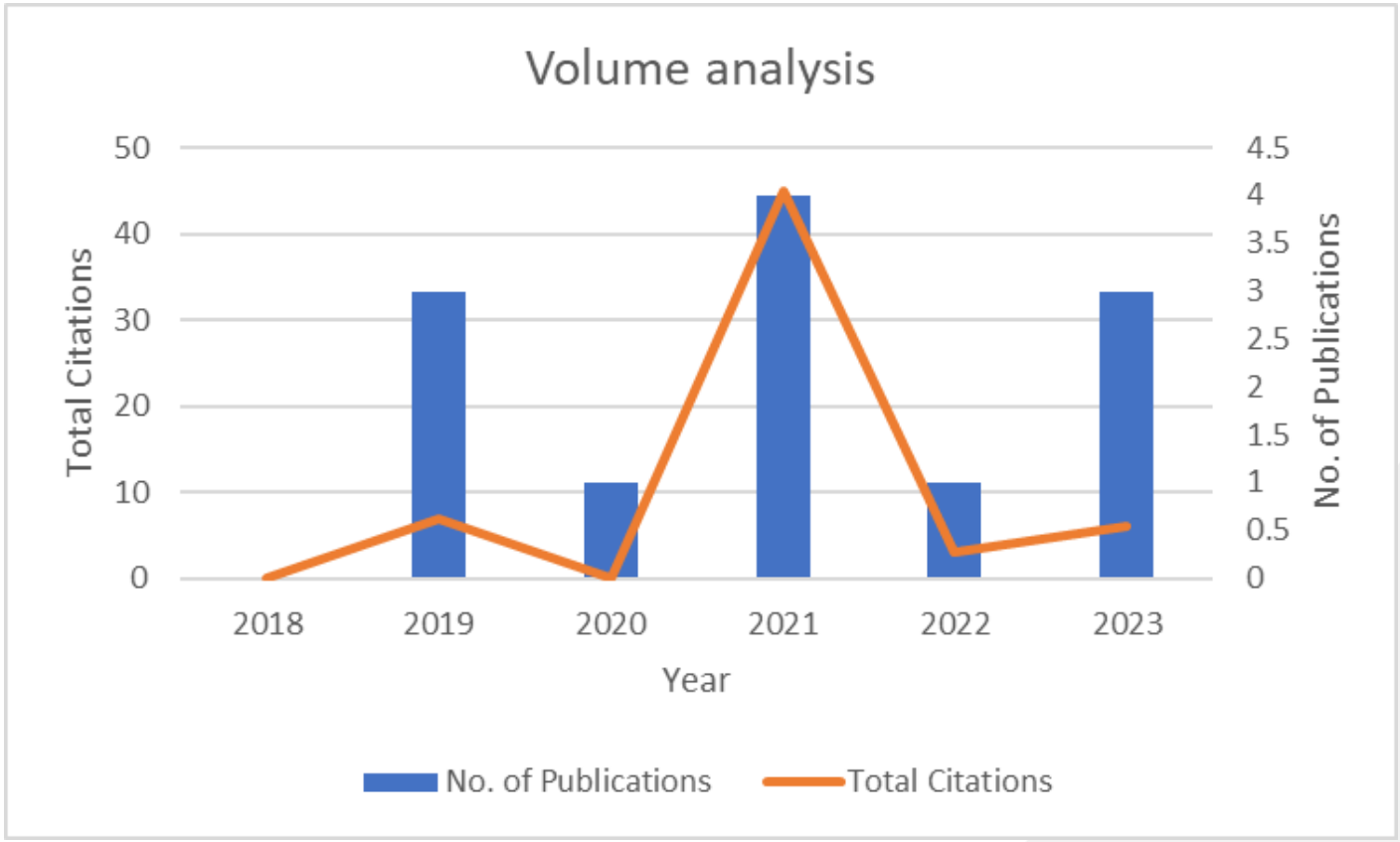
Literature mapping based on authors and year of publication



Bibliometric analysis based on co-citation and authors



Bibliometric analysis based on co-authorship and organizations



Volume analysis based on total citations and no. of publications

Constraint Identification

- The biggest constraint in creating this review paper is the low volume of papers on this domain
- The main reasons for the same are the:

1. Relatively sensitive nature of military operations and hence the secrecy of information
2. Comparatively new application of blockchain technology; earliest use dates to 2018

Analysis of Features

- We have used a varied of tools and methodologies for data extraction and analysis like:

1. For Literature Mapping – Connected papers, Inciteful, Litmaps
2. For Data Collection – Scopus, Lens, Dimensions
3. For Bibliometric Analysis – Vosviewer, Origin

Design Selection

- The whole paper will be focused on:

1. Bibliometric analysis of the existing publications
2. Identifying the unresolved issues in these publications
3. Suggesting a solution based on the review questions and analysis

Methodology used

For food supply and ration

CONSENSUS TO ORDER AS PER PRIORITY

TRACK AND TRACE IN NEAR REAL TIME USING RFID

COMMAND INFORMATION SYSTEM WITH ALL THE POSSIBLE PATHS

SECURED COMMUNICATION USING KNOWN HASHES TO DELIVER LAST MINUTE UPDATES

UAV AND DRONE NODES TO WORK AS PER CONSENSUS AND SELF-EXECUTABLE SMART CONTRACTS

For C2C

Methodology used

For Military Logistics Operations

USING CONSORTIUM TO ORDER GOODS

TRANSACTION IS SIGNED USING A UNIQUE ID AND THE DATA IS STORED OVER LEDGER FOR NON-REPUDIATION

SEPARATE PERMISSIONED NETWORK FOR SUPPLIERS WHICH IS LINKED WITH THE CONSORTIUM

TIMINGS AND OTHER DETAILS CAN BE OBTAINED USING THE UNIQUE ID.

Conclusion

So far, the paper highlights various blockchain deployments and tests implemented by people across the globe to improve supply chain security in military settings. It discusses the advantages and disadvantages of using this technology. The main aim of this paper is to investigate the viability and effects of using blockchain as a remedy for the weaknesses and inefficiencies that beset conventional military supply chain systems.

Future Scope

- To improve the security of consensus mechanism and encryption algorithms, making them tamper-proof and anti-eavesdropping
- To separate the blockchain to create a department-wise network to maintain confidentiality
- To find an incentive mechanism for the military blockchain to work in real-life
- To adapt as per situational information updates and provide real-time commands to combat units for assistance and integrity of information

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