The Impact of Blockchain Technology On the Supply Chain Management Efficiency in The Maritime Industry in Dar ES Salaam Tanzania

Rebecca Maclean Kasyele
Department of Science and Management at Dar es salaam Maritime institute (DMI)
Kasyelerebecca@gmail.com, Dar es salaam, Tanzania.

Prof. Wilfred Johnson Kileo
Lecturer, Department of science and Management at Dar es salaam Maritime Institute
Wilfred.kileo@dmi.ac.tz, Dar es salaam, Tanzania.

DOI: 10.29322/IJSRP.15.08.2025.p16408
https://dx.doi.org/10.29322/IJSRP.15.08.2025.p16408

Paper Received Date: 18th June 2025
Paper Acceptance Date: 28th July 2025
Paper Publication Date: 6th August 2025

Abstract

Tanzania's maritime sector deals with challenges such as fraud, inefficiencies, and high operation costs. With increasing digitalization across global logistics, Blockchain technology has emerged as a potential solution to address the imperative need for enhancing security, transparency, and efficiency in the maritime industry, where increasing reliance on digital systems and data prevails. The aim of the study was to investigate and look on how the transformative potential of blockchain in enhancing the efficiency and transparency of maritime supply chains. The study used qualitative method, and data collected through structured questionnaires which was filled with key maritime stakeholders, including logistic officers, customs officers and supply chain professionals. These findings reveal that blockchain technology significantly reduce paper work, enhance real time cargo, enhance transparency, traceability, shortens customs clearance time, minimize delays in cargo handling and overall efficiency in the complex realm of maritime logistics. However, challenges such as high implementation costs, lack of technical expertise, regulatory uncertainty and stakeholder resistance impede wide spread adoption. Furthermore, the paper offers a practical roadmap for the integration of blockchain technology into the maritime industry, presenting a comprehensive framework that maritime stakeholders can adopt to unlock the advantages of blockchain in their operations. The study recommends strategic investments in infrastructure, policy development, and capacity building to optimize blockchain integration. These findings contribute to the understanding of digital transformation in developing economies and provide actionable insights for policy makers and maritime industry stakeholders aiming to enhance supply chain performance through blockchain technology.

Keywords; blockchain technology, supply chain management, efficiency, maritime industry, Tanzania digitalization.

1.INTRODUCTION

The maritime industry, a critical pillar of global commerce, is increasingly confronted with significant challenges in supply chain management. These include operational inefficiencies, limited transparency, security vulnerabilities and elevated costs. The traditional systems often fail to meet the demands of today's complex and large-scale maritime supply chain networks, resulting in frequent delays, inaccuracies and higher expenses. In response to these issues, blockchain technology has gained attention as a promising tool for improving supply chain transparency, security, and operational efficiency. Blockchain technology functions as a decentralized and

This publication is licensed under Creative Commons Attribution CC BY.

distributed ledger that records and verifies all transactions or digital activities among network participants. This system ensures high security, as records are permanently stored and cannot be altered once verified. One of the primary advantages of block chain is its ability to enhance transparency while simultaneously reducing operational costs, (Karen V. Czachorowski, 2018). The integration of blockchain has paved the way for various innovative approaches in supply chain management, improving traceability, security and overall operational effectiveness. According to (hayes, 2024), supply chain management refers to the interconnection system of individuals and businesses responsible for producing and delivering goods to the final users or consumers. The process begins with the suppliers of raw materials and end when the finished products reach the consumers or end users, (Fernando, 2024).

Tanzania's maritime supply chain is burdened by several persistent challenges, including outdated technological systems, limited trust among stakeholders, inefficiencies in documentation, and circulation of counterfeit goods. These problems are further exacerbated by insufficient investment, managerial shortcomings and workforce skill gaps. In response, the stakeholders have emphasized the need to transform maritime industry by integrating paperless systems and establishing integrated processes that links all stages of the supply chain. Blockchain system ensures high security, as records are permanently stored and cannot be altered once verified. One of the primary advantages of block chain is its ability to enhance transparency while simultaneously reducing operational costs (Karen V. Czachorowski, 2019)

Supply chain within Tanzania's maritime industry are plagued by considerable inefficiencies, elevated operational costs and limited transparency, all of which contribute to recurring delays, congestion, and heighted exposure to fraud and cyber threats. The existing system relies heavily on manual workflows, extensive documentation and disjointed communication among key stakeholders including shippers, carriers, port authorities and customs agents which further amplifies these challenges. Blockchain technology, through its decentralized and tamper-resistance ledger system, presents a promising solution to these challenges. However, its applicability and effectiveness within the Tanzania maritime sector have not been extensively examined. This study seeks to explore how blockchain can enhance the efficiency of supply chain management operations in Tanzania's maritime industry, while also identifying its potential advantages, obstacles and key factors for successful implementation.

This research adds value to Tanzania's maritime sector by delivering an in-depth examination on how blockchain technology can improve efficiency, transparency, and security supply chain and logistics processes. By suggesting practical blockchain -driven solutions, the study provides meaningful guidance for industry stakeholders. These insights intended to support the integration of blockchain technology, leading to enhanced operational effectiveness, cost reduction and increased trust and consensus within the country's maritime industry.

2.OBJECTIVE OF THE STUDY

The objective of this study is to assess the impact of blockchain technology on the supply chain management efficiency in maritime industry in Dar es salaam Tanzania. The ultimate goal was to offer practical recommendations for stakeholders in Tanzania's maritime industry to improve their operational performance and competitiveness through the blockchain integration

3.LITERATURE REVIEW

This publication is licensed under Creative Commons Attribution CC BY.

3.1 THEORETICAL REVIEW

Resource based view theory

(Jay Barney, 2001), suggest that a firm's sustainable competitive advantage mainly stems from its distinct internal resources and capabilities, which are valuable, rare, hard to replicate and irreplaceable. They emphasize that a firm's key assets for gaining a competitive edge are rooted in its internal structure, rather than being influenced by external market conditions. This framework focuses on understanding how a company's internal strengths contribute to its success. Its main goal is to focus on the internal resources like technology that is used. A company should identify their unique resources that can be used to develop strategies that exploit their competitive advantage. So, a company may decide to position blockchain technology as a strategy resource that can help them to achieve the company's efficiency and competitive advantage, this is through using the importance unique capabilities of blockchain such as transparency, immutability, decentralization and smart contracts.

3.2 EMPIRICAL REVIEW

According to (logistics, 2024), block chain tracks items throughout the entire supply chain, from raw materials to global shipments, reducing costly errors and boosting efficiency. This capability not only improves delivery accuracy but also enhances overall supply chain management by providing real time updates and secure transaction records. Blockchain technology is revolutionizing the logistic industry by enhancing traceability, improving freight processes, and reducing fraud. Logistics companies use block chain to create transparent and unchangeable records of supply chain activities, ensuring each step is verifiable and secure. Shipping companies leverage block chain solutions to expedite customs clearance times and reduce delivery times. Smart contracts automate financial transactions, simplifying the payment process. Block chain fosters transparency and trust among parties involved, reducing payment disputes and increases accountability. This is essential for supply chain companies striving for cost efficient delivery and improved logistics operations.

According to (Heejo Kim, 2024), explains that Block chain is proposed as a disruptive technology that can solve the existing challenges in maritime trade. Most of the current maritime transportation are managed manually, which takes significant time and costs. Block chain can enhance security, efficiency, and transparency in the maritime industry. Block chain enabled smart contracts automatically facilitate transactions upon meeting the predetermined conditions, simplifying and expediting traditionally complex transaction process. In addition to facilitating transaction, blockchain decentralized systems ensures data is immutable and highly secure. When combined with other 4th industrial revolution technologies like IoT and AL, the future of the logistics industry will transform towards being more intelligent and sophisticated.

This publication is licensed under Creative Commons Attribution CC BY.

4.METHODOLOGY

A mixed-method approach was used to get answers on the impact of blockchain technology in supply chain management efficiency in the maritime industry in Dar es salaam Tanzania. The sample size consisted of 42 respondents that included stakeholders in the supply chain management such as logistic officers, shippers, customs officers, operational officers and clearing and forwarding agents. Quantitative data was gathered through structured questionnaire that used Likert scale in acquiring the answers from the respondents relating blockchain impact, challenges and the strategies for the optimization. Qualitative data was gathered through several interviews with the stakeholders to get the deep insight of the impact of blockchain technology in supply chain management in the maritime industry, challenges and the strategies in blockchain optimization. The qualitative data was well interpreted and quantitative data used statistical package in analyzing the data. The methodology helped in acquiring crucial information on the benefits, challenges and strategies for blockchain technology in the supply chain management in the maritime industry in Dar es salaam Tanzania.

5.RESEARCH FINDINGS

5.1Demographic characteristics

The findings provide the explanation of respondents after answering objectives of study. The findings were carefully discussed in order to assess the impact of blockchain technology on the supply chain management efficiency in maritime industry and some recommendations were provided. Different characteristics of respondents were considered for this study include demographic factors such as age, gender, work experience and position The age of respondents was regarded as important because individuals of different age groups may vary in experience and time worked in the industry. Understanding the age distribution helps to interpret how different age have different working experience in the industry. The experience of respondents in maritime industry is crucial in getting the acquired answers, because more experienced users might provide more informed insights into service quality, operational challenges, and suggestions for improvements

Table 1.1 demographic characteristics of respondents

s/no	characteristic	category	frequency	percentage
1	gender	male	23	71.9
		Female	9	23.9

This publication is licensed under Creative Commons Attribution CC BY.

2.	age	20-30	17	53.1
		30-40	11	34.4
		40-50	3	9.4
		50 above	1	3.1
3	experience	Less than 1 year	0	0
		1 to 5 years	7	21.9
		5 to 10 years	11	34.3
		More than 10 years	14	43.8
4	Job position	operation manager	6	18.8
		Logistic officer	9	28.1
		Shippers	6	18.8
		Clearing officer	5	15.6
		Customs officer	6	18.8

Source: field data (2025)

5.1.1Job position of the respondents

This study investigated the impact of blockchain technology in Tanzania's supply chain management in the maritime industry, focusing on sample of 32 respondents representing roles within the maritime sector. The participants included the operational manager responsible for operational activities in the shipping companies, logistic officer responsible in logistics operations, supply chain manager involved in ensuring smooth supply chain of the goods and services, clearing officers responsible for clearing goods and services and customs officers responsible in managing regulatory compliance. Among the respondents, 6 were operational managers, 9 logistic officers, 6 supply chain managers, 5 clearing officers and 6 customs agents. The participants emphasized the importance of efficiency and reliability in supply chain operations, which are often hindered by traditional paperwork and manual processes. Shippers shared their experiences in managing logistic operations, highlighting the complexities involved coordinating shipments and ensuring timely deliveries and amid varying port regulations and operational bottlenecks.

Operational officers also provided insights that the technology plays crucial role in ensuring efficient of port operations and facilitating smooth cargo movements. They also expressed concerns regarding the transparency and security of current supply chain practices, citing frequent delays and inefficiencies that could potentially be mitigated through the adoption of advanced technologies such as blockchain.

In addition, customs officers offer their views on trade facilitation. They pointed out recuring issues such as traditional paperwork system and verification of cargo contents, which often lead to delays in clearance procedures. Blockchain played a crucial role in reducing the paperwork and improved the cargo verification systems and transparent supply chain practices.

Collectively, these interviews and questionnaire answered offered a great understanding of the challenges facing Tanzania's maritime industry and highlighted how blockchain technology could be served as a transformative tool. By enhancing operational efficiency, transparency and stakeholders collaborations, blockchain presents promising solutions to address long standing inefficiencies within the supply chain.

This publication is licensed under Creative Commons Attribution CC BY.

5.1.2 Years of experience.

Respondent years of experience varied which provides different level of understanding on the industry and the potential impact of blockchain technology on supply chain management efficiency. The new employees of 1 to 5 years of experience provided current state insight of the maritime supply chain management, often highlighted few challenges faced due to manual processes. Their perspectives underscored the potential benefits of blockchain technology in simplifying and streamlining the supply chain processes.

The respondents of 5 to 10 years of experience described the improvements and integrations they have witnessed in the years and providing the bottlenecks and challenges they faced before the blockchain technology adaption. Their experience shows that the innovation is needed so as to accelerate and improve the supply chain management.

The last group was respondents with more than 10 years of experience in the industry. They offered the trend of technology during the traditional technology to the adaption of blockchain technology. They discussed the significant changes that they have witnessed over the decade in working in the maritime industry from the traditional use to the introduction of digital systems and the efforts in improving immutability, transparency and traceability. Their opinions were important in analyzing on how blockchain have positively impacted the supply chain management in the maritime industry.

The experience range of respondents helped the researcher to understand the common issues that they faced overall years of experience and to propose the suitable strategies that can help in eradicating or improve the efficiency in the supply chain management in the maritime industry in Dar es salaam Tanzania.

5.2 The impact of blockchain technology on maritime supply chain management efficiency

Table 1.2 Response on the impact of blockchain technology in maritime supply chain in Tanzania

Response	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Reduce paperwork and manual processes	0	3	3	17	9
Efficient and faster documentation handling	0	0	4	22	6
Efficient tracking and tracing of goods	0	1	4	19	8

Source; field data (2025)

This publication is licensed under Creative Commons Attribution CC BY.

5.2.1Reduce paperwork and manual processes in the maritime supply chain

Reducing paperwork and manual processes is a critical step toward enhancing operational efficiency in supply chain management. The participants were asked to evaluate on how the blockchain has reduced the paperwork and manual processes in the maritime supply chain. A Likert scale was used by respondent choosing strongly disagree, disagree, neutral, agree and strongly agree. 19 and 7 respondents strongly agreed and agreed that the blockchain reduce the paperwork. provided their views on how blockchain reduced the paperwork and manual processes in the supply chain management. 5 respondents interviewed felt that the manual work and paperwork have been reduced since implementation of blockchain. One of the respondents who is the operational officer strongly agreed that,

"…the implementation of blockchain technology has helped in reducing the paperwork and manual processes hence these have helped in faster documentation, saves time and reduce the delays in the port…"

3 respondents disagree that the blockchain have reduced paperwork and manual processes in the maritime supply chain. 2 respondents interviewed have different views on the reduction of paperwork and manual processes. One of the respondents who is a clearing officer noted,

"…the paperwork and manual processes are still there during their clearing activities hence these takes a lot of time in doing the clearing processes and leads to so much processes in doing the work hence the cost during the processes…"

3 respondents have neutral agreement on the impact of blockchain technology on the supply chain management efficiency in the maritime industry in Dar es salaam Tanzania.3 respondents interviewed believed that the technology have reduced the paperwork in some extent and the paperwork is still there hence is not accurate to 100 percent. One of the respondents who is a logistic officer noted that,

"…blockchain technology have reduced paperwork and manual processes in the logistic activities but also the paperwork is still there during the processes…"

The varied responses show that while the blockchain technology have impacted the supply chain management by reducing paperwork and annual processes, but the paperwork and manual processes are still there in the maritime supply chain industry in Dar es salaam Tanzania.

5.2.2 Efficient and Faster Documentation Handling

Efficient documentation is a cornerstone of timely cargo movement and customs clearance in maritime logistics. Delays in processing essential documents, such as bills of lading or invoices, can disrupt the flow of goods and incur additional costs. Blockchain enables secure and tamper-proof document management through smart contracts, significantly improving processing time and accuracy. The participants were asked to evaluate on how blockchain has improved the efficient and faster documentation handling in the supply chain management. A Likert scale was used by respondent choosing strongly disagree, disagree, neutral, agree and strongly agree. 22 and 6 respondents agreed and strongly agreed that the blockchain technology have improved the efficient and faster documentation handling through provision of bill of lading and invoices. 8 respondents interviewed felt that the technology has improved the efficient tracking and tracing of goods compared to traditional way. One of the respondents highlighted,

"...blockchain technology has offered the system for providing the documentation such as bill of lading and invoices when clearing of goods and services hence these has led to easy flow of goods and reduced the cost that was associated with documentation…."

Another respondent added;

"... blockchain have improved the provisions of bill of lading which helps in reducing the ship delays in the port and the invoices that helps the stakeholders in easy payments. the bill of lading helps the stakeholders to communicate easy and sharing their document during the supply chain processes…"

This publication is licensed under Creative Commons Attribution CC BY.

4 respondents were neutral on the agreement that the blockchain technology has led to the efficient and faster documentation handling. 2 the respondents interviewed expressed their vies that the systems is not well built hence the process takes much time. One of the respondents highlighted,

"…. Its true the technology have improved the documentation processes but the system is not well built and have a lot of bugs in some departments that the documents takes a lot of time being processed hence these result to the waste of time and lead to consume a lot of time in getting the documents…"

The varied responses show that, while the blockchain technology has improved efficient and faster documentation handling, but the systems

is not well built in some departments hence the documentation takes a lot of time to be processed in the maritime supply chain management in Dar es salaam Tanzania.

5.2.3 Efficient tracking and tracing of goods

Blockchain facilitates more efficient tracking and tracing of goods across the supply chain, Visibility and traceability are essential for effective supply chain performance and customer satisfaction. Blockchain technology enhances the tracking and tracing of goods by creating an immutable and transparent record of each transaction. This allows stakeholders to monitor the location, condition, and status of cargo throughout the shipping process. The participants were asked to evaluate on how blockchain has improved the efficient tracking and tracing of goods in the supply chain management. A Likert scale was used by respondent choosing strongly disagree, disagree, neutral, agree and strongly agree to answer the structured questionnaire. 19 and 8 respondents agreed and strongly agreed that the blockchain technology had led to efficient tracking and tracing of goods. This group felt that the blockchain technology has improved the tracking and traceability of goods. 5 respondents interviewed also shows their views on the efficient and tracking of goods as the benefit of the technology. One of the respondents highlighted,

"… the implementation of blockchain was a gamechanger for us. After the implementation of blockchain technology, we are able to monitor the location, condition and status of the cargo throughout the shipping process hence we are sure on providing the ships status on the arrival date to the customers…"

Four respondents have neutral opinion on the efficient tracking and tracing of goods. This group felt that the goods are being tracked yes but there is no accuracy in the tracking of goods. Also 2 respondents interviewed have felt that the technology have improved the tracking and tracing but the problem is still there. One of the respondents highlighted,

"…. The blockchain system despite improving tracing and tracking of goods is still not accurate due to lack of skilled personnel hence the tracking and tracing of goods are not seen or there are no much different in tracing and tracking of goods as hyped because the system still has a lot of problems to be worked out"

one of the respondents disagreed that the blockchain technology has led to efficient tracking and tracing of goods. 3 respondents interviewed felt that the blockchain technology has not led to efficient tracking and tracing of goods. The respondent highlighted,

"… The blockchain have not made a difference in traceability and tracking of goods, because we have seen minor improvements in the product tracking, the technology has not fully delivered its potential hence is difficult to measure its effectiveness in tracking and tracing of goods…"

These findings suggest that we all have different views on the blockchain system. But the dominant view is that the blockchain technology increasingly being recognized as a transformative tool for improving transparency, traceability, and overall operational efficiency in maritime supply chain management Efficiency in Dar es salaam Tanzania.

This publication is licensed under Creative Commons Attribution CC BY.

5.3 Challenges of blockchain technology integration in the supply chain management efficiency in maritime industry in Dar es salaam Tanzania

Table 1.3; Responses on the challenges for blockchain technology integration in maritime supply chain in Tanzania.

Response	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
High investment cost	0	0	0	16	16
Resistance to change and lack of awareness	1	7	7	14	3
Lack of consensus	0	4	10	15	3

Source; field data (2025)

5.3.1High initial investment cost

High initial investment costs represent is the obstacle, the most significant barriers to blockchain adoption is the high initial capital outlay required to develop, implement, and maintain the necessary technological infrastructure. The financial burden can be challenging to small and medium enterprises in implementing the blockchain technology. A Likert scale was used by respondent choosing strongly disagree, disagree, neutral, agree and strongly agree to answer the structured questionnaire. 16 respondents agreed and 16 respondents also strongly agreed that the high initial investment cost is a core challenge in the blockchain technology integration hence it is very difficult to shift from traditional means to the new technology. The 10 respondents interviewed expresses their views that the cost of investment is a barrier in integrating blockchain technology. One of the respondents quoted;

"... the investment costs are high because the technology is seen as long-term investment and as long term it needs a high investment so as to be able to last long. So this came as a financial to many small and medium enterprises that are involved in the supply chain management..."

Other respondent also talked about the cost associated with technological infrastructure of blockchain technology to small companies being beyond their budget. The respondent highlighted;

"..... the cost of building and implementing well infrastructures for small and medium enterprises in maintaining blockchain needs high investment which is beyond our budget for many small companies..."

Other respondents also discussed on how blockchain may results into return on investment made in the adoption. People clear information on blockchain hence become difficult for them in implementing and adopting it. It highlighted,

".... We are getting difficult to understand on how blockchain may bring the positive impact if implemented. It is difficult to come up with the financial plan in implementing it because its needs a high investment and budget ....."

These findings reveal that, the blockchain technology is faced with financial problems in implementing it because it needs high initial investment because it's a long-run investment. To solve these financial problems the strategies such as government support in subsidies,

This publication is licensed under Creative Commons Attribution CC BY.

loans from banks and collaboration among stakeholders may be used so as to solve the financial problem in the supply chain management. provision of cost-benefit analysis to these enterprises may help them in analyzing on how the implemented technology may bring benefit depending on the cost used.

5.3.2 Resistance to change and lack of awareness

Many Tanzania's maritime institutions, stakeholders may be reluctant to shift from traditional processes due to limited awareness or understanding of blockchain technology, leading to slow or partial adoption. A Likert scale was used by respondent choosing strongly disagree, disagree, neutral, agree and strongly agree to answer the structured questionnaire. 14 respondents agreed that resistance to change and lack of awareness is the challenge in implementing and adopting the technology, 7 respondents have neutral agreement on the resistance to change and lack of awareness indicating that the institutions does not want to change due to high investment cost, 7 respondents also disagree that resistance to change and lack of awareness is not the challenge but the main challenge is the high cost in implementing it, 1 respondents strongly disagree that the resistance to change and lack of awareness is not the challenge in adopting the technology. 5 respondents interviewed shows their concerns in the resistance to change and provided their view that lack of awareness is the challenge to many institutions. One of the respondents highlighted;

"…. It is difficult to shift to blockchain technology because our current systems despite of being not perfect it is trusted and familiar, so shifting to new idea with no awareness will be difficult due to unforeseen uncertainties…"

3 respondents interviewed shows their concerns on the resistance caused by high investment cost as the main cause many institutions resist in adapting new technology despite being aware of the benefits of the technology. One respondent shared;

"….. we are not resisting to change and we are aware of the benefits of blockchain like improving transparency and traceability efficiency, but it is difficult to change because the cost of implementing it is very high and we have very limited budget hence became difficult to shift to it…."

2 respondents did not see the resistance to change as the barrier. They see the challenges associated to change as the barrier because the changes need investment and skilled personnel. But they are much aware that the technology has many benefits to the industry. One of the respondents highlighted;

"….. blockchain is very important in any institution that offers the maritime services, but its difficult to change because we lack skilled personnel and the investment cost is high hence we can not afford to shift into it…"

These findings reveal that, the resistance to change and lack of awareness is not the core challenge because the people are awareness of the importance of the blockchain technology but they are resistance to change due to other factors that are forcing them like the high investment cost and lack of skilled personnel. To solve the problem, the institution should upskill their employees and seek loans so as they can be able to invest in the technology that can help them in their maritime activities.

5.3.3 Trust and consensus

The effectiveness of blockchain depends on the collective participation of all supply chain actors. A lack of trust, communication, and shared technological standards among stakeholders undermines the collaborative nature of blockchain systems, limiting their functionality and benefits. A Likert scale was used by respondent choosing strongly disagree, disagree, neutral, agree and strongly agree to answer the structured questionnaire.15 and 3 respondents agreed and strongly agreed that the lack of trust and consensus is the challenge in blockchain technology implementation because the stakeholders lack the trust among themselves hence the implementation of blockchain became difficult because all the stakeholders need to implement it for effective function. 6 respondents interviewed

This publication is licensed under Creative Commons Attribution CC BY.

expressed their views that the stakeholders need to collaborate so as to bring effective blockchain systems. One of the respondents highlighted;

"….. stakeholders lack the trust in each other hence the effectiveness in the technology became difficult because other stakeholders have implemented it others have not implemented it due to lack of trust among them…"

4 respondents disagreed that the lack of trust and consensus is the challenge in implementation, 1 respondent interviewed expressed that the investment cost is the problem and not the trust among the stakeholders. She highlighted;

"….. even if trust is there among the stakeholders but the main challenge is the investment because we all need investment in implementing it and that the problem we are facing…"

10 respondents have neutral agreement that the lack of trust is the challenge but also not the challenge because even if the trust is there and there is no skilled personnel and investment the blockchain will not be implemented. 3 respondents interviewed felt that trust and consensus is the challenge is being associated by other challenges like investment cost and resistance to change. One respondent highlighted;

"……. trust is the challenge in the blockchain implementation but other factors like high investment cost are also the problems that rise the lack of trust and consensus among stakeholders hence it became difficult to implement it…."

The findings reveal different views of respondents on the lack of trust and consensus among the stakeholders the problem result from the lack of investment and skilled personnel hence the stakeholders rise trust among themselves. The investment loans and subsidies should be provided so as to allow all stakeholders in implementing the technology because if all the stakeholders implement the technology the problem of trust among them will be solved.

6.CONCLUSION

The research critically examined the impact of blockchain technology on supply chain management efficiency within Tanzania's maritime industry, with a focus on Dar es salaam. The results indicate that blockchain technology significantly enhances efficiency in maritime supply chain operations. Benefits observed includes reduction of manual processes, improve documentation and lower operational costs. Also, the study identified several barriers hindering full scale adoption including high initial investment costs and lack of technical expertise. The study also highlighted actionable strategies for facilitating successful integration include infrastructure investment and collaboration among supply chain stakeholders. In conclusion, blockchain technology presents a viable path towards digital transformation and operational excellence in Tanzania's maritime sector.

The study would like to recommend;

- To improve the blockchain education to the stakeholders so to improve their awareness to the stakeholders that lack awareness about the technology
- To encourage collaboration among stakeholders so as to allow effectiveness process in the use of technology and improve trust among them.
- To improve in provision of subsidies and loans by banks and government so as to allow them to solve the investment problem.

This publication is licensed under Creative Commons Attribution CC BY.

REFERENCES

Fernando, J. (2024). Supply Chain Management(SCM): How it Works and Why its Important.

hayes, a. (2024). *supply chain: from order fullfillment.*

Heejo Kim, Z. X. (2024). Rethinking Blockchain Technologies for the Maritime industry: An overview of the Current Landscape. *MDPI*.

Jay Barney, M. W. (2001). The Resource-Based view of the Firm: ten years after 1991. *Journal of Management*.

Karen V. Czachorowski, S. M. (2018). Applying Blockchain Technology; Evidence from Norwegian companies. *MDPI*.

Karen V. Czachorowski, S. M. (2019). *The Application of Blockchain Technology in the Maritime Industry.*

logistics, I. (2024). Blockchain in Logistics: Definition, Role in logistics and Benefits.

This publication is licensed under Creative Commons Attribution CC BY.