Adaptation of Blockchain Technology in Banking Sector in Sri Lanka: Opportunities and Challenges

DN Bandulahewa[1#], EASS Edirisinghe[2], PGAD Ranasinghe[3] and ASP Ilangasekara[4]

[1]*Department of Management and Finance, General Sir John Kotelawala Defence University, Sri Lanka*
[2]*Department of Management and Finance, General Sir John Kotelawala Defence University, Sri Lanka*
[3]*Department of Management and Finance, General Sir John Kotelawala Defence University, Sri Lanka*
[4]*Department of Management and Finance, General Sir John Kotelawala Defence University, Sri Lanka*

[#]dunalnethika@gmail.com

Abstract *- Blockchain Technology is one of the main components in Industry 4.0 implications which enable organizations to trace transactions, create new business models to solve customer problems, increase the quality and productivity, etc. Blockchain technology is used in various industries such as supply chain industry, banking industry, healthcare industry, construction industry and many more. However, in Sri Lanka there is a gap while implementing blockchain technology in banking sector despite the number of on-going and completed projects. The primary goal of this study was to identify the challenges and opportunities in blockchain adaptation and identify how the banking sector should be facilitated in the future to implement blockchain based banking systems. Cluster sampling and intensity sampling techniques were used to identify the sample. In-depth interviews were used for data collection, and they were analyzed using Thematic Analysis. Technological, Organizational and Environmental (TOE) framework was used in developing the questionnaire and to support the data analysis. The study shows that implementing blockchain-based banking systems would improve the transactions' transparency, give managers access to real-time data, improve the transactions' auditability, and save consumers time and effort. Additionally, the key reasons that challenge the implementation of blockchain technology were lack of technological understanding and accessibility, organizational hurdles, and environmental barriers.*

Keywords*:* ***Blockchain Technology, Banking, Thematic Analysis***

I. INTRODUCTION

Since then, the growth of online businesses, the Internet of things (IoT), and mobile computing have changed consumer purchasing habits and corporate processes. Thanks to the internet, customers can communicate directly with product distributors. By eliminating some middlemen, the supply chain has been shortened, and cooperation has increased as a result. A few businesses have already begun integrating blockchain technology into their business processes, even though it is still challenging for an organization to accept new technologies, as it represents a substantial technological advancement and disruptor lacking the necessary preparation for the digital transformation (Abeysekera & Kumarawadu, 2022; Elvers & hoon Song, 2014; Stank et al., 2011).

In contrast to traditional centralized financial ledger systems, which provide a bank complete control over transactions recorded into the ledger, a decentralized and distributed ledger, like blockchain, has no central authority and enables each node of the network to retain an exact copy of the ledger. Furthermore, the use of blockchains enables automated, simplified, and efficient processes while maintaining security through difficult validation processes. In many industrialized nations during the past ten years, blockchain-based business solutions have experienced enormous growth. For the start of blockchain adoption, the banking, finance, insurance, healthcare, and supply chain industries have built the regulatory framework and technological foundation (Liu et al., 2019; Wang & Kogan, 2018). They enable a group of users to log transactions in a shared ledger at the most fundamental level so that, assuming the blockchain network is operating smoothly, no transaction can be amended once it has been recorded.

The banking industry in Sri Lanka is currently facing multiple several challenges, including a decrease in revenues and a rise in risk, and has entered a new phase of growth and transformation. The sudden Internet finance development has also caused several issues in the traditional banking sector. Therefore, commercial banks must rely on cutting edge technology. New client needs and competitive markets are made possible by technological developments that hasten the improvement of products and services. Blockchain technology could significantly reduce the cost of financial services while improving product quality. Financial institutions are using this technology to find solutions to the problems of speed and cost today. Some tasks can be automated when using blockchain. A secure, open, and user-friendly decentralized database is the blockchain. These capabilities make it possible to automate a variety of banking-related procedures (for example, payments or issuing loans).

Table 1: Blockchain based Projects in Sri Lankan Banking Sector

Name of the Bank	Project	Duration
Central Bank	Know Your Customer (KYC) project	More than two years
Sampath Bank	igift Project	3 years
HSBC	Digital Vault	5 years
NDB Bank	TradeLens	More than 5 years

Source: Survey Data (2022)

According to the Table 1, there have been projects on the blockchain implementation in the banking sector, amongst which Central Bank's KYC project is a well-known project in Sri Lanka. However, most of the projects are still in their implementing stage. Some of them had issues and some of them gained advantages. In this study, the researchers' main objective was to identify the main challenges and opportunities and attempt to add new knowledge and awareness for the future researchers and decision makers in the banking sector in Sri Lanka.

II. METHODOLOGY

According to the research philosophy interpretivism was used since it explored from a scientific and qualitative standpoint. The researchers followed an inductive approach since it has examined the subject area using qualitative techniques. When it comes to research strategies, the researchers have used interview method to collect data. The researchers have adopted a mono method approach and cross sectional as the time horizon.

As this research is about blockchain technology of banking sector in Sri Lanka, the sample population was all private and public banks in Sri Lanka. The sample size was selected using cluster sampling technique on the criteria of banks that have previously conducted and currently conducting new projects on blockchain based systems which have been published in all media (newspapers, articles, research and publications). Accordingly, the researchers identified four banks in Western Province in Sri Lanka by referring the media and selected eight interviewees using intensity sampling technique on the basis of practitioners and professionals who have been involved in blockchain adaptation projects and those who have been researching about them. Similarly, cluster sampling (Thomas, 2022) and intensity sampling (Patton, 2001) techniques were used to identify the most relevant information rich professionals and practitioners to answer the research questions.

Accordingly, the respondents were given ID as Managing Director (I1), Manager – Data Science and Solutions (I2), Senior Lecturer Gr. I (I3), CEO (I4), Manager – Digital Implementation (I5), Manager – Global Remittances (I6), Director – Credit Section (I7) and Manager – Research and Development (I8). Data collection was conducted through e-mailed questionnaires and interviews via Zoom which last between 35 and 60 minutes. Data analysis was conducted following the Braun and Clarke (2006) Thematic Analysis. The Technological, Organizational and Environmental (TOE) framework was used to develop the questionnaire which is widely used in research related to adoption of blockchain in various businesses (Clohessy & Acton, 2019; Clohessy et al., 2019; Dai & Vasarhelyi, 2017). Secondary data was collected from journal articles, magazines, newspapers, and reports.

III. RESULTS AND DISCUSSIONS

According to this research data collected through face-to-face structured interviews with top level managers and one middle level managers and directors in banking industry. Following the completion of the data collection process, all interviews were transcribed into word documents. The transcripts were meticulously examined one by one to identify the codes in each interview. After identifying all the codes in each interview, the codes were entered into a table with all the codes in separate columns. The remaining codes were entered into a word document after duplicates and codes with similar meaning were removed.

All the interviewees were asked three main structured questions on (1) lack of adoption of blockchain technology in Sri Lanka, (2) benefits and challenges of blockchain adoption in banking sector and (3) facilitating blockchain adoption for banking sector in the future. The initial coding generated is depicted in Table 2.

Table 2: Initial Coding based on TOE Framework

Interviewee	Highlighted Response	Initial Coding
I4, I3, I5	• The technique is sufficiently developed. The infrastructure is the issue. However, because the processes are not user-friendly, it is challenging to reach the public and meet user needs. • Technological infrastructure is very important when it comes to blockchain adoption. • There is no national cloud here. We do have a government cloud, but not everyone has access to it.	Technological
I6, I8, I2, I1	• Insufficient investment. • Cost-benefit analysis, project's value, financial returns, and the level of confidence (trust). • Project transactions typically have enormous values and come with hefty interest rates and premium charges. • Assist to manage cash flow activities, reduce non-payments, and payment issues in the supply chain.	Organizational
I4, I7	• Support of numerous stakeholders' interest and their trust. • Different stakeholder groups should join and be on par for a blockchain implementation. Additionally, numerous counterparties must be open to using a blockchain for it to make sense. • Lack of awareness and information	Environmental

Source: Survey Data (2022)

As per Table 1, researchers identified twelve main themes from initial three codes. There are defined as follows.

i. User-friendliness as a Technological Factor in Blockchain Implementation
ii. Payment Facilities as a Technological Factor in Blockchain Implementation
iii. Lack of Infrastructure as a Technological Factor in Blockchain Implementation
iv. National Cloud as a Technological Factor in Blockchain Implementation
v. High Initial Cost as an organizational Factor in blockchain implementation
vi. High Maintenance Cost as an organizational Factor in blockchain implementation
vii. Process Optimization as an organizational Factor in blockchain implementation
viii. Financial Benefits as an Organizational Factor in Blockchain Implementation
ix. Common Platform as an Environmental Factor in Blockchain Implementation
x. Ownership and Control as an Environmental Factor in Blockchain Implementation
xi. Lack of Trust as an Environmental Factor in Blockchain Implementation
xii. Stakeholder Interest as an Environmental Factor in Blockchain Implementation

Accordingly, interpretation of opportunities and challenges are depicted in Table 3 as follows.

Table 3: Interpretation of Opportunities and Challenges

Opportunities	Challenges
• User-friendliness • National Cloud • Financial Benefits • Stakeholder Interest • Process Optimization • Common Platform	• Payment Facilities • Lack of Trust • Lack of Infrastructure • High Initial Cost • High Maintenance Cost • Ownership and Control

Source: Survey Data (2022)

IV. CONCLUSION

Sri Lankan banking sector has not adopted blockchain technology due to three main reasons: lack of technological understanding, organizational hurdles, and environmental barriers. To promote blockchain, the government should establish necessary technological infrastructures, build environmental variables like sponsorship and inter-organizational trust, and resolve control-related problems. Implementing blockchain-based banking ecosystems would improve transaction transparency, provide real-time data access, enhance auditability, and save time and effort. However, traditional accountants and managers may face difficulties adjusting to blockchain technology, potential cyber-attack vulnerabilities, system faults, disruptions, and increased fees. To facilitate adoption, regulatory bodies should connect current ERP systems with blockchain ecosystems, introduce system ethics for professional accountants, managers, and IT specialists, and establish bank-level integrations between IT specialists and professional managers. A thorough understanding on challenges and opportunities helps the decision makers prior to investing

on blockchain related projects. It also gives professionals in the banking industry, an understanding of how their field might be impacted in the future by the adoption of blockchain based banking systems and what must be facilitated. According to the objectives of the study, twelve factors were identified with six factors each for opportunities and challenges.

REFERENCES

Abeysekera, M.C. and Kumarawadu, P. (2022) *Analysis of factors influencing blockchain implementation in finance sector in Sri Lanka*, *HO CHI MINH CITY OPEN UNIVERSITY JOURNAL OF SCIENCE - ECONOMICS AND BUSINESS ADMINISTRATION*. Available at: https://journalofscience.ou.edu.vn/index.php/econ-en/article/view/2236 (Accessed: 04 July 2023).

Clohessy, T. and Acton, T. (2019) *Investigating the influence of organizational factors on blockchain adoption: An innovation theory perspective*, *Industrial Management & Data Systems*. Available at: https://www.emerald.com/insight/content/doi/10.1108/IMDS-08-2018-0365/full/html. (Accessed: 04 July 2023).

Dai, J. and Vasarhelyi, M.A. (2017) *Toward blockchain-based accounting and assurance*, *American Accounting Association*. Available at: https://doi.org/10.2308/isys-51804 (Accessed: 04 July 2023).

Elvers, D. and Song, C. hoon (2014) *R&D cooperation and firm Performance – Evaluation of partnering strategies in the Automotive Industry*, *Journal of Finance and Economics*. Available at: https://doi.org/10.12691/jfe-2-5-9 (Accessed: 04 July 2023).

Liu, M., Wu, K. and Xu, J.J. (2019) 'How will blockchain technology impact auditing and accounting: Permissionless versus permissioned blockchain', *Current Issues in Auditing*, 13(2). doi:10.2308/ciia-52540.

Patton, M.Q. (2001) 'Book review: Qualitative research and evaluation methods, 3rd ed., by Michael Quinn Patton (2001). Thousand Oaks, ca: Sage, 688 pages.', Organizational Research Methods, 5(3), pp. 299–301. doi:10.1177/10928102005003006.

Thomas, L. (2023) *Cluster sampling: A simple step-by-step guide with examples*, *Scribbr*. Available at: https://www.scribbr.com/methodology/cluster-sampling/ (Accessed: 04 July 2023).

Wang, Y. and Kogan, A. (2018) 'Designing confidentiality-preserving blockchain-based transaction processing systems', *International Journal of Accounting Information Systems*, 30, pp. 1–18. doi:10.1016/j.accinf.2018.06.001.

Ye, Z., Wu, Z. and Tian, X. (2021) *Schmitz, J. and Leoni, G. (2019) accounting and auditing at the time of Blockchain technology a research agenda. Australian Accounting Review, 29, 331-342. - references - scientific research publishing*. Available at: https://www.scirp.org/(S(czeh2tfqw2orz553k1w0r45))/reference/referencespapers.aspx?referenceid=3061608 (Accessed: 04 July 2023).

ACKNOWLEDGMENT

This research would have not been possible without all the respondents who spent their precious time who we interviewed providing valuable insights into the study. Last but not least, we would like to express our appreciation to our supervisor, Head of the Department, families and friends for their unwavering support during our academic careers. Once again, we would like to express our gratitude to everyone who helped us to accomplish our project.

AUTHOR BIOGRAPHIES

DN Bandulahewa is an undergraduate following BSc in Logistics Management (Supply Chain Management) Degree programme at General Sir John Kotelawala Defence University. Currently he is undertaking his internship which is a six-month training at MAS Areli Pvt. Ltd Sri Lanka for the degree completion.

EASS Edirisinghe is an undergraduate following BSc. in Logistics management (Supply Chain Management) at General Sir John Kotelawala Defence University. Currently she is undertaking her internship which is six-month training at ASL Logistics CMB Pvt. Ltd Sri Lanka for the degree completion.

ASP Ilangasekara is a Lecturer in the Department of Management and Finance, Faculty of Management, Social Sciences and Humanities, in General Sir John Kotelawala Defence University, Sri Lanka. He has previous experience in Assistant Managerial and Executive roles in Construction and Shipping industry. His present research interests are on sustainable supply chains, supply chain resilience and digitalization.