FINTECH, AND BLOCKCHAINS TRENDS IN THE FINANCIAL SECTOR

Editors:
Rishikaysh Kaakandikar
Keshav Kaushik
Priya Tiwari
Surekha Suresh Ningule

Bentham Books

Fintech, and Blockchains Trends in The Financial Sector

Edited by

Rishikaysh Kaakandikar
Department of Management
Zeal College of Engineering and Research Narhe
Pune, India

Keshav Kaushik
Amity School of Engineering and Technology
Amity University Mohali
Punjab, India

Priya Tiwari
Dr D. Y. Patil Institute of Management and Research
India

&

Surekha Suresh Ningule
Department of Management
Siddhant Institute of Business Management
Pune, India

Fintech, and Blockchains Trends in The Financial Sector

Editors: Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari and Surekha Suresh Ningule

ISBN (Online): 978-981-5256-83-3

ISBN (Print): 978-981-5256-84-0

ISBN (Paperback): 978-981-5256-85-7

First published in 2024.

need for a court order if at any point you breach any terms of this License Agreement. In no event will any delay or failure by Bentham Science Publishers in enforcing your compliance with this License Agreement constitute a waiver of any of its rights.

3. You acknowledge that you have read this License Agreement, and agree to be bound by its terms and conditions. To the extent that any other terms and conditions presented on any website of Bentham Science Publishers conflict with, or are inconsistent with, the terms and conditions set out in this License Agreement, you acknowledge that the terms and conditions set out in this License Agreement shall prevail.

Bentham Science Publishers Pte. Ltd.
80 Robinson Road #02-00
Singapore 068898
Singapore
Email: subscriptions@benthamscience.net

CONTENTS

PREFACE

"Fintech, and Blockchains Trends in The Financial Sector" by Bentham Science is a brainchild of Dr. Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari, Surekha Ningule. This book also examines many features of block chains in economic systems and investing methods in cryptocurrency markets. It approaches the subject first from a conceptual and theoretical standpoint, then from an assessment and investment one. Furthermore, it investigates the benefits and drawbacks of cryptocurrency taxes and the political ramifications, such as cryptocurrency speculation regulation. The book is intended for economics and finance professors, financial professionals and students. Big thanks to all our co-authors, who as experts in their own domains, for sharing their experience and knowledge. This book is an attempt to compile their ideas in form of chapters and shared with the world. This book provides insights into Blockchain, FinTech, Blockchain applications, Cryptocurrency, Finance. The book will be helpful for Undergraduate and Postgraduate students, Researchers, Academicians, and Industry people. We would like to thank the contributors to this book for their smooth collaboration and Bentham Science Publishers.

Rishikaysh Kaakandikar
Department of Management
Zeal College of Engineering and Research Narhe
Pune, India

Keshav Kaushik
Amity School of Engineering and Technology
Amity University Mohali
Punjab, India

Priya Tiwari
Dr D. Y. Patil Institute of Management and Research
India

&

Surekha Suresh Ningule
Department of Management
Siddhant Institute of Business Management
Pune, India

List of Contributors

Akshita Kapoor	University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India
Arnav Sharma	University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India
Bhupinder Singh	School of Law, NMIMS Deemed to be UNIVERSITY, Chandigarh Campus, India
Chanakya Lahiri	Zeal Education Society's, Zeal Institute of Business Administration Computer Application & Research, Department of Computer Science, Pune, India
Don Charles	Department of Economics, University of the West Indies, Point Fortin, Trinidad and Tobago
Ishita Nanda	University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India
P. K. Paul	Department of CIS, & Information Scientist (Offg.), Raiganj University, 733134-India
Roohi Sille	University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India
Rajesh Kumar Kashyap	Zeal Education Society's, Zeal Institute of Business Administration Computer Application & Research, Department of Computer Science, Pune, India
Samyukta Sahoo	University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India
Sanket L. Charkha	Savitribai Phule Pune University, Pune, Maharashtra, India
Siddhant A. Kale	Savitribai Phule Pune University, Pune, Maharashtra, India
Swati Verma	Department of Mathematics, School of Science, OP Jindal University, Raigarh (C.G.), India
Shilpa Dhanaji Vishvas	Siddhant College of Management Studies, Sudumbre Chakan- Talegaon Road 410109, India
Sarita Kumari	Siddhant College of Management Studies, Sudumbre Chakan- Talegaon Road 410109, India
Sanmay Kumar	Dr Vishwanath Karad MITWPU, India
Sagar O. Manjare	Siddhant Group of Institutions, A/p. Sudumbare, Pune, India
Surekha Ningule	Siddhant Group of Institutions, A/p. Sudumbare, Pune, India

CHAPTER 1

A Systematic Review on Recent Trends of Digital Financial Inclusion

Roohi Sille[1,*], Ishita Nanda[1], Akshita Kapoor[1], Samyukta Sahoo[1] and **Arnav Sharma[1]**

[1] *University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India*

Abstract: Digitalization and related processes have become prevalent in the last few years. In this chapter, we have examined and discussed the main aspects of digital transformation, their impact on the financial sector, challenges faced and scope of digital finance *etc*. Financial technology has become increasingly prominent in financial markets in recent years, though this cannot be attributed to the competence of regulators and policymakers as to this call. Fintech can, however, demonstrate its importance as a tool and strategy for achieving inclusive development by attesting to what it has already achieved in the realm of financial inclusion and disruption of traditional market structures. It is now much easier to have basic financial services in India, due to the vast adoption of digital payment systems.

The FinTech ecosystem in India has been aided by a number of factors like the growing availability of smartphones, increased internet access, demonetization and Covid outbreak. The financial industry is full of new innovations that can be applied in a variety of ways to the fields of artificial intelligence and block chain. They all aim to satisfy ever-evolving customer needs generated by the digital revolution. There is also a discussion of the obvious positive advantages of the application of the latest technological solutions. Payment systems facilitate entrepreneurs to easily and affordably connect with their banks, employees, suppliers, and new markets for their services. Reduced travel time and costs can speed up the process of registering and paying for business licenses and permits using these systems. While the situation is improving, entrepreneurs and employees still face challenges due to a lack of banks, digital devices, and reliable technology infrastructure.

As a result of technological advancement, today's underground economy can provide a favourable breeding ground for hiding a broad range of illegal activities which include cyber threats like phishing, ransomware fraud, and tax evasion. The financial sector is constantly innovating. The industry today places significant emphasis on transaction speed, along with security. The process begins with clients who demand immediate payment transactions and ends up with large corporate trade transactions where time and transparency of the action become core requirements. The digital advancement and

* **Corresponding author Roohi Sille:** University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India; E-mail: rsille@ddn.upes.ac.in

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

financial literacy will help customers find smarter and better ways to save, borrow, invest, and make payments. With consumers becoming savvier, there will be an intense new battle between incumbents and challengers to become their trusted interface.

Keywords: Blockchain, Covid-19, Demonetisation, Digital payments, ERP (enterprise and resource planning), FinTech, Financial inclusion, MSMEs, NFT (Non fungible token).

INTRODUCTION

Financial technology has made it easier to access finance. It is continuously providing alternative solutions and a variety of business models that could potentially replace traditional banking practices. FinTech revolutionize certain financial services in such a way that they deliver current financial products and services in novel ways. In parallel with the proliferation of start-ups, these firms provide more specialized services that are often more affordable, faster, and more convenient than traditional banks.

In the past, individuals with high economic status or wealth could only access certain services. As an example, let's look at the investment field. Now that investment advice is easily accessible and cheaper, the public can receive it more easily. In other words, what was previously only open to a certain group of people is now available to all. In terms of lending, this is another example. Until recently, lenders could only assess risk using limited data sources. This results in many people not being approved for loans or paying excessive interest.

Finance companies are nowadays using multiple sources of information while analyzing consumers. As a result, public exposure has been boosted. Through Fintech, it is possible to obtain an installment loan online even if you have a below-average credit score. World Bank data shows that 31% of adult populations are unbanked. Individuals who do not have access to a bank account or credit institutions are considered to be in this category. Such individuals tend to save their money under their mattresses. Individuals cited the difficulties of accessing financial institutions, the expense of opening an account, and a lack of documentation as reasons for not opening accounts.

The advent of FinTech allowed, for the first time in modern history, a variety of individuals from different socioeconomic levels to access essential financial services.

Adoption of Technology in Finance

It has been ages since financial systems have expanded, from the introduction of Credit Card, ATMs, online wallets, and bitcoins to the inclusion of savings, credit, investments, and insurance. Since then, the inclusion of technology in finance has enabled citizen service providers to offer quality services at low prices to urban and rural areas. Introducing FinTech into the financial services industry can lead to more efficient and inclusive business models and an expansion of the pool of service providers. It is also widely recognized that FinTech can turn the financial system into one that is more inclusive and stimulate economic growth.

Through financial inclusion, a large segment of the rural population can develop a culture of savings, broadening the resources of the economic system and contributing significantly to development. Further, financial inclusion permits low-income groups to participate in the formal banking sector, effectively protecting their wealth and resources. Financial inclusion also prevents vulnerable populations from being exploited by usurious money lenders by making formal credit easily accessible.

Fintech start-ups and banks are two opposing forces that continue to compete for market share as technology becomes more integral to the finance industry. The term FinTech refers to an emerging digital technology that allows for more efficient and automated delivery of financial services. The FinTech industry focuses on developing and delivering financial products and services in an innovative way through leveraging technology. Their potential for reshaping the financial services and financial inclusion landscape in the world is immense, and they are a critical part of achieving universal growth and widespread prosperity.

Due to the digitization of data, assessing the creditworthiness of individuals and MSMEs is becoming easier, faster, and less expensive. Banks can now provide pre-approved loans on the basis of this data. The number of FinTech companies operating in the digital lending area has risen due to the huge potential for business.

In 2019, India and China had the highest FinTech adoption rates (87%) (See Table **1**), while the average global adoption rate was 64%. As of 2017, India was still doing better than the average global FinTech adoption rate of 33% when the above index was created for the first time.

Money transfer and payments are the most commonly used FinTech services at 96% (see Table **2**). Comparatively to the global average, adoption in all other categories is also higher. Higher adoption rates of FinTech in 2019 are mostly due to higher rates or fees, easier setup of an account, access to a broader range of

CHAPTER 2

A Blockchain Solution for Cross-Border Payments

Don Charles[1,*]

[1] *Department of Economics, University of the West Indies, Point Fortin, Trinidad and Tobago*

Abstract: A blockchain can be described as a network of computers that is used to digitally and immutably record transactions. Digital currencies, also referred to as tokens, can be used on blockchain to make payments. Blockchain has the potential to facilitate cross-border payments, as well as trace all transactions. This is an admirable property, especially since the rise of know-your-customer (KYC), counter financing of terrorism (CFT), and anti-money laundering (AML) requirements have been cited by many banks as the primary reason for them terminating their correspondent banking relationships (CBRs).

The main objective of the research paper is to explain how blockchain can be used to facilitate cross-border payments.

Banks and money transfer organizations (MTOs) can adopt blockchain and distributed ledger technology (DLT) to enable cross-border payments. The most practical option would be to take the route of using a Payment as a service (Paas) provider and outsource the payment services.

The Paas provider's application processing unit (API) can be integrated with the financial institutions payment systems. Therefore, when a payer attempts to may a cross-border payment, on the bank end, the API will contact the Paas' server to initiate the transaction.

The payer's local currency will be converted to a token, then transferred across the blockchain to the payee's bank. The token will then be converted to the payee's local currency, and deposited in the payee's bank account. This entire process will take a few minutes in contrast to the traditional CBR cross-border payment process that takes 5 days or more.

Keywords: Blockchain, Cross-border payments, Money transfer organizations.

[*] **Corresponding author Don Charles:** Department of Economics, University of the West Indies, Point Fortin, Trinidad and Tobago; E-mail: doncharles005@gmail.com

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

INTRODUCTION

Individuals and organizations desire to transfer funds as effortlessly as they can send an email. What is stopping them? One reason is that the international payments system can be inefficient and expensive. The transactions which involve different currencies can require processing by multiple intermediaries. This processing can take days or weeks to complete. Additionally, transaction processing by middlemen presents opportunities for the middlemen to charge ridiculous fees, which in turn can increase the cost of processing.

For every cross-border transaction, the parties to the transaction must have their records on separate ledgers. In other words, the sender of the funds must have a ledger, and the receiver of the funds must have a ledger recording the transaction. In the traditional banking system, the recording of the transaction is done manually. This process can involve many steps, which in turn presents scope for errors, as well as processing delays.

In recent years, blockchain has been drawing attention due to its potential to eliminate the middlemen that perform manual processing, as well as the potential to improve efficiency and transparency through shared distributed ledgers, also called a blockchain.

A blockchain is a digital record of transactions across a network. The transactions are stored in blocks. The blocks are connected to form a chain, hence the term blockchain. A blockchain is distributed, thus allowing the data to be shared with all the users across the network. Additionally, a blockchain is immutable, therefore once a transaction is verified, it can't be changed.

Thus, a blockchain can be described as a digitally generated, immutable record of transactions. It is a network of computers that is used to record transactions. Digital currencies, also referred to as tokens, can be used on blockchain to make payments.

Blockchain has the potential to facilitate cross-border payments (Casey *et al*., 2008), trade finance, and financial reporting and compliance. It can also simplify the know-your-customer (KYC) process, and affect capital markets. This is an admirable property, especially since the rise of KYC, counter financing of terrorism (CFT), and anti-money laundering (AML) requirements have been cited by many banks as the primary reason for them terminating their correspondent banking relationships (CBRs).

Indeed, in the aftermath of the 2008 global financial and the 2010-2011 Eurozone crises, several regulatory jurisdictions have strengthened their financial sector

regulation. Regulated banks that fail to comply with the KYC, CFT, and AML requirements are often faced with hefty fines. Therefore, many global banks have responded to this enhanced regulation challenge by de-risking, and terminating their CBRs offered to banks that are deemed to be too risky.

This de-risking challenge has affected several banks in the Caribbean region. While this de-risking reduced the risk exposure for the global banks, the Caribbean banks that lost their previous CBRs are challenged to find new and more expensive CBRs. This in turn affects the services offered to customers, especially remittances, and cross-border payments.

However, this paper specifically focuses on blockchain's applications in payment systems. Alternatively expressed, the main objective of the research paper is to explain how blockchain can be used to facilitate cross-border payments.

The sub-objectives are to:

1. Examine the scope of de-risking in the Caribbean.
2. Explain in detail how blockchain can be used to facilitate cross border payments.
3. Provide policy recommendations for the development of a system that uses a blockchain network to enable cross-border payments.

FACTORS AFFECTING DE-RISKING

De-risking refers to the situation where banks, facing enhanced regulations by respective financial authorities, choose to terminate or restrict business relationships with other categories of clients to avoid the risk of penalties for allowing the financing of terrorism or money laundering. The phenomenon of de-risking and the termination of correspondent banking relationships (CBRs) is driven by factors related to compliance and business costs. Many big banks choose to terminate CBRs rather than trying to manage the risk of small banking and other financial clients.

There are four key areas banks must address with their anti-money laundering compliance program:

Know Your Customer

This is where banks collect a customer's information and verify its accuracy to ensure that a customer's digital identity matches their real-world identity. This

CHAPTER 3

Cryptocurrencies as Financial Assets A Cross-Section

Rajesh Kumar Kashyap[1,*] and **Chanakya Lahiri**[1]

[1] *Zeal Education Society's, Zeal Institute of Business Administration Computer Application & Research, Department of Computer Science, Pune, India*

Abstract: This book chapter provides an extensive insight into the world of Cryptography and Stock Market 2.0 as is seen through crypto itself and the perspectives of the consumers who actively participate in them, as it nearly slides itself to the top to replace the financial assets as we know it. It provides a vivid conceptual use and utilization block chain technology in the field of of crypto whether it be for making an impact in the current security issues or the entire currency based side which controls the entire international stock and trade crypto markets and could one day even topple governments if not regulated with caution and maintenance. We would also dive into the depth of the covid19 crisis and how it gradually impacted the rise of crypto currencies and attached assets in a cloud environment integrated with the block chain technology, helped gather attention of consumers who were trying to find a solution for their more digital alternative to acquiring assets and currency based secure crypto transactions in the financial markets as well. We also get to cover the details on the concepts, essentials and implementations of cryptography and cryptographic algorithms and patterns and why it is needed in the modern cloud-computing world. The integration with advancements of cloud computing devices and detailed implementation could benefit the entire technological field. It also talks about the features cryptography brings and how it influences the speed of response time, which in a cloud environment is the most crucial especially in a high-pressurized demanding environment and its structures and layers like edge computing as well. The vulnerabilities and the proposed way of solving those are also discussed, the various nature where cryptography is essentially needed for maintaining a secret key involving sensitive data exchange overall at large scale, even when the flexibility of cloud computing is challenged. It has also taken into account the various factors involving the deployment and the standard guidelines established as more emerging technologies adapt to the environment. As the world keeps improving, the thieves get smarter, so does the justice department. Algorithms keep improving and so do the devices with it.

Keywords: Bitcoin, Block chain, Crypto, Crypto wallet, Crypto prices, Crypto currencies, Ethereum, Exchange, Mining, Market, Nft, Stock, Security, Token.

[*] **Corresponding author Rajesh Kumar Kashyap:** Zeal Education Society's, Zeal Institute of Business Administration Computer Application & Research, Department of Computer Science, Pune, India;
E-mail: rajdlw@gmail.com

INTRODUCTION

This book chapter should cover all the basic topics in relation to Cryptography in general and through the cloud environment, its advantages and disadvantages. It should give an overview on the idea of Cloud computing and its many benefits and vulnerabilities. It should also address methodologies to solve those vulnerabilities through the power of cryptography and its many benefits. Encryption and Decryption being the central piece of hiding data around which the whole architecture floats. Nothing that exists on the internet could be done without the gateway and the servers to provide it. Cloud computing just brings a more speedy and safer approach to the entire situation, as the technological world faces the greatest of developments through the power and scalable nature of the cloud. There are of course others waiting to get a chance to infiltrate the system to gather data. It would definitely cover the nitty gritty details on how financial assets are viable these days in the world of crypto, its vulnerabilities and profit or loss rate and how manipulation of the entire market may cause serious inflations of the overall currency or asset quantity.

As of January 2021, a survey from the German company specializing in data 'Statista' indicated there are over 4.66 billion number of active users of internet worldwide which covers an approximate of 59.5% of the entire population of the globe, with a significant number of users actively participating the usage of internet through their mobile devices as well. It is now safe to say, the world has never advanced as much as it has now through the help of technology and the power of the internet. There is an increasing and demanding nature for the transfer of billions of bytes of data across several platforms and corners of the world hitting the servers at an unprecedented rate. The global penetration rate in relation to northern European statistics covers 96% of internet penetration rate amongst their population. With the demand for faster loading times and quicker response times, it was only a matter of time until cloud came into the play. Cloud, unlike any other forms of internet service, has set its entire focus on speed and flexibility above all others. Its focus is primarily fixed on delivering their content over the internet remotely to the clients with features to help with scalability even at large scale. With an annual or monthly pay as you utilize charge the variation of flexibility between the cloud computing companies is unmatched against any other alternatives. Especially the business owners or separate clients who focus on growing their businesses quickly and rapidly can focus their entire time on their products rather than fixate themselves on improving the standards of the server qualities and response times. They could also reap numerous special customized services offered by the cloud platforms in order to benefit their specialized focused businesses. The ability to not have tremendous finances to start a business but still have the computing points to deliver the top quality service and scale at

large when needed stands out from the rest of the global marketplace service providers altogether. Even the expenditures for their organizations is significantly lower in the long term when considering a cloud based approach being more agile and flexible and designed for enterprises. Keeping that in mind, and having the agenda to protect user data as top priority, complex algorithms were developed in order to give the thieves a run for their money. Cryptography according to modernization could be described as the beautiful art of writing and solving codes making objects hidden or translucent and less vulnerable to any kind of attacks by self or third-party authorities. It existed even from ancient Egypt as the dialects for the king's tombs or other important areas in the town center indicated symbols rather than a language itself.

The bottom line is that although, understandably, the cryptocurrencies (Motsi-Omoijiade, 2018) and Initial Coin Offerings are limited and hence worth a lot of value, it is noted that it could disrupt the standard market just like the internet did in the 1990s. It is good to consider them as a financial asset keeping in mind their general volatile nature and take into consideration the most common pitfalls for investors.

CLOUD SECURITY CHALLENGES AND PRIVACY MEASUREMENTS

While cloud computing offers significant benefits and utilizes modern security standards, its expanding reach necessitates heightened security measures. As costs decrease and adoption increases, more data is entrusted to cloud storage, attracting potential attackers (*e.g.*, malicious actors on the dark web). This highlights the critical need for robust cloud security practices.

Data breaches can occur due to misconfigurations by service providers, inadequate internal controls, or a lack of a comprehensive cloud security strategy. These weaknesses can empower insiders and create vulnerabilities within the system.

The Cloud Security Alliance (CSA) offers a solution through its Cloud Controls Matrix. This standardized approach provides a framework for establishing strong cloud security environments and preventing security specification leaks.

Cloud technology have to be based around the foundation of transactions to handle the volatile nature of cryptocurrencies, especially when it comes to the fact that cryptocurrencies are used as financial metric standards to measure a person's wealth in nanosecond differences as per market statistics. The speed and momentum at which at node gets transferred from one valuation to another needs the rapid cloud storage as a whole. If the currencies follow one channel of communication, then when at the point of attack the currency may be affected and

CHAPTER 4

Blockchain Technology and Future of Triple Entry Accounting (TEA) System

Sanket L. Charkha[1,*] and **Siddhant A. Kale**[1]

[1] *Savitribai Phule Pune University, Pune, Maharashtra, India*

Abstract: This research utilizes a single descriptive technique to analyze and compare the perspectives of various scholars on triple-entry accounting (TEA). The rise of blockchain technology has undoubtedly spurred discussions on the potential merits of transitioning to TEA. While TEA itself hasn't been widely adopted, there's a growing debate regarding the value of such alternative accounting methods. Implementing TEA presents challenges, but exploring its potential offers significant knowledge advancement.

Considering these factors, the study examines three emerging accounting scenarios: (i) Robust accounting software built on double-entry accounting (DEA), (ii) the convergence of blockchain and TEA, and (iii) the impact of disruptive technologies beyond blockchain and TEA. Finally, the research proposes a basic design for a hypothetical TEA information system, facilitating real-time organizational activity comprehension. To conclude, the study establishes a trending cycle for financial reporting technologies, empowering global organizations to select the most relevant financial statement preparation technologies.

Keywords: Blockchain, Challenges, Double Entry Accounting, Triple Entry Accounting.

INTRODUCTION

Double-entry accounting, established by Fra Luca Bartolomeo de Pacioli (as referenced in MacKinnon, 1993; Mann, 1994; Perry, 1996), has been the foundation of modern financial accounting. This system offers companies advantages such as accurate financial reports and reduced errors/fraud. However, inherent trust issues arise as managers control the internal system, limiting transparency for external stakeholders like shareholders and governments.

[*] **Corresponding author Sanket L. Charkha:** Savitribai Phule Pune University, Pune, Maharashtra, India; Tel: +91 97674 19373; E-mail: charkha.sanket@gmail.com

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

External audits aim to verify financial information, but current methods are expensive and time-consuming. Additionally, research by The Association of Certified Fraud Examiners (ACFE, 2018) highlights their limitations: only 4% of global fraud losses in 2017 were detected by auditors. Fraud often involves concealment strategies beyond the initial act (ACFE, 2018). Therefore, enhancing accounting transparency is crucial to deter fraud.

Efforts to Increase Transparency

Initiatives like International Financial Reporting Standards (IFRS) promote financial market transparency, fostering global confidence, economic growth, and stability (IFRS, 2019). Integrated reporting, a framework for combining financial and non-financial information in a comprehensive report (de Villiers, Rinaldi, & Unerman, 2017; Rinaldi, Unerman, & de Villiers, 2018), is another recent development.

Furthermore, regulations governing auditor accountability are becoming stricter. However, significant progress in information transparency hinges on addressing the fundamental trust gap between internal and external stakeholders.

Blockchain and Triple-Entry Accounting

Prior to Bitcoin's emergence in 2009, a novel accounting approach seemed impractical. Bitcoin's core innovation lies in facilitating value transfer without a central authority (Brown, 2015). This technology, known as blockchain, utilizes a distributed and shared ledger to enable "decentralized" transactions. Every network participant holds a complete and constantly updated copy of the transaction log, eliminating the need for additional verification. Initially used for currency, blockchain's applications (Nakamoto, 2008) have expanded to other domains, including accounting, leading to the resurgence of the "triple-entry accounting" concept.

In 1989, accounting theorist Yuji Ijiri (Ijiri *et al*., 1989) introduced the concept of "triple-entry accounting." This system proposed expanding traditional double-entry bookkeeping by incorporating an additional data layer called "trebit." Trebit aimed to capture information explaining fluctuations in a company's income. The goal of this innovation was to equip businesses with more dynamic financial insights, ultimately enhancing their strategic decision-making capabilities.

In 2005, financial cryptographer Ian Grigg offered a distinct interpretation of "triple-entry accounting" in his working paper. Unlike Ijiri's focus on momentum accounting, Grigg emphasized the potential of blockchain to create a secure, third-party verified record for each transaction.

A key aspect of blockchain transactions involves a shared, digitally signed receipt (Fig. **1**). This concept, introduced by Ian Grigg, emphasizes the receipt itself as the transaction. Secured by cryptography, it deters fraud and eliminates the need for redundant internal record-keeping.

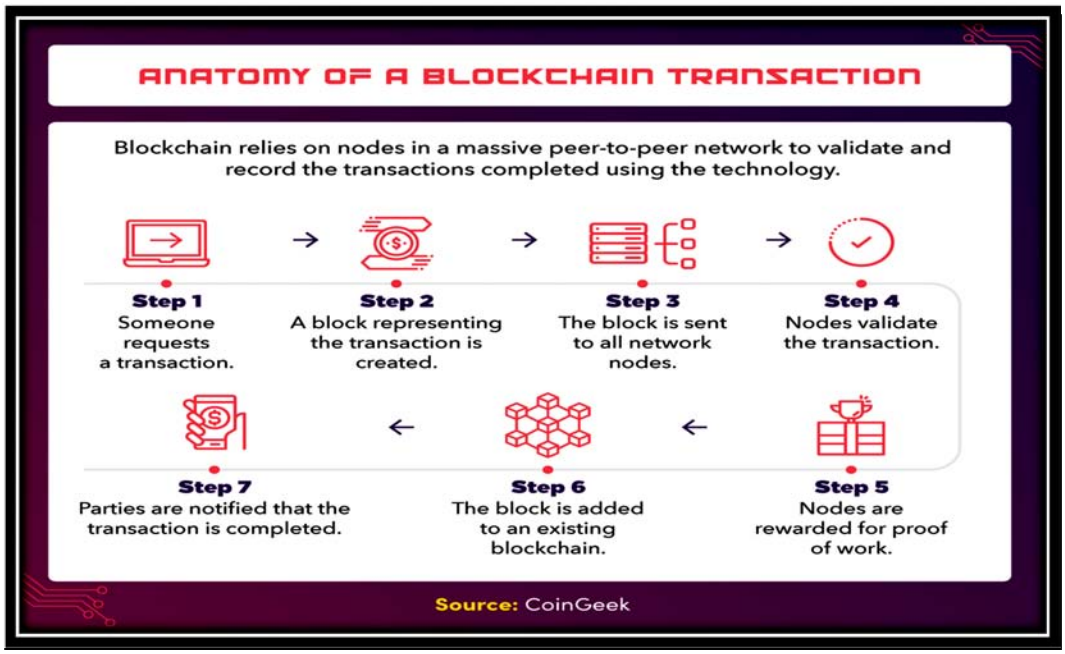

Fig. (1). Anatomy of a Block chain Transaction.

In 2014, Jason Tyra, writing in Bitcoin Magazine, recognized the potential synergy between Grigg's approach and the emerging field of triple-entry accounting. He argued that this combination would benefit both businesses and external users (Coyne, 2017). This perspective has become widely accepted, with "triple-entry accounting with blockchain" now the standard term.

The potential of this integration is significant. A 2016 industry report predicted it could revolutionize accounting practices (Deloitte, 2016). Bridging the gap between theory and application, blockchain engineers are actively developing solutions. Examples include initiatives like Request Network and Balance.

While the potential for disruption in accounting is undeniable, limited academic research has been conducted on this topic. This study aims to explore potential applications of blockchain technology within the framework of triple-entry accounting.

CHAPTER 5

Restoring Consumer Privacy and Healthcare Delivery: Effectiveness of Blockchain Technology

Bhupinder Singh[1,*]

[1] *School of Law, NMIMS Deemed to be UNIVERSITY, Chandigarh Campus, India*

Abstract: Across the globe effective healthcare management and its delivery is of prime concern. Governments generate and maintain infrastructure for healthcare and its facilities ensuring every citizen to receive the basic and advanced treatments. There have been significant advances with regard to delivery of healthcare to populations, irrespective of their economic status. Handling and security of medical records and data belonging to patient is a major concern for hospital managements. Privacy of patient's personal information and statistics are important but can be scattered and fragmented leading to ineffective health service and as malpractice in delivery. The Constitution of India, 1950 contains various fundamental rights for its citizens and foreigners. As per Article 21, the right to life and personal liberty is considered as one of the fundamental right entitled to every citizen without discrimination on basis of religion, race, socio-economic conditions. In addition, the right to health and medical care also falls under Article 21 *via* judicial pronouncement. Good health is significant for all and include factors like- life-style, food habits, hygiene, sanitation and healthcare facilities *etc*. Explanation of these factors are relevant to understand the core concept of patient's privacy for medical and healthcare. Relevancy of blockchain technology in patient's privacy has become much significant because hospital's system of record keeping may be vulnerable to cyber-attacks and frauds. Thus, introduction of blockchain technology in hospitals ensures safety and security of data and medical records. The access to data is available to patient, the network members and the hospital management to timely update and provide availability whenever required. To achieve this aim, there is a need of legal framework which intends to secure medical records and statistics. This article aims to discuss relevancy of blockchain technology in securing patient's privacy with regard to hospital's healthcare delivery and its management.

Methodology

Blockchain technology is helpful in securing and handling patient data where in the information stored is impossible to theft, hack or changed. Timely healthcare delivery

[*] **Corresponding author Bhupinder Singh:** School of Law, NMIMS Deemed to be UNIVERSITY, Chandigarh Campus, India; E-mail: talwandibss@gmail.com

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

to all is the need of hour and blockchain technology can provide easy access to secure and comprehensive data and patient's medical record. This article shall examine and analyses various international documents, national provisions, hospital management, books, legislations, reports, articles concerning to blockchain technology and patient's privacy.

Keywords: Big Data Analytics, Blockchain Technology, Patient Privacy, Hospital Management, Legal Provisions.

INTRODUCTION

"Health is Wealth". It is considered as a fundamental right of every citizen of the country. The World Health Organization (WHO) define health as "a state of complete physical and mental wellbeing and not merely absence of disease or infirmity". The Constitution of India in 1950 constituted fundamental rights for its people, citizens and foreigners. "The right to life" and 'Personal Liberty' is considered as one of the fundamental right as per Article 21 available to all without discrimination on the basis of religion, race and socio-economic conditions. Every citizen is entitled for emergency care and advanced treatment. Doctors and hospital staff are responsible to provide health services and care to all which include patients physical, mental handling the safety and security of data/ medical records from being leak/ counterfeit. The concept of Blockchain Technology (BT) helps in prevention of threats thus ensuring the security for enhancing the privacy of patient's (Thakur *et al.*, 2020) medical records. There are discrepancies and gaps in maintaining patient's medical records which make it difficult to improve and availability of healthcare delivery. Massive resources are available for providing health facilities to all but still, the healthcare infrastructure lacks behind due to asymmetricity of patient's information. There are major hurdles in terms of leverage full use of healthcare (Agbo *et al.*, 2019) resources following insufficient and non-adequate medical data of stakeholders. In the light of these challenges, BT these can help as a conceptual model for enhancing integration of India's healthcare services. For the universal health coverage, BT is being used for eliminating disparities of health services. This technology can be utilized to strain resources efficiently and effectively enabling governmental agencies to plan and enforce core health programmes with aadhaar number and biometric access. Health data and statistics can be secured *via* cloud-based and time-stamped provide timely healthcare services.

The objective of this paper is to propose significant policy framework and regulations concerning privacy of patients and structures to be adopted in the healthcare sector. The traceability of existing legal provisions and development of new for the protection of patient's medical data is desired to be the duty of healthcare sector ensuring safety of personal data of individuals which have being

given medical treatment or for research purpose. The data stored by the healthcare institutions for extended time and the chances of its hacked by the potential hackers for misuse shall be brought to minimal. As the healthcare sector in India is growing and the existing infrastructure making all efforts to be equal to the international standards, this paper takes into consideration to existing legal system available for the safety of data and medical records. Privacy of the individual is important and the relationship of doctor and patient is significant. This doctor-patient relationship is based on mutual trust where both the treatment and opinion matters for the patient. Past medical history and new data in context to the treatment containing sensitive data can be regulated through BT.

GOOD HEALTH: MEANING AND SIGNIFICANCE

Good health is significant for all encompassing factors like life-style, food habits, hygiene, sanitation or healthcare facilities *etc.* Life-style includes daily work and leisure activities. These activities put both positive and negative impact on one's physical and mental health. Work related stress hampers good health and long sitting job significantly increased the health hazards on musculo-skeletal, physiological and psychological wellbeing. Fig. (**1**) shows relevancy of BT to upheld privacy of patient.

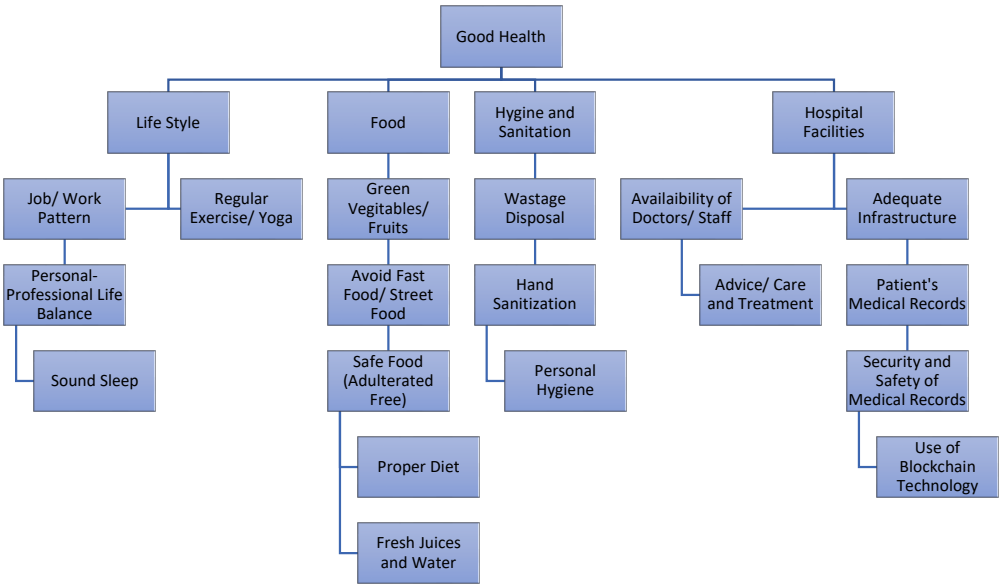

Fig. (1). Good Health Classification.

CHAPTER 6

Digital Forensics: Using Blockchain in Cryptocurrency Investigations

Swati Verma[1,*]

[1] *Department of Mathematics, School of Science, OP Jindal University, Raigarh (C.G.), India*

Abstract: Blockchain technology, a distributed ledger system, offers a secure and verifiable way to validate transactions without a central authority. Its applications extend beyond finance, impacting the Internet of Things, big data, cloud computing, and edge computing. Notably, blockchain can enhance the trustworthiness of artificial intelligence by providing a tamper-proof record of training data.

In the realm of electronic evidence, ensuring its integrity is critical. Evidence needs protection from alteration or destruction to be admissible in court. This concept, known as the Chain of Custody, involves meticulously documenting evidence handling chronologically.

The Chain of Custody establishes a clear record of all steps taken by investigators to preserve evidence integrity. It's crucial because tampered evidence becomes unreliable. Blockchain technology, with its secure database structure utilizing hashing and block storage (like Bitcoin and other cryptocurrencies), can significantly improve the Chain of Custody process. By tracking data access and maintaining an immutable record, blockchain can bolster the accuracy of evidence presented in court.

Bitcoin is the foremost cryptographic cash that strikes a chord while managing blockchain. The lousy information is that the damage related to the blockchain will not end in Bitcoin. There is bounty more cryptographic types of cash and approaches to utilize them illicitly. The uplifting information is, regulation authorization has dependably advanced to illuminate even the most excellent innovation violations, which implies that tackling digital currency wrong doings is certainly a query of time utilizing proper association of apparatuses and out of the field considering.

This chapter provides policing demanding situations of investigating; evidencing and prosecuting prepared cybercriminals for the crimes devoted the use of cryptocurrencies, blockchain together with Bitcoin. This work is a result of collaboration with some of stakeholders the policing and judicial environment with the goal of investigating and

[*] **Corresponding author Swati Verma** Department of Mathematics, School of Science, OP Jindal University, Raigarh (C.G.), India; E-mail: swati.verma@opju.ac.in

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

prosecuting the brand new era of organized cybercriminals. Concrete situations of the use of Bitcoins in a variety of cybercrimes have been evolved as a part of this undertaking and the gadgets have been analyzed to extract proof to help prosecution of organized cybercriminals.

Keywords: Artificial Intelligence, Bitcoin, Blockchain, Cryptocurrencies, Chain of Custody, Digital Forensics.

INTRODUCTION

The digital landscape is undergoing a significant transformation fueled by two groundbreaking technologies: blockchain and artificial intelligence (AI). Blockchain has emerged as a revolutionary platform for secure and transparent data management, while AI is rapidly transforming industries with its ability to learn, analyze, and make intelligent decisions. This paper delves into the core functionalities of both these technologies and explores the exciting possibilities that arise from their potential integration.

Blockchain: A Distributed Ledger Revolution

At its core, blockchain technology operates on a system of interconnected blocks that chronologically store information. Each block contains data relevant to a specific transaction (*e.g.*, financial exchange, product ownership record) along with a unique timestamp and a cryptographic hash linked to the preceding block. This creates an immutable and tamper-proof chain of records. Here's a closer look at the key characteristics of blockchain:

Unalterable Records

Data stored on a blockchain is permanent and cannot be modified or erased. This creates a verifiable and enduring record of transactions, promoting trust and transparency within a network.

Enhanced Visibility

All transactions on a blockchain are accessible to authorized participants, providing a clear audit trail and minimizing the risk of fraudulent activities.

Distributed Control

In contrast to traditional systems with a single central authority, blockchain networks are spread across a network of computers. This decentralization makes them resistant to censorship or manipulation.

Cryptographic Safeguards

Blockchain utilizes cryptographic hashing to ensure data integrity. Each block possesses a unique hash, and any alteration to the data would cause a change in the hash, making tampering readily identifiable.

Artificial Intelligence: The Power of Machine Learning

Artificial intelligence (AI) represents a vast field of technologies that empower machines to exhibit human-like intelligence. Machine learning forms the foundation of AI, enabling algorithms to learn and improve their capabilities through data analysis. Here are some of the key capabilities of AI:

Pattern Recognition

AI algorithms can identify patterns in vast amounts of data, enabling them to make predictions and classifications.

Data Analysis

AI can process and analyze complex datasets, extracting valuable insights that might be missed by humans.

Decision Making

AI systems can be trained to make intelligent decisions based on the data they have learned from.

Automation

Artificial intelligence (AI) excels at automating repetitive tasks. This frees up human workers to focus on higher-level, strategic endeavors. By handling routine activities, AI can significantly improve efficiency and productivity.

The impact of AI is already being felt across various industries, from healthcare and finance to manufacturing and transportation. As AI continues to evolve, its capabilities are expected to become even more sophisticated.

The Intriguing Intersection of Blockchain and AI

The convergence of blockchain and AI presents a unique opportunity to address challenges and unlock new possibilities in various domains. Let's explore how these technologies can empower each other:

CHAPTER 7

A Study of Impact of Digital Technology and Use of Blockchain Technology from the Consumer Point of View

Shilpa Dhanaji Vishvas[1,*] and **Sarita Kumari**[1]

[1] *Siddhant College of Management Studies, Sudumbre Chakan- Talegaon Road 410109, India*

Abstract: This chapter explores the impact of blockchain technology on consumers, delving beyond its association with cryptocurrencies. Blockchain, a distributed ledger shared across a computer network, securely stores digital data. While cryptocurrencies like Bitcoin popularized blockchain as a secure platform for transaction records, its potential extends far wider. Businesses and investors are recognizing blockchain's disruptive potential in various sectors, including finance, governance, smart contracts, the Internet of Things, and the sharing economy.

However, for many consumers, blockchain remains synonymous with cryptocurrencies. These digital currencies are often seen as a subset of alternative currencies and, more specifically, digital currencies. Consulting firms predict that by 2025, blockchain will become a significant technological platform. Though research on blockchain is ongoing, with a focus in engineering and finance, few studies consider the consumer perspective. Neglecting this perspective creates an incomplete picture of such a revolutionary technology. After all, consumers are the lifeblood of the economy, making their experience crucial in understanding any business innovation.

Keywords: Bitcoin, Blockchain, Cryptocurrency, Digital Technology.

INTRODUCTION

One of the foundational technologies shaping various industries is blockchain. It utilizes decentralized databases and peer-to-peer networks to create a secure record of transactions, cryptographically linked together (Kokina, J., Linton, J., & McGovern, T., 2017). Essentially, a blockchain acts as a shared, distributed ledger that facilitates digital transactions across a user network and tracks ownership of any associated assets, tangible or intangible (Iansiti, M., & Lakhani, K. R., 2017).

[*] **Corresponding author Shilpa Dhanaji Vishvas** Siddhant College of Management Studies, Sudumbre Chakan-Talegaon Road 410109, India; Tel: 9096503554; E-mail: vishvasshilpa6@gmail.com

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

While academic research exploring the impact of blockchain on marketing and branding remains limited (Hughes, A., Park, J., & Kietzmann, J., 2019; Morkunas, V. J., Paschen, J., & Boon, E., 2019; Montecchi, L., Garcia-Sanchez, A., & Chouk, I., 2019), recent years have witnessed a surge in blockchain-based applications and platforms across diverse sectors, including financial services, retail, and airlines (Kokina, J., Linton, J., & McGovern, T., 2017; Casino, R., 2024).

Cryptocurrency is a very broad topic in the realm of money, but we should attempt to improve the world by comprehending it. Knowing the risks associated with holding cryptocurrency after learning about the risks and legal concerns facing this industry is the goal of choosing this topic on ownership challenges and legal issues.

The Foundational Characteristics of Blockchain Technology

Blockchain technology emerged as a solution to the "double spending problem" inherent in digital transactions. Traditionally, digital assets like money could potentially be spent twice because copies sent electronically lack unique identifiers (Hawlitschek, Notheisen, & Teubner, 2018).

The term "blockchain" first appeared in the foundational white paper published by Satoshi Nakamoto in 2008. This work described blockchain as a cryptographic chain of data blocks underlying a cryptocurrency system. Essentially, it's a distributed digital ledger that securely stores transaction records (Pilkington, 2016). This ledger comprises a continuously growing list of data structures called "blocks."

When a new user joins a blockchain network and initiates a transaction (like a financial exchange), they receive a copy of all previously recorded data (Risius & Spohrer, 2017; Tapscott & Tapscott, 2017). Once verified by the network, the transaction receives a unique identifier and is added as a new block to the chain's end. Each completed block, containing a set of transactions, is then distributed to other users, forming a chronological chain – the blockchain (Crosby, Pattanayak, Verma, & Kalyanaraman, 2016; Risius & Spohrer, 2017). This interconnected series of blocks utilizes public-key cryptography to secure the transactions (Van de Velde, Cecchetti, Eren, & Mehigan, 2016).

FOCUS ON MARKETING AND BRANDING RELEVANCE

While the passage provides a good overview of blockchain technology, it delves more into the technical aspects. To give a fair and comprehensive portrayal rele-

vant to marketing and branding, the focus should shift towards exploring how blockchain can be used to:

- Enhance brand transparency and customer trust through secure and verifiable transactions.
- Develop innovative marketing campaigns and loyalty programs leveraging tokenization and smart contracts.
- Improve data security and customer privacy within the marketing and branding domain.

These are just a few examples, and further research can be conducted using the mentioned databases ("Business Source Premier," "ABI/INFORM Global," "Web of Science," and "Scopus") with keywords like "blockchain marketing," "blockchain branding," "customer experience," and "data privacy."

Consumer behavior (Zohar *et al.*, 2018) is the study of how individuals interact with and make choices about goods and services. In recent years, digital technology has ushered in an era of profound transformation, fundamentally altering how we connect, create, and consume. This phenomenon, known as digitalization, is believed to have a significant impact on society, businesses, and our personal lives.

Digitalization acts as a democratizing force, impacting both businesses and consumers. New technologies transcend limitations of size and reach, making them accessible even for smaller businesses. These businesses, despite potential financial uncertainties, are increasingly investing in technology and fee-based platforms to remain competitive (Rishel, W., & Burns, J. M., 1997).

The rise of "MarTech," a blend of marketing automation and technological solutions, is a prime example (Cvitanović, 2018). It fosters improved connections and interactions between businesses and consumers. However, MarTech also alters consumer expectations, shifting the dynamics of brand interactions and necessitating adjustments to outreach strategies (Treiblmaier & Strebinger, 2008).

Marketing Disruption with Blockchain Technology

Built on peer-to-peer communication, blockchain technology disrupts traditional business models by facilitating disintermediation. This means removing middlemen who process and validate data, often adding unnecessary costs and complexities. Blockchain can revolutionize customer connections from a consumer perspective by:

CHAPTER 8

Blockchain Technology Vis-à-Vis Financial Sector*: A Contemporary Review & Policy Framework in Indian Context*

P. K. Paul[1,*]

[1] *Department of CIS, & Information Scientist (Offg.), Raiganj University, 733134-India*

Abstract: Blockchain Technology is an emerging technology in the areas of Information Technology field and applicable in the process of the keeping the records on business as well as other transactions. Blockchain Technology is enhancing financial and business sector rapidly. Blockchain is primarily known as a tool and gradually become a technology and even treated as a field of study as 'Blockchain Technology'. Blockchain is perform only by the registered members with permission to cattle immediate, shared and completely transparent information. Changes of blockchain can be noted in tracking orders, payments, accounts, and production and here all the transaction details can be visible to end users time to time. The requirements of the blockchain in financial sectors is enhanced in the areas *viz*. financial transfer, added security systems, automation and data storage, digital identity verification, credit reporting and so on. Along with blockchain crypto currency is important form of emerging IT in financial sector. Worldwide there is a boom on blockchain Technology applications in different financial and business areas and in India too there are healthy potentialities of its implementation. However there are issues and concern of blockchain in financial systems and management. This chapter is about blockchain specially its nature, types, and opportunities available in the financial sectors emphasizing India. Chapter also illustrates about the challenges and issues of Blockchain Technologies in financial areas especially in Indian context.

Keywords: Cryptography, Emerging Information Technology, Financial Technologies, Indian Digital Economy.

INTRODUCTION

Blockchain Technology is a kind of encrypted record of data and particularly works on the distributed database. And such database is basically deals with the data of transaction, contract. Blockchain is fully lies on distributed database and it

* **Corresponding author P. K. Paul** Department of CIS, & Information Scientist (Offg.), Raiganj University, 733134-India; E-mail: pkpaul.infotech@gmail.com

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

is an independent record. In Blockchain Technology digital ledger is prime and this is being accessible in various kinds of platforms, and not bound to be in a particular place. Blockchain Technology has many financial activities and directly and partially helps in promoting digital currency such as bitcoin transactions. It is worthy to note that tangible and intangible assets can be tracked or recorded in a particular network and ledger of Blockchain. Due to its role and requirement Blockchain is being considered as tool, technique and procedure in respect of financial management and business transaction management. Blockchain Technology in recent past becomes a field of study and gaining popularity as an academic program internationally. Blockchain Technology can prompt financial transaction effectively and there is no need of any third party, and in absence of third party Blockchain Technology can be utilized in data encryption. In Blockchain registered participants don't share any personal data hence data can be keeps as encrypted. Data breach is another feature of Blockchain which is significantly reduces the data breach means getting information illegally or without any consent. In Blockchain Technology multiple number of shared copies are exists in the database and it automatically helps in challenging to wage a data breach attack *i.e*. simply the cyber attack. As Blockchain is dealing with the feature of fraud resistant therefore it is having the potentiality to revolutionize business and financial sector advanced, sophisticated and transparent. This one is also efficient compare to other traditional business process and technology management.

There are different segments in Blockchain *viz*. smart contract, digital currency, securities and record keeping here (Fig. **1**) is depicted whole aspects briefly. Blockchain has increased its feature day by day due to its importance. Here it is worthy to note that this technology is needed in different types of ledger based data management. Here all the data are blocked together and one by one. Decentralized data management is an important factor in Blockchain systems as depicted in Fig. (**2**). Blockchain is useful in some of the Financial concern such as transferring money, adding transaction related securities, automation and digitalization through smart contracts, regarding customer data storage.

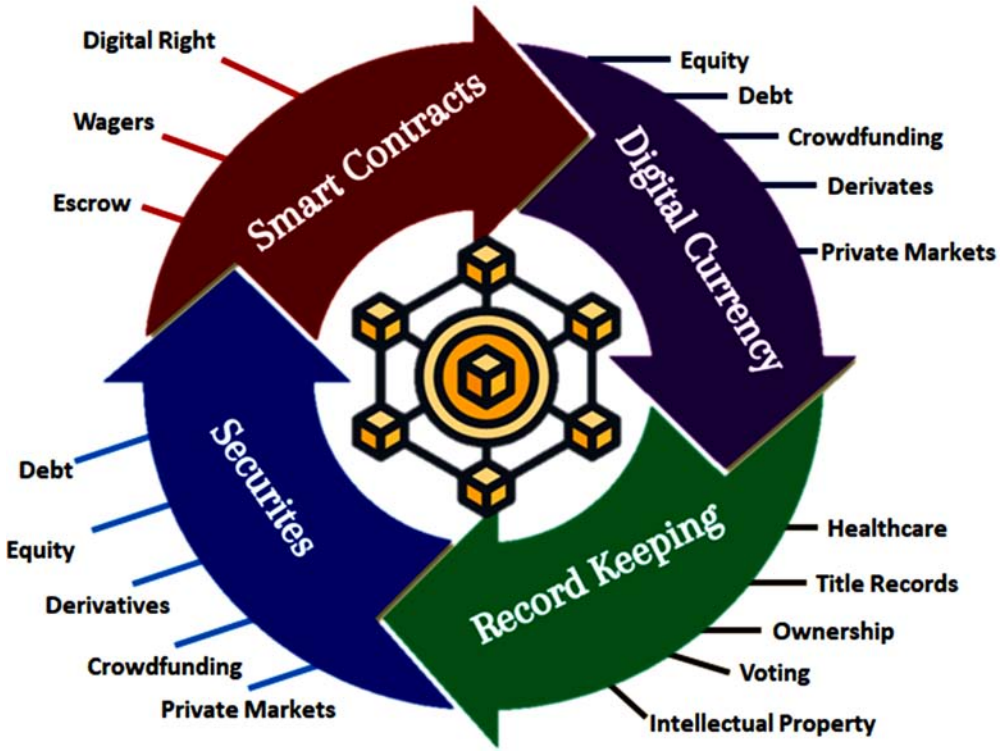

Fig. (1). Blockchain technology and sectorwise beneficiaries.

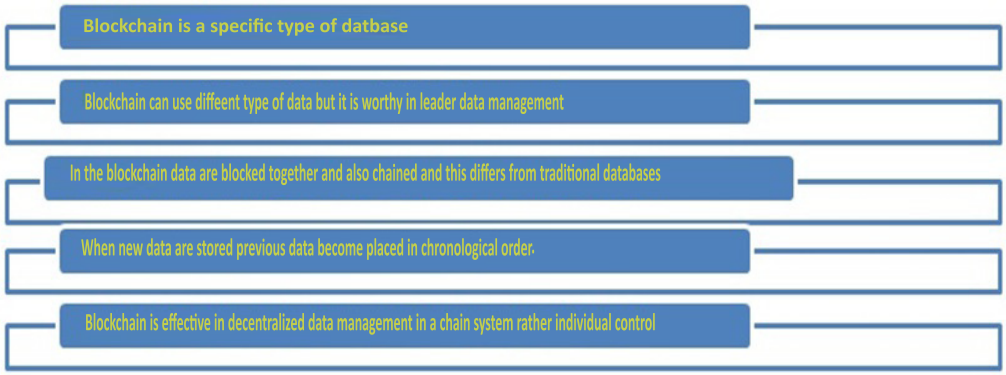

Fig. (2). Features of Blockchain.

CHAPTER 9

DeFi - A Case for the Indian Economy: A Systematic Literature Review and Research Directions

Sanmay Kumar[1,*]

[1] *Dr Vishwanath Karad MITWPU, India*

Abstract: Decentralized Finance - DeFi - challenges the role of traditional financial intermediaries in providing financial services of loans, brokerage and banking. An evolutionary movement accessible to anyone with mobile and internet has grown from $4Bn to $104Bn in the last five years.

DeFi is the intersection of FinTech *(Financial Technology)* and RegTech *(Regulatory Technology)*. DeFi has the potential to reduce transaction costs and bring financial inclusivity to a larger level and create new opportunities in modernizing finance.

As the regulations for cryptocurrencies are a bit murky in India, this paper aims to put forth a case of Decentralized finance through a standardized systematic literature review based on different tiers of micro, meso and macro levels. Through different sections of the paper, we introduce Decentralized Finance, compare it to the prevalent Centralized Financing and look forward to the challenges and opportunities in bringing DeFi to mainstream services in India.

Keywords: Blockchain, Decentralized Finance, DeFi, Literature Review, Research Directions.

INTRODUCTION

Nakamoto (2008) introduced the Bitcoin blockchain – the first decentralized, consensus-governed cryptographic block. The main objective of the Bitcoin Blockchain was to eliminate financial intermediation and intermediary and replace it with a code-based, openly transparent, and accessible financial system.

[*] **Corresponding author Sanmay Kumar:** Dr Vishwanath Karad MITWPU, India;
E-mail: 1212210039@mitwpu.edu.in

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

The blockchain ecosystem through cryptocurrency has evolved as many players have emerged into the market. A Turing script language – Ethereum, Buterin (2013), provided a practical implementation of the first 'smart contracts'. Ethereum laid the technical foundations for Decentralised Finance — code-based agreements without human intervention. Decentralised Finance, popularly known as DeFi, has gained immense traction in developing economies. It mimics the functions and services of existing financial intermediaries with substantially more transparency and openness. The features are attributed to the foundations of decentralized apps (dApps) and protocols and enforce contracts and agreements through codes. The agreements are supported by 'Smart Contracts' – the backbone of DeFi protocols and agreements (Schär, 2021). Smart Contracts are relatively small applications but consistent large validations increase the transparency of the protocols allowing agreements to be enforced by code and transactions to be conducted in a secure and verifiable manner.

DeFi aims to overcome the challenges faced by traditional financing activities. Traditional Financing, as we know, is plagued with inefficiencies concerning high transaction costs and restrictions on the line of credit. Through the systematic literature review, the paper aims to identify key peer-reviewed papers and bridge gaps in the literature based on three research questions (RQ):

RQ1) How can DeFi literature be structured systematically and what systems did the scholars focus on? RQ2) What features of the ecosystem can be integrated with the Indian economy? RQ3) How does DeFi differentiate itself from Traditional Finance? RQ4) Moving forward, what is the scope of future research?

The paper offers contributions in five key areas - i) Micro-level: research based on the components of DeFi. ii) Meso-level: Understanding the role of DeFi in financial inclusivity and microfinancing activities. iii) Macro-level: Understanding the ecosystem of DeFi on the whole and the role it plays in International Trade and Decentralized Exchange. iv) Differentiating DeFi from Traditional Finance v) Understanding the risk looming over the DeFi ecosystem. The paper is structured as shown in Fig. (**1**); Section 2 provides the background to DeFi and the research methodology employed. Section 3 presents a literature framework answering questions RQ1 and RQ2. Section 5 presents the risk associated with DeFi. Section 6 suggests future research avenues for DeFi with respect to the Indian economy. Section 7 discusses the limitations and concludes the paper.

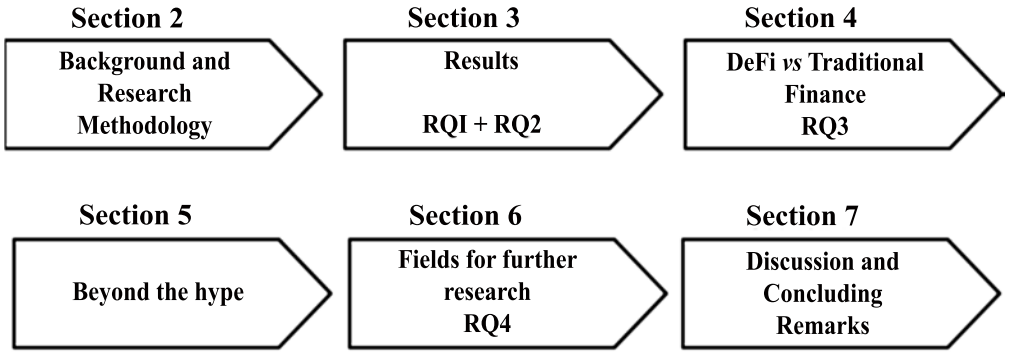

Fig. (1). Section wise Paper structure.

BACKGROUND AND RESEARCH METHODOLOGY

Defining 'DeFi'

While decentralization may seem like a new concept, its roots trace back to the early-mid 1800s. Tocqueville claimed centralization brought governance while decentralization empowered individuals (Janara, 1998).

DeFi is based on several scholars' definitions – refers to a set of protocols built on the framework of i) 'smart contract-based' and 'tokens' (Zetche *et al*., 2020; Gudgeon *et al*., 2020; Jensen *et al*., 2021). ii) The framework is 'trustless' – without the need for intermediaries (Chen & Bellavitis, 2020; Kumar *et al*., 2020; Werner *et al*., 2021) and iii) developed on 'permissionless, public blockchains'

Smart Contracts

Blockchains implement smart contracts enabling transparent peer-to-peer lending in a transparent way without the need for financial intermediaries (Ojog, 2021). Schär (2021) emphasized programmatically enforced agreements providing complex financial services. Similar strategies were noticed in non-smart contract-enabled frameworks of price building of Bitcoin or crypto-asset trading strategies.

Trustless

Cryptocurrencies were invented to replace the traditional method of a centralized exchange, but, on the contrary, undermined their own aim of dis-intermediation (Zamyatin *et al*., 2019). The role of Decentralized Finance – DeFi comes into action but with a lower amount of intermediation through stablecoins and third-party backed digital currencies (Congo *et al*., 2019).

CHAPTER 10

Review of Cryptocurrencies as Financial Assets

Sagar O. Manjare[1] and **Surekha Ningule**[1,*]

[1] *Siddhant Group of Institutions, A/p. Sudumbare, Pune, India*

Abstract: A cryptocurrency is a type of digital money used as a medium of exchange over a computer network that is not always backed and maintained by a country's central bank or government. Since the introduction of Bitcoin in 2009, hundreds of different "cryptocurrencies" have been created and accepted for a variety of transactions in top online marketplaces, the "sharing economy," as well as more conventional retailers, producers, charities, and political organisations. This paper will take a thorough look at the qualities of cryptocurrencies as financial assets. We talk about how crypto generates value, as well as trading and information platforms. Then we look at crypto-currencies as alternative financial assets, looking at their returns and how they interact with bitcoin and each other. We assess their inclusion to investors' portfolios and demonstrate that, due to their small co-movements with existing assets as well as with each other, they can certainly improve portfolio diversity. In addition, we assess three pure crypto-currency portfolios: an equally weighted, a value-weighted, and one based on the CRIX. The CRIX portfolio has a lower risk than any of the tradable crypto-currencies individually. We also keep track of how the crypto-currency sector is evolving. A growth in market value is accompanied by increased liquidity, and a rising number of cryptos are contributing bigger sums to the total crypto market capitalization. (Determining the value, size, or quality of) Bitcoin's role and influence are the emphasis of this chapter. Techno-Indians are discussing, investing, and owning Bitcoin at a time when India is at its most technologically advanced in history. This article is the outcome of an investigation on the current and potential role of Bitcoin in the Indian economy (the process through which individuals make, trade, and purchase goods). New definitions argue that cryptocurrency is a replacement for fiat currency. The attention of legal/law-based entities is focused on cryptocurrencies because of the global interest in it (now under different control). In another country, it is seen as distinct and distinct. The status of bitcoin in India is now being tested/evaluated. As a result of this study, it is determined that bitcoin is neither a money or legal tender under Indian law, but rather a product that may be traded.

Keywords: Assets, Cryptocurrency, Currency, Digital, Economy, Finance.

[*] **Corresponding author Surekha Ningule:** Siddhant Group of Institutions, A/p. Sudumbare, Pune, India; E-mail: surekhaningule201s@gmail.com

Rishikaysh Kaakandikar, Keshav Kaushik, Priya Tiwari & Surekha Suresh Ningule (Eds.)

INTRODUCTION

Coins that employ cryptography (encryption) to produce money and verify transactions are known as cryptocurrencies. To produce new currencies, "mining" is used to add transactions to a public record known as a Transaction Block Chain (TBC) (Gao *et al*., 2018). Individuals and financial institutions throughout the world are familiar with, use, and exchange a wide variety of cryptocurrencies, including Bitcoin. Decentralized digital currency based on blockchain technology and protected by encryption is known as cryptocurrency. Blockchain, decentralization, and cryptography are three concepts that must be grasped in order to comprehend Bitcoin fully. By introducing entirely virtual assets, Satoshi Nakamoto's development of Bitcoin in 2008 fundamentally changed the nature of finance worldwide (Fanusie & Robinson, 2018). In less than ten years, not only has the original Bitcoin technology advanced from a technical proof-of-concept to a reliable and serious investment asset, but the underlying blockchain technology has also gained popularity, and hundreds of new cryptocurrencies have been developed and are currently being traded. Cryptographic claims currently make up a complete asset class for other types of investments, with a wide variety of possibilities, replacing virtual assets as the exclusive alternative investment.

In a nutshell, a blockchain in the context of cryptocurrency is a digital record that can only be seen by those who have been granted access by the relevant authorities. Assets such as money, real estate, and even intellectual property are all tracked in this ledger. Cryptocurrencies have been around for almost 20 years (Penedo, 2020). A forerunner of Bitcoin, "bit gold," was created by Nick Szabo in 1998 and may be dated back to that year. Before bitcoin, there was a cryptocurrency called "bit gold." In 2008, Satoshi Nakamoto (unknown person or group) published a paper outlining the concept that would soon form the foundation of the cryptocurrency known as Bitcoin. Nearly a thousand cryptocurrencies may currently be traded on the internet. There was a $100 billion total market value for all cryptocurrencies as of 2017 (Guo *et al*., 2017). Companies that want to keep up with and cater to the new generation of millennial clients who are particularly fond of cryptocurrencies will need to get a thorough understanding of how cryptocurrencies function and how the industry is changing as a whole. Blockchain technology has been adopted widely and quickly, in part due to the open-source nature of Bitcoin, which has its source code made accessible to the public on GitHub.com and a free software license that permits derivative works (Noyen *et al*., 2014). The Bitcoin idea may be imitated, modified, and experimented with by computer programmers all over the world, leading to the development of a number of competing cryptocurrencies (altcoins). This has led to the development of a healthy ecosystem that permits several experiments in the development of digital currencies.

Global cryptocurrency traders have benefited from the altcoin boom by making bets on these currencies' regularly changing prices or investing in alternative assets free from government interference. According to Elendner *et al*. (2018), a number of altcoins, including Ethereum, Ripple, Dash (formerly Darkcoin), Namecoin, and others, have considerably assisted the development of digital currencies as a whole. For instance, Namecoin incorporates a decentralized Domain Name System, while Ethereum provides a Turing-complete programming language that enables the creation of smart contracts. Dash also offers blockchain transaction anonymity. Initial Coin Offerings have been used by cryptocurrency developers to commit outright scams, with the creators vanishing after raising funds from the public. According to bitcointalk.org, Edgecoin is an example of an Initial Coin Offering (ICO) fraud since the organizers changed their initial ICO notice to one that claimed they had been hacked. In the meantime, several cryptocurrencies have been created with bad intentions, such as stealing users' private keys or personal information by installing malware and trojans onto altcoin wallets. On the other hand, the prevalence of freeloaders and fraudsters is not a sign of a fundamental weakness in the asset class; rather, it is a product of the early market's rapid growth and the involvement of many inexperienced participants (Böhme *et al*., 2015). After all, stock frauds were widespread when the first joint-stock companies initially offered their shares to the public, and today's counterfeiting problems still affect real currencies. Who would, however, rule out the possibility of investing in stocks and currencies?

There has been an epidemic of COVID-19, and there is a potential that it might be transmitted through banknotes and coins. As a result, digital currency has become a topic of intense debate. According to a credible review, the market environment has undergone a monumental transformation, and as a result, the trading instruments available today are designed to simplify transactions to the greatest extent possible. Because it was the first unit of accounting, money provides a clear method for determining and communicating value. Cash is the most basic unit of accounting. From the time of trade to metal and coins, to gold and silver, continuing through contemporary monetary systems and checks, and culminating with the most recent worldwide cash advancements, such as the presentation of digital forms of money known as Bitcoin and Ethereum and alike, we have come a long way. Every sort of money has played the role that is necessary for it in monetary transactions over the course of time. In any event, because of the ever-increasing prevalence of computer technology, there was a demand for ever-more-complicated instruments for the trading of goods. In this way, the introduction of digital forms of money has disrupted the global installment framework to an extent that is unfathomable. Cryptographic methods are employed for the purpose of providing safety in a digital currency, which is a sophisticated kind of technology. But despite their benefits, digital currencies also have certain

SUBJECT INDEX

C

D

E

F

G

H

I

L

M

O

P

R

S

T

W

Rishikaysh Kaakandikar

Prof. Rishikaysh Kaakandikar has 12 years of teaching and 1 year of industrial experience. He is currently working as associate professor at SBIIMS Pune. He has been engaged at SBIIMS as finance faculty. He has also published more than 40 Research papers in different ABDC, Scopus, UGC-approved, and UGC Care List Journals. He has also authored books in the field of management. He has attended several guest lectures, seminars, workshops.

Keshav Kaushik

Prof. Keshav Kaushik is an accomplished academician, cybersecurity, and digital forensics expert currently serving as an assistant professor at the Amity School of Engineering and Technology, Amity University Mohali, Punjab, India. His scholarly contributions are extensive and impactful, with over 135 publications to his credit. This includes 25 peer-reviewed articles in SCI/SCIE/Scopus-indexed journals and 50+ publications in Scopus-indexed conferences. He has one granted patent and six published patents, alongside five granted copyrights. His editorial expertise is showcased by publishing 30 books and 25 book chapters, further cementing his reputation as a thought leader in the field. He is a Certified Ethical Hacker (CEH v11) by EC-Council, a CQI and IRCA Certified ISO/IEC 27001:2013 Lead Auditor, a Quick Heal Academy Certified Cyber Security Professional (QCSP), and an IBM Cybersecurity Analyst. His recognition as a Bentham Ambassador by Bentham Science Publishers and his role as a Guest Editor for the IEEE Journal of Biomedical and Health Informatics underscore his influence and authority in cybersecurity. He is a dynamic speaker, having delivered over 50 national and international talks on cybersecurity and digital forensics topics. With a career marked by significant achievements and a profound impact on cybersecurity and digital forensics, he continues to inspire and lead in both academic and professional circles.

Priya Tiwari

Prof. Priya Tiwari is a finance post graduate and holds master's in business administration with a Ph.D. in financial management. She has more than 11 years of academic and 2 years of industry experience. She has worked as an IQAC coordinator and research coordinator. Currently, she is working as an assistant professor at D.Y. Patil Institute of Master of Computer application and Management under Savitribai Phule Pune University. She has written two books on management courses and developed a module for university. She has published a patent and more than 15 research papers in national and international journals. She has attended and organized various conferences and FDPs at management institutes. She has been invited as resource person for Ph.D. coursework and holds the position of conference secretary at national and international conferences. She is on the reviewer board of an international publication house journal. She has guided several research and internship projects. She is also actively involved in various academic activities of Savitribai Phule Pune University.

Surekha Suresh Ningule

Prof. Surekha Ningule, a science-savvy HR whiz at Siddhant Institute of Business Management, ignites minds with 6+ years of teaching experience. Her unique background, blending a M.Sc. in physical chemistry with an MBA in HR, bridges the gap between scientific analysis and people management. This empowers her to develop well-rounded business leaders prepared to tackle complex challenges in the real world. Dr. Ningule's passion extends beyond the classroom, with over ten research papers published in UGC-listed journals, contributing valuable insights to the field of human resource management.