Transformations Through Blockchain Technology

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Editors

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The New Digital Revolution

Springer

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ISBN 978-3-030-93343-2 ISBN 978-3-030-93344-9 (eBook)
https://doi.org/10.1007/978-3-030-93344-9

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Blockchain has come a long way ahead ever since its inception by Satoshi Nakamoto. Blockchain is more than just a novel decentralized technology. It is also an emerging technology that disrupts and revolutionizes almost all sectors of our society, in financial sector, industry, and institutions. Blockchain is a distributed software network that serves as a digital ledger and a means for transferring assets securely without involving any third party. Blockchain and decentralization can help to solve most of the industry's challenges, among others, interoperability. There are several different types of blockchain available today. Some blockchains were created to cater the demands of a small group of people with limited access to the network, while some are designed without any restriction where anyone throughout the world can join and use the blockchain network when needed. These are examples of permissioned blockchains, or private blockchains, and public blockchains. Irrespective of the type of blockchain, blockchain technology has the potential to alter centuries-old business structures, opening the path for increased government legitimacy and new possibilities for regular individuals to flourish.

This book *Transformations Through Blockchain Technology* familiarizes the reader with the detailed knowledge of blockchain technology and how this technology is transforming different sectors of society. This book provides a comprehensive knowledge about various cutting-edge research areas involving blockchain technology and decentralization. It serves as a connecting medium involving various domains and blockchain technology. This book facilitates sharing of information, case studies, theoretical and practical knowledge required for blockchain transformations in various sectors.

This book further focuses on the concepts of the technology and how blockchain technology can work in an integrated manner with other existing technologies to transform the society. This book serves as an interesting knowledge sharing medium to discuss the major areas that are impacted by blockchain technology. The book is divided into various chapters, and a brief summary of the chapters is presented as below.

Chapter: Revolutionising the Approach to Smart Campus Architecture Through IoT and Blockchain Technologies.

This chapter proposes a novel architecture framework for IoT and blockchain applications deployed within a smart campus environment, comparing the main technologies involved. This framework is tested in the usability scenario of Higher Education Smart Certification system for issuing authentic, verifiable, and sharable student credentials. The results of this study are particularly useful in the context of developing countries seeking to achieve and maintain relevant safety and security standards.

Chapter: Transforming Education Through Blockchain Technology.

The chapter defines the major issues and challenges in front of digital world along with the specific leakages all around the computing environment. The reason blockchain technology is the primary consideration for present and future digital platforms is that through blockchain one can learn how to protect all essential credentials digitally in a suitable manner and establish commutation services across the globe with the management of higher level of security, privacy, and confidentiality.

Chapter: Development of a Blockchain-Based Survival Game for Blockchain Education.

Blockchain applications provide many potential use cases for organizations and businesses. However, the complexity of blockchain technology has limited its adoption in addressing real-life problems. Gamification provides a visual approach for reducing complex concepts into easily understandable contents. This chapter of the book provides gamification of the main concepts in the blockchain using a closed system such that participants can generate and exchange assets and record their activities in a transparent and tamperproof ledger.

Chapter: Integrating Blockchain with Education: Proposed Model, Prospects, and Challenges.

Blockchain is one of the most important emerging technologies which is aimed at decentralization. In this work, we apply the concepts of blockchain to solve the problems faced by the Indian education sector. We propose a model for credit management and a blockchain-based certificate management system. The proposed work aims to incorporate the newly emerging educational institutes and various initiatives which lack any certified creditability. Using our system, such initiatives can be integrated and approved by higher authorities, thereby allowing students to claim what they have learned.

Chapter: Towards a Distributed Record of Measurement Adapters Powered by Blockchain Technology.

Scope, resolution, and coverage of distributed data collectors are a current challenge. Data interoperability in a heterogeneous context is a concern. Real-time data collection systems use measurement adapters (MA) like semantic bridges for fostering data interoperability. This work proposes a distributed record of MA based on blockchain technology for articulating direct and indirect data transmissions among measurement adapters. It provides an open-source library implementing the described functionality.

Chapter: Blockchain Technology: A Breakthrough in the Healthcare Sector.

Technological innovations rapidly changed the healthcare sector from stages of drug development to patient care. Despite these, many challenges need to be

addressed. To provide solutions, blockchain technology is an effective way with its enhanced security features. This chapter deals with the latest applications of blockchain technology in various health domains, problems resolved by blockchain in the health sector, with its future perspectives.

Chapter: Digital Transformation of Healthcare Sector by Blockchain Technology.

The chapter deals with key features such as introduction to blockchain, its key elements, life cycle, and technologies using blockchain. This chapter focuses on applications, benefits, and challenges of blockchain in the healthcare sector. It enables readers to answer some significant questions such as how blockchain can transform the health sector, what is the advantage of using BCT in the healthcare sector? Is it essential to apply blockchain technology in the healthcare sector? What is the role of blockchain in a pandemic such as COVID-19?

Chapter: A Systematic Review on Blockchain in Transforming the Healthcare Sector.

This chapter presents a comparative analysis of the work carried out by various researchers to provide solutions for enhancing the healthcare system. Some have focused on providing complete user control for sharing their own health records whereas other have given importance to enhance interoperability of data globally and to secure the sensitive data of patients. Using smart contract can lead to seamless connectivity.

Chapter: Blockchain Technology for Contact Tracing During COVID-19.

This chapter analyzes how blockchain technology can be exploited to develop contact tracing applications that guarantee the security of users' privacy. First, the general concepts underlying blockchain technology are introduced, and then practical cases of use of this technology in various fields are analyzed. Finally, practical cases of application of blockchain technologies for contact tracing in the Covid-19 pandemic are analyzed.

Chapter: Transforming Healthcare Sector in India Through Blockchain Technology: Challenges and Opportunities from Legal Perspectives.

This chapter aims to address the techno-socio-legal aspects and implications of blockchain technology in the healthcare sector. It engages inter alia with diverse medical practices and major health insurance models exploring the viability of Blockchain 4.0. It further engages and evaluates the socio-legal challenges which are potential impediments for the acceptability of this technology. Finally, the chapter recommends the possible adaptation mechanism by which the technology may integrate with law and society in the healthcare sector of the Global South, especially in India.

Chapter: Smart Contracts in Blockchain Application: Review Chain.

In the form of ratings and reviews, many e-commerce and other digital sites allow for greater consumer participation. A recent study has highlighted the importance of this feedback, confirming that positive feedback increases product sales and therefore popularity. Managers of online portals are in charge of overseeing the whole evaluation process. Online operators have the ability to tamper with legitimate reviews, and in the worst-case situation, they may prevent users from leaving evaluations if it has a negative impact on sales. Our focus will be on limiting the

digital site operators through the use of smart contracts and decentralized apps with storage, allowing all customers to give and observe unrestricted data.

Chapter: Blockchain Technology Transforms Digital Marketing by Growing Consumer Trust.

Today, digital marketing allows companies to enhance their marketing strategies and to establish global marketplaces, as well as drive further demand for their products and services. In this vibrant market, blockchain technology has emerged to enable better customer journeys. In this chapter, we discuss how blockchain technology can impact a company's digital marketing efforts, contributing to market engagement and empowering a customer-driven paradigm. Furthermore, we discuss how blockchain technology promotes digitalization, assists in preventing fraud, strengthens trust and transparency, and allows for better privacy protection while also enhancing security.

Chapter: Blockchain Technology: Unlocking the Business Model Maze for Evolving Businesses and Start-Up.

Blockchain technology has received notable recognition with bitcoin since 2008. Contrary to the popular notion that blockchain can only revolutionize the financial sector, it is capable enough to bring revolution to the business models irrespective of industry nature, size, ownership, geographic location, etc. This chapter aims to explore and establish successful application of blockchain solutions in developing business models for well-established business units and startups as well, in the field of health care, supply chain, energy, e-governance, and crypto currency.

Chapter: Transformation of Logistics Value Chain for Enhancing Cross-Border Trade Using Blockchain and IOT.

Cross-border shipment has always been a tedious process because of a lot of paperwork and manual human intervention by various stakeholders of the entire process, for example customs authorities, freight forwarders, buyers, sellers, transporters, etc. The authors have tried to optimize the process by integrating blockchain technology into the process of cross-border trade ultimately making the process more secure and robust.

Chapter: Rural Logistics Transformation Through Blockchain.

The concept of rural logistics encompasses transport, distribution, storage, material handling, and the packaging of goods in rural areas, as well as the flow of information and funds in support of rural production and consumption. This chapter researches the possibility of the development of sustainable rural logistics and supply chain management through decentralized data storage represented by blockchain technology. Blockchain can increase the efficiency and transparency of the supply chain and positively affect all logistic processes, from storage to delivery and payment. The goal of this chapter is to explore the possible use of blockchain technology in logistics processes and to identify the impact of blockchain technology on business transparency.

We hope you find this book interesting and enjoy delving deeper into the varied aspects of the book and enjoy reading and learning about the transformations through blockchain technology. This book would not be possible without the involvement of many people. We owe our gratitude and sincere "Thank You" to our

contributors and reviewers without whose support this would not be achieved. Much appreciation goes to our authors, and we are obliged to the reviewers for their comments which improved the quality of the book. Last but not least, thanks to God for showing us the light to start this project and blessing us to complete it.

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