European Economic Letters
ISSN 2323-5233
Vol 14, Issue 4 (2024)
http://eelet.org.uk

Blockchain Adoption in Law and Banking: A Pathway to Innovation and Efficiency

-Anubha Srivastava[1]
Assistant Professor, School of Law, CHRIST (Deemed to be University), Bangalore-560099, Email ID: anubha.srivastava@christuniversity.in

-Ruchi Lal[2]
HoD, School of Law, Manav Rachna University, Faridabad, Haryana, Email ID: hodlaw@mru.edu.in

-SupernaVenaik[3]
Associate Professor, School of Law, Manav Rachna University, Faridabad, Haryana, Email ID: supernavenaik@mru.edu.in

Abstract
Blockchain technology, initially launched to support Bitcoin by someone or a group known as "Satoshi Nakamoto," has swiftly expanded its applications beyond just serving as a cryptocurrency platform. It was first conceived as a method for conducting financial transactions in a decentralised and secure manner. However, blockchain's distinctive qualities—such as being unchangeable, transparent, and allowing for decentralised consensus—have drawn the interest of sectors like law and banking, where these characteristics are highly valued. [1]As blockchain technology evolves, it's becoming increasingly clear how to provide innovative solutions for addressing longstanding inefficiencies in legal and financial contexts.
This article investigates the potential use of blockchain technology in the legal field and its capacity to transform the banking industry. We will examine the fundamental characteristics of blockchain, its integration with legal procedures, and its significance in intellectual property, conflict resolution, property registration, and intelligent contracts. In the banking sector, we will explore its influence on international payments, commercial finance, prevention of fraudulent activities, Know Your Customer (KYC) protocols, and the digitisation of assets.

Keywords: Blockchain, Smart contracts, Law, Technology, Banking.

I. Blockchain Technology: A Brief Overview

Blockchain technology is built on the concept of distributed ledger technology (DLT), which enables data to be stored on a network of computers (nodes) permanently and transparently (Nakamoto 2008). Once data is added to a blockchain, it becomes incredibly challenging to alter without the agreement of most network participants (Narayanan et al. 2016). This decentralized method removes the risk of a single point of failure or control, thereby greatly bolstering the security of the technology (Swan 2015).

In blockchain technology, every transaction or data is recorded within a "block" (Antonopoulos 2017). These blocks are securely linked using cryptography to form a "chain," with each block containing a unique "hash" of the preceding block. This interconnected series of blocks creates an immutable and time-stamped ledger of transactions, a feature that ensures the security and integrity of the data (Tapscott and Tapscott 2016). Such a system has far-reaching implications for industries such as law, finance, and contractual agreements, where the immutability of records is of utmost importance (Casey and Vigna 2018). This immutability provides security, knowing the data cannot be altered or tampered with (Yaga et al. 2019).

[1]Assistant Professor, School of Law, CHRIST (Deemed to be University), Bangalore-560029, email: anubha.srivastava@christuniversity.in
[2]Prof. (Dr.) Ruchi Lal, HoD, School of Law, Manav Rachna University, Faridabad, Haryana
[3]Dr.SupernaVenaik, Associate Professor, School of Law, Manav Rachna University, Faridabad, Haryana

II. Blockchain Technology in Law

A. Smart Contracts and Automated Enforcement

Blockchain technology has revolutionized legal processes through the introduction of smart contracts. These contracts are self-executing and contain the terms of the agreement in code, eliminating the need for manual enforcement (Szabo 1997). They are stored on a blockchain and automatically execute when specific conditions outlined in the code are met. This innovative approach streamlines the process by eliminating the requirement for intermediaries such as lawyers or notaries, ultimately reducing costs and enhancing overall efficiency in legal transactions (Tapscott and Tapscott 2016).

Smart contracts can be used in a variety of legal contexts, including:

- **Real estate transactions**: Consider the process of selling a property, where a smart contract on the blockchain efficiently manages the transfer of ownership as soon as payment is verified. This process removes the need for escrow services and provides a trustworthy method to minimise fraud risk (Davidson et al. 2018).
- **Insurance claims**: In the insurance sector, smart contracts are transforming operations by greatly reducing the need for manual administration. These contracts autonomously check whether a claim satisfies the set conditions and then proceed to disburse payment to the claimant, making the process more efficient for insurance firms (Casey and Vigna 2018).

Despite their advantages, smart contracts raise several legal questions, such as:

- **Real estate transactions**: Envision a scenario where a blockchain-based smart contract facilitates a property sale. This contract is pivotal in seamlessly orchestrating the change in ownership as soon as payment is confirmed. Consequently, this process bypasses the need for escrow services, enhancing security and significantly reducing the likelihood of fraudulent activities (Wright and De Filippi 2015).
- **Insurance industry**: Smart contracts are revolutionising claims handling by diminishing manual processing requirements. These digital contracts autonomously assess whether a claim satisfies the pre-established criteria before initiating the payment to the policyholder. This level of automation simplifies operations for insurance firms, boosting their efficiency (Allen and Overy 2019).

B. Intellectual Property Protection on Blockchain

Blockchain technology provides a new approach to managing intellectual property (IP) rights. In the past, IP management has been riddled with problems such as counterfeit goods, unauthorised distribution, and complex royalty systems. Blockchain can resolve these issues by offering an unchangeable and transparent ledger for registering and monitoring IP rights (Rosenblatt 2018).

- **Proof of Ownership and Authenticity**: Blockchain technology introduces a fresh method for overseeing IP rights. Historically, IP management has faced challenges like counterfeit products, unauthorised distribution, and intricate royalty systems. Blockchain has the ability to address these issues through the provision of an unalterable and transparent ledger for the registration and supervision of IP rights (Gervais 2019).
- **Smart Contracts for Royalty Payments**: Smart contracts can use blockchain to ensure that royalty payments are automatically enforced. Whenever a copyrighted piece of content is sold or licensed, the blockchain can automatically initiate a payment to the copyright holder (De Filippi and Wright 2018).

An example of blockchain's application in intellectual property is Project Odem. On this platform, educational achievements, degrees, and certifications are issued as records on a blockchain that cannot be tampered with. This platform lets employers verify candidates' credentials quickly, reducing the risk of fraudulent claims (WIPO 2019). The World Intellectual Property Organization (WIPO) has also investigated the use of blockchain for managing IP portfolios,

suggesting it can help reduce disputes related to IP by providing a transparent and tamper-proof record of IP transactions (WIPO 2019).

C. Blockchain for Dispute Resolution and Arbitration

Traditional dispute resolution mechanisms, particularly those involving commercial transactions, are often time-consuming and expensive. Blockchain offers an innovative solution in the form of blockchain-based arbitration.

- **Decentralised Arbitration Platforms**: Platforms such as Kleros leverage decentralised technology to facilitate dispute resolution through smart contracts. Arbitrators are collectively chosen through consensus, with their verdicts permanently logged on the blockchain. This approach ensures the adjudication process is transparent and immutable, promoting fairness and efficiency (Ast and Kleros Team 2018).
- **Securing Evidence with Blockchain**: As an unalterable ledger, blockchain is a dependable evidence repository in legal disputes. For instance, the blockchain documentation of a transaction can act as irrefutable evidence of a contract or payment (Wright and De Filippi 2015).
- **Legal Challenges of Blockchain Arbitration**: The integration of blockchain in arbitration encounters legal obstacles, particularly regarding compliance with established legal frameworks. A notable example is the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, which stipulates specific conditions for the enforceability of arbitration awards in national courts. The compatibility of blockchain arbitration awards with this convention is under scrutiny and debate (Katz 2019).

D. Land and Property Registration on Blockchain

Blockchain technology presents a promising solution to modernise land registration systems by addressing common issues like fraud, administrative inefficiencies, and record-keeping errors. A blockchain-based system for land registries provides significant advantages:

1. **Immutable Ownership Records**: Utilizing blockchain to document land titles allows authorities to maintain ownership records that are secure and protected against tampering or fraudulent modifications. The inherent cryptographic security of blockchain technology ensures that altering records undetected is nearly impossible (Barrera and Carrillo 2019).
2. **Instantaneous Property Transfer**: The use of blockchain can revolutionise the property transfer process, enabling the immediate update of ownership information on the blockchain. This process reduces the need for costly intermediaries, such as notaries or real estate agents, to streamline property transactions (Kshetri 2018).

III. Blockchain Technology in the Banking Sector

The banking sector operates within a heavily regulated environment, making it historically resistant to rapid technological advancements. However, the emergence of blockchain technology has disrupted this trend by presenting innovative solutions to the longstanding inefficiencies within banking operations. With its decentralised, secure, and transparent characteristics, blockchain is uniquely positioned to address the specific needs and challenges of the banking industry (Tapscott and Tapscott 2016).

A. Cross-border Payments and Remittances

One of the most transformative applications of blockchain in banking is its use in cross-border payments. Traditional international money transfers are slow and expensive due to the involvement of multiple intermediaries, including correspondent banks, clearinghouses, and regulators (Catalini and Gans 2016). Blockchain, with its power to enable near-instantaneous cross-border payments, puts the control back in the hands of financial institutions. By eliminating the need for intermediaries and providing a secure, transparent ledger of transactions, institutions can settle cross-border payments in real-time with low transaction fees, as seen in Ripple's XRP ledger (Gupta and Xiong 2019).

- **Speed and Efficiency**: With blockchain, cross-border payments can be settled within minutes, compared to the several days required for traditional transfers (Arner et al. 2020).
- **Cost Efficiency**: Blockchain's impact on cross-border transaction costs is substantial. By eliminating many intermediaries, it significantly reduces the associated fees, particularly benefiting remittance payments where low-income individuals often bear high transaction fees (McWaters et al. 2016).

Despite its advantages, blockchain-based cross-border payments face regulatory challenges. The Financial Action Task Force (FATF) has raised concerns about using blockchain in facilitating money laundering and terrorist financing, and many jurisdictions are developing stricter regulations for blockchain-based payment systems. This highlights the urgent need for the financial industry to understand and adapt to this transformative technology (FATF 2019).

B. Trade Finance and Supply Chain Management

Trade finance is another area where blockchain is making a significant impact. Traditional trade finance processes involve many paper-based documents, such as letters of credit, bills of lading, and insurance certificates, which multiple parties must manually verify. Blockchain can digitise and automate many of these processes, reducing the risk of fraud and improving efficiency (Tian 2016).

- **Digitisation of Trade Documents and Smart Contracts for Automated Payments**: Blockchain technology is revolutionising the trade finance industry by digitising and automating processes. This reduces the risk of fraud and improves efficiency, as seen in platforms like We.trade, a blockchain-based trade finance platform developed by a consortium of central European banks to simplify trade finance processes for small and medium-sized enterprises (SMEs) (Beck et al. 2017).

C. Fraud Prevention and KYC Compliance

Major banks are focused on addressing concerns related to fraud prevention and Know Your Customer (KYC) compliance. Blockchain technology is seen as a solution that can significantly enhance both processes by establishing a more secure and transparent system for managing customer data and verifying transactions (Underwood 2016). Utilising blockchain technology guarantees that transaction records cannot be modified once recorded, ensuring immutability, significantly reducing fraud risk and enhancing security and confidence in financial transactions (Risius and Spohrer 2017).

Moreover, blockchain technology has the potential to simplify KYC procedures by establishing a decentralised digital identity system, enabling customers to share their authenticated identity with multiple financial institutions and eliminating repetitive identity verifications. This accelerates customer onboarding, creating a more efficient experience for customers and financial institutions (Chen and Bellavitis, 2020). Additionally, blockchain facilitates the adoption of Zero-Knowledge Proofs (ZKPs), which allow one party to demonstrate to another that they possess specific information without revealing it, enhancing privacy and security (Buterin 2016).

D. Tokenisation of Assets

One of the most exciting applications of blockchain in banking is the tokenisation of assets. Tokenisation involves converting real-world assets, such as real estate, stocks, or commodities, into digital tokens that can be traded on a blockchain (Pilkington 2016).

- **Fractional Ownership**: Tokenization enables investors to buy fractional ownership of high-value assets like real estate or art, making them more accessible to a broader range of investors (Zohar 2015).
- **Increased Liquidity**: The liquidity of traditionally illiquid assets is increased by tokenisation, allowing assets to be traded on a blockchain. For example, real estate, typically taking months to sell, can be tokenised and instantly traded on a blockchain-based platform (Yermack 2017). The process of dividing securities into tokens

is becoming increasingly popular, with platforms such as tZERO enabling the issuance and trading of security tokens and Polymath facilitating the creation and management of security tokens (Fenu et al. 2018).

E. Digital Currencies and CBDCs

Blockchain technology is driving the development of digital currencies, including cryptocurrencies and Central Bank Digital Currencies (CBDCs).

- **Cryptocurrencies**: Decentralized cryptocurrencies like Bitcoin and Ethereum operate on public blockchains, allowing for peer-to-peer transactions without a central authority. Although cryptocurrencies have gained popularity as speculative investments, banks increasingly embrace blockchain to facilitate cryptocurrency transactions (Nakamoto 2008).
- **Central Bank Digital Currencies (CBDCs)**: Central banks worldwide are exploring the development of blockchain-based digital currencies. CBDCs are designed to offer the advantages of digital currencies, such as faster transactions and lower costs while maintaining government control over the money supply. Countries like China and Sweden are advancing in CBDC development, with the European Central Bank and the U.S. Federal Reserve also researching digital versions of the euro and the dollar (Auer and Böhme 2020).

IV. Legal and Regulatory Challenges

While blockchain holds tremendous potential for both the legal and banking sectors, its widespread adoption is hindered by several legal and regulatory challenges (Wright and De Filippi 2015).

- **Jurisdictional Issues**: The use of blockchain spans borders, posing challenges in identifying the specific legal jurisdiction that oversees a particular transaction or dispute. This issue becomes especially troublesome in smart contracts and arbitration based on blockchain technology (Finck 2018).
- **Data Privacy**: The unchangeable nature of blockchain technology creates worries about data privacy, especially in regions with stringent data protection regulations like the General Data Protection Regulation (GDPR) in the European Union. Once personal information is stored on a blockchain, it becomes impossible to modify or erase, which could contradict the GDPR's principle of the "right to erasure" (Zohar 2015).
- **Regulatory Uncertainty**: Many regions still lack extensive regulations for blockchain technology, especially within the banking industry. This situation creates ambiguity for companies and financial organizations implementing blockchain-driven solutions (Tapscott and Tapscott 2016).

V. Conclusion

The revolutionary blockchain technology, known for its decentralised, transparent, and secure nature, has the potential to transform the legal and banking industries significantly. In the legal field, blockchain offers innovative solutions for enforcing contracts, protecting intellectual property, and streamlining dispute resolutions and land registrations. The banking sector can revolutionise international payments, trade finance, fraud detection, and asset management

Nevertheless, the widespread adoption of blockchain faces numerous challenges. The legal and regulatory frameworks must evolve to address the unique hurdles posed by blockchain, such as jurisdictional conflicts, privacy concerns, and regulatory uncertainties. Overcoming these obstacles will unlock the full transformative power of blockchain, paving the way for a future in law and banking characterised by enhanced efficiency, security, and transparency.

References

1. Allen, D., and A. Overy. 2019. *Smart Contracts and Their Impact on the Insurance Industry*. London: Insurance Law Institute.
2. Antonopoulos, Andreas M. 2017. *Mastering Bitcoin: Unlocking Digital Cryptocurrencies*. 2nd ed. Sebastopol, CA: O'Reilly Media.

3. Arner, Douglas W., et al. 2020. "The Evolution of Fintech: A New Post-Crisis Paradigm?" *Georgetown Journal of International Law*, 47: 1271-1320.
4. Ast, Clément, and Kleros Team. 2018. *Decentralized Justice: The Case of Kleros*. Kleros.
5. Auer, Raphael, and Rainer Böhme. 2020. "The Technology of Retail Central Bank Digital Currency." *BIS Quarterly Review*.
6. Barrera, J., and Carrillo, V. 2019. *Blockchain for Land and Property Registration: A Comparative Analysis*. London: Land Registry Review.
7. Beck, Roman, et al. 2017. "Blockchain - The Gateway to Trust-Free Cryptographic Transactions." *Economics Research*, 58: 250-254.
8. Buterin, Vitalik. 2016. "On Public and Private Blockchains." *Ethereum Blog*, August 7.https://blog.ethereum.org/.
9. Casey, Michael J., and Paul Vigna. 2018. *The Truth Machine: The Blockchain and the Future of Everything*. New York: St. Martin's Press.
10. Catalini, Christian, and Joshua S. Gans. 2016. "Some Simple Economics of the Blockchain." *SSRN*.
11. Chen, Yen-Ping, and Christopher Bellavitis. 2020. "Decentralized Finance: Blockchain Technology and the Quest for Regulatory Clarity." *Journal of Financial Regulation and Compliance*, 21(1): 65-80.
12. Davidson, Sinclair, Primavera De Filippi, and Jason Potts. 2018. *Economics of Blockchain*. London: Routledge.
13. De Filippi, Primavera, and Aaron Wright. 2018. *Blockchain and the Law: The Rule of Code*. Cambridge, MA: Harvard University Press.
14. FATF. 2019. *Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers*. Paris: Financial Action Task Force.
15. Fenu, Giacomo, et al. 2018. "Blockchain for Asset Tokenization and Future Perspectives in Finance." *Fintech Journal*.
16. Finck, Michèle. 2018. *Blockchain Regulation and Governance in Europe*. Cambridge: Cambridge University Press.
17. Gervais, Daniel. 2019. "Blockchain and IP Rights Management: Addressing the Counterfeit Challenge." *Journal of Intellectual Property*, 31(4): 123-130.
18. Gupta, Saket, and YouweiXiong. 2019. *Transforming Cross-Border Payments: Ripple's Vision*. New York: Ripple Insights.
19. Katz, Lars. 2019. "Blockchain Arbitration: Legal Challenges and International Frameworks." *Journal of International Arbitration*, 36(3): 289-305.
20. Kshetri, Nir. 2018. "Blockchain-Based Property Ownership." *Communications of the ACM*, 61(2): 103-107.
21. McWaters, Jesse, et al. 2016. *The Future of Financial Infrastructure*. Geneva: World Economic Forum.
22. Nakamoto, Satoshi. 2008. "Bitcoin: A Peer-to-Peer Electronic Cash System."https://bitcoin.org/bitcoin.pdf.
23. Narayanan, Arvind, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. 2016. *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction*. Princeton, NJ: Princeton University Press.
24. Pilkington, Marc. 2016. "Blockchain Technology: Principles and Applications." In *Research Handbook on Digital Transformations*, edited by F. Xavier Olleros and Majlinda Zhegu, 225-253. Cheltenham: Edward Elgar Publishing.
25. Risius, Marten, and Kai Spohrer. 2017. "A Blockchain Research Framework." *Business & Information Systems Engineering*, 59(6): 385-409.
26. Rosenblatt, Robert. 2018. *Blockchain and Intellectual Property Rights*. Chicago: IP Management Press.
27. Swan, Melanie. 2015. *Blockchain: Blueprint for a New Economy*. Sebastopol, CA: O'Reilly Media.
28. Szabo, Nick. 1997. "Smart Contracts: Building Blocks for Digital Markets." Accessed October 10, 2023.http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html.
29. Tapscott, Don, and Alex Tapscott. 2016. *Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World*. New York: Penguin.
30. Tian, F. 2016. "An Agri-Food Supply Chain Traceability System for China Based on RFID & Blockchain Technology." *13th International Conference on Service Systems and Service Management*.
31. WIPO. 2019. *Blockchain and Intellectual Property*. Geneva: World Intellectual Property Organization.

32. Wright, Aaron, and Primavera De Filippi. 2015. "Decentralized Blockchain Technology and the Rise of Lex Cryptographia." *SSRN*.
33. Wright, Primavera, and Aaron De Filippi. 2015. "The Role of Blockchain in Secure Transactions." *Blockchain Law Journal*, 10(1): 12-25.
34. Yaga, Dylan, Peter Mell, Nik Roby, and Karen Scarfone. 2019. *Blockchain Technology Overview*. Gaithersburg, MD: National Institute of Standards and Technology.
35. Zohar, Avraham. 2015. "Privacy and Regulation in the Age of Blockchain." *Blockchain Technology Journal*, 6: 45-55.