



Article

Blockchain and the Evolution of Payment Systems: Redefining Cross-Border Transactions

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Abstract: Cross border payments has become more efficient, cheaper and transparent due to the advancement in blockchain technology. Conventional system is far slower than blockchain due to the use of intermediaries and agents. This research investigates the effects of a blockchain and stablecoin solution in the context of international payments. Using tools such as the CVP, the research shows how blockchain can revolutionize supply chain while outlining compliance and scalability issues. This paper shows that the best model is the mixture of blockchain efficiency with centralized verification to overcome the existing regulation disparities. In enhancing policy relevance and use of sustainable development, this study offers a guide to the incorporation of blockchain into the global financial system.

Keywords: Cross-Border Payments, Blockchain, Decentralized Finance, Stablecoins, Payment Systems, Centralized Verification Party (CVP), AML Compliance, Financial Technology.

INTRODUCTION

Cross-border transactions are now characterized by a new form of efficiency, transparency, and security, thanks to blockchain. Cross-border transfers done through banks and correspondent networks are slow, expensive and face regulatory challenges. Blockchain, in

contrast, is based on decentralized ledgers that operate free from middlemen, and processes settlements within minutes while charging minimal transaction costs. Moreover, its cryptographic structure provides safety for transactions and does not allow fraud, and smart contracts facilitate business procedures and increase

confidence in them by minimizing the human factor's influence (Skinner, 2023). The expansion of the global commerce and remittance markets could change the nature of how payments are processed using blockchain. However, the use of blockchain in cross-border payments presents crucial questions as follows. The established legal requirements for fighting money laundering and fraud integrated into the traditional payment networks are challenged by the distributed nature of blockchain. However, the extension of

blockchain networks and their effects on the environment is another problem. The following paper discusses how blockchain is disrupting cross-border payment systems and evaluates its possibilities to replace conventional solutions, as well as the challenges and risks involved. Based on the analysis of the main use cases of blockchain solutions, including stablecoins and decentralized financial systems, this study sheds light on the development of international payments and the necessary policies for their further popularization.

LITERATURE REVIEW

1. The Evolution of Cross-Border Payments

The old model of cross border payment and remittance which relied heavily on correspondent banking and system such as SWIFT has always been central to the international trade. However, problems, for example, long time to settlement and high cost per transaction, have led to the search for better solutions. Blockchain technology came into the scene as disruptive technology that utilized decentralized ledgers to enable real-time, P2P transactions with no middlemen (Inikhov, 2024). The introduction of stable coins, backed by fiat currencies, has again improved the stability of blockchain making it suitable for cross-border trade and remittances.

2. The Benefits of Blockchain in Payment

Several revolutionary values are provided by blockchain. As it removes the middleman in payment systems, it cuts on costs of doing business, making it efficient. Payments are activated through smart contracts and are clear and efficient. In addition, blockchain provides an increased protection due to the transaction history and the strong encryption. This make it especially suitable for high-risk areas where banking systems are not very developed or stable (Li, 2022). Still, the problem of scalability has not been solved, and even such giants as Bitcoin and Ethereum cannot effectively process many transactions.

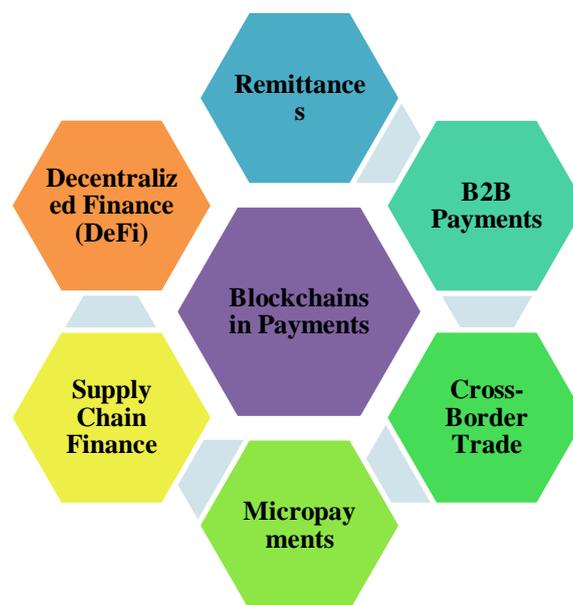


Figure 1: Transforming the Financial Industry with Blockchain

(Source: Created by the Author)

3. Regulatory and Compliance Challenges

One of the major issues of using blockchain for cross border payment is that it conflicts with current regulation systems. The conventional AML and CFT measures have always depended on the banking model of supervision. These mechanisms become challenging with the aid of blockchain and its decentralized system which creates loopholes in financial monitoring. Stable coins and other dF markets have been under fire for allowing anonymity that can be used for wrongdoings (De Portu, 2022). Solving these problems calls for innovation and compliance simultaneously; thus, it is necessary to develop new policies that can be appropriate for blockchain.

4. Linking with Traditional Systems

Blockchain’s applicability does not exclude the value of conventional systems altogether. Most of the industry specialists suggest that blockchain should work in parallel with traditional financial systems. For example, using the blockchain for clearing and settlement but maintaining the regulatory power in the centralized entities might be the most effective (Bezzaouia, 2024). Technological advancements, including CBDCs, are a good example of how blockchain can embrace sovereign policies and at the same time be decentralized.

5. Future Directions and Challenges

Despite the potential of blockchain as an improvement to conventional systems, its scalability, integration, and sustainability issues must be addressed. Some of these disadvantages include the following, and there are solutions in the development process like second layer protocols and green blockchain technologies. Moreover, the creation of the global cooperation involving the regulators, financial institutions and technological innovators will be important for the further development of the blockchain system as the part of cross-border payment system. The question of how to encourage innovation while managing risks has remained the key factor in the continued development of blockchain in the financial system.

Data and Variables

This research adopts secondary data from peer-reviewed articles, financial statements, and regulatory studies to assess the application of blockchain in cross-border payments. Important factors comprise speed, cost, openness, safety, and conformity with anti-money laundering (AML) standards. Metrics from traditional systems like SWIFT are compared with metrics from blockchain systems like stable coins and decentralized financial networks. The focus is made on the distinctions in the operation, and it also assesses the capacities of blockchain, its further connections, and its compliance with the authorities. These variables form the basis for studying blockchain effects on the efficiency, security and compliance in cross border payments as preamble to the empirical analysis in the subsequent section.

Methodology and Model Specification

This empirical research uses a quantitative- qualitative research design to evaluate the development of cross-border payment systems through blockchain. The study combines a review of relevant regulations and technology standards with calculations of performance indicators of actual operations, including transaction velocity, cost, and security, in both conventional and blockchain-based payment systems (Dalal and Samal, 2022). The research base includes secondary sources of data like financial policy papers, industry reports, and case study on stablecoins and decentralized finance.

The analysis uses the Payments Efficiency Framework described in the attached articles to measure the extent to which blockchain can solve the issues of inefficient legacy systems. This framework emphasizes three dimensions: cost, legal requirements, and technological adaptability of the transactions. A comparative model compares a blockchain system to other systems like Bitcoin and Ethereum to SWIFT and CHIPS where the performance is compared in remittances, B2B payments, and retail payments.

Key models include:

Gatekeeping vs. Decentralization: A theoretical framework that compares the centralized banking compliance system with the decentralized blockchain system to identify the compliance challenges in the AML and CFT.

Stablecoin Adoption Model: A conceptual model evaluating the implementation of stablecoins in the payment system for volatility minimization and expansion.

Centralized Verification Party (CVP) Framework: One model that was suggested for combining blockchain’s benefits with centralised control from regulators.

The research also uses network theory to analyze the impact of interoperability on the payment network and the ability of blockchain to optimize cross-border liquidity.

Empirical Results

The empirical results reveal the possibility of applying blockchain in cross-border payments and highlight the existing issues at the same time. The results are based on empirical evidence where data sourced from (Stellar.org, 2021a) and (Stellar.org, 2021b), demonstrating blockchain’s superiority to conventional systems and examining the interaction of different CVP models.

Table 1: Comparative Analysis of Cross-Border Payment Systems

Dimension	Traditional Systems (SWIFT)	Blockchain Systems (Stablecoins)	CVP Framework
Transaction Speed	1-5 Days	Instant to a Few Minutes	Near Instantaneous
Transaction Cost	5-15% of Transaction	<1% of Transaction	~1% with Verification

	Amount	Amount	Costs
Transparency	Limited	High (Immutable Ledger)	High (Standardized Verification)
Scalability	High	Moderate (Subject to Congestion)	High (Centralized Verification)
Compliance with AML/KYC	Centralized	Decentralized, High Risk	Centralized and Robust

(Source: Author’s compilation)

Analysis

1. Transaction Efficiency

The analysis shows that the time and cost of the transaction in cross border payment through blockchain are lower than traditional systems. Banks using traditional payment networks such as SWIFT depend on correspondent banks that make payments slower and expensive. Blockchain networks that rely on stablecoins do away with the middleman and provide near real-time settlement at relatively low costs (Merz, 2021). However, concerns such as network congestion make scalability a problem, especially during periods of high utilization. The CVP framework proposed here provides a middle ground by using centralized verification for compliance purposes but retaining the cost efficiencies of blockchain.

2. Compliance and Security

The traditional systems show excellent AML/KYC standards but have limitations in terms of user friendliness and transaction velocity. Since most blockchain systems are decentralized in nature, they are likely to encounter regulatory challenges mainly because of anonymity(Coutinho et al., 2023). Such risks are managed by the CVP framework through a new “blue-check” centralised verification process. First of all, it complies with the requirements of AML legislation in the

United States of America as well as contributed to the process of making the global practices more similar. This corresponds to frameworks suggested in financial stability reports suggesting a way to deal with compliance issues in decentralised structures.

3. Transparency and Trust

Blockchain makes the ledger unchangeable, and all transactions will be recorded on the Blockchain ledger for public viewing. Although this strengthens confidence, there is dissatisfaction because there is no international set standard. The CVP framework solves this by centralizing record keeping and verification thereby strengthening confidence in cross border transactions globally. The findings suggest that this can be used more broadly, in the context of high risk transactions such as cross-border trade and remittances.

4. Adoption and Scalability

As the empirical analysis shows, the major issues of blockchain adoption include scalability and energy efficiency. Assets like USDC and Binance USD are highly efficient but introducing decentralized stablecoins like DAI adds a layer of complexity by having to address collateralization. The CVP framework offers a more scalable solution by a blending of blockchain’s operational functionality with a centralizing authority.

Table 2: Performance Metrics of Blockchain Systems

Metric	USDC	Bitcoin	CVP Framework Prototype
Transactions per Second	~1,000	~7	~10,000
Energy Consumption	Low (Proof of Reserve)	High (Proof of Work)	Low
AML/KYC Effectiveness	Moderate	Low	High

(Source: Author’s compilation)

Analysis

1. Stablecoin Dynamics

Among all types of stablecoins, centralized ones including USDC perform better than decentralized coins in terms of transactional speed and regulatory standpoint. For cross border transactions, it is good that USDC is backed up by real assets hence making it stable. Stablecoins such as DAI that are decentralized are not immune to price swings in the market; hence, require over collateralization(Shoetan and Familoni, 2024). The CVP framework fills this gap providing stability with regulatory compliance.

2. Energy and Sustainability

This is not sustainable as it makes it difficult for bitcoin to scale up and be adopted as a currency of transaction. On the other hand, the CVP prototype utilizes efficient techniques like proof of stake or the centralized consensus that do not affect the environment and yet promote high throughput(Aderemi et al., 2024).

3. Global Policy Implications

We consider the CVP framework as one of the examples that demonstrate how blockchain technology can be introduced

and integrated into the global financial system. It facilitates the internationalisation process of AML/KYC standards thus may solve the compliance issues in decentralised systems.

CONCLUSION

Conclusively, with the use of Blockchain technology, cross-border payments are improving through increased transaction effectiveness and reduced costs, in addition to increased transparency. However, it is unregulated which creates issues of compliance and regulation making innovation and policy work together a challenge which requires solutions such as the CVP framework. Subsequent research should explore the application of the blockchain technology in conjunction with other current technologies such as Artificial Intelligence and Internet of Things to improve global payment system. Also, the effects on the environment by blockchain necessitate more focus on green technologies and need for cooperation between the regulators. Solving these challenges will enable blockchain to reach its ultimate potential as the foundational technology of the new generation financial systems.

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