Blockchain-Enabled Efficiency and Value Creation in International Commerce: A Macro Analytical Perspective

[1]Natarajan K and [2]John Atta Mills
[1]Department of Electrical and Electronics Engineering, Trinity College of Engineering and Technology, India.
[2]School of Science in Business Economics, University of Professional Studies, Madina, Ghana.
[1]drknatarajan17@gmail.com, [2]attamills1@outlook.com

Correspondence should be addressed to Natarajan K: drknatarajan17@gmail.com

Article Info
Journal of Enterprise and Business Intelligence (https://anapub.co.ke/journals/jebi/jebi.html)
Doi: https://doi.org/10.53759/5181/JEBI202606004
Received 02 August 2025; Revised from 30 September 2025; Accepted 18 October 2025.
Available online 05 January 2026.

Abstract – Blockchain technology (BT) has become a techno-structural foundation that defines efficiency, transparency, and coordination within the global economy. This paper proposes an institutional and macroeconomic approach to the adoption of blockchain and it assumes that blockchain is a general-purpose technology that reduces transaction costs and enhances information asymmetry and increases trust in international trade, supply chains, government procurement, and financial intermediation. We combine the methods of structural dependency, constrained value-assignment, and efficiency-transmission models to find out the extent to which specific factors influence an outcome in a non-causal manner. The results indicate that the use of blockchains is structurally aligned with efficiency in coordination and the potential value-creation in institutionally complex trade. By promoting repeating and decision-based methodological architecture, our study will add to the body of knowledge a system-wide information to evaluate economic ramifications.

Keywords – Blockchain Technology, International Trade, Transaction Cost Economics, Supply Chain Efficiency, Public Procurement, Digital Infrastructure.

I. INTRODUCTION

The acceptance of Bitcoin has attracted the attention of scientists, motivating the community to establish addition cryptocurrencies, such as Litecoin, a decentralized Bitcoin-based currency. The major distinction is in its blocks (block are structures of data on which every transaction is captured. These blocks are constructed on chronologically connected blocks) creation duration and in the highest number of coins, which can be produced within the network. For instance, Litecoin blocks are produced every 2.5 minutes, and are 4 times faster than Bitcoin [1]. This implies that the cryptocurrency can process more transactions/sec, making it a better option for smaller transactions. Concerning the highest number of coins, which can be produced through the mining process (mining is the process of making every node to reach consensus and produce a new block alongside their respective rewards to the first to produce the block), Bitcoin has a maximum of 21 million coins, while Litecoin is 84 million.

There are various blockchain system, each customized to various acceptability levels and use cases. Public blockchains, such as Ethereum and Bitcoin, are available to everyone, and depend of consensus approaches such as Proof of Stake (PoS) and Proof of Work (PoW) to approve a transaction. On the other hand, private blockchains, are constrained to particular participant, hence providing higher efficiency and control for enterprise-level applications. Hybrid blockchains integrate elements private/public systems, providing scalability and flexibility for industries requiring both privacy and transparency. These models collectively create the backbone of blockchain's relevance and adaptability across different industries. **Fig 1** provides a framework of the blockchain market and economy as described by Kwok and Treiblmaier [2].

BT can be applied in various fields such as supply chains. Employing blockchain in the tracking of origins of raw materials and to follow international and domestic supply chains can meet this rising demand of data with levels of accuracy and transparency not previously achievable. The tracking of raw materials can also assist firms to enhance their internal procedures. In addition, blockchain has widely been employed in international trade, especially in the wake of technological innovation. The entire global supply chain is strategizing on how to employ blockchain to boost productivity.

However, BT comes with some hurdles, which have to be overcome for businesses to thrive in the international trade platform. These hurdles are linked to technology, including challenges of regulatory, policy, and legal compliance. Both Internation and national policies have not developed enough to mitigate these issues that always arise. In addition, there is a deficiency of standards and models of the BT to inform global participants. In that regard, our study proposes a systematic macro-analytical model that evaluates economic effects of BT adoption in internation trade, systems of public procurement, and financial intermediation.

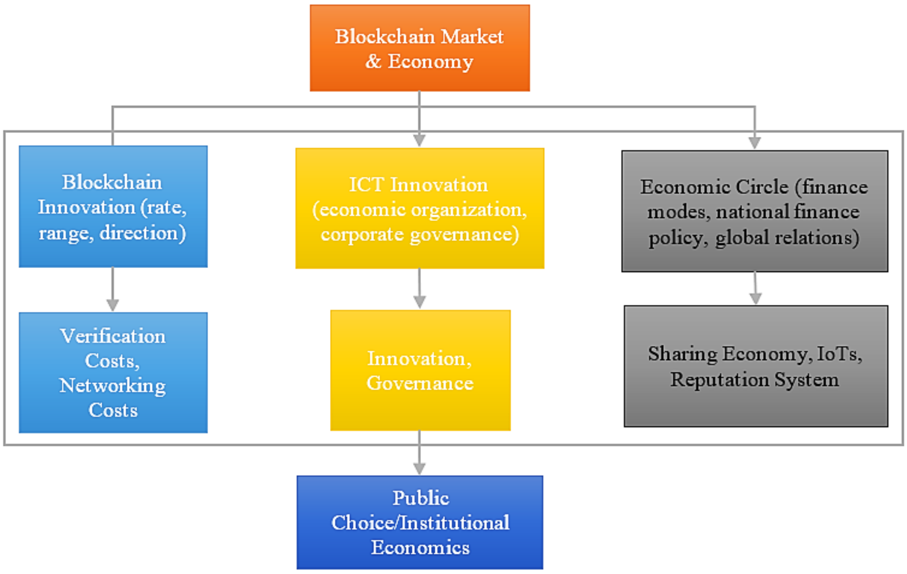

Fig 1. Blockchain Market and Economy

The following research questions have been addressed in our study:

- What is the role of blockchain in terms of efficiency-boosting coordination approaches, how to model the diversity of technological adoption to transparency gains and cost savings?
- What is the potential role of these efficiencies in the general economic value addition in the context of trade-related activities?

In Section II, we have reviewed related works on blockchain, public procurement, as well as the relationship between corporate governance and procurement. Section III describes our research design, data framework, and modeling approach. In Section IV, a detailed discussion of our finding has been documented, including blockchain market growth, supply chain and cost efficiency, and public procurement/trade value. Lastly, we conclude our study in Section V and highlight the importance of BT in key areas where high verification is needed, where data flow is fragmented, and where high organizational costs are recorded.

II. RELATED WORK

According to Nguyen [3], Blockchain Technology (BT) is potentially a major source of futuristic financial market innovation. This technology allows the establishment of immutable transactional records available by all network participants. Blockchain database is composed of various "chained" blocks through a reference in every block to the previous one. Every block records a single or multiple transactions that are basically changes in the listed owners of an asset. Novel blocks are integrated to the current chain using a consensus approach where a blockchain network member confirms the validity of a transaction.

As described by Toorajipour et al. [4], this technology allows the design of a system that is "completely peer-to-peer, with no third parties", such as financial institutions and government agencies. While many cryptocurrencies are in their initial development stage, there are many promising applications of BT within the financial sector. Its ecosystem represents the largest application of BT to data especially as technology continues to grow in the wider financial service industry.

Yuan and Wang [5] posit that the complex permission models of blockchain and other cryptocurrencies guarantee data security and privacy without interventions from any centralized authority, which initially attracts investors. Irrespective of their high social impact, Becker [6] have proposed that a novel section of law known as the lex cryptographic will be introduced due to the convergence of algorithms and law to govern the interaction and actions of agents. This is why different players, such as the financial sector, energy industry, e-commerce, and healthcare, have come to rely on them heavily.

Ozili [7] focused on the significant strides made by the Fintech sector. According to their study, "digital coins" have simplified and eliminated inherent financial risks linked with funding novel business ventures. Self-processing security protocols such as PoS, PoW, and Smart Contracts are enhancing its viability within the financial sector. Moreover, this innovation has been highlighted as beneficial in trade finance's present challenges. Transactional traceability, information transfer, transaction authority, and trust mechanisms are some of the examples of these challenges. In their work, it was also evident that there are tendencies and efforts to control blockchain transactions. However, this is mainly outside of government-enforced protocols. The main objective of these protocols is to enhance customer trust during blockchaincentered transactions rather than determine their content or form. In order to provide a firm guideline of future research in this area, the scholars proposed a deeper assessment of literature on BT.

Kembro and Selviaridis [8] provided information sharing insights linking a supply chain with a selling company and multiple buying companies. Under these supply chain structures, the scholars concentrated on horizontal data sharing between the buying company and reviewed their private signal exchange patterns on typical demand shocks. They recorded that the buying company will not share data when there is data leakage from companies who do not share. In another study by Premazzi et al. [9], buying companies have no incentives to share data with the selling firm concerning their private signals on common markets but have incentives to share data on their private marginal manufacturing expenses. Lus and Muriel [10] additional consider the effect of independent, substitutable, and complementary products in this environment. Assessing the effect of various confidentiality levels, the scholars highlight that the buying companies will not share their data without some level of confidentiality.

In case study of Ghana, Dzreke and Dzreke [11] described the process of public procurement governed by Act 663. These legislative models aim to enhance efficiency, fairness, and transparency in public procurement, protect public resources and foster competition and accountability. However, according to their study, there is no consensus on the procurement cycle phases in public procurement. Different scholars have categorized this cycle in a different way. In order to arrive at an effective public procurement cycle, Patrucco, Luzzini, and Ronchi [12] interviewed 25 experts, and summarized their opinions into 7 notable public procurement cycle phases, as shown in **Table 1**.

Table 1. Cycle Phases of Public Procurement

Procurement Cycle Phases	Details	Author(s)
Procurement planning	This phase is the foundation of the procurement process, where needs, and specifications are identified and plans are designed.	Torabi et al. [13]
Sourcing	This phase ensures a fair and competitive process is achieved to enhance value for money.	
Tender Documentation	This phase integrates provision of tender documents and inviting bids from possible suppliers. Nonetheless, this phase is prone to hurdles, like principal-agent issues, where officers may exploit their privileged and discretion data for individual gain.	
Tender Evaluation	This phase is crucial but susceptible to corruption due to the lack of transparency. It integrates evaluating bids to choose the most suitable supplier. It necessitates strict oversight to mitigate malpractices.	Bergman and Lundberg [14]
Contracting	This phase integrates negotiating terms, contract formalization, and drafting agreements between supplier and procurement entities. Effective contracting guarantees clear expectations and responsibilities.	
Contract management	It integrates the tracking of contractual executions to ensure compliance with terms. This stage is critical for protecting the procurement's outcome and value.	Brown and M. Potoski [15]
Finalization/Closeout	This phase concludes the process, and involves reviewing, and verifying deliverables and ensuring each contract term has been acceptably fulfilled.	

Hughes, Morrison, and Ruwanpura [16] studied corporate governance and procurement corruption, which have long been identified as a social concern. Their systematic literature review identifies how the connection between procurement and corporate governance could contribute significantly to effective control of public resources, enhance social welfare and augment an economy. Drawing from research by Clohessy and Acton [17], the adoption level of blockchain is still in its infancy stage. Firms have not fully conceptualized transaction cost economics and mitigated or set effective measures to deal with corporate governance and procurement corruption issues.

Our study is designed to consider blockchain as a general-purpose institutional technology, which will mitigate this issue and transform transactional validation, trust systems, and information symmetry in public procurement, logistics, finance, and trade systems.

III. DATA AND METHODS

Research Design and Theoretical Underpinnings

We have developed a research design that is a macro-level and quantitative analytical model, which assesses BT as a systematic coordination system within the global economic landscape. We conceptualize blockchain as an element of transaction cost economics and theoretical institutional performance, where technological infrastructure determines economic outcomes by minimizing enforcement friction, verification costs, and coordination delays among distributed players.

Fig 2 determines our analysis flow of data intake to value-assignment modeling. We start our study with verifying the credibility of sources through a data harmonization and screening process. Afterwards, we evaluate its structural dependency on efficiency-transmission modeling, and lastly to limited value-addition approximations. All transits in our research design are conditional, i.e., the next phase of analysis is attained only on the achievement of structural validity and predetermine statistical level. The design is structured in a way that estimates are constrained in their methodology and regenerated in analysis as opposed to conjectural and extrapolative.

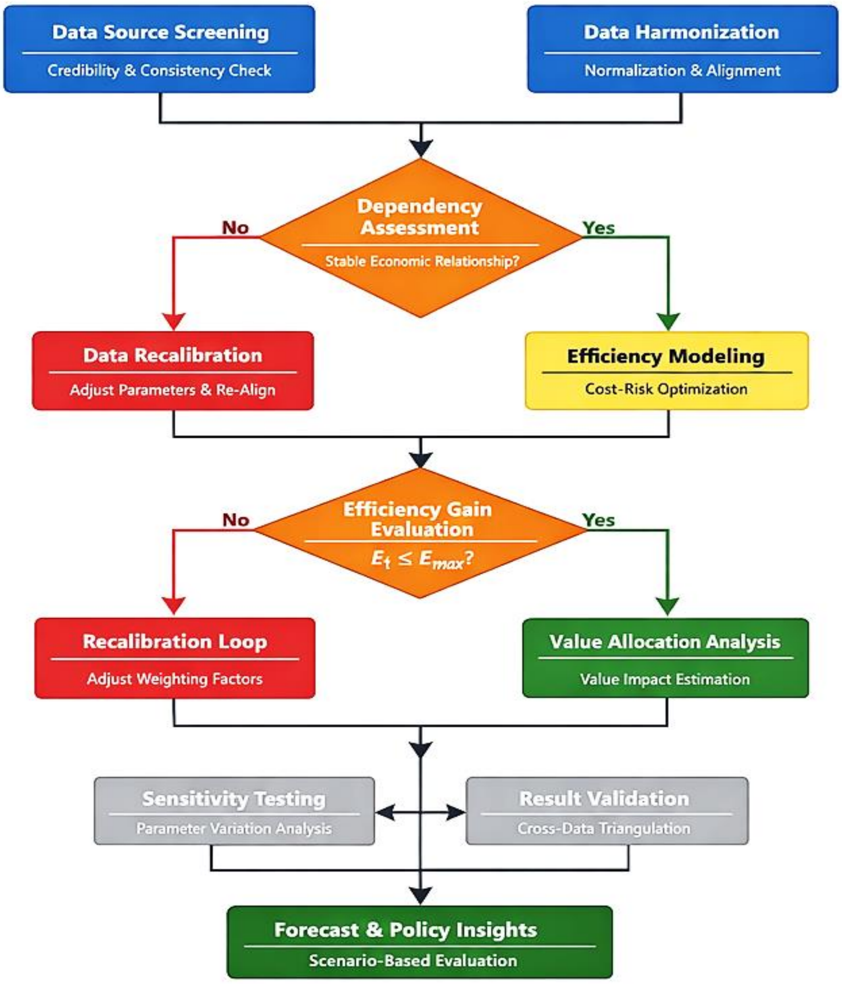

Fig 2. Research Design

Data Framework, Variable Systematization, Modeling

Our research integrates an empirical model, which is designed according to sectoral and secondary macroeconomic data obtained in globally-reputed analytical databases such as the European Commission, OECD, Gartner, HIS Markit, Juniper Research, and Statista. These sets of data were selected using global comparability, definition stability, and longitudinal continuity. Any monetary values were converted to USD, and the process of alignment across different report cycles were rendered consistently.

We grouped variables into hierarchical correlation form between technological adoption intensity and the economic efficiency of a firm on the basis of efficiency coefficient where represented blockchain adoption intensity as time t, E_t refers to the overall efficiency gain, and Y_t is the economic output related to trading activities. This work relation is computed using Eq. (1).

$$E_t = \int_0^{B_t} \left(\phi_1 \cdot \frac{\partial T_c}{\partial b} + \phi_2 \cdot \frac{\partial I_s}{\partial b} + \phi_3 \cdot \frac{\partial R_f}{\partial b} \right) db \tag{1}$$

In which, T_c computes the transaction coordination cost, I_s refers to the asymmetry of data, R_f is used to determine compliance and fraud risk, and ϕ_i is the weighting factor showing the sensitivity of the sector in process transformation enhanced by blockchain. This representation allows endogenous efficiency gains to arise out of adoption intensity as opposed by being ex ante. We employ constrained value-assignment function, which is obtained by Eq. (2).

$$\Delta V_t = \sum_{i=1}^{n} \left(Y_{i,t} \cdot \theta_{i,t} \cdot \frac{E_t}{1+\kappa_i} \right) \tag{2}$$

where ΔV_t represents to incremental value addition, $Y_{i,t}$ is the sector-based economic output, and $\theta_{i,t}$ is the structural exposure of every blockchain-relevant process, and E_t is the institutional friction coefficient, which modulates unbelievably faster transfer level. In order to achieve structural coherence of macroeconomic aggregates before estimation, interdependence is assessed through normalized dependency indexes in Eq. (3).

$$D_{xy} = \frac{\sum_{t=1}^{T} \left| \frac{X_t}{\Sigma X_t} - \frac{Y_t}{\Sigma Y_t} \right|}{T} \quad (3)$$

where X_t and Y_t represent matching macroeconomic variables. The pairs that have surpassed their dependency level and stability test progress to projection level. Within the modeling framework, methodological consistency is encapsulated using variable clusters. These clusters have been included in **Table 2**, which displays the operationalization of a structure mapping logic of measurement, and functional location.

Table 2. A Framework of Variable Clusters and Their Functional Roles

Variable Cluster	Analytical Role	Measurement Logic	Model Integration
Blockchain Adoption Intensity ($\boldsymbol{B_t}$)	Exogenous driver	Market diffusion and market scale indicators.	Efficiency integral
Efficiency Gain ($\boldsymbol{E_t}$)	Mediating variable	Minimization of costs, risk and coordination.	Value-assignment input
Trade-Related Output ($\boldsymbol{Y_t}$)	Endogenous base	Aggregate economic performance.	Value multiplier
Institutional Friction ($\boldsymbol{\kappa_i}$)	Constraint parameter	Structural inertia and regulatory inertia.	Dampening factor

Analytical Process, Decision-Flow and Validation

Our analytical process is governed by a multi-tiered decision-flow framework that guarantees the harmonious flow of phases within the estimation process. As show in **Fig 2**, our study begins with screening the admissibility of data, during which datasets that do not meet consistency requirements and scope are normalized or removed. When the workflow is validated, it proceeds to structural dependency test level where variables are evaluated based on their stability and proportional coherence before proceeding to efficiency modeling test.

At the efficiency modeling node, a decision gate is integrated and employed to compare the projected gains of efficiency with empirically viable limits. In case the condition $E_t \leq E_{max}$ is not attained, with E_{max} being the top quartile of the historically evaluated optimization process rate, the model bounces back to recalibration loop, where sectoral sensitivity coefficients denoted by ϕ_i are modified. It is not until the loop has passed that the workflow continues to value-assignment projection.

Lastly, we performed a sensitivity analysis over the major parameters, such as adoption elasticity and institutional friction coefficients, which are shown in Eq. (4),

$$\frac{\partial \Delta V_t}{\partial \kappa_i} < 0 \text{ and } \frac{\partial \Delta V_t}{\partial B_t} > 0 \quad (4)$$

rendering model activity directionally consistent and economically intuitive. Triangulation between different providers of data, internal consistency tests between bounded-variation tests and macroeconomic ratios with alternative parametric specification are employed to validate it. This methodology does not make any causal assertions on its part, hence contributing to the framework of integrated projections, decision-oriented economic analyses, and system-level modeling, which is aligned with current Gartner and OECD methodical recommendations on the evaluation of emerging technologies.

IV. RESEARCH FINDINGS

Blockchain Market Growth

Our findings show that the cryptocurrency market is rapidly growing. In the context of the financial sector, Yang, Sun, and Wang [18] reported a market turnover of up to USD 0.84 billion in 2020. As shown in **Fig 3**, this value tripled by 2022. Nonetheless, as shown in **Fig 4**, considering the rapid spread of technology, blockchain is widely employed in the Western Europe (with turnover of over USD 2.9 billion), and in the United States (with over USD 4.2 billion). Currently, BT is widely employed in organizing the circulation of cryptocurrency, but with novel protocols, blockchain has started to grant data exchange and information access, track transactions, provide payments, protect identity, etc. (see **Fig 5**). The major objectives and functions of BT are to coordinate mutual settlement, provide data flows, and safeguard data. Thus, these innovations are on high demand in financial businesses, and global trade, especially during a season when logistics are highly affected see **Fig 6** and **Fig 7**.

Bekkers et al. [19] recorded in 2020 a decline in global trade activities by 5.3% compared to 2019. During this time, GDP reduced by 3.6%, highlighting that the general trade suffered increasingly compared to the overall economic processes in the globe.

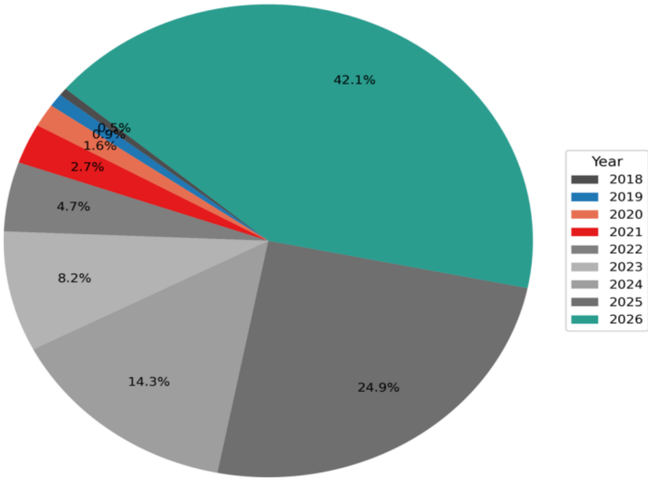

Fig 3. Projections of BT within the Financial Sector, USD Billion

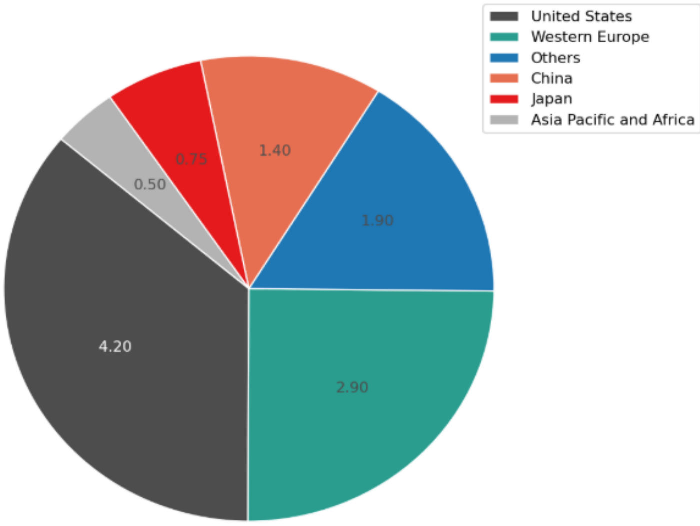

Fig 4. Projections of Geographic Tends of BT Employed by 2026

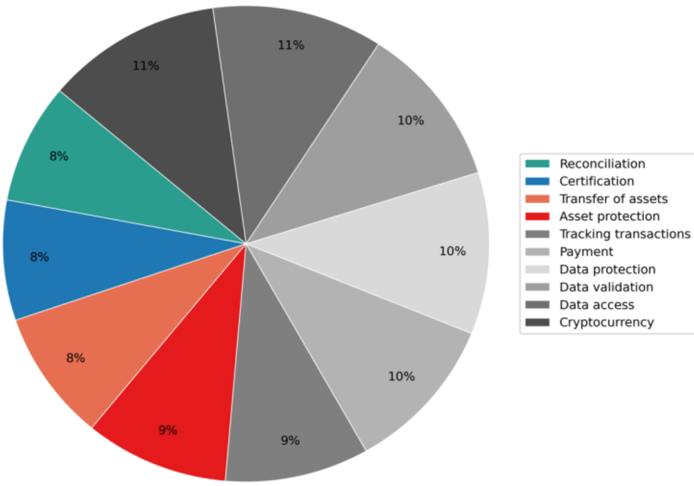

Fig 5. Major Application of BT

It should be considered that global trade accounts for approximately 26% of the GDP, while as of 2019, the global trade to the GDP ratio was approximately 27%. Irrespective of the general negative global service dynamics, the financial sector indicated an increase of 4% as of 2020. Moreover, during this period, activity and commodity level with the computer sector also increased by 8%.

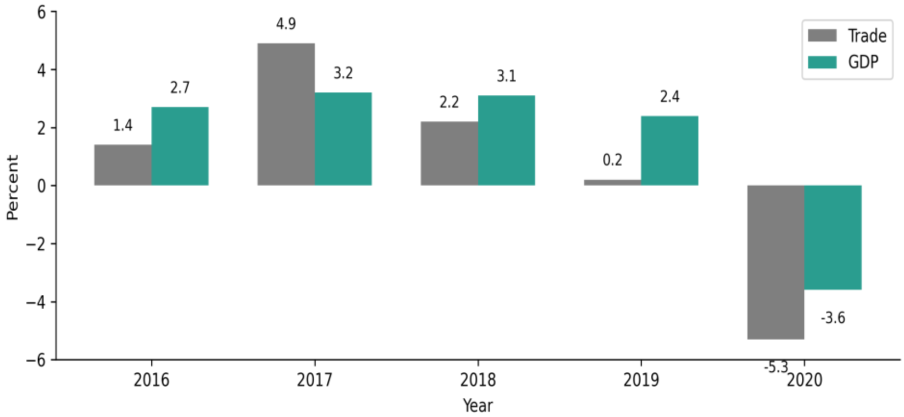

Fig 6. Yearly Growth of Global GDP/Trade Indicators from 2016-2020, In Percent

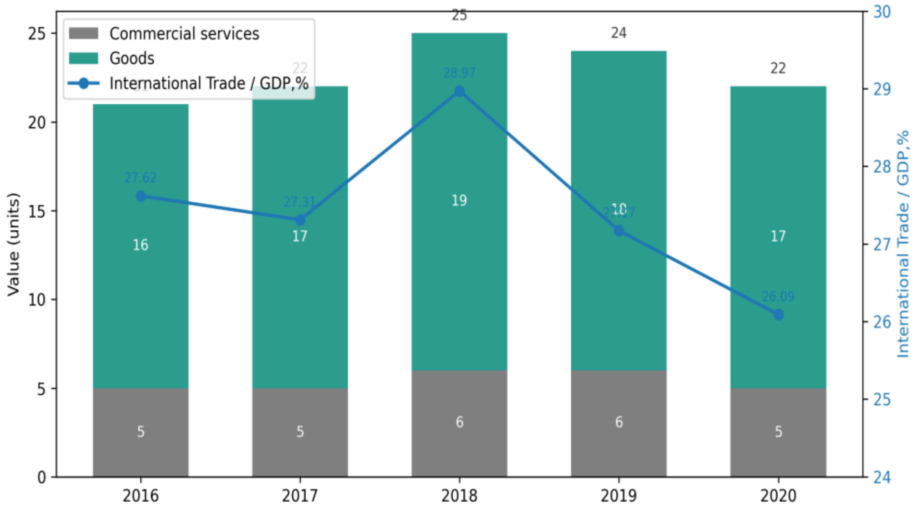

Fig 7. Structure and Dynamics of Global Trade, Recorded from 2016 To 2020 and Their Links to GDP Dynamics

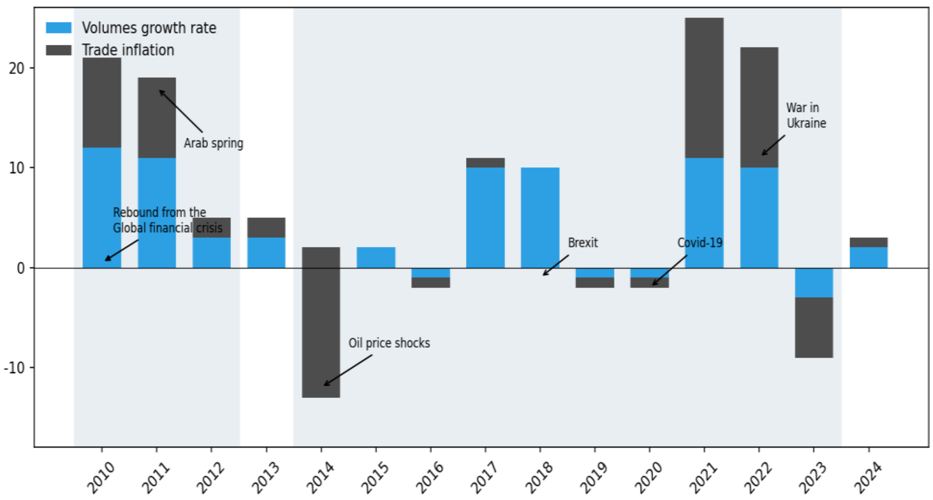

Fig 8. Growth Rate of Import Volume (2010-2024), Percent

For over a decade now, both the commodity price and inflation have experienced major volatility, with critical international events increasingly contributing to rapid changes in the values of global trade through trade volumes. **Fig 8** highlights the patterns in the general pricing of traded products, underscoring various key patterns that have contributed to their recent patterns.

Supply Chains and Cost Efficiency

Blockchain has various applications and may be employed in any exchanges, contracts, or agreements, monitoring, and making payments. It is noted that blockchain can enhance the transparency and efficiency of the supply chain and positively impact every activity from delivery warehousing to payment. The BT enhances consensus, which implies that there are no conflicts in transaction chains because all parties in the chain have a similar ledger version. Every entity in the blockchain system can view their asset ownership sequence within the chain. In addition, blockchain recordings cannot be removed, which makes it possible to implement transparency within the supply chain see **Fig 9**.

Fig 9. Enhancing the Supply Chain with BT

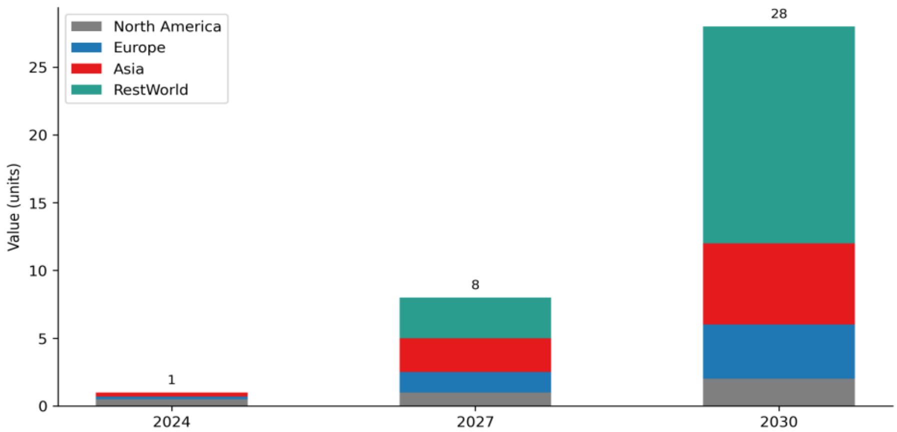

Fig 10. Implementation Costs of BT In the Banking Sector, in USD Billion

The application of BT can minimize the costs of coordinating trading activities by digitizing financial mediation and organizing the firm's operations. Moreover, provided the fact that quite a significant segment of the logistics procedures will be automated in future years, the effect of labor efficiency will greatly be impacted. By 2030, banking institutions globally will save more than USD 27 billion yearly in international trade using BT.

In addition, as depicted in **Fig 10**, the advent of blockchain-oriented solution will significantly minimize bank's expenses. However, professionals in the financial sector warn that it is pointless to expect sudden reduction in costs. Early on, existing methods of screening will be applied matching with the strategies designed on the chain, so it will take years for them to converted into a uniform format.

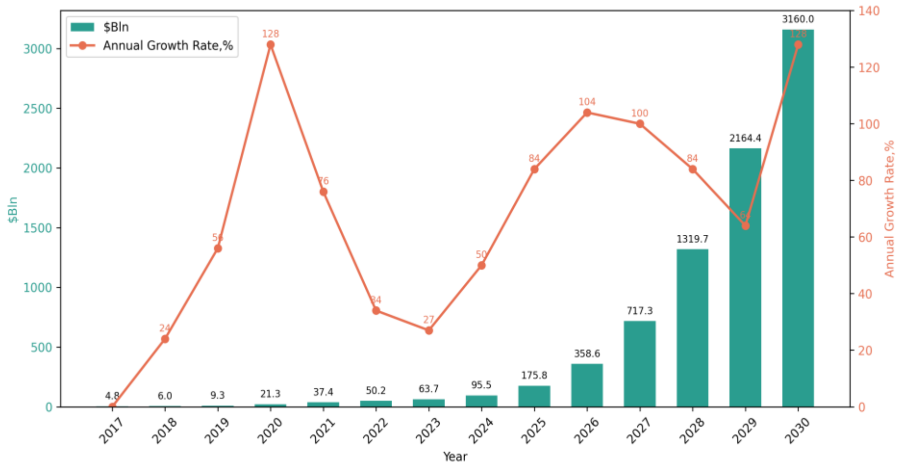

Fig 11. Value Addition to Global Economy Using BT, in USD Billion

According to Meghla et al. [20], the yearly cost savings in 2024 were USD 1 billion. They believed that firms engaged in food exports will also benefit from the technology. In a period of 12 years, they will be able to reduce costs by half to fight corruption activities. Initially, global data providers, HIS Markit, forecasted that the business value of firms using BT on decentralized registry technologies would increase from USD 2.5 billion in 2017 to USD 2 trillion by 2030.

Public Procurement and Trade Value

Lastly, BT allows the advent of concepts of global copyright protection. Currently, this is only controlled at the regional level. Government procurements is one of the major elements of global trade. These purchases form approximately 10 to 15% of the overall GDP. In reference to calculation of professionals, the turnover rate of government procurement is approximately USD 9.45 trillion. The professionals estimate that 20 to 25% all procurements typically involve corruption or fraud. In addition, we firms save 10% on procurement, most of EU nations will end up with an excess rather than a shortfall in budget. In that case, the challenge of transparency in the coordination of procurement is severe in most countries.

BT can provide highly effective electronic environments where all data will remain unmodified for future years. Second, the technology can provide the privacy for these transactions with intelligent contracts and screening of the whole process of procurement, which ranges from submission of market campaigns, bid searching to control of delivery procedures. However, the most essential aspect about public procurement is its public and transparent process. Currently, developed countries such as Canada and USA are transiting to these technologies. BT activation in these countries contribute to rapid growth of the economy, and its revenue is projected to be more than USD 3.1 trillion by 2030, as illustrated in **Fig 11**.

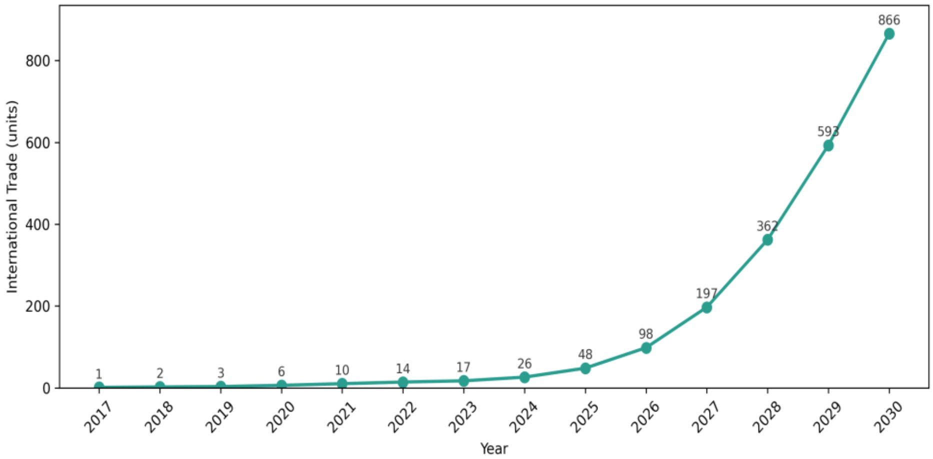

Fig 12. Value Addition of Global Trade Using BT, in USD Billion

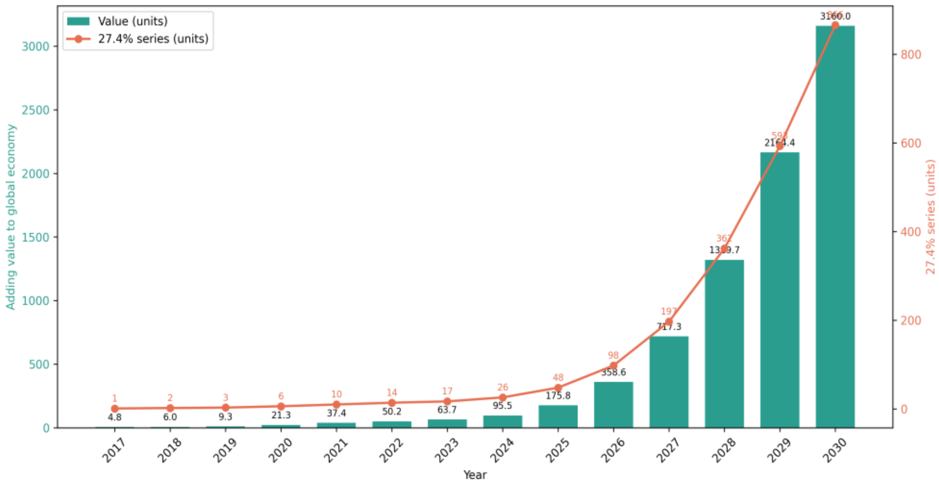

Fig 13. Value Addition Calculations of Global Trade Using BT, in USD Billion

Since global trade account to approximately 27% of the overall GDP, it is convenient to forecast the pattern of trade value addition using BT see **Fig 13**. In addition, the Person coefficient between global trade volume and GDP is 0.81, which permits us to assume adequately higher forecast reliability. Therefore, with the employment of BT, global trade can grow by USD 14 billion, and reach USD 866 billion by 2030, as shown in **Fig 12**. Lastly, blockchain is in its active development stage, after which investment operations will reduce, and BT will repurpose on creating business models for operating firms, regardless their sector. By 2030, a third development phase is expected to be rolled out, which will involve the deployment of the technology in the economic landscape.

V. CONCLUSION

Our findings underscore the significance of blockchain in the fields characterized by intricate verification procedures, fragmented data flows, and higher organization costs, such as public procurement, and international trade. For a strategic and policy perspective, results propose that the economic relevance of blockchain depends not solely in technological advent, but in its ability to restate efficiency and trust at scale. Systematically, we provide a replicable analytical framework for assessing emerging digital systems, providing a basis for future research which involves sector-based data, institutional analysis and dynamic adoption modeling as BT continues to grow and penetrate the global economic landscape.

CRediT Author Statement

The authors confirm contribution to the paper as follows:
Conceptualization: Natarajan K and John Atta Mills; **Methodology:** John Atta Mills; **Data Curation:** Natarajan K and John Atta Mills; **Writing- Original Draft Preparation:** Natarajan K and John Atta Mills; **Visualization:** Natarajan K; **Investigation:** Natarajan K and John Atta Mills; **Supervision:** John Atta Mills; **Validation:** Natarajan K; **Writing-Reviewing and Editing:** Natarajan K and John Atta Mills; All authors reviewed the results and approved the final version of the manuscript.

Data Availability

No data was used to support this study.

Conflicts of Interests

The author(s) declare(s) that they have no conflicts of interest.

Funding

No funding agency is associated with this research.

Competing Interests

There are no competing interests.

References

[1]. L. V. T. Duong, D. Van Hieu, P. H. Luan, T. T. Hong, and L. D. Khai, “Hardware Implementation For Fast Block Generator Of Litecoin Blockchain System,” 2021 International Symposium on Electrical and Electronics Engineering (ISEE), vol. 2, pp. 9–14, Apr. 2021, doi: 10.1109/isee51682.2021.9418691.

[2]. O. J. Kwok and H. Treiblmaier, “Blockchain technology as a driver of economic development in small economies: a dynamic capabilities framework,” Journal of Decision System, vol. 33, no. 3, pp. 413–438, May 2023, doi: 10.1080/12460125.2023.2214304.

[3]. Q. K. Nguyen, “Blockchain - A Financial Technology for Future Sustainable Development,” 2016 3rd International Conference on Green Technology and Sustainable Development (GTSD), Nov. 2016, doi: 10.1109/gtsd.2016.22.

[4]. R. Toorajipour, P. Oghazi, V. Sohrabpour, P. C. Patel, and R. Mostaghel, “Block by block: A blockchain-based peer-to-peer business transaction for international trade,” Technological Forecasting and Social Change, vol. 180, p. 121714, Apr. 2022, doi: 10.1016/j.techfore.2022.121714.

[5]. Y. Yuan and F.-Y. Wang, “Blockchain and cryptocurrencies: model, techniques, and applications,” IEEE Transactions on Systems Man and Cybernetics Systems, vol. 48, no. 9, pp. 1421–1428, Jul. 2018, doi: 10.1109/tsmc.2018.2854904.

[6]. K. Becker, “Blockchain Matters—Lex Cryptographia and the Displacement of Legal Symbolics and Imaginaries,” Law And Critique, vol. 33, no. 2, pp. 113–130, Jan. 2022, doi: 10.1007/s10978-021-09317-8.

[7]. P. K. Ozili, “CBDC, Fintech and cryptocurrency for financial inclusion and financial stability,” Digital Policy Regulation and Governance, vol. 25, no. 1, pp. 40–57, Nov. 2022, doi: 10.1108/dprg-04-2022-0033.

[8]. J. Kembro and K. Selviaridis, “Exploring information sharing in the extended supply chain: an interdependence perspective,” Supply Chain Management an International Journal, vol. 20, no. 4, pp. 455–470, Jun. 2015, doi: 10.1108/scm-07-2014-0252.

[9]. K. Premazzi, S. Castaldo, M. Grosso, P. Raman, S. Brudvig, and C. F. Hofacker, “Customer Information Sharing with E-Vendors: The Roles of Incentives and Trust,” International Journal of Electronic Commerce, vol. 14, no. 3, pp. 63–91, Apr. 2010, doi: 10.2753/jec1086-4415140304.

[10]. B. Lus and A. Muriel, “Measuring the impact of increased product substitution on pricing and capacity decisions under linear demand models,” Production and Operations Management, vol. 18, no. 1, pp. 95–113, Jan. 2009, doi: 10.1111/j.1937-5956.2009.01001.x.

[11]. N. S. S. Dzreke and N. S. E. Dzreke, “Evaluating the impact of public procurement reforms on Ghana’s economic development: An Analysis of Effectiveness and Growth Contribution,” World Journal of Advanced Engineering Technology and Sciences, vol. 16, no. 2, pp. 037–043, Aug. 2025, doi: 10.30574/wjaets.2025.16.2.1282.

[12]. S. Patrucco, D. Luzzini, and S. Ronchi, “Research perspectives on public procurement: Content analysis of 14 years of publications in the journal of public procurement,” Journal of Public Procurement, vol. 17, no. 2, pp. 229–269, Mar. 2017, doi: 10.1108/jopp-17-02-2017-b003.

[13]. S. A. Torabi, I. Shokr, S. Tofighi, and J. Heydari, “Integrated relief pre-positioning and procurement planning in humanitarian supply chains,” Transportation Research Part E Logistics and Transportation Review, vol. 113, pp. 123–146, Mar. 2018, doi: 10.1016/j.tre.2018.03.012.

[14]. M. A. Bergman and S. Lundberg, “Tender evaluation and supplier selection methods in public procurement,” Journal of Purchasing and Supply Management, vol. 19, no. 2, pp. 73–83, Mar. 2013, doi: 10.1016/j.pursup.2013.02.003.

[15]. T. L. Brown and M. Potoski, “Contract–Management capacity in municipal and county governments,” Public Administration Review, vol. 63, no. 2, pp. 153–164, Feb. 2003, doi: 10.1111/1540-6210.00276.

[16]. Hughes, E. Morrison, and K. N. Ruwanpura, “Public sector procurement and ethical trade: Governance and social responsibility in some hidden global supply chains,” Transactions of the Institute of British Geographers, vol. 44, no. 2, pp. 242–255, Oct. 2018, doi: 10.1111/tran.12274.

[17]. T. Clohessy and T. Acton, "Investigating the influence of organizational factors on blockchain adoption," Industrial Management & Data Systems, vol. 119, no. 7, pp. 1457–1491, Jun. 2019, doi: 10.1108/imds-08-2018-0365.
[18]. B. Yang, Y. Sun, and S. Wang, "A novel two-stage approach for cryptocurrency analysis," International Review of Financial Analysis, vol. 72, p. 101567, Sep. 2020, doi: 10.1016/j.irfa.2020.101567.
[19]. E. Bekkers, E. Corong, J. Métivier, and D. Orlov, "How will global trade patterns evolve in the long run?," World Economy, vol. 47, no. 8, pp. 3578–3617, Jun. 2024, doi: 10.1111/twec.13575.
[20]. H. A. Meghla, Md. N. Alam, S. M. Rifat, and I. Masroor, "Sea of opportunities: unravelling the impact of cluster-based blue entrepreneurship and blue technology penetration on seaweed export propensity," Environment Development and Sustainability, Sep. 2024, doi: 10.1007/s10668-024-05349-z.