International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 12 Issue 7 (Special Issue), July 2025, Website: www.ijiras.com
ISSN: 2394-4404

The Role Of Blockchain In E-Commerce: Enhancing Security And Transparency

H. Shafiya Begam

V. Mathivathana

II-M.com
Idhayacollege for Women(A), Kumbakonam
(Affiliated to Bharathithasan University)

Abstract: ***This study explores the role of blockchain technology in enhancing security and transparency in e-commerce. Lumpchain's decentralized and unchallengeable nature offers a secure and transparent platform for online transactions, reducing the risk of fraud and data interruptions. The use of smart contracts and cryptographic procedures ensures the integrity and authenticity of transactions, while real time following and transparent supply chains enhance customer trust and confidence. This study highlights the potential of blockchain to develop the e-commerce industry by providing a secure, transparent, and efficient way to conduct transport network and manage data. Blockchain technology is updating commerce by meaningfully attractive security and transparency through its decentralized, immutable, and transparent ledger system. By leveraging blocksequence, businesses can restructure operations, reduce fraud, and shape greater faith with customers.***

Keywords: Blockchain, e-commerce, security, transparency, smart contracts, supply chain management.

I. INTRODUCTION

The speedy growth of e-commerce has led to an enlarged demand for protected and transparent online transactions. Blockchain technology has appeared as a potential solution to address the security and transparency concerns in e-commerce. By providing a decentralized, immutable, and transparent ledger, blockchain technology can enrich the security and obligation of online transactions. This training explores the role of blockchain in e-commerce, with a effort on its potential to enhance safety and transparency. Blockchain is a decentralized digital ledger that records transactions across multiple computers in a secure, tamper-proof way. Each transaction is stored in a block, interconnected to the previous block, forming a chain hence the name. The skill ensures data integrity and eradicates the need for intermediaries.

II. BENEFITS OF BLOCKCHAIN IN E-COMMERCE

- ✓ *Enhanced Security:* Blockchain uses cryptographic algorithms to safe data, making it nearly impossible for hackers to change or bargain information. This is especially vital for maintenance sensitive customer data like payment details.
- ✓ *Improved Transparency:* Transactions on a blockchain are immutable and visible to all participants, encouragement trust between businesses and customers. Slide helps reduce differences and ensures accountability.
- ✓ *Cost Saving:* By removing intermediaries such as payment supercomputers, blockchain reduces business deal fees, saving money for both businesses and customers.

III. SECURITY BENEFITS

- ✓ *Decentralized Data Storage:* Blockchain offers a decentralized and immutable ledger that confirms transparency and trust in online transactions, meaningfully dropping the risk of fraud and data openings.
- ✓ *Encryption and Cryptographic Confusing:* Blockchain uses advanced cryptographic systems to secure data, making it nearly difficult for hackers to alter or steal data.

IV. TRANSPARENCY BENEFITS

- ✓ *Immutable Ledger:* Every transaction is recorded on a public ledger that can be retrieved and audited by all parties complicated, ensuring transparency and accountability.
- ✓ *Transparent Supply Chain:* Blockchain can track the journey of a product from its beginning to the consumer, providing complete and clear records at every step of the supply chain.

V. EXAMPLES OF BLOCKCHAIN IMPACT ON E-COMMERCE

- ✓ *Rakuten's Blockchain Project:* Rakuten, a Japanese e-commerce company, integrated blockchain technology into its platform, producing a special program for loyal customers called "Rakuten Super Points" and introducing a new payment tool called Rakuten Coin.
- ✓ *Walmart's Food Traceability:* Walmart uses blockchain to track food products, confirming their validity and security.

DIFFICULTIES OF IMPLEMENTING BLOCKCHAIN TECHNOLOGY IN E COMMERCE

- ✓ *The sensitive efficiency of the supply chain.* The growth of technology for ecommerce that relies on blockchain is a solution that improves the efficiency of the supply chain by making an correct and up-to-date picture and, therefore, a record of every transaction. And with blockchain every single division of that supply chain starting from the making of the product till the reaching at the end step is checked and verified. This makes the whole running of the business much easier and more competent.
- ✓ *Better Imperviousness and Assurance of The Product.* One of the exclusive points of division in blockchain technology is her ability to provide imperviousness and assurance. Using Blockchain allows users to look back at all transactions recorded on the ledger and find where accurately the products came from, all the up to their quality. Such high stages of transparency help to create trust between the sellers and buyers of high or luxury grade products.

OPTIONS	NO OF RESPONDENTS	PERCENTAGE
Very Satisfied	9	17%
Satisfied	24	46%
Neutral	11	21%
Unsatisfied	7	14%
Very Unsatisfied	1	2%
Total	**50**	**100%**
OPTIONS	**NO OF RESPONDENTS**	**PERCENTAGE**
Very Satisfied	9	17%
Satisfied	24	46%
Neutral	11	21%
Unsatisfied	7	14%
Very Unsatisfied	1	2%
Total	**50**	**100%**

REDUCTION IN

- ✓ *Fraudulent Activities.* Cybercrime is still a big fear in e-commerce, but it may be moderated with the use of a responsible and secure blockchain ledger. The incapability to alter or erase a noted transaction lowers the possibility of fraud.
- ✓ *Better Data Traceability.* Blockchain records every transaction in an intricate, irreversible ledger, which enhances data tracking. This tool facilitates compliance and dispute resolution while streamlining audit procedures.

VI. OVERCOMING CHALLENGES AND LIMITATIONSOFBLOCK CHAIN IN ECOMMERCE

- ✓ *Scalability Issues*

Blockchain networks like Bitcoin and Ethereum often suffer from slow transaction speeds and imperfect output. E-commerce platforms that handle millions of transactions daily may fight with block sequence's current capacity.

- ✓ *High Energy Consumption*

Proof-of-Work (PoW) blockchains consume large amounts of energy. This raises concerns about sustainability and operational costs, particularly for large-scale retail operations.

- ✓ *Integration with Current Systems*

E-commerce businesses use traditional centralized databases. Participating blockchain with these systems requires mechanical expertise and rearrangement, making adoption multifaceted and costly.

- ✓ *Absence of Regulatory Clarity*

In many countries, blockchain is not yet fully controlled. Insecurity around legal status, data privacy, and taxation makes businesses uncertain to adopt it.

- ✓ *Data Privacy vs Transparency Dilemma*

Blockchain is transparent and unchallengeable, but this may conflict with privacy regulations like GDPR, which require data removal rights.

VII. CLASSIFICATION OF BLOCKCHAIN TECHNOLOGY IN ECOMMERCE

✓ *Public Blockchain*

Open to everyone; anyone can join and confirm transactions.Examples: Bitcoin, Ethereum.

Use in e-commerce: Accepting cryptocurrency payments, worldwide peer-to-peer transactions.

✓ *Private Blockchain*

Controlled by a single organization; access is constrained.

Use in e-commerce: Secure internal operations like inventory tracking, supplier contracts, and logistics.

✓ *Consortium Blockchain (Federated)*

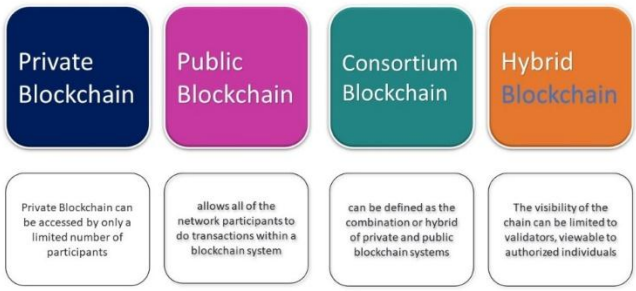
Controlled by a group of organizations rather than a single entity.

Use in e-commerce: Collaboration between vendors, manufacturers, and logistics providers for shared visibility and transparency.

✓ *Hybrid Blockchain*

Combines features of both public and private blockchains.

Use in e-commerce: For example, sensitive business data remains private while transaction records persist public.



VIII. SIGNIFICANCE OF SECURITY AND TRANSPARENCY OF BLOCKCHAIN IN ECOMMERCE

✓ *Enhanced Confidence*

Immutable records prevent interfering or fraud. Encryption and devolution protect data from hacks.

✓ *Improved Transparency*

Every transaction is recorded and accessible in the ledger. Builds customer trust through traceable product histories.

✓ *Efficient Payment Structures*

Enables fast, secure, and low-cost cross-border transactions using crypto currencies. Reduces reliance on groups and third-party processors.

✓ *Automation with Smart Contracts*

Routinely enforce agreements (like refund conditions, payments, or shipping) without manual intervention.

✓ *Supply Chain Visibility*

Pathways goods from origin to delivery. Helps combat imitation products and ensures product validity.

IX. SMART CONTRACTS IN ECOMMERCE

Here are some potential uses of smart contracts in e-commerce:

✓ *Mechanical Payment Processing:* Smart contracts can automate payment processing, safeguarding that payments are made automatically when certain circumstances are met.

✓ *Inventory Supervision:* Smart contracts can track portfolio levels and automatically generatereplacing or shipping processes.

✓ *Order Fulfillment:* Smart contracts can mechanize order fulfillment, ensuring that orders are processed and shipped efficiently.

✓ *Returns and Refunds:* Smart contracts can automate returns and refunds, reducing the need for manual interpolation.

✓ *Supply Chain Management:* Smart contracts can track products throughout the supply chain, ensuring authenticity and reducing pretending.

X. THE FUTURE OF BLOCK CHAIN IN E-COMMERCE IN MARKETPLACES

✓ *Decentralized Marketplaces:* Block series empowers peer-to-peer transactions without intermediaries, reducing fees and increasing faith. Platforms like Open Bazaar and Origin Protocol are already leveraging this knowledge.

✓ *Smart Contracts:* Self-executing contracts automate transactions, enforce terms, and eliminate intermediaries, making transactions faster, safer, and more efficient.

✓ *Tokenization:* Varying assets into digital tokens on the blockchain can create new income streams and enhance customer loyalty.

✓ *Crypto currency Payments:* Integrating cryptocurrency payments into e-commerce platforms suggestions an alternative to traditional expense methods and can reduce transaction costs.

XI. APPLICATIONS OF BLOCKCHAIN IN E-COMMERCE

✓ *Inventory Control*

Through block chain, online stores can automate inventory management, consuming real-time data to ensure ideal stock levels. By eliminating manual progressions and human error, blockchain minimizes the risk of stock outs and excess inventory growth.

✓ *Digital Proprietorship*

Through block chain technology, retailers gain comprehensive ownership of digital assets such as storefronts, product mass media, and customer appraisals. These assets are

securely recorded on the block chain, ensuring transparency and preventing unauthorized modifications or meddling.

✓ *Loyalty Reward Sequencers*

Leveraging blockchain, e-commerce platforms can offer modified loyalty reward programs by securely capturing and analyzing buying history and preferences. This enables targeted offers and rewards tailor-made to individual customer needs and preferences, enhancing customer appointment and maintenance.

✓ *Supply Chain Tracking*

Block chain technology enables transparent and dependable tracking of the entire supply chain process. By recording every transaction and undertaking of goods on a decentralized ledger, e-commerce companies can ensure observance to agreed-upon criteria, verify product authenticity, and maintain transparency throughout the supply chain voyage.

XII. CONCLUSION

Blockchain technology is revolutionizing commerce by expressively improving security and transparency. Its decentralized and immutable ledger system ensures secure transactions, eradicates intermediaries, and provides a transparent record of all activities. This nurtures trust, reduces fraud, and updates various processes, including supply chain management and digital asset defense. While encounters like scalability and integration exist, the potential benefits of blockchain in e-commerce are incontrovertible.

REFERENCES

[1] S. S. Alateeg and A. D. Alhammadi, "Traditional Retailer's Intention To Opt E-Commerce For Digital Retail Business In Saudi Arabia," Migration Letters, vol. 20, no. 7, pp. 1307-1326, 2023.

[2] O. Ghazali et al., "Cloud-based global online marketplaces review on trust and security," 2019.

[3] N. Kuruwitaarachchi, P. Abeygunawardena, L. Rupasingha, and S. Udara, "A systematic review of security in electronic commerce-threats and frameworks," Global Journal of Computer Science and Technology, vol. 19, no. 1, pp. 33-39, 2019.

[4] A. S. Sikder, "Blockchain-Empowered E-commerce: Redefining Trust, Security, and Efficiency in Digital Marketplaces in the Context of Bangladesh.: Blockchain-Empowered E-commerce," International Journal of Imminent Science & Technology, vol. 1, no. 1, pp. 216-235, 2023.

[5] D. Widijowati, "Enhancing Consumer Protection in Electronic Commerce Transactions," Research Horizon, vol. 3, no. 4, pp. 283-290, 2023.

[6] J. Babayev, "Safeguarding Consumer Rights in the Digital Age: Challenges and Strategies," Uzbek Journal of Law and Digital Policy, vol. 1, no. 1, 2023.