International Journal of Management, IT & Engineering
Vol. 13 Issue 07, July 2023
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Electronic Data Interchange on Blockchain

Jhansi Bharathi Madavarapu*

Abstract

Blockchain has the potential to transform Electronic Data Interchange. Based on public blockchain technology, Blockchain Data Interchange is the current progression of Electronic Data Interchange (EDI). It enables the peer-to-peer exchange of electronic business communications in an agile, encrypted, auditable, and cost-efficient manner without third parties. All Business-to-Business operations are connected and streamlined via Blockchain Data Interchange based on Industry Standard communication formats and ERP/IT system plugins.Technology experts and commentators have been praising Blockchain. The underlying technology underpinning cryptocurrencies like Bitcoin has usedthe applications ever since Bitcoin started to get widespread notice. Even though Blockchain has applications and uses beyond cryptocurrencies, there is still much excitement around this relatively new technology regarding its potential to increase transaction security and transparency. It might be tempting to join the early adopters to benefit from the many opportunities and possibilities of adopters. However, occasionally thismight make businesses neglect other, more conventional options. It is essential to carefully weigh each alternative and choose the one that best suits the organization's requirements before deciding. Understanding the various technologies and how they might meet unique requirements is essential to making the best decision. Electronic data exchange (EDI), a currently available technology that enables transacting parties to cooperate and share information electronically, is one such option. This study examined the two technologies and a procedure to aid businesses in choosing the best choice for their needs and skills.

*Copyright © 2023*International Journals of Multidisciplinary Research Academy.*All rights reserved.*

Keywords:
Blockchain;
Electronic Data Interchange;
Security;
Protocol;
Encryption/Decryption

Author correspondence:
Jhansi Bharathi Madavarapu
Ph.D. in Information Technology,
University of the Cumberland's, Williamsburg, Kentucky, USA,40769
jhansimadavarapu@gmail.com

1. Introduction

In 1970-71, businesses started experimenting with EDI, and the first EDI standards were created for the transportation sector. Different corporate systems can connect using a standard format that EDI offers most extensively used EDI standards are EDIFACT (Electronic Data Interchange For Administration, Commerce, and Transport), used globally, and ANSI ASC X12 (American National Standards Institute/Accredited Standards Committee X12), widely used in North America [1]. Both standards include subgroups to meet the unique requirements of different sectors.Blockchain is a decentralized information system that uses encryption and peer-to-peer networking to build a shared ledger of transactioninformation. A single, secure, and immutable database houses an ever-expanding ledger of validated transactions organized into batches by the system.

Electronic business messages Purchase orders, Sales Orders, and Invoices can be exchanged in anencrypted and cost-efficient. Blockchain Data Interchange (BDI) is a modern evolution of Electronic Data Interchange (EDI) based on blockchain technology, with the help of the UNISOT ERP plugins and established industry standards. Blockchain Data Interchange enables companies to securely link and automate their business-to-business activities

*Ph.D. in Information Technology, University of the Cumberland's, Williamsburg, Kentucky, USA,40769

International Journal of Management, IT & Engineering
Vol. 13 Issue 07, July 2023
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

with their supply chain partners.Today, Blockchain Data Interchange (BDI) offers a very adaptable, smooth, and secure way to integrate corporate operations throughout international supply chains. Allowing businesses of all sizes to digitalize their business operations fully will lead to quicker partner integration, improved trade partner connections, cheaper transaction costs, and improved data [2].

2. Electronic Data Interchange Use

EDI standards are EDIFACT, used globally, and ANSI ASC X12,widely used in North America. Both standards include subgroups to meet the unique requirements of different sectors. The standard's goal is to identify the segments and transactions that make up an EDI document's sequence and location of data.Individual bits of data make up elements. A segment is produced when components are brought together,and a transaction combines several parts. Trading partners can use an EDI network service provider or their system to send and receive documents detailing. Three steps are necessary to submit a document:

- Information in the document
- Producing an EDI document
- Sending the EDI document

Organization staff can manually enter the data via a digital form or use computer tools to pull the data from multiple systems when determining the data that has to be included in an EDI document. The procedure is more effective when an extraction program is used; nonetheless, mapping the data sources of the current system to the EDI application takes time [3]. After it has been prepared, the EDI document is sent directly to the trade partner's internal system or an EDI network services provider. In Figure 1,

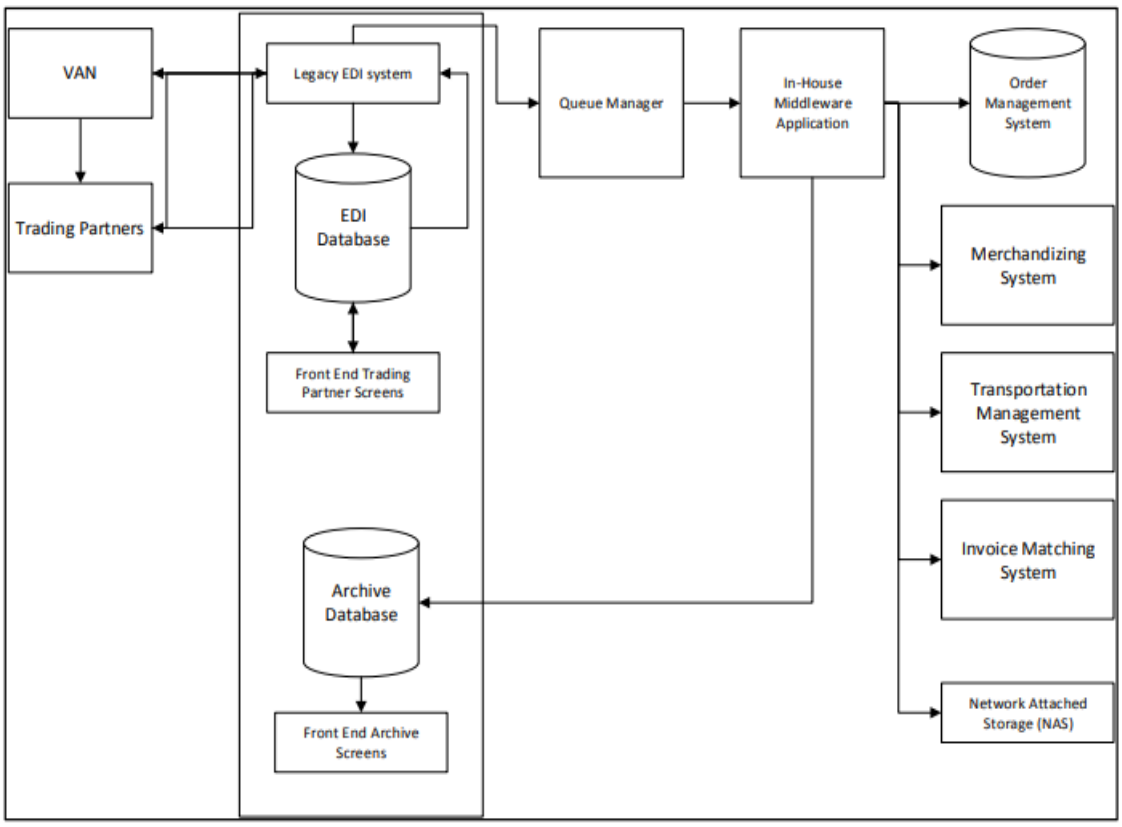

Figure 1. *EDI Process*

According to Figure 1, Sending and receiving EDI documents are identical. The EDI document is sent to the trade partner directly into its internal system or via an EDI network service provider. The internal system receives the EDI data after being modified to fit it [4]. The information system sends A confirmation receipt to the sending

International Journal of Management, IT & Engineering
Vol. 13 Issue 07, July 2023
ISSN: 2249-0558 Impact Factor: 7.119
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

partner. EDI integration now takes place in a cloud environment. The cloud version of EDI, often known as an integration platform as a service, enables businesses to, Regardless matter whether the company's information systems are controlled internally, by a third party, or are cloud-based, must integrate via any protocol, format, and system. These cloud EDI options offer smooth improvements that do not interfere with corporate processes. Are just a few broad advantages of implementing EDI are:

- Minimized data input while improving data quality
- Less interference with the auditing process
- The shortened time needed for a business cycle to complete.
- Increased corporate productivity.
- Encryption software to improve data security
- Increased strategic benefits
- Business models are driven by demand
- Enhanced decision-making techniques

Additionally, EDI has several drawbacks. Onboarding new trade partners could take longer since they need to connect their information system to the EDI application. Businesses would need to allocate specific IT resources during the early installation phase for data mapping and after that for EDI application maintenance. It might take a long time and be challenging to implement changes due to regulatory changes. Similar to this, certain business partners can request customized supplementary information. These modifications can be expensive and negate the standard format's benefits. Lastly, EDI software managed by third parties might restrict visibility, making it harder for businesses to track any mistakes during data transfer [5][6].

3. Blockchain Use

This section explains that Blockchain uses adecentralized information system with encryption andpeer-to-peernetworking to build a shared ledger of transaction information. A single, secure, and immutabledatabaseledger of validated transactions organized into batches by the system. When a customer wants to place an order with a vendor for particular items, the consumer may give the vendor the purchase order as a hash record, who would then decrypt the order using a private/public key pair (Figure 2).

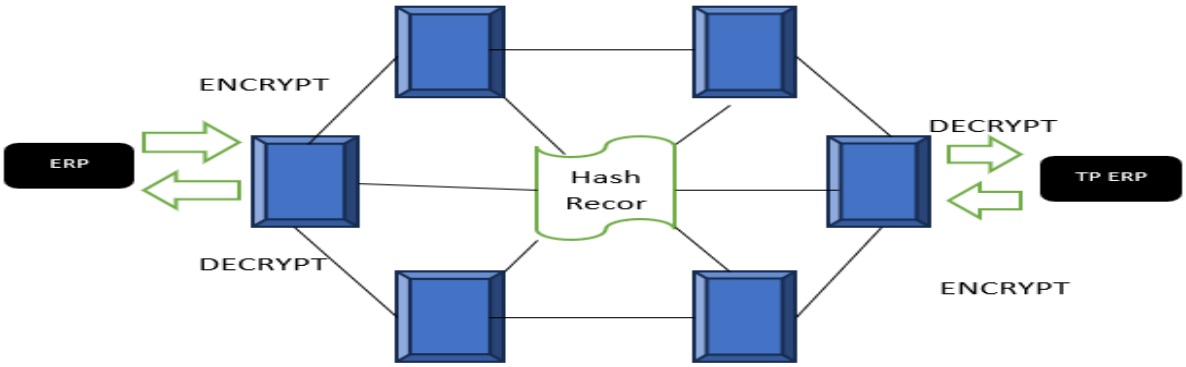

Figure 2. *Blockchain Process*

Blockchain uses smart Contracts that may be carried out automatically in response to the satisfaction of specific requirements. Alternatively, the buyer and seller might agree upon the terms of the deal. Given how much-complicated paperwork is involved in the supply chain, there is a chance to develop smart contracts in various contexts for speed, trust, and security. Developing a smart contract that automates all the following steps in the process. Blockchain not only makes it possible to transfer and receive papers, but it may also automate the process after that. There are advances where the transaction's encryption, transmission, decryption, and receipt happen mostly independently without user input. The document is delivered to the vendor over a peer-to-peer network when the user submits the form to start the process, and a record is kept on the distributed ledger

throughout. A more sophisticated choice is establishing an intelligent contract where each subsequent action is tracked, and a predetermined set of trigger events is used to generate an automated reaction [2].

For instance, the payment is immediately made without further action after the vendor receives the purchase order, and any involvement of people verifies the dispatch of the product. The information required is duplicated throughout the networks of participants in the Blockchain, making it accessible to all parties engaged in the transaction. The Blockchain is a single shared record of transactions. Confidence between trade partners is made possible by data consistency among network members, product provenance, and traceability of product movements in the supply chain. Since no intermediaries or third-party service providers are involved in the transaction, the peer-to-peer structure of Blockchain lowers transaction costs.

Additionally, using smart contracts, the peer-to-peer system may effectively shorten the time it takes to execute a transaction and facilitate the exchange of value in a significantly shorter time. Depending on the Blockchain's capacity for processing transactions, it can speed up transaction settlement from many days to minutes or hours. The core of Blockchain is using cryptography to link blocks together by affixing the encrypted-yet-visible chain of hashes of transaction data and authenticating participants to transactions. Users can only see the hashes and the digital identity on the Blockchain, maintaining privacy because the accurate identifying information of the person or business is not disclosed to third parties.

4. EDIand Blockchain Comparison

EDI and Blockchain both have the following crucial traits:

- Multiple trade partners can be incorporated into both technologies.
- Both technologies make it possible to communicate transactional information.
- Businesses may restrict and manage the data that their trade partners have access to.
- Both systems provide for an audit trail and keep a thorough record.
- Any documents may be sent and received by businesses.
- Information systems between trading partners do not need to be interoperable.

In contrast, since service providers serve as a middleman between trading partners, it is not a problem with EDI. It is also crucial to consider how much more programming and technical expertise the business could require. Even though the first EDI implementation calls for mapping the record source to a common format, this often only needs rudimentary programming expertise. However, changing current applications and creating new interfaces with the existing systems and Blockchain may be necessary to use Blockchain to send and receive transaction data. It will be necessary to write code to enable the execution of documents on the Blockchain after a document is submitted to the current information system, even if the plans just call for sending and receiving documents. Also, developing smart contracts will require programming knowledge if the goal is to automate the process. So while Blockchain does provide an opportunity for automation that EDI does not offer, it will require more significant programming expertise. Blockchain's decentralized structure is one feature that proponents often tout. One advantage of this is availability, and if one of the nodes in the blockchain network goes offline, the other nodes can keep the data and system available for network participants. In addition, every node in the blockchain network contains a copy of the transaction [7][8].

Instead, a trustworthy, organized method built into the Blockchain is utilized to uphold entity identities, confirm their transactions, and add those transactions to the Blockchain's current state, which is copied across all participants. EDI does not provide these services. Information entered into Before being transmitted to the trade partner, the system is not verified [9][10]. The distributed ledger's immutability is a crucial benefit of blockchain technology. Rolling back transactions or amending a previously written transaction will involve updating the hashes of all following blocks since the blocks are connected to the prior block using the previous block hashes. Any modification to a prior block will be denied since most nodes have already recognized the Blockchain's state as legitimate [11].

5. Conclusion & Future Work

The implementation and enforcement of adequate preventative measures are required, including access controls, data integrity controls, and general controls such as creating source documents and user obligations.Since EDI is a well-established application, finding suppliers and EDI applications will be simpler than finding the many prospective trade partners and supply chain players currently utilizing EDI. In the early phases of adoption,

organizations may need to spend more time with Blockchain than EDI when onboarding a trade partner. Furthermore, it can cause a lock-in with current trading partners up until widespread adoption happens. However, if Blockchain gains popularity, it could only take a short period to onboard new suppliers or clients. Currently, businesses must communicate using the same kind of Blockchain. Different blockchains used in supply chain management include Ethereum. They cannot coexist with one another. If a single entity attempted to update data in a block already included in the Blockchain, it would change the hash of carrying the accurate data.Since EDI does not offer immutability, transactions may be changed in the future, leading to incorrect transactions. In addition, EDI mandates the implementation, enforcement, and maintenance of processing controls in addition to preventative controls. Contrarily, Blockchain is made up of consensus algorithms that manage processing controls.It is important to compare the labor and effort needed to install the two technologies and their features and functionalities.

References

[1] Majed Al-Mashari, "Enterprise resource planning (ERP) systems: A research agenda," *Industrial ManagementData Systems*, vol. 102, pp. 165-170.
[2] H. Fraser, How Blockchains Can Provide New Benefits for Healthcare, IBM, February 2017, [online] Available: www.ibm.com/blogs/think/2017/02/blockchain-healthcare
[3] Choudhary, K., Pandey, U., Nayak, M. K., & Mishra, D. K. (2011, July). Electronic data interchange: A review. In 2011 Third International Conference on Computational Intelligence, Communication Systems Network (pp. 323-327). IEEE.
[4] J. Madavarapu, "Electronic Data Interchange Analysts Strategies to Improve Information Security while using EDI in Healthcare Organizations." Order No. 30526513, University of the Cumberlands, United States -- Kentucky, 2023.
[5] Delivery Model (On-premise Cloud-based and Web-based)—Global Opportunity Analysis and Industry Forecast 2017–2023, Allied Market Research, 2017, [online] Available: www.alliedmarketresearch.com/healthcare-supply-chain-management-market.
[6] R. K. Yalamanchili, "International Student Portal," All Capstone Projects, Oct. 2014, Available: https://opus.govst.edu/capstones/85/
[7] M. Wallgren, EDI and Blockchain—A Match Made in Heaven?, LinkedIn, March 2018, [online] Available: www.linkedin.com/pulse/edi-blockchain-match-made-heaven-mathias-wallgren.
[8] Madavarapu, Jhansi Bharathi, "Payroll Management System" (2014). *AllCapstone Projects*. 82. https://opus.govst.edu/capstones/82
[9] B. Lester, How Blockchain Technology Augments EDI Systems, Remedi, March 2018, [online] Available: www.remedi.com/blog/how-blockchain-technology-augments-edi-systems.
[10] J. B. Madavarapu, F. H. Mohammed, S. Salagrama, and V. Bibhu, "Secure Virtual Local Area Network design and implementation for Electronic Data Interchange," International Journal of Advanced Computer Science and Applications (IJACSA), https://thesai.org/Publications/ViewPaper?Volume=14&Issue=7&Code=IJACSA&SerialNo=1.
[11] Islam, H., Madavarapu, J. B., Sarker, N. K., Rahman, A. (2022). The Effects of Cyber Threats and Technical Problems on Customer's Attitude Towards E-Banking Services. Oblìk ì finansi, 2(96), 58-67. https://doi.org/10.33146/2307-9878-2022-2(96)-58-67