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Blockchain in Customer Service

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ABSTRACT

Blockchain technology is a decentralized digital ledger system that records transactions across a network of computers in a tamper-resistant and transparent manner. It can bring to the customer service industry enhanced transparency, security and efficiency. These in turn help increase trust and collaboration between businesses and consumers. Blockchain for customer service is a term used to define how blockchain can enhance customer experience, increase the efficiency of processing refunds and other transactions, and improve customer trust and loyalty. With using blockchain in customer service, businesses can unlock new opportunities for innovation and differentiation in an increasingly digital and interconnected world. This paper explores using blockchain in customer service, for transparency, security, and efficiency.

KEYWORDS: *blockchain, distributed digital ledger, logistics, customer service, customer service industry, automation.*

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INTRODUCTION

In the business world, the key to success lies in understanding and satisfying customer needs. With the world moving towards a more digital world, fulfilling the increasing demands for better customer service is not easy. As businesses strive to meet changing consumer expectations, blockchain technology emerges as a powerful tool to support this. Blockchain has the potential to change the customer experience. Blockchain, originally known for its association with cryptocurrencies, offers far-reaching benefits beyond finance. It offers transformative possibilities across diverse industries, especially in increasing customer satisfaction. Blockchain in customer service is an innovative and new technology that has the potential to reduce the time spent on processes and increase communications [1].

WHAT IS BLOCKCHAIN?

Blockchain, a type of distributed digital ledger technology (DLT), is a relatively new and exciting way of recording transactions in the digital age. It is a decentralized and distributed digital ledger technology that securely records and verifies transactions across multiple computers or nodes in a network. Basically, it is a chain of blocks in which each block contains a list of transactions. The symbol of a blockchain is depicted in Figure 1 [2]. The blockchain technology was created as the foundational basis for Bitcoin – a digital currency in which secure peer-to-peer transactions occur over the Internet. It is expected that the spending on blockchain solutions worldwide would grow from 4.5 billion USD (2020) to an estimated value of 19 billion USD by 2024 [3].

Originally developed as the accounting method for the virtual currency Bitcoin, Blockchains are appearing in a variety of commercial applications today. Blockchain technology is a type of distributed digital ledger that uses encryption to make entries permanent and tamper-proof and can be programmed to record financial transactions. It is used for secure transfer of money, assets, and information via a computer network such as the Internet without requiring a third-party intermediary. It is now being adopted across financial and non-financial sectors. As a catalyst for change, the Blockchain technology is

going to change the business world and financial matters in major ways.

The first Blockchain was conceived in 2008 by an anonymous person or group known as Satoshi Nakamoto, who published a white paper introducing the concept of a peer-to-peer electronic cash system he called Bitcoin [4,5]. Bitcoin and Ethereum are the first two mainstream blockchains. Other modern blockchains include Namecoin, Peercoin, Ether, and Litecoin. Figure 2 shows different components of blockchain [6].

Blockchain combines existing technologies such as distributed digital ledgers, encryption, immutable records management, asset tokenization and decentralized governance to capture and record information that participants in a network need to interact and transact. As illustrated in Figure 3, a complete blockchain incorporates all the following five elements [7]:

- *Distribution:* Digital assets are distributed, not copied or transferred. A protocol establishes a set of rules in the form of distributed mathematical computations that ensures the integrity of the data exchanged among a large number of computing devises without going though a trusted third party. A centralized architecture presents several issues including a single point of failure and problems of scalability.
- *Encryption:* BC uses technologies such as public and private keys to record data securely and semi-anonymously. Completed transactions are cryptographically signed, time-stamped, and sequentially added to the ledger.
- *Immutability:* The blockchain was designed so these transactions are immutable, i.e. they cannot be deleted. No entity can modify the transaction records. Thus, Blockchains are secure and meddle-free by design. Data can be distributed, but not copied.
- *Tokenization:* Value is exchanged in the form of tokens, which can represent a wide variety of asset types, including monetary assets, units of data or user identities.
- *Decentralization*: No single entity controls a majority of the nodes or dictates the rules. A consensus mechanism verifies and approves transactions, eliminating the need for a central intermediary to govern the network.

Bitcoin and its underlying blockchain technology increasingly impact all facets of society. Bitcoin's status as digital gold is merely the tip of this technology. Figure 4 shows Bitcoin [8], while Figure 5 shows how blockchain works [9]. Although blockchain technology will for all time be associated with Bitcoin due to their common genesis, it has broader applications. Cryptocurrency will increasingly become a factor in family law issues as well.

A blockchain is a tamper-proof, distributed database that stores blocks of information for cryptographically bound transactions via peer-to-peer networks. At the heart of blockchain's functionality is cryptographic hashing. Each block in a blockchain contains a cryptographic hash of the previous block, creating an immutable chain of blocks. If anyone attempts to tamper with the data in a block, it would alter the block's hash. This would disrupt the entire chain, making it virtually impossible to manipulate. The security feature ensures data integrity and prevents unauthorized changes [10].

In a nutshell, blockchain technology involves three basic concepts [11]: (1) It is a system for recording a series of data items (such as transactions between parties); (2) It uses cryptography to make it difficult to tamper with past entries; (3) It has an agreed process for storing copies of the ledger and adding new entries (also called a consensus protocol).

Blockchain is a novel decentralized infrastructure and distributed computing paradigm that uses a chained data structure for verification, storage, and distributed consensus algorithms to generate and update data. Decentralization is a key feature of blockchain technology, which refers to the distribution of power and decision-making across a network of nodes or participants rather than being controlled by a central authority or system. It provides robustness while eliminating many-to-one traffic flows to avoid delays and single points of failure. Figure 6 shows the decentralized property of blockchain [9]. The advantages of decentralized property of blockchain network include the following [9]:

- The decentralized property of blockchain makes it less prone to failure and more expensive for hackers to attack the network.
- There is no third-party involvement; therefore, there is no added risk.
- Every change made in the network is traceable and concrete.
- Users maintain full autonomy of their properties and are not dependent on third parties to maintain and manage their assets.
- It provides enhanced security.

BLOCKCHAIN IN CUSTOMER SERVICE

Customer service operations are essential for any business that wants to retain and satisfy its customers. The customer service industry is always evolving, and

managers constantly look for new ways to improve customer satisfaction and operational efficiency. Regarding customer service, blockchain is a new and innovative technology that can streamline processes and improve communication. Blockchain is a distributed ledger technology that records and verifies transactions without the need for a central authority. By understanding what blockchain is and how it works, businesses can begin to see the potential benefits that this technology could bring to their customer service operations. Using blockchain, businesses can securely store customer data and records while allowing customers to view their data and transactions. This makes it an ideal platform for managing customer data, as it provides a single source of truth that can be accessed by all parties involved in a transaction. Figure 7 shows a representation of blockchain in customer service [12].

There are many potential applications for blockchain in customer service. Using blockchain, businesses can create a secure and tamper-proof communication platform, allowing customers to contact businesses directly without going through a third party. This would allow for more efficient and effective customer service and improve communication between businesses and their customers. Blockchain provides a secure and tamper-proof way to store customer data. This would allow businesses to track customer information and history, while allowing customers to view their data [13].

APPLICATIONS OF BLOCKCHAIN IN CUSTOMER SERVICE

The customer service department can use blockchain for a variety of purposes. Common applications of blockchain in customer service include the following [1,14-17]:

- *Smart Contracts:* A smart contract is a piece of code stored on a blockchain. It works like a digital agreement that carries out actions automatically when certain conditions are met. Smart contracts can automate service agreements between customers and service providers. This can reduce the need for intermediaries and helps ensure transparency and efficiency. Once a claim has been filed and the blockchain is activated, smart contracts can speed up verification procedures. This speeds up the approval process and facilitates payment. Smart contracts on a blockchain can include predefined dispute resolution mechanisms. This can help automate the resolution process in case of conflicts between customers and service providers. Smart contracts also help in designing loyalty programs. Utilizing smart contracts in blockchain networks lets you offer your customers a transparent and traceable reward distribution. A business could use a smart contract to refund customers unsatisfied with their purchase. This would reduce the need for manual processing of refunds while ensuring that refunds are issued promptly.
- *Transparent Supply Chains*: Supply chains can be tracked with great accuracy and produce tracked and their origin validated. Blockchain applications in customer service offer a transparent and immutable log of every deal throughout the supply chain. Its end-to-end transparency permits all stakeholders, including clients, to follow the progress of products from origin to the delivery destination. Blockchain can be used to track the journey of products from manufacturer to consumer. This transparency ensures authenticity and can help address issues such as counterfeit products. Everything, from sourcing raw materials to production and delivery, can be recorded on the blockchain. It provides complete information about the product's entire journey.
- *Immutable Customer Records*: Blockchain can securely store customer records such as purchase history, warranties, and support interactions. These records cannot be altered, providing a reliable source of truth for both customers and businesses.
- *Fraud Prevention:* Blockchain's immutability can help prevent and detect fraudulent activities such as identity theft, payment fraud, and warranty fraud. Once data is recorded on the blockchain, it cannot be tampered with. Each transaction is traced on a decentralized ledger, so changing or altering information is nearly impossible. This provides a secure audit trail that is continuously monitored. If customers use the service, their identities and transaction history are confirmed against this permanent record, which helps identify fraud before it occurs.
- *Identity Verification:* With a decentralized ledger, businesses can safely store and manage client identities, thus reducing the possibility of fraud and increasing security. All customer data is secured and accessible only upon their permission, which ensures transparency and security. Blockchain holds the key to the customer's identity in a safe, secure area and intercedes between a company and its customers to authenticate that identity. Blockchain identities cannot be altered, so the business and its customers can trust them. This puts the control

over their information back into the consumer's hands and improves user experience.

- *Cross-Border Payments:* Blockchain facilitates transactions across borders with a central platform, reducing time-consuming and complicated processes that arise from various regulations and currencies. It offers a safe and transparent system for managing global transactions and communications. Traditional cross-border assistance often has issues like language restrictions, different rules and regulations, and data security concerns. Blockchain facilitates fast, secure, and low-cost cross-border payments. This can benefit customers who need to send money internationally or make purchases from overseas merchants. Blockchain allows customer interactions and transactions to be recorded on a decentralized ledger, giving real-time access to data in different countries.
- *Dispute Resolution:* In traditional settings, dispute-related issues can lead to long investigations and lengthy delays. Blockchain transactions are recorded on the tamper-proof ledger, which allows quick access to relevant information. All parties can access a single reliable source, thus reducing the possibility of miscommunications.
- *Customer Relationship Management* (CRM): CRM is regarded as a manifestation of the novel marketing strategy referred to as relationship marketing (RM), also known as one-to-one marketing. CRM has the potential to revolutionize data sharing, customer engagement, and loyalty programs. In recent years, the CRM landscape has seen significant transformation. The emergence of CRM 3.0 marked a shift towards integrating structured data from traditional relational databases with unstructured data obtained from consumer interactions on social media sites. A new paradigm, CRM 4.0, is emerging at the intersection of Blockchain and CRM. This paradigm has potential for improving customer data security, transparency, and trust. The integration of blockchain with CRM can enhance customer experiences, provide significant customer value, increase data confidentiality, and facilitate efficient data exchange. Blockchain-based CRM systems have the potential to overcome the limitations of traditional CRM systems by rethinking the security and privacy of customer data.
- *Customer Communication:* Another potential blockchain application is in the area of customer communication. Blockchain is a new, innovative technology that can streamline processes and improve communication. Using blockchain, businesses can create a secure and tamper-proof communication platform, allowing customers to contact businesses directly without going through a third party. This would improve communication between businesses and their customers.
- *Customer Engagement:* Business enterprises are looking for new ways to better interact with their customers. The aim is to create a more convenient and personalized customer experiences. Today, a growing number of businesses are leveraging blockchain to improve customer engagement. Blockchain makes data management more systematic, allowing business leaders to make decisions using the most up to date data. According to research studies, a fully engaged consumer brings in 23% more revenue than an averagely engaged one. Therefore, failing to engage with your customers is a sure way to miss opportunities. Business enterprises should be deliberate in all their customer engagement endeavors. Consistent and excellent customer experience helps a company grow by ensuring every new customer becomes a word-of-mouth ambassador for your brand. Chatbots have gained prominence in improving customer engagement in ways previously virtually impossible.
- *Customer Support:* Blockchain customer support refers to the use of blockchain technology to offer scalable and secure customer experience (CX) solutions for consumer brands. It is a new way to deliver exceptional customer experience solutions. Businesses are expected to increase adoption of blockchain based CX solutions to offer better support and reduce risk. Also, with blockchain customer support, you can store data across multiple systems. This prevents unauthorised changes and reduces disputes. Figure 8 shows blockchain's role in customer support [15].

BENEFITS

The benefits of using blockchain in customer service include shorter wait times, easier tracking of tickets, and improved communication with representatives. One main benefits of blockchain for customer service operations is that it can reduce costs and increase efficiency by eliminating intermediaries, streamlining workflows, and reducing errors. Another benefit of blockchain for customer service operations is that it can enhance data security and privacy by encrypting and storing data on a decentralized network. Blockchain can enable peer-to-peer payments, which

can lower transaction fees and speed up settlements. It can also automate customer verification, which can reduce manual work and fraud. It can improve customer satisfaction and retention by creating more value, transparency, and engagement. Other benefits include the following [1,17]:

- *Automation*: Smart contracts can automate various customer service processes, such as claims processing and customer service inquiries. The automation minimizes manual intervention needs and human errors and speeds up response time. Smart contracts, a fundamental feature of blockchain, can automatically execute actions based on data received from IoT devices. Automation ensures swift and accurate execution of transactions, enhancing overall efficiency in customer service operations.
- *Transparency:* Another cornerstone of blockchain's ability to bolster trust in the customer service industry is its transparency. All participants in a blockchain network have access to the same ledger, allowing for real-time verification of transactions. This transparency is instrumental in building and maintaining trust among stakeholders, as it ensures that all parties are privy to the same information and that all transactions are conducted openly. Blockchain can build trust and authenticity, mitigating issues like counterfeit products and unethical sourcing practices.
- *Trust:* Trust is one of the primary aspects that a consumer considers when selecting a particular company over another. Blockchain improves transparency in processes and allows customers access to data that boosts their trust in the organization. Its tamper-resistant nature can protect against identity theft, payment fraud, and data breaches. Blockchain technology allows customers to establish trust built on fundamental values like integrity, security, fairness, and equity. This, in turn, helps improve confidence and cooperation between consumers and businesses. Blockchain can also provide customers with more control over their data and preferences, which can increase their trust and loyalty.
- *Data Privacy:* Customers provide a large amount of data before ordering from any e-Commerce website. Companies require data to enable the purchase process and ensure customers authentically who they say they are. Blockchain-based systems can give customers more control over their data by allowing them to grant and revoke consent for its use. This enhances privacy and ensures compliance with data protection regulations like GDPR. Blockchain technology allows users to gain control of their data because it has an open system, which means one person cannot solely control your information.
- *Data Security:* The cornerstone of blockchain's contribution to data security lies in its decentralized architecture. Unlike traditional centralized databases that present lucrative targets for cyberattacks, blockchain disperses data across a network of nodes. Blockchain not only fortifies data against unauthorized access but also ensures its integrity and confidentiality.
- *Personalization:* Blockchain use cases in customer service can enhance customer interactions by providing the security of a decentralized, safe system for storing customer information. Businesses can create complete customer profiles while also ensuring security and privacy. Every transaction is tracked in the blockchain system, allowing companies to access a complete record of customers' preferences and interactions. With this information, organizations can customize their customer support to efficiently satisfy each customer's needs.
- *Improving Ad Targeting*: Marketers are quite excited by the fact that the use of blockchain technology will make it easy to create and promote more targeted ad campaigns. Through blockchain's identity verification feature, marketers will be better placed to deliver super-targeted ads to the right customers. Using this technology, marketers will with ease know whether their ad was delivered to the intended person, evaluate how effective an ad campaign, and use this information to make changes to future ad campaigns.

CHALLENGES

Although blockchain technology can provide various benefits to improve customer satisfaction, companies must still navigate multiple challenges and issues. The challenges include lack of standardization, security concerns, and slow processing time. Customer service operations face significant challenges such as high costs, low efficiency, data security, trust, data breaches, inefficient processes, and lack of transparency, which can erode customer trust and impede growth. There are concerns around issues such as the security of personal data, the potential for bias in automated decision making based on historical data, and the lack of transparency in how they work. Other challenges include the following [1]:

- *Cost:* Implementing blockchain technology may require significant financial investments, especially for smaller and medium-sized businesses. Businesses must evaluate the ROI and ensure that the benefits outweigh the expenses. Making and maintaining blockchain solutions requires specialized expertise and resources.
- *Speed:* One of the major issues with blockchain is the speed of transactions. Blockchain networks like Bitcoin can process one or two transactions per second. The more customers and transactions processed on the blockchain networks increase, the more it can get overloaded. This can result in lower transaction speed and more transaction costs, adversely affecting the customer experience.
- *Customer Acceptance*: Some customers hesitate to use blockchain technology for transactions or data management. Informing customers about blockchain's advantages and security benefits is vital to gaining their trust. The business must be focused on developing easy-to-use interfaces that encourage users to use blockchain.
- *Regulatory Compliance:* Regulatory frameworks surrounding blockchain technology vary globally and may impact its adoption in customer service applications. Different nations have different methods of controlling blockchain technology, which can lead to confusion for companies that operate in various areas. Some governments have adopted blockchain technology, while others have enforced strict rules or bans. The compliance process can be challenging because of blockchain transactions' distributed and anonymous nature.
- *Integration:* Integrating blockchain solutions with existing systems and processes can be complex and costly. It may take time and effort. Different blockchain platforms might not work with one another, which can lead to problems with interoperability. Companies must ensure their blockchain applications can communicate with other platforms and systems for maximum benefit.

FUTURE OF BLOCKCHAIN IN CUSTOMER SERVICE

The future of blockchain in customer service looks bright. Businesses are only beginning to explore blockchain technology's possibilities regarding customer service and the possibilities to improve customer satisfaction and operational efficiency. In the future, we can expect businesses to use blockchain to create secure and tamper-proof customer databases and use blockchain to create smart contracts that would automate processes and transactions. We can also expect businesses using blockchain to improve customer communication, increase efficiency in processing refunds and other transactions, and reduce the need for manual processing of refunds and other transactions [13]. The global blockchain technology market is growing alarmingly and will grow significantly over the next few years. Many experts who have been keeping an eye on the growth of blockchain technology expect it to go mainstream in just a few years. This is largely because of the ability it gives users to track information in a manner devoid of undue interference by any external forces or parties not part of an event or transaction [17].

CONCLUSION

Blockchain is an emerging technology that may fundamentally alter the way in which customers and companies interact. The potential of blockchain technology to revolutionize industries by enhancing transparency, security, and efficiency has been widely accepted . However, there is still uncertainty toward use cases in the distinct aspects of customer service. Businesses aiming to provide the best customer service should definitely harness the power of blockchain. Today, when everyone wants to create the next big thing and improve customer service, blockchain could give you an edge over your competitors.

Company leaders should care about blockchain in customer service because it can improve customer satisfaction and operational efficiency. By using blockchain technology, businesses can address some of the major problems they face regarding customer service. Businesses can create a secure and tamper-proof customer database that would allow businesses to track customer information, histories, and preferences while also allowing customers to view their data. Blockchain technology can potentially improve customer satisfaction and operational efficiency regarding customer service. More information on the integration of blockchain in customer service is available from the books in [18-24] and the following related journals:

- Blockchain
- IEEE Blockchain
- Human Resources Management and Services
- Global Journal of Human Resource Management
- International Journal of Human Resource Studies
- International Journal of Blockchain Technologies and Applications

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Figure 1 The symbol of blockchain [2].

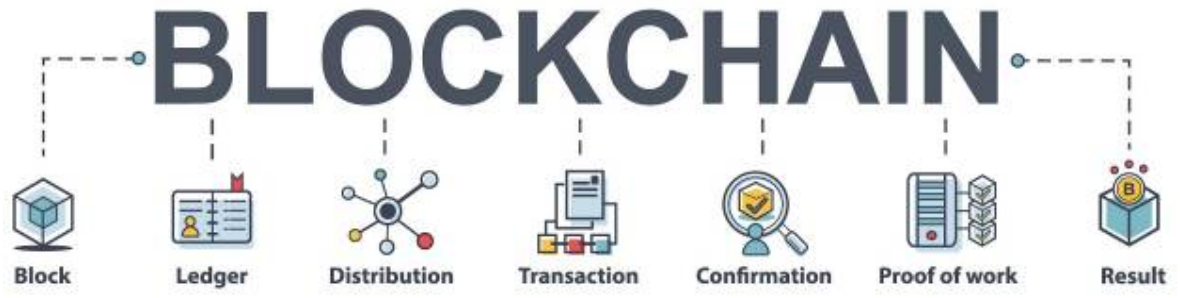

Figure 2 Different components of blockchain [6].

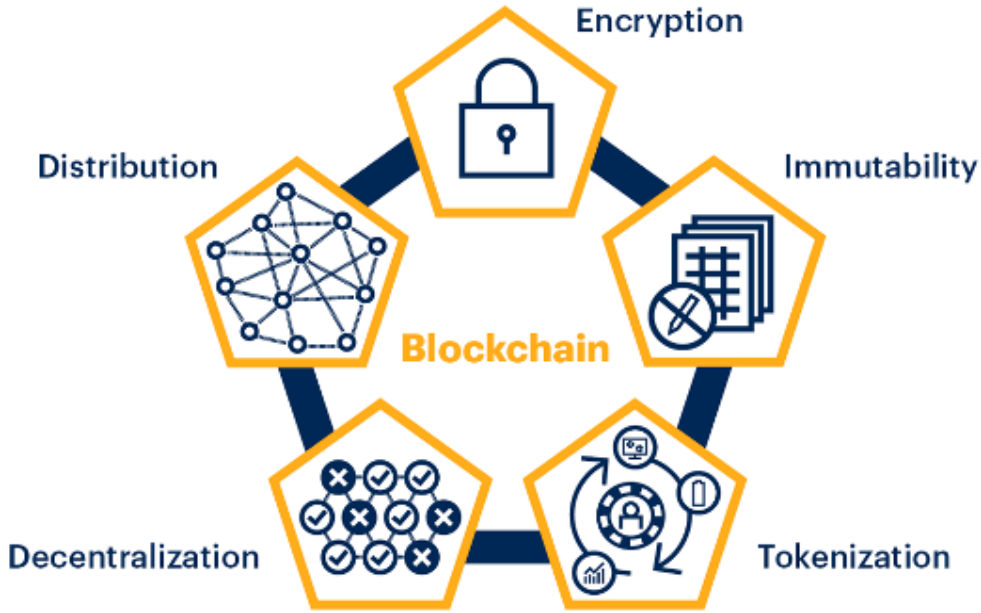

Figure 3 Five key elements of Blockchain [7].

Figure 4 Bitcoin [8].

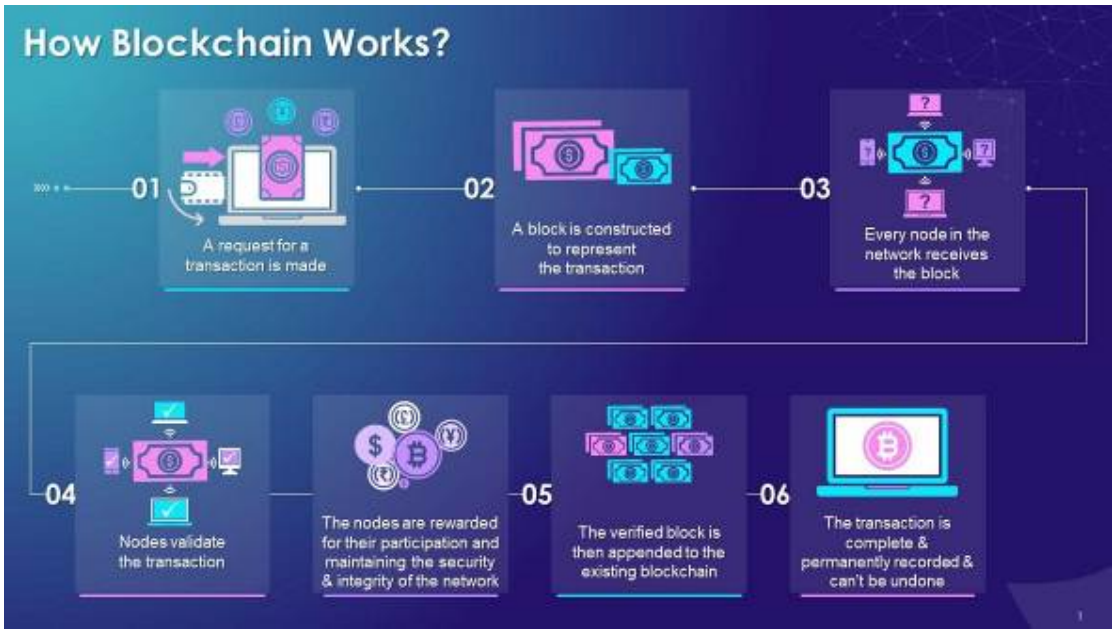

Figure 5 How blockchain works [9].

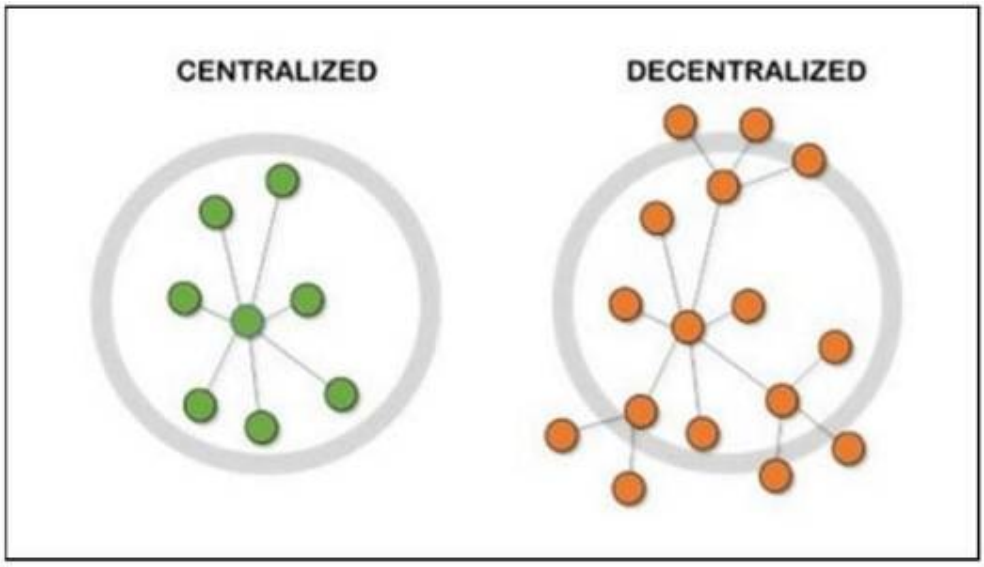

Figure 6 The decentralized property of blockchain [9].

Figure 7 A representation of blockchain in customer service [12].

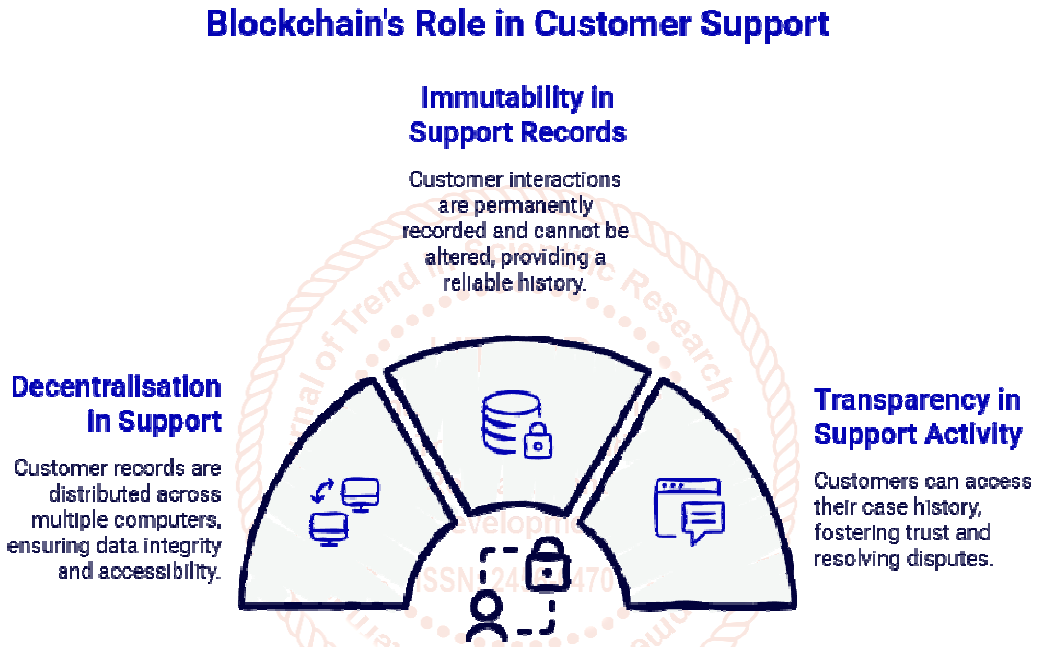

Figure 8 Blockchain's role in customer support [15].