The Effect of Blockchain on Customer-To-Customer Electronic Commerce

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ABSTRACT

The popularity of the Internet and e-business has led more people to online shopping, especially customer-to-customer (C2C) electronic commerce (e-commerce). However, C2C e-commerce faces challenges such as security, product and vendor trust, and more. One of the most important solutions to such problems is the use of decentralized and distributed technologies such as blockchain, which play an important role in identifying, verifying, and validating data, developing information security, and creating transparency and trust in a business. Therefore, this study uses a qualitative method to investigate the effect of blockchain on C2C e-commerce. After conducting the conceptual study, the experiences of experts in this field were used through semi-structured interviews. The data from the interviews were then coded and analyzed. Finally, 12 conceptual codes were extracted. Due to the high frequency of the transparency code, other concepts were studied around this axis and based on it. According to the results, strategies such as transparency, trust, and legal barriers were more important in using blockchain in C2C e-commerce, respectively.

Keywords: Customer-to-Customer Electronic Commerce; Blockchain; Transparency; Trust; Security.

INTRODUCTION

Today, advances in information and communication technology have had a great impact on various aspects of people's lives in society and the way they do business. This evolution and change have led to the transition to innovative ways of doing transactions such as e-commerce (Choshin & Ghaffari, 2017; Deng et al., 2020; Shorman, Allaymounq & Hamid, 2019). E-commerce is currently the most widely used type of commerce, which processes more than one billion transactions per day (Dennis & Owenson, 2016; Ismanto et al.,2019). E-commerce is the conduct of all business activities using computer communication networks, especially the Internet. In other words, e-commerce is a generic name for a range of software and systems that provide services such as information retrieval, transaction management, credit check, online payment, reporting, and account management on the Internet. These systems provide the basic foundation of Internet-based activities (Jozdani & Mozaffari, 2019).

The most popular and growing type of e-commerce is customer-to-customer e-commerce, in which the parties are trading through a platform provided by a third party (Liang & Liang, 2014). Transactions of this e-commerce are not limited to place and time, so the probability of successful transactions increases (He, Lu, & Zhou, 2008). Although C2C e-commerce has great development potential, it faces many problems (Deng et al., 2020), including fraud, commission costs, limited contact between seller and customer, and misuse of personal data that affects buyers' trust, buying behavior, and their willingness to buy (Deng et al., 2020; Ismanto et al., 2019). Besides, intermediaries are not liable for substandard goods sold, and no refunds are accepted, which also exacerbates buyers' distrust (Ofori et al., 2017). Therefore, Trust is an integral part of consumer behavior in the adoption of new technologies, including the Web and e-commerce (Kumar, Anand & Mutha, 2016). It is the foundation of e-commerce and refers to the relationship between the parties (Smits & Hulstijn, 2020). Trust is important because it helps consumers to overcome perceptions of uncertainty and risk and to share their personal information or purchase their intended goods and services (McKnight, Choudhury & Kacmar, 2002).

The Internet has made it possible for transactions to take place regardless of geographical restrictions, yet cybercrime has made consumers worry about security issues when conducting Internet transactions. Lack of trust in the seller has been shown to be an important deterrent to online trading. Due to the lack of rules and regulations in e-commerce and because the purchase of goods and services on the Internet is usually not immediately provable, the issue of trust in e-commerce is one of the most important obstacles to success in online shopping (Akman & Mishra, 2010, Yoon & Occeña, 2015).

In addition to trust, transaction security, privacy, and electronic payment system and logistics problems are also important in its adoption (Chang & Chen, 2009; Deng et al., 2020; Tombe et al., 2017; Yoon & Occeña, 2015;). Given the issues and problems that exist in such infrastructures, blockchain technology can be considered as a solution in this field (Shorman et al., 2019; Xu, 2016). Blockchain has the potential to shake the foundations of e-commerce by activating barter relationships that are

untrustworthy and operate on dedicated intermediaries. In addition, the exchange of information and value between companies and consumers may change significantly by providing integrated access to unchanging data throughout the supply chain (Treiblmaier & Sillaber, 2021).

Blockchain implementation can improve e-commerce and solve its problems (Deng et al., 2020; Ismanto et al., 2019). It can transform all financial systems and activities of many industries, financial institutions, banks, and service companies around the world without compromising the privacy, security of digital assets and stakeholders. Blockchain encourages peer-to-peer payments through cryptocurrency and requires no fees. It also allows buyers and sellers (senders and recipients of virtual money) to communicate directly with each other (Ismanto et al., 2019). By adopting blockchain to the e-commerce environment, merchants can use smart contracts to work with logistics service providers (Deng et al., 2020). The smart contract has a precondition that guarantees justice and security, and the head office creates a transparent and decentralized environment (Ismanto et al., 2019). Under such circumstances, e-commerce users can gain a better logistics experience (Deng et al., 2020).

Recent research has studied the use of blockchain in e-commerce in general as well as various types of e-commerce, especially business-to-business (B2B) e-commerce and even supply chain, but despite the increasing use of C2C e-commerce, little attention has been paid to the use of blockchain, in this business. Given the dramatic development of the C2C e-commerce that has led to the popularity of this business in the short term, and considering the characteristics and risks of C2C e-commerce, this question arises: What changes can the use of blockchain make in C2C e-commerce? To answer this question, this study aims to investigate the effect of blockchain on C2C e-commerce.

The rest of the study is organized as follows: after reviewing the research literature, research methods and findings are described; finally, conclusions and recommendations for future research are presented.

LITERATURE REVIEW

Electronic commerce (E-commerce) is buying and selling through the Internet (Treiblmaier & Sillaber, 2021; Wen et al.,2011). It refers to the application of electronic communications and information processing technologies in business transactions (Gupta, 2014; Shorman et al., 2019; Treiblmaier & Sillaber, 2021). E-commerce involves the use of the Internet, the World Wide Web, and mobile devices to conduct business transactions (Laudon & Traver, 2016; Shorman et al., 2019). E-commerce through web-based technologies facilitates transactions at any time and place. This feature gives unlimited opportunities to those who have access to the Internet to connect with others (Hosseinpour & Mokhtarrezaei, 2014). It also allows customers more choices and faster comparisons. In addition, it allows users to interact, exchange, and compare customer experiences with other customers on the Web (Yoon & Occeña, 2015).

There are different types of e-commerce include business to business (B2B), business to customer (B2C), customer to customer (C2C), business to government (B2G), and mobile commerce (m-commerce) (Nemat, 2011). Among them, C2C e-commerce has become widespread and is growing rapidly (Liang & Liang, 2014). The C2C e-commerce can take place in e-auctions, chat rooms, email groups and social networks, advertising websites, and more (Ofori et al., 2017; Turban et al., 2015). It involves transactions between customers through online platforms. In this type of e-commerce, customers place their ready-to-sell products on the auction sites, and platform suppliers provide search engine and trading capabilities to facilitate product sales (Laudon & Traver, 2016). One of the benefits of C2C e-commerce is the reduction of administrative and commission costs for both buyer and seller (Ofori et al., 2017; Turban et al., 2015).

In this type of e-commerce, transactions are not done in person, and the parties to the transaction are in virtual contact with each other so, it is necessary to provide a trust for both parties, especially the buyer (Tombe et al ., 2017; Yoon & Occeña, 2015). Trust is defined as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer & Davis, 1999, p. 712). However, there is a risk that the product will not be shipped or the quality of the product will not meet the buyer's expectations (Weltevreden & Rotem-Mindali, 2009). Besides, due to risks such as insecurity and disclosure of personal information, denial of transactions, unauthorized access, and alteration of information, trust plays an important role in terms of positive or negative effects on customer satisfaction and loyalty. (Lu, Wang & Hayes, 2012). Therefore, this type of e-commerce needs a reliable platform to attract more people and increase the ease of transactions (He et al., 2008; Ofori et al., 2017; Shorman et al., 2019; You, Li & Cao, 2010). One of the most important solutions to such problems is the use of decentralized and distributed technologies such as blockchain. It is a combination of several technologies that create a decentralized and reliable structure for recording, sending, storing, and displaying data (Harish et al., 2021; Hawlitschek, Notheisen & Teubner, 2018; Kshetri, 2017).

Blockchain provides high-security functions without the intervention of intermediaries and the provision of banking information by the buyer because all processes are encrypted, and all transactions of tracked individuals are recorded. It has a lot of reliability (Sheikh, Azmathullah & Rizwan, 2019). It allows users to maintain a shared database without the need for a trusted central controller so that any participant can log in or log out at any time. Algorithms determine the chronology of time-stamped inputs by encrypting individual transaction sets ("blocks") into each other via cryptographic hashes. Each block is connected to its predecessor through a hash reference, thus establishing order and integrity in the blockchain (Treiblmaier & Sillaber, 2021). Blockchain is a stack of technology that affects e-commerce through technical, legal, organizational, and quality issues as well

as consumer issues. It can use different consensus protocols to validate (Smits & Hulstijn, 2020) and opens up new opportunities with unprecedented technological possibilities, but at the same time, it requires critical evaluation of current business processes, such as practices involving sensitive customer data or the design of communication channels throughout the supply chain (Treiblmaier & Sillaber, 2021; Zetzsche et al., 2017). Blockchains can be classified into public and private chains as well as authorized versus unlicensed chains. A combination of these features leads to three different types of Blockchain technology: (1) in publicly licensed chains, all nodes can read transactions, but only authorized nodes can read write them; (2) in unlicensed chains, all nodes are able to read, send, and write transactions. And (3) in privately licensed chains, only authorized nodes can read, send, and write transactions (Treiblmaier & Sillaber, 2021; Tsai et al., 2017).

Blockchain has many applications in e-commerce and helps companies to overcome their challenges (Bulsara & Vaghela, 2020). It supports e-commerce, as it is very secure for data storage (Sheikh et al., 2019). A comparison between two systems in terms of payment, with and without the use of blockchain, showed that in a system without blockchain, the payment process is slower, processes are more costly, and the negative effects of the dispute resolution system are greater (Sheikh et al., 2019). One example of blockchain usage in e-commerce is the OmniBazaar, which is a place to buy and sell without the need for credit cards and bank accounts. The advantages of using this platform include eliminating intermediaries, no bank charges, using cryptocurrencies, and speeding up transactions. In this context, people can exchange through bitcoins and other digital currencies without the need for intermediaries. In this software, sellers can offer their products without having to pay, and buyers can search for the product and do not pay for the use of this platform. (E-commerce Platform OmniBazaar, 2018).

Considering the advantages of blockchain, researchers are looking to study the impact of this technology on electronic businesses to reap its benefits. For example, Arora, Sharma & Bhaskaran (2020) have studied the impact of blockchain on various aspects of trust, including security, privacy, brand, usability, reliability, availability, reputation, third party, risk, quality, appearance, and feel in E-commerce. They indicated that using blockchain can revolutionize e-commerce, as there are many processes that can be automated, and implementing Blockchain can help better the application of e-commerce.

Jiang et al. (2019) designed a blockchain-based model to protect the privacy of individuals while conducting electronic transactions. In this model, smart private contracts were used to keep the information of the parties involved in the transaction confidential and then increase trust in this plan. This model consists of three separate chains that will eventually be interconnected. These chains include the payment chain for financial transactions, the trade chain for commodity contracts, and the logistics chain for storing delivery information. Each chain operates in conjunction with the other chains. According to the results, using this blockchain-based platform will gain more trust due to the lack of third-party access to other people's transaction information.

Liu and Li (2020) study focused on cross-border e-commerce to propose a blockchain-based framework. They developed a set of related techniques and methods for achieving traceable products and transactions in supply chain management.

In another study, Ismanto et al. (2019) studied the use of blockchain, cryptocurrencies, and smart contracts for a secure and efficient transaction in Indonesia. They showed that implementing blockchain has the potential to improve e-commerce and solve its problems. They also indicated that smart contracts are a prerequisite for ensuring fairness and security. Besides, distributed ledgers create a transparent and decentralized environment.

Treiblmaier and Sillaber (2021), by proposing 19 research questions, indicated that how blockchain can be investigated as a future technology that has the potential to have a major impact on e-commerce. The study by Grover, Kar & Ilavarasan (2018) examined the impact of blockchain on B2B, B2C, and C2C e-commerce. Their results indicated that blockchain would increase efficiency, transparency, speed of operation, and trust in the fields of accounting, market analysis, process management, supply chain tracking, and many other areas.

Lahkani et al. (2020) also examined the impact of blockchain on B2B e-commerce and indicated that the use of blockchain would improve the efficiency of logistics and digital documents by 74% and 75%, respectively. Their results also indicated that the main advantage of using blockchain is creating a decentralized and secure database. In addition, it increases payment speed, reliability, and transparency of data transfer.

Another study by Joshi and Kumar (2020) on various issues related to existing C2C e-commerce and overcoming them using blockchain technology and cost estimation model indicated that the use of different aspects of blockchain technology leads to better evaluation of cost, provides data privacy, and creates a sense of trust in customers.

In a similar study, Shorman et al. (2019) presented a model for C2C e-commerce based on blockchain. This model facilitates the business processes between the customers and eliminates the main role of large commercial companies in controlling and regulating.

According to previous studies, the impact of blockchain on various dimensions of e-commerce, especially B2B, B2C, and B2G businesses and the supply chain, has been studied. However, few studies have examined the impact of this technology on the C2C business. In addition, no research in this field has been conducted in Iran. Considering opportunities that blockchain

technology can provide for C2C business development and its ability to create security and trust in transactions in this area, and given that the C2C business has received a great deal of attention and acceptance today and is constantly growing and evolving, the lack of research in this area creates a significant gap in research. Therefore, the need to fill this gap and take advantage of its future results is undeniable, which is the purpose of this study.

METHODOLOGY

This study aims to investigate the effect of blockchain on C2C e-commerce. To this end, a qualitative method was used, and after conducting the conceptual study, to better understand and interpret the subject, the required data were collected through semi-structured interviews with experts in the field of blockchain and e-commerce. The questions were first stated in general terms, and then, to discover the hidden parts of the theories, possible questions were extracted and discussed from the answers of the interviewees, and finally, the interviews were coded.

The statistical population of this study includes experts who have sufficient information and experience in the fields of C2C e-commerce and blockchain. The statistical sample includes 10 academic experts and experts active in this field, whose opinions were examined to identify the characteristics and challenges of each field through interviews. Given the lack of experts in this field, experts were selected by using a snowball approach in which each expert introduces other experts in this field.

Then the data were coded to analyze the data from the interviews. Coding was done in three stages of open coding, axial coding, and selective coding (Liamputtong, 2009; Smith & Firth, 2011). To encode the data, MAXQDA software was used. To evaluate qualitative research, terms such as acceptability, transferability, and verification are used instead of the word validity and reliability. Acceptability refers to being real. Pitney and Parker (2009) proposed methods to increase research acceptance that include multiple sources, multiple analysts, and multiple methods. In this regard, the research data was collected from various sources such as knowledgeable people and various written sources. The transferability of the research results indicates the generalizability of the results to other similar groups and environments. Although this is beyond the ability of a qualitative researcher, by extracting and presenting maximum data, this part of the validity of the research can be provided to some extent. Validation of qualitative research results is achieved when other researchers can follow the research path and actions taken by the researcher. In this research, an attempt was made to do this ethically.

FINDINGS

Coding was used to analyze the data, and the data were encoded in three stages of open, axial, and selective coding. In the open coding stage, the concepts in the text of the interviews were extracted, and specific categories were identified for these concepts. For this purpose, according to the literature review and based on the purpose of the study, 12 conceptual codes including privacy, the challenge of specialists to develop blockchain, lower cost of transactions, reducing fraud and fraud, user experience, technological barriers, public blockchain, the immutability of information, security, legal barriers, transparency, and trust were identified, and their characteristics and dimensions in the data were discovered and extracted from the interviews. These categories were selected based on prominent and influential factors in C2C e-commerce as well as the features of blockchain technology. After identifying the codes, the concepts in the interview texts were categorized based on these codes. In some cases, a combination of several concepts was observed, and duplicate concepts were eliminated (Table 1).

In the axial coding stage, one component was considered for each category of conceptual codes. The results are presented in Table 2. As the table demonstrates, the highest frequency belongs to transparency, which indicates the great importance of this component and the need to pay attention to it.

In the selective coding stage, an analysis was performed to understand the relationships between the different codes. Due to the high frequency of the transparency code, the concepts were studied around this axis and based on it. According to the results, the close relationship between the transparency code and the category of "trust" is significant. In fact, despite the transparency that blockchain technology creates through its distributed and decentralized capabilities, it builds trust in the network, followed by trust in transactions and nodes. Such transparency in the presentation of information and its immutability also reduces fraud in transactions. The immutability of information makes the transaction records available to everyone. This feature is very important for proving the transactions in C2C e-commerce. This feature and the transparency of records at all nodes minimize the possibility of fraud. However, there will be more legal barriers to the transparency of information as a result of the use of blockchain, as public opinion has not yet changed to accept this level of transparency in transactions and the transfer of information. Therefore, legal barriers are chosen as the intervening factor. To develop this blockchain-based system, the presence of specialists and facilities is required. The consequences that will emerge in this system are related to the categories of "trust" and "reduction of fraud. " The results are shown in Table 3

DISCUSSION AND CONCLUSION

Online retailers have grown exponentially in recent years. However, they have faced challenges in how to communicate with customers and create security, reduce costs, provide high-quality services, and gain the trust and satisfaction of their customers. One of the most important solutions to such problems is the use of decentralized and distributed technologies such as blockchain. Using blockchain, businesses can turn payment, delivery, and transportation of goods into smart contracts. Therefore, in this study, the effect of blockchain on C2C e-commerce was investigated, which is the innovation of this research. This research can help the C2C high-tech and e-commerce literature, which requires applied research to cover various areas of e-commerce

operations that support the conversion of traditional operations to digital operations.

Table 1: Sample of Extracted Concepts and Concept Codes in Open Coding

Conceptual Codes	Extracted concepts
Privacy	Blockchain is secure in design and is considered a solution for cyber security and privacy protection.
User experience	The value of a blockchain network, like other networks, is the number of users. Accepting a network can increase the number of users. In the blockchain, despite the transparency of transaction details and users' trust in such a network, users will have a better and more satisfying experience, which in turn will increase the number of users.
The challenge of specialists	Developing an efficient and effective system requires the necessary specialists and facilities. Therefore, training in this field can be helpful in the adoption of this new technology.
Lower Cost	Blockchain is a technology that allows direct transactions between two users. Therefore, in blockchain, there are no intermediary costs per transaction. The volume of transactions in C2C e-commerce is low. So the transfer fee is low. In these small transactions, the transaction cost would not be higher than the transaction amount. So blockchain can cover this issue because transactions are done for free.
Public Blockchain	The development of public blockchain is significant for the implementation of this C2C platform. Private blockchain has limited use and is mostly used for a small segment or a specific entity.
Immutability of Information	The information recorded in the blockchain ledgers is not subject to change or manipulation. This makes the transactions between buyers and sellers, after registration, undeniable, and there is no possibility of violations in transactions. Unchangeable information.
Security	From a technical point of view, there are challenges related to security and blockchain acceptance within the network. Blockchain technology provides network security by assigning public and private passwords and digital signatures. Therefore, by using blockchain in the C2C business structure, more security will be provided for transactions.
Technological Barriers	In Iran, one of the problems is that blockchain is often known as money and bitcoin, not as a technology. This leads to the use of blockchain by monetary institutions that have problems with blockchain and bitcoin. Technological barriers
Fraud Reduction	Following the development of blockchain-based business, this system will allow users to track unchangeable transaction information. Therefore, there is no possibility of infringement in transactions.
Transparency	Blockchain, as a general distributed ledger technology, provides high-security information sharing and authentication of transactions by creating transparency in immutable information.
Legal Barriers	Following the transparency of information as a result of the use of blockchain, more legal barriers will be imposed because public opinion has not yet changed to accept this level of transparency in transactions and the transfer of information.
Trust	The development of blockchain-based trading will allow users to track unchanging transaction information, which in turn will increase trust in transactions in this area.

Source: This study

Table 2 : Frequency of Open Codes in Categories

Conceptual Codes	Coded Segments (All)	Coded Segments (Active)	% Coded Segments (All)	% Coded Segments (Active)
Privacy	2	2	2.06	2.06
User experience	4	4	4.12	4.12
The challenge of specialists	4	4	4.12	4.12
Lower Cost	4	4	4.12	4.12
Public Blockchain	5	5	5.15	5.15
Immutability of Information	6	6	6.19	6.19
Security	7	7	7.22	7.22
Technological Barriers	7	7	7.22	7.22
Fraud Reduction	8	8	8.25	8.25
Transparency	21	21	21.65	21.65
Legal Barriers	11	11	11.34	11.34
Trust	18	18	18.56	18.56

Source: This study

Table 3. Content of the Model Obtained From the Selective Coding

Causal Conditions	Main Category	Underlying Conditions	Interventional Conditions	Strategies	Implications
Fraud Incorrect information	Transparency	Technological issues The challenge of specialists	legal barriers	· immutability of information · Tracking transactions with blockchain	· Increased security · Increased trust · Reduced fraud

Source: This study

The results indicated that transparency, trust, and legal barriers are the most important factors in the use of blockchain in e-commerce, respectively. Blockchain promises a set of new possibilities that regulators must fully understand before changing rules. Since in C2C e-commerce, people interact with each other on a peer-to-peer basis, and there is no guarantee that any kind of abuse will not occur, the issue of transparency and trust will be very important. Thus, the use of blockchain in C2C e-commerce provides an opportunity to optimize many processes, and with the help of this technology, many existing problems and difficulties can be managed with less cost and more transparency. Following such transparency, users' trust in this platform and consequently other users will increase, and this in itself will attract more users. With the increase in the number of users and the acceptance of this type of network, the necessary infrastructure must be provided to make the most of use of this technology. The important issues in this regard will be education and culture for the use of blockchain technology in various fields, including C2C e-commerce.

In addition, transparency should be considered in situations where there is a lot of fraud and abuse in online commerce, and it is not possible to track the accuracy of information. Optimizing security measures and strengthening various security channels in e-commerce programs to prevent identity theft, access to private data, etc., is essential. Besides, the security practices used in e-commerce must be developed; because different types of attacks and threats are still evolving. However, the development of an efficient and effective system often faces legal and technical barriers and a lack of specialized personnel. Many people oppose this technology because of the transparency of all transaction steps, the specificity of records, and the impossibility of misuse. The central bank's dominance over transactions has also diminished following the use of cryptocurrencies in transactions; therefore, it opposes its implementation. Lack of support to provide the necessary infrastructure and facilities will lead to a shortage of expert and developer staff. These factors will slow down the development and use of this technology. While having more technical facilities and expertise, better progress will be made in this area and will have a great impact on the user experience in using blockchain-based platforms. If the government does not try to use blockchain today, the same technology will become a threat later and shortly as it is today in the foreign exchange market.

An important feature of blockchain is its vastness so that it can summarize all the events around the product, which can be a commodity such as money, in a hierarchy and determine if someone wants to manipulate this chain. As a result, by facilitating key market functions, blockchain, if successfully adopted, could complement and compete with traditional electronic markets. Inclusive programs, on the other hand, can improve the customer experience through efficient content delivery and quick responses to customer requests. Therefore, to make a better experience with e-commerce for users, it is very important to use blockchain to ensure the normal implementation of all aspects to complete the purchase.

Furthermore, the development of blockchain-based business will allow users to track unchangeable transaction information, which will further increase trust in transactions and reduce violations in this area. Therefore, to implement this system in e-commerce, whenever the purchase cycle is completed, credit must be given to the manufacturer immediately; intermediaries must be eliminated; profits from factories and stores must be reasonable and controllable; hoarding of goods must be prevented; the production process must be distributed until it reaches the customer and the accuracy of transactions within this ecosystem must be confirmed.

Another issue that depends on trust is network security. There are many security concerns in the C2C business environment, including the security of confidential information and bank account information. Applying blockchain to the C2C business structure will create more security for transactions. In addition, in current C2C models, transactions are done with intermediaries. Intermediaries include both suppliers and the banks through which payments are made. These intermediaries charge a fee to carry out the transactions. The use of blockchain in these transactions, as shown in the analysis results, eliminates these costs. Therefore, transactions will be done free of charge.

According to the analysis of expert opinions, the public blockchain was more accepted. In this case, there will be no intermediary for centralized control, and all controls will be performed by the node consensus mechanism. Therefore, completely private contracts cannot be used due to the need for transparency in the content of transactions and the approval of other nodes. If the platform is based on transparency and trust, the information about the part of the transaction that relates to the type and number of goods, the delivery information, and the like should be clear.

A technical study of how blockchain and cryptocurrencies work can lead to research design in this dimension and provide a more detailed and technical model, which is a recommendation for future research.
Another issue that can be considered in a similar study is the potential of blockchain to adopt technologies such as the Internet

of Things. Research can be done by combining these two technologies for the C2C business. In addition, it is suggested that future research examine the impact of blockchain on a combination of B2B, B2C, and C2C businesses.

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