Designing and Offering a Ccustomer Trust Model in the Marketing Ecosystem Based on Blockchain Technology

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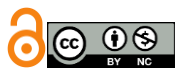* **Corresponding author email address**: doshmanziari@gmail.com

A r t i c l e I n f o

A B S T R A C T

Objective: The main purpose of the current research is to designing and presenting a model for building customer trust in the marketing ecosystem based on blockchain technology and based on the identification and introduction of trust-building elements and functions arising from blockchain technology in marketing actions.

Methodology: In this study, by adopting a qualitative approach, the researcher seeks to identify the antecedents and consequences of building customer trust in the marketing ecosystem based on blockchain technology. In this regard, the required data were collected based on the opinions of experts in the field of digital marketing and advanced information technology and semi-structured interview tools and were analyzed based on thematic analysis method and the use of MaxQDA software.

Findings: The analysis of the collected data in the research resulted in the extraction of 64 main themes with a frequency of 264 codes which after the final categories, these themes provided seven general antecedents and two general consequences of applying blockchain technology in order to build trust among customers of a marketing ecosystem.

Conclusion: Therefore, in this context, it is possible to design a mechanism to paying commissions to agents and brokers in case of implementing this technology.

Keywords: Building Customer Trust, Marketing Ecosystem, Blockchain Technology.

1   Introduction

In less than a decade, blockchain technology, with its gradual presence and emergence, and of course the clear vision of its presence in the future, can become one of the valuable pillars of business marketing to provide the grounds for development and strengthening of trust among customers. Because this technology is associated with specific characteristics and potentials that are quite consistent with the marketing needs of businesses in order to create and develop trust in customers. Capabilities such as decentralization, along with the ability to track and lack of ambiguity and complete transparency, and the ability to

permanently maintain information and data, and especially the impossibility of manipulation and change in information and data, are some features that considered blockchain technology as one of the most important trust-building tools in brand marketing activities (Boukis, 2020).

In today's digital world, due to the reduction of face-to-face contact between brands and customers, these technology-oriented intermediaries are able to lead the processes of creating and developing trust. In their usual state, the technologies itself are based on brand communities and customer engagement with these communities in order to build trust in the brand, as well as trust-building interactions between companies and customers through technology-based intermediaries such as websites, social media, etc. (Giovanis & Athanasopoulou, 2018). With the emergence and development of blockchain technology, the trends and approaches of building trust for customers in the marketing actions of companies have transformed; Bukis (2019) showed in her study that the acceptance and application of blockchain technology in the marketing actions of companies can restore or strengthen customer trust in three ways (Boukis, 2020):

- through strengthening brand transparency;
- through reducing the consumption of non-original and fake products;
- through increasing trust in the brand in online marketplaces.

blockchain technology is able to create a more secure and more interactive environment to exchange and use information created in different parts of the system for all members and actors present in the customer loyalty programs. Studies have also shown that due to the transparency and access to information in blockchain technology, its application is highly attractive in developing customer trust and loyalty in both BTC and BTOB sectors because it leads to a reduction in fraudulent practices and an increase in customer trust in the programs. By increasing attention to blockchain, questions about how to embrace innovation and user experience of its services were raised. Since trust is the main element of blockchain technology, how trust is created and evolved and its impact on user interactions should be discussed more clearly. Since blockchain does not create trust by itself, the salient features of this technology create trust in blockchain-based platforms. Especially, the recent studies such as Ferreira da Silva and Moro (2021) showed that the aspects from customer trust such as traceability and privacy and the role of blockchain technology in these aspects have received very

low attention and researches in the field of marketing should make more efforts to investigate the application of blockchain in marketing practices and its effect on customer trust (Ferreira da Silva & Moro, 2021).

In this context, studies such as Brophy (2020) showed that blockchain is one of the most important factors in creating revolution and high-level innovations and will lead to major changes in policies and laws and regulations in the future. Therefore, it is necessary to reveal the effects and applications of this technology over time. In this context, the present study is dedicated to a small but important part of these applications, i.e., the use of blockchain technology in the field of building customer trust and will try to develop the knowledge and insight in this field by identifying the causes and factors of using blockchain technology in the processes of creating or restoring trust and the consequences of developing this trust (Brophy, 2020).

A blockchain is defined as a shared digital ledger that supported by a group of nodes. Hence, blockchain is a kind of information recording and reporting system. Its difference from other systems is that the information stored on this type of system is shared among all members of a network (Tang et al., 2019). By using encryption and data distribution, the possibility of hacking, deleting and manipulating recorded information is almost eliminated. This technology based on encrypted algorithms guarantees data integrity, standard auditing and formalized contracts in the scope of data access (Chen et al., 2021). This technology can also be considered as a safety archive of exchanges and interactions that are compiled in blocks and connected to each other under a chained time order and distributed in several servers to provide security and reliable access (Angelis & Ribeiro da Silva, 2019). Therefore, this technology can be used well in fields such as marketing.

Blockchain technology has variety applications, which are derived from its inherent capabilities and features. At first, blockchain technology was only used in economic fields and cryptocurrencies, but today its application in several other fields, such as biology and marketing, is also being developed and expanded. Blockchain technology has been widely used in the disciplines of medicine and marketing. This technology with its mechanism, creates security and confidence in the information that users use (Siyal et al., 2019). The emergence of blockchain technology as part of the digital revolution has led to extensive changes in marketing processes and with facilities such as transparency, traceability and security allows the application of a new type of marketing. This new technology has a

tangible meaning (a block chain) and a latent meaning (digital information in a database), and provides a reliable execution environment by using smart contracts (publishing, validating and executing smart contracts in an informational way) (Stallone et al., 2021). In these smart contracts, there is no need to guarantees from third-party individuals or organizations. As a result, transaction costs will be reduced by ensuring the security and efficiency of the system (Ding et al., 2021). Blockchain facilitates the development of digital marketing due to benefits such as improving transparency and efficiency, preventing fraud, development of user experience and direct and unmediated interaction between brands and customers. Companies that use blockchain technology in the field of advertising have the most grown. In this context, blockchain has three basic components: asymmetric cryptography, transactions, and a consensus mechanism. In marketing, these three components are named as program, protocol, and encryption solutions, and they are used to develop programs, independent organizations, or decentralized independent communities (Gorkhali et al., 2020).

In the past, trust was established through a central authority; But today, there is an immutable and distributed data stored in the core of a blockchain program that is managed through smart contracts. In this way, the immutable nature of blockchain can facilitate the solution of anticipated problems by building trust (Antoniadis et al., 2019). Blockchain is a decentralized and transparent network consisting of a block chain and is used to manage transactions and information. Blocks are the main structure for storing information in the chain and are identified by unique codes called hashes. Blockchain has features that make it a distinctive technology for building trust and integrity, the most important of which are (Atlam et al., 2020):

- Decentralization: processing capability for all network users

- Immutability: the ability to ensure the integrity of transactions

- Transparency: no need for a third party, sharing transaction details between all participants

- Better security: data protection against malicious actions

- Efficiency: cost efficiency, settlement speed and risk management.

By increasing attention to blockchain, questions were raised about how to accept innovations and users' experience of its services. Since trust is a main element of blockchain technology, it should be clear how trust is created and evolved and how it affects user interactions. Because blockchain does not create trust by itself, the above-mentioned salient features create trust in blockchain media. Researchers and marketers acknowledge that trust is a key factor in the adoption of blockchain technology by users and consumers. The critical role of trust in blockchain has prompted researchers to review this concept from different perspectives. Therefore, in the existing literature, the role of trust is explained from the perspective of information systems and focusing on the technical design features of this technology. As a result, it is important to identify the aspects of users and consumers in examining the role of trust in this technology. In fact, a distinguishing factor between investors and users of blockchain is the way individuals or companies who own the technology trust and the technology itself. As long as people develop and manage technologies, it is very difficult to imagine the basic principles of trust not being applied. Thus, in a complex business environment, it is very important to examine the creation and maintenance of trust from different aspects (individuals, process, technology) (Fleischmann & Ivens, 2019).

The study of Sanchez-Perez (2021) also showed that the success of marketing measures of brands can be explained based on two hypotheses of social exchange and the model of planned behavior. The theory of social exchange was first proposed by Homans (1980) and this theory explains behavior based on variables related to reflection, feeling, emotion and profit and cost of such a relationship. In other words, based on this theory, individuals tend to get involved in an interaction when they feel that the benefit of participating in that interaction is more than its costs. In this way, the development of the use of blockchain in order to building trust in customers by brands through the improvement of people's attitude towards them is able to strengthen their tendency in order to expand relations with the brand. On the other hand, the theory of planned behavior is a theory for the connection between beliefs and behavior. This theory was presented by Ajzen (1985) and includes three key components of attitude, mental norms and perceived behavioral control, and these three factors interact with each other to shape the individual's behavioral tendencies. In the field of building trust in blockchain-based customers, people's attitudes towards trust-builder measures of brands have been favorable due to the involvement of these programs with blockchain and providing significant value to customers and this issue, along with his perceptions regarding the amount of control over exchanges and

interactions and the transparency of relationships, along with reducing the possibility of fraud due to the trust-builder nature of blockchain technology, can lead to the strengthening and development of trust in him (Sánchez-Pérez et al., 2021).

Based on the studies conducted, the field of study is the role of blockchain technology in marketing, and especially the role of this technology in building trust among extremely young customers and the few studies conducted in this field also rely on drawing a face of the concept of trust in blockchain technology in order to create the necessary platforms for future studies.

2   Methods and Materials

The current research is placed in the category of applied research in terms of its purpose; applied research is conducted to find a solution to an important problem or issue in society, an industrial or administrative organization. This research seeks to add to the collection of knowledge in the field of that problem or issue.

The method of data analysis in this research is based on theme analysis approach. Thematic or theme analysis is a method for understanding, analyzing and reporting existing patterns in qualitative data. This method is a process for analyzing textual data and turns scattered and diverse data into rich and detailed data. Also, the choice of thematic analysis method in this research is because the purpose of the research is to identify primary and deep ideas for developing theoretical models for future empirical research based on qualitative findings. Also, another reason for

choosing the theme analysis method for this research is that this method, especially, is extremely useful for drawing insights and attitudes from real events and experiences and for more detailed explanation of social issues involved in these events and experiences. Therefore, in this research, which seeks to identify the pattern of blockchain technology's effect on building trust among customers in a marketing ecosystem and achieve insight into the consequences of this application, thematic analysis method is a desirable approach to identify and analyze hidden themes in the context of collected data.

3   Findings and Results

Based on the introduced steps, first, the interviews conducted in the field of antecedents and consequences of building customer trust in the marketing ecosystem based on blockchain technology and based on Max QDA software and open coding approach were analyzed to identify the relevant themes and codes and finally the relevant factors. The first step in this method is extracting open codes from seven interviews (semi-structured interviews with seven research experts) in the field of antecedents and consequences of customer trust in the marketing ecosystem based on blockchain technology. Based on the results, a total of 79 open codes with a frequency of 293 numbers were extracted, and after editing, adjusting and removing similar items and merging some codes, finally 64 main themes with a frequency of 259 numbers remained. Table 1 shows the main, organizing and inclusive themes:

Table 1

The main themes and their classification in the form of organizing and inclusive themes

Main themes	Organizing themes	inclusive themes
Data immutability	Security due to fundamental features	Trust comes from data security
Anti-counterfeiting		
Unable to delete data		
Impossibility of manipulating registered data		
The security-creating nature of the network instead of the individual		
High costs of hacking the system		
The existence of distributed systems		
Continuous validation of identity information	Security mechanisms	
Continuous validation of interactions and exchanges		
Increasing security by providing a source of information		
Randomness of information distribution		
Decentralized storage		
Continuous encryption of data		
Data security control in each node		

Functional independence of elements	-	Trust resulting from redistribution of power
Equality of processing power between the service provider and the client		
Removal of ownership of data processing		
No need for a single monitoring system		
Decentralization of the system		
The existence of collective agreement law		
Reducing the possibility of fraud and forgery in products	Improve the shopping experience	Trust resulting from the shopping experience and interaction with the brand
Reduce click fraud		
Reduce purchase costs		
The possibility of earning income through personal information	Improving brand interaction	
Create a fair reward system		
End-to-end technology capability		
Maximum protection of users' personal information	-	Trust resulting from privacy
Customer power at the level of disclosure of personal information		
Reducing malicious advertising practices		
Maximum transparency of data	Transparency resulting from the use of technology	Trust resulting from transparency
Elimination of intermediaries in the market structure	Transparency resulting from blockchain elements	
Full access of all members to all exchanges		
Smart contracts	Transparency resulting from the use of technology	
The existence of a ledger or ledger	Transparency resulting from blockchain elements	
Shared block chains		
Sharing data across the entire system	Transparency resulting from the use of technology	
Product quality changes are obvious to all members		
Ability to instantly view all approved transactions		
Peer-to-peer communication		
Permanent access to the network		
Creating fields of information symmetry	-	Trust resulting from the power of technology
Creating a space with maximum possibility of inspection		
More efficient data processing		
Receive and provide maximum feedback	-	Trust resulting from user monitoring
The ability to track the origin of data from the customer		
The ability to control the viewing of advertisements by the user		
Better market targeting		
Increasing business income	-	Financial consequences
Creating added value		
Paying fair compensation to customers' advertising actions		
Reducing the marketing costs of companies		

Finally, in order to better understand the results obtained from the implementation of the theme analysis approach, a visual output related to the antecedents and consequences related to trust building in the marketing ecosystem based on blockchain technology is presented. In Figure 1, i.e., the first figure, the totality of the dimensions identified in the form of the antecedents of trust building due to the use of blockchain technology in the marketing ecosystem, and in Figure 2, the consequences of using this technology can be seen.

Figure 1

Theme network for building customer trust in the marketing ecosystem
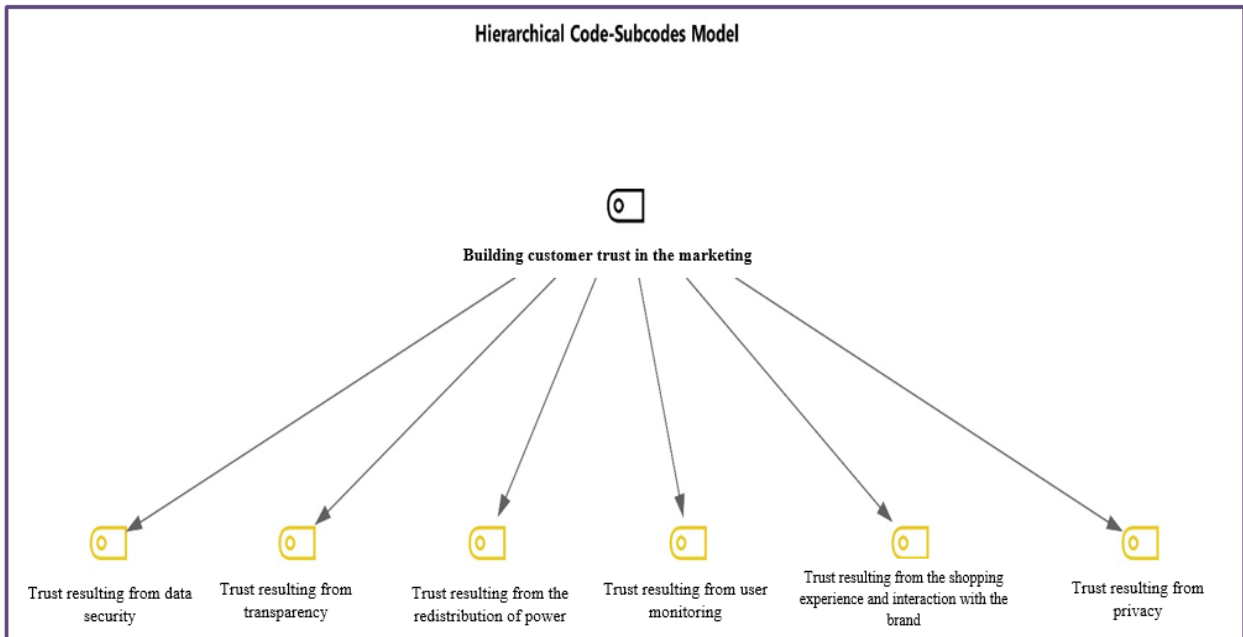

Figure 1 is the thematic network structure for customer trust building factors in the marketing ecosystem. As can be seen, customer trust factors in the marketing ecosystem include 6 main dimensions, i.e., trust resulting from data security, trust resulting from redistribution of power, trust resulting from shopping experience and interaction with the brand, trust resulting from privacy, trust resulting from transparency and trust resulting from user supervision.

Figure 2
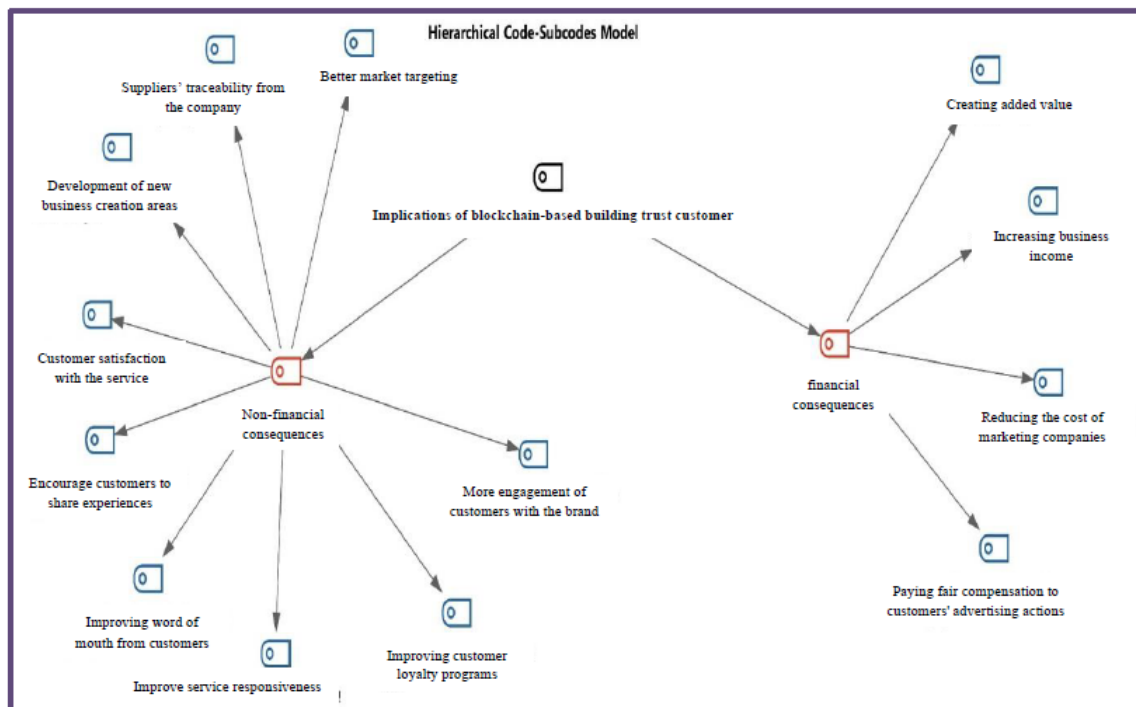
Network of themes for consequences

Figure 2 shows the network of themes for consequences. As can be seen, non-financial consequences include indicators such as improving customer loyalty programs, improving service responsiveness, improving word of mouth from customers, encouraging customers to share experiences, the development of new business opportunities, more customer engagement with the brand, customer satisfaction with services, the company's ability to track suppliers, and better targeting of the market. And the financial consequences have also included four indicators of increasing business income, creating added value, paying fair compensation to customers' promotional actions and reducing the marketing costs of companies. Table 3 refers to these items.

Table 2

Main themes and their frequency

Main themes	Frequency
Data immutability	15
Anti-counterfeiting	1
Unable to delete data	3
Impossibility of manipulating registered data	9
The security-creating nature of the network instead of the individual	1
High costs of hacking the system	5
The existence of distributed systems	8
Continuous validation of identity information	3
Continuous validation of interactions and exchanges	2
Increasing security by providing a source of information	1
Ability to create a digital signature	2
Using information chain links	5
Randomness of information distribution	1
Decentralized storage	5
Continuous encryption of data	11
Data security control in each node	2
Functional independence of elements	1
Equality of processing power between the service provider and the client	1
Removal of ownership of data processing	1
No need for a single monitoring system	5
Decentralization of the system	18
The existence of collective agreement law	18
Reducing the possibility of fraud and forgery in products	1
Reduce click fraud	6
Reduce purchase costs	1
The possibility of earning income through personal information	1
Create a fair reward system	1
Strengthening the relationship between the customer and the brand	5
High speed of settlement	1
End-to-end technology capability	1
Maximum protection of users' personal information	8
Customer power at the level of disclosure of personal information	6
Reducing malicious advertising practices	1
Maximum transparency of data	5
Elimination of intermediaries in the market structure	16
Peer-to-peer communication	3
Permanent access to the network	1
Creating fields of information symmetry	2
Creating a space with maximum possibility of inspection	1
More efficient data processing	1
Receive and provide maximum feedback	1
The ability to track the origin of data from the customer	15
The ability to control the viewing of advertisements by the user	1
Improving customer loyalty programs	4
Improve service responsiveness	1
Improving word of mouth from customers	2

Encourage customers to share experiences	3
Development of new business opportunities	1
More involvement of customers with the brand	3
Customer satisfaction with the service	5
Ability to track suppliers from the company	4
Better market targeting	1
Increasing business income	3
Creating added value	2
Paying fair compensation to customers' advertising actions	1
Reducing the marketing costs of companies	2

According to what is mentioned in the above table, the decentralization of blockchain-based systems, the existence of the law of collective agreement in the blockchain system, and the elimination of intermediaries in the market structure were the three most frequent mechanisms that were introduced by experts in the field of the trust-building role of blockchain technology in a marketing ecosystem. Also, among the consequences of using blockchain technology, the three consequences of customer satisfaction from the programs and services received, improving customer loyalty programs, and the ability to accurately track suppliers by customers and companies were introduced by experts as the most frequent consequences.

4   Discussion and Conclusion

New technologies have significantly affected the structure of marketing and have caused to emerge new strategies and concepts of marketing. Today, brands use technologies more than before to penetrate global markets and meet customer needs. Zhang et al. (2017) also stated that the analysis of sets of big data has helped businesses to find new views into the market. Blockchain technology is one of the technological advancements that have helped brands better understand and target their customers. As mentioned, in this study, the researcher has sought to design and present a model for building customer trust in the marketing ecosystem based on blockchain technology. According to the obtained results, blockchain can create trust in two ways for online marketers (Zhang et al., 2017):

First, by building trust between vendors themselves in different markets rather than building trust in sites. Because when there is trust among the vendors themselves, there is no need for a third party and an intermediary and every transaction is completely transparent (all details about service providers and vendors are accessible) and nothing can be manipulated or faked. Blockchain technology have open-source platforms that connect buyers and vendors without any intermediary and fees and enables customers to

buy and sell products using digital cryptocurrencies (Zhang et al., 2017).

Second, blockchain platforms can enhance trust in the products themselves. Blockchain increases trust in purchasing products such as high-involvement products (electronics), high-risk products (drug purchasing), second-hand products, and luxury brands. Additionally, blockchain can enhance trust in markets where brands are highly responsible (such as industries that threaten the environment) and markets where corporate responsibility is strongly tied to the nature of the products being sold (such as companies selling organic products). In the same way, blockchain is able to eliminate the uncertainty of consumers, because in online purchases, consumers are not able to concretely evaluate their purchases. In the end, it should be said that interactions between companies and customers have long been based on trust and now, blockchain technology has the ability to guarantee this trust, provide customer petitions with the utmost confidence and security, and providers to keep their promises in the long and short term. Obviously, with the transparency that blockchain technology provides, security, information protection and trust will be provided in the best possible way (Zhang et al., 2017).

Based on what the present study achieved based on its qualitative analysis, the following general suggestions can be made in order to building customer trust in the marketing ecosystem based on blockchain technology. In this section, suggestions and solutions are presented to building customer trust in the marketing ecosystem based on blockchain technology based on the results. These suggestions are based on the opinions and experiences of experts, along with the researcher's reviews and observations:

1)   Based on the obtained results, security caused by fundamental features has been introduced as the first important factor in building customer trust in the marketing ecosystem based on blockchain technology and includes the components of data immutability, being anti-fraud, the impossibility of deleting data, the impossibility of

manipulating recorded data, the nature of the security of the network instead of the individual, the high costs of hacking the system, and the existence of distributed systems. Blockchain was designed and created in order to provide an immutable, reliable and valid platform for recording information that is produced by unreliable organizations.

For this purpose, data management requirements should be embedded in the blockchain platform and, if necessary, traditional data management solutions should be implemented.

It is also recommended to use blockchain technology to track legal products and fight against fake products.

2) Based on the obtained results, the trust resulting from the redistribution of power has been introduced as the second most important factor in building customer trust in the marketing ecosystem based on blockchain technology and includes the components of functional independence of elements, equality of processing power between the service provider and the customer, elimination of ownership of data processing, no need for a single monitoring system, decentralization of the system, and the existence of the law of collective agreement.

Therefore, in this context, it is possible to design a mechanism to paying commissions to agents and brokers in case of implementing this technology.

Regarding this limitation, another proposal that can be proposed is to try to provide a paradigmatic model in the field of customer trust building in the marketing ecosystem based on technologies such as blockchain based on intervening, contextual, causal factors, strategies and its consequences. Because the researcher, while examining the domestic literature as well as the opinions of experts and managers, realized that basically, the concept of building trust in marketing ecosystems and using new information and communication technologies needs theoretical development inside the country and there is a need to differentiate between traditional and new trust building mechanisms and develop this phenomenon in the form of an independent concept. Also, according to the findings of this research and the existing limitations, it is suggested that in line with the findings of this research, future studies should seek to expand the range of indicators identified in the field of building customer trust in the marketing ecosystem in the current study. Because the model introduced in this study is designed by focusing on the structures, features and capabilities of blockchain technology and naturally, according to the essential differences between this technology and other new technologies used in marketing

and branding, such as artificial intelligence, Internet of Things, Metaverse, etc., these dimensions need to be developed or adjusted according to these different technologies from blockchain technology. The important point is to focus on the pathology of this model. Because predicting the damage to trust from an organization or group of organizations can lead to a more effective implementation of the model in various industries and fields.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

References

Angelis, J., & Ribeiro da Silva, E. (2019). Blockchain adoption: A value driver perspective. *Business Horizons*, *62*(3), 307-314. https://doi.org/10.1016/j.bushor.2018.12.001

Antoniadis, I., Kontsas, S., & Spinthiropoulos, K. (2019). *Blockchain and Brand Loyalty Programs: A Short Review of Applications and Challenges*. https://doi.org/10.2645/v5.i1.1

Atlam, H. F., Azad, M. A., Alzahrani, A. G., & Wills, G. (2020). A Review of Blockchain in Internet of Things and AI. *Big Data and Cognitive Computing*, *4*(4), 28.

Boukis, A. (2020). Exploring the implications of blockchain technology for brand–consumer relationships: a future research agenda. *Journal of Product & Brand Management*, *29*(3), 307-320. https://doi.org/10.1108/JPBM-03-2018-1780

Brophy, R. (2020). Blockchain and insurance: a review for operations and regulation. *Journal of Financial Regulation and Compliance*, *28*(2), 215-234. https://doi.org/10.1108/JFRC-09-2018-0127

Chen, S., Liu, X., Yan, J., Hu, G., & Shi, A. (2021). Processes, benefits, and challenges for adoption of blockchain technologies in food supply chains: a thematic analysis. *Information Systems and e-Business Management*, *19*. https://doi.org/10.1007/s10257-020-00467-3

Ding, Y., Luo, D., Xiang, H., Liu, W., & Wang, Y. (2021). Design and implementation of blockchain-based digital advertising media promotion system. *Peer-to-Peer Networking and Applications*, *14*(2), 482-496. https://doi.org/10.1007/s12083-020-00984-5

Ferreira da Silva, C., & Moro, S. (2021). Blockchain technology as an enabler of consumer trust: A text mining literature analysis. *Telematics and Informatics*, *60*, 101593. https://doi.org/10.1016/j.tele.2021.101593

Fleischmann, M., & Ivens, B. S. (2019). Exploring the Role of Trust in Blockchain Adoption: An Inductive Approach. Hawaii International Conference on System Sciences,

Giovanis, A. N., & Athanasopoulou, P. (2018). Consumer-brand relationships and brand loyalty in technology-mediated services. *Journal of Retailing and Consumer Services*, *40*, 287-294. https://doi.org/10.1016/j.jretconser.2017.03.003

Gorkhali, A., Li, L., & Shrestha, A. (2020). Blockchain: a literature review. *Journal of Management Analytics*, *7*(3), 321-343. https://doi.org/10.1080/23270012.2020.1801529

Sánchez-Pérez, M., Terán-Yépez, E., Marín-Carrillo, M. B., Marín-Carrillo, G. M., & Illescas-Manzano, M. D. (2021). The impact of the COVID-19 health crisis on tourist evaluation and behavioural intentions in Spain: implications for market segmentation analysis. *Current Issues in Tourism*, *24*(7), 919-933. https://doi.org/10.1080/13683500.2021.1889481

Siyal, A. A., Junejo, A. Z., Zawish, M., Ahmed, K., Khalil, A., & Soursou, G. (2019). Applications of Blockchain Technology in Medicine and Healthcare: Challenges and Future Perspectives. *Cryptography*, *3*(1), 3. https://doi.org/10.3390/cryptography3010003

Stallone, V., Wetzels, M., & Klaas, M. (2021). Applications of Blockchain Technology in marketing—A systematic review of marketing technology companies. *Blockchain: Research and Applications*, *2*(3), 100023. https://doi.org/10.1016/j.bcra.2021.100023

Tang, H., Shi, Y., & Dong, P. (2019). Public blockchain evaluation using entropy and TOPSIS. *Expert Systems with Applications*, *117*, 204-210. https://doi.org/10.1016/j.eswa.2018.09.048

Zhang, P., White, J., Schmidt, D. C., & Lenz, G. (2017). Applying software patterns to address interoperability in blockchain-based healthcare apps. *arXiv preprint arXiv:1706.03700*. https://arxiv.org/abs/1706.03700