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Are Blockchain Functions Required for Sharing Economy Business?: From the Perspective of Customers

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ABSTRACT

The current blockchain business emphasizes its advantages from the business developers' perspectives. However, research on the customer's perspective on the blockchain technology itself is rare; it has been difficult to prove whether it is necessary for customers. To verify the necessity of the blockchain in the business, we investigated the customer's perspective by grasping how much the business customers need blockchain functions, especially in the sharing economy business sector. In this study, we defined the functions with which blockchain technology can provide customers in the business. Thirty participants evaluated what blockchain functions are necessary for sharing economy business. They responded that seven of the blockchain functions were necessary for sharing economy business.

Keywords: Blockchain technology, Customer perspective, Sharing economy business

INTRODUCTION

Blockchain as an emerging technology can impact business fields (Halaweh 2013; Brey 2017; Schlegel et al., 2018). From the business developer's perspective, research has been conducted on the topics such as the innovativeness of blockchain technology (Morkunas et al., 2019; Thurner, 2018) and its implementation in the service industry (Chang et al., 2020; Garg et al., 2021). According to Werner's research, the blockchain features, such as traceability and immutability, will positively affect the competitive performance of companies (Werner et al., 2021). Smart contracts also positively affect partnering flexibility and composite performance. The impact of blockchain technology on businesses has been proved; however, research on blockchain technology from the user's perspective is rare.

It is not easy to prove the necessity of the blockchain from the customer's perspective since the current blockchain business emphasizes only the advantages of the technology. According to Albayati's study, users' experience, trust, social impact, regulatory support, and design affect customers' acceptance of blockchain technology (Albayati et al., 2020). They focused on users' understanding or experience of technology and in which the influence of external factors affects technology acceptance rather than blockchain technology itself. We investigated the customer's perspective by how much the business customers need blockchain technology.

In this study, we want to investigate whether blockchain is necessary for the sharing economy businesses from the customers' perspective. In particular, we focused on blockchain functions. We investigated what functions potential customers think are necessary for sharing business.

BACKGROUND

Blockchain Service Sectors

We reviewed existing blockchain businesses that described blockchain technology as their central technology. From December 2019 to January 2020, 521 blockchain businesses and DApps were surveyed. By examining the business sectors to which the blockchain applied, excluding game and gambling businesses, six business sectors were classified: a) trace (38 businesses), b) transact (53), c) share (70), d) verify (17), e) match (31), and f) store (94). Among them, we investigated 'share', sharing economy business, the second most common sector.

Blockchain Functions

The block and chain formation process generates blockchain technology characteristics. The block contains the information about the transaction data: the transferred object, the total amount thereof, and the information about the sender (Daniel, 2018; Lin and Liao, 2017). All nodes verify the blocks before the block is connected to existing chains (Christidis and Devetsikiotis, 2016). After the verification, the verified block is stored in separate databases and shared by everyone on the blockchain network. Since all nodes own the identical blockchain, the ledger data stored in the blockchain guarantee transparency and integrity (García-Bañuelos et al., 2017); even if one node's data are damaged, it can be recovered quickly. Data fraud is prevented by the verification process (García-Bañuelos et al., 2017). However, because all data must be verified and distributed among all network participants, the accumulated time in the network may be prolonged (Wust and Gervais, 2018), and data interoperability could be low between different blockchains (Belchior et al., 2021).

A previous study (Koh et al., 2021) summarized 14 blockchain features. We referred to blockchain features as to how blockchain is used to solve customer problems in the service industry. In this study, we have expanded the blockchain features to the functions with which blockchain can provide customers in businesses. Sixteen functions were derived, and these functions also included latency, low compatibility, and low upgradeability, which are limitations of blockchain (see Table 1).

METHOD

Thirty participants who have experiences to use the Airbnb service participated in the experiment. Assuming any sharing economy service in the future, they responded to see if they thought the 16 functions would be necessary for

Table 1. Blockchain functions and their descriptions.

Blockchain functions	Descriptions
Interoperability	All data in the service should be able to be transmitted for use in other services as well
Programmability	All users of the service must be able to create the terms and conditions they want
Anonymity	The personal information of all users of the service should be protected
Direct transaction	All users of the service must be able to trade without intermediaries
Accessibility	All users of the service should always be able to use all data stored in the service
Locatability	All users must be able to know the path of movement of all data stored in the service
Traceability	All users must be able to know the source of all data stored in the service
Equal rights	All users should be able to create, modify, and delete data on the service
Right level of encryption	All data stored in the service must be kept safe
Non-modifiable data	All data stored in the service should not be manipulated
System reliability	Even when there is a problem with the service, it must be restored stably
Economical/reward	All users of the service must be able to receive financial benefits through specific activities
Latency	Service approval time should be fast
Upgradability	All users of the service should have no difficulty updating the service
Confidentiality	All users of the service must be verified when signing up for the service
Public verifiability	All users must verify the data stored in the service

the business with a 7-point scale (1: Strongly disagree – 7: Strongly agree). After the survey, they explained the reason for the evaluation score.

We selected the participants who understand the sharing economy services. To this end, people who have experiences in using the Airbnb service were selected. Airbnb was chosen as an experimental service because it is a representative sharing economy service that can reflect the characteristics of the blockchain network. Unlike other services where ordinary users can borrow objects only, the Airbnb service can be both a lender and a borrower who can borrow the thing. The person who lends the thing can set the price they want.

We screened to ensure that the participants understood the Airbnb service accurately in advance. Only those who answered more than five of six questions about Airbnb correctly were allowed to participate in the experiment. The questions are whether Airbnb service users can rent or borrow goods, anyone who uses the service can leave a review, lend the goods at the desired price, and whether everyone can see the reviews.

Table 2. t-test results.

	Mean	StDev	SE Mean	T	DF	P-Value	Mean Difference
All	*5.67*	*1.53*	*0.07*				
Confidentiality **	6.4	0.93	0.17	4.29	29	0.00	0.73
Anonymity **	6.4	1.04	0.19	3.85	29	0.00	0.73
Direct Transaction	4.87	1.57	0.29	−2.80	29	0.01	−0.80
Programmability *	6.1	0.99	0.18	2.37	29	0.02	0.43
Economical/ Reward	5.47	1.31	0.24	−0.85	29	0.40	−0.20
Traceability	5.23	1.52	0.28	−1.57	29	0.13	−0.44
Locatability	4.23	1.65	0.3	−4.76	29	0.00	−1.44
Public Verifiability	4	1.93	0.35	−4.74	29	0.00	−1.67
Non-modifiable Data *	6.17	1.23	0.23	2.20	29	0.04	0.5
Right Level of Encryption **	6.73	0.52	0.09	11.18	29	0.00	1.06
Equal Rights	5.33	1.4	0.26	−1.32	29	0.20	−0.34
Accessibility	5.6	1.4	0.26	−0.27	29	0.79	−0.07
System Reliability **	6.4	1.13	0.21	3.53	29	0.00	0.73
Latency	6.03	1.33	0.24	1.50	29	0.14	0.36
Compatibility	5.13	1.74	0.32	−1.69	29	0.10	−0.54
Upgradability **	6.6	0.62	0.11	8.20	29	0.00	0.93

Test of H0: $\mu = 5.67$, Ha: $\mu > 5.67$

**p<0.01, *p<0.05.

RESULTS

The survey results were analyzed to find the functions of blockchain that customers think are more necessary for arbitrary sharing economy business in the future. As the results of paired t-test, the mean response value for the seven blockchain functions was significantly larger than the overall mean response value. This can be interpreted as customers need seven of the blockchain functions more than the remaining nine in the sharing economy business (see Table 2). The functions that the participants think are more necessary for the sharing economy business include a) confidentiality, b) anonymity, c) programmability, d) non-modifiable data, e) right level of encryption, f) system reliability, and g) upgradability. Among them, upgradability is the limitation of the blockchain. Participants responded that knowing the path of data movement and verifying data to be stored in service by all users is less necessary than other blockchain functions.

DISCUSSION

This study surveyed the customer's need for blockchain in sharing economy business. The seven blockchain functions were more necessary than the others by simply comparing the mean values with paired t-test. We selected prominent functions compared to the overall mean; however, we need to prove the

necessity of blockchain by asking various questions about each function in further study.

To better understand the customer's perspective on blockchain, we propose several future studies. First, it is possible to compare with other technologies and see which of the two technologies is more necessary for a particular business. It will be possible to compare the necessity by listing the functions with which the technology can provide the customer, as in this study. Second, it is necessary to confirm the need for blockchain in different business sectors. And finally, research on how each technology's functions affect the acceptance of blockchain is needed.

CONCLUSION

This study investigated whether blockchain is necessary for the sharing economy businesses from the customers' perspective. Customers responded that seven of the blockchain functions were relatively necessary for the sharing economy business. The limitations of the blockchain were also included in these seven functions. For the blockchain to be applied to the sharing economy businesses, it will be necessary to overcome the technical limitations of the blockchain through alternative technologies.

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