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Creating New Blockchain Business Ideas using Morphological Analysis: A Case Study

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ABSTRACT

This study suggests a methodology for creating blockchain business ideas using a morphological analysis method. A total of 521 blockchain businesses and Dapps were surveyed and analyzed to derive 6 representative business fields. In addition, the role that blockchain plays in the business and the customer problems that blockchain solves in the business were analyzed to derive customers' generalized needs. A methodology for creating blockchain business ideas was developed by combining "fields" and "needs" through morphological analysis. A case study was conducted to make a new business model using the developed methodology.

Keywords: Blockchain technology, Blockchain business, Business model creation, Morphological analysis

INTRODUCTION

Blockchain technology is attracting attention from academia and industry as having the potential to innovate businesses (Chen et al., 2018; Viriyasitavat and Hoonsopon, 2018). In various industries such as finance, medical care, energy, and supply chain, numerous blockchain businesses are newly created or blockchain technology is introduced into existing businesses by paying attention to the technological capabilities and characteristics of the blockchain (Tasatanattakool and Techapanupreeda, 2018; Jaude and Jade, 2019).

Businesses can only be competitive when they meet the customer requirements of the market (Hills and Sarin, 2003). However, there is a lack of a customer-centered business model innovation framework (Keiningham et al., 2019). In particular, in the high-tech industry, constructing business strategies mainly considering the technological characteristics and capabilities is inappropriate to solve business problems (Hills and Sarin, 2003). Even in the case of blockchain business, it is difficult to survive in the market unless technical characteristics and business models are matched to customer requirements. In this study, a methodology for creating blockchain business ideas was suggested using a method of morphological analysis considering both technology and customer perspectives.

BACKGROUNDS

Blockchain Technology

Blockchain is a distributed database system that records transactional data or other information, secured by cryptography and governed by a consensus mechanism (Swan, 2015) It stores data in blocks which is a small distributed data storage environment created based on the P2P method and is connected in a chain form. The chain is a distributed ledger or list of entries maintained by participants over a network of computers (Cole et al., 2019)

The following sentences describe how blockchain operates and represent the core technical characteristics of blockchain technology (Zheng & Lu, 2021; Lu, 2018; Lu, 2019 Yi, 2019; Cole et al., 2019). Because there is no centralized control in blockchain, any qualified block should have been verified and voted in participants' agreements so participants don't need to take care of trust issues. Immutability of the data can be guaranteed because blockchain is integrated with consensus and encryption algorithms. Anonymity of the participants can be guaranteed because blockchain provides an encrypted coded record for all possible transactions to prevent participants' authentication. Since the blockchain stores data in connected blocks in the form of chains, it is easy for participants to access the detailed transaction process, thus traceability of the data can be guaranteed. Participants have an equal rights to access all data stored in the blockchain, so is has a characteristic of transparency. Blockchain system based on the integration of consensus algorithms, cryptography, and smart contract is considered a secure and private platform.

Business Innovation

Due to various social and economic causes, the current business is not sustainable (Baldassarre et al., 2017). Therefore, businesses must implement innovative and continuous changes to meet customer requirements and secure a competitive advantage (Baldassarre et al., 2017; Marcinkowski and Gawin, 2019).

The technology-driven approach is defined as the beginning of business innovation with the development of specific technologies (Chidamber and Kon, 1994). However, in many cases, relying on only one technological solution or setting incorrect customers making the market less competitive are pointed out as main weaknesses (Brem and Voigt, 2009). The market-driven approach begins business innovation while identifying business users and market demands (Terzidis and Vogel, 2018). However, this approach has the disadvantage that it is difficult to find a solution to meet market demand because there are few potential customers who have an accurate understanding of the technology (Geum et al., 2016). Therefore, it is important to connect technological and market characteristics for successful business innovation (Lee, 2003; Brem and Voigt, 2009; Geum et al., 2016).

Morphological Analysis

Morphological analysis was proposed as an atypical modeling method for identifying, structuring, and analyzing technology, organization, and social

Table 1. Business fields.

Business Fields					
1	Assets	6	Diet	11	Shopping
2	Beauty	7	Energy	12	Sport
3	Entertainment	8	Healthcare	13	Tourism
4	Mass Communication	9	Knowledge	14	Transportation
5	Daily Life	10	Medicine		

problems (Zwicky, 1969, Im and Cho, 2013; Arciszewski, 2018). Morphological analysis from an engineering perspective is a method of acquiring design knowledge, creating an abstract design representation space, and randomly generating potential design solutions using this space (Arciszewski, 2018). It is considered an inventive design method because this method can produce new, feasible, and useful results (Zwicky, 1969; Arciszewski, 2018).

METHOD

This research team investigated the blockchain business for about two months from December 2019 to January 2020. We explored Dapp, business web pages, and white papers that are in service or scheduled to be serviced with keywords such as blockchain business/service and Dapp. A total of 521 blockchain businesses were collected.

Business Fields

The affinity diagram technique was conducted to derive representative keywords of the 'business fields' to which industry domain the business belongs. In order to find meaningful rules among vast amounts of businesses, highly relevant items were grouped, and titles representing the grouped items were given. Through repeating the process of analyzing the correlation between the titles of the groups and integrating them between groups or reclassifying them based on new criteria, different representative keywords with consistent criteria were derived. As shown in Table 1, 14 'business fields' to which the business belongs were derived.

What Blockchain Does

'What blockchain does' was defined as the action that the blockchain functions when the blockchain technology operates in the actual business. In the business survey process, the business purpose and business model were identified through business or Dapp's white paper and homepage information, and representative keywords were derived by performing an affinity diagram technique based on what the blockchain does. In this process, the keywords were constructed in the form of verbs that can explain what the blockchain performs considering the characteristics of blockchain technology. As shown in Table 2, a total of 6 keywords of 'what blockchain does' were derived from the actions performed by blockchain technology in the business.

Table 2. What blockchain does.

What blockchain does			
1	Transact	4	Match
2	Store	5	Verify
3	Share	6	Trace

Table 3. An example of deriving customer needs.

What Blockchain Does	What needs do customers have?	What problems do customers experience?	Generalized Needs
What blockchain does to address the customer's problems	I want to know the origin of romaine lettuce	I want to eat reliable vegetables	Want to verify
	I want to know the route of movement of drugs, luxury goods, diamonds, etc.	I want to know the origin	Want to rent
		I want to verify the authenticity	Want to connect

Table 4. Generalized needs.

Generalized needs			
1	Want to integrate	9	Want to be untact
2	Want to approach anytime	10	Want to verify
3	Want to approach anywhere	11	Want to rent
4	Want to manage	12	Want to connect
5	Want to know the route	13	Want to get economic benefits
6	Want to be motivated	14	Want security
7	Want to get information	15	Want to customize
8	Want to be recognized		

Generalized Needs

From the customer's point of view, business plays a role in solving the problems faced by customers and satisfying various needs. If we find the hidden needs of existing business customers within each industry and generalize what problems they are experiencing and what needs they want to meet, we can provide the directions necessary to construct the business model from business ideas, making it easy to apply to other domains. Therefore, considering 'what blockchain does' in the business, it went through the process of finding the superficial reason why each business was born and deriving the hidden needs of customers from it. Table 3 shows the process of deriving customer needs with an example and Table 4 shows 15 'generalized needs' of customers finally derived.

A METHODOLOGY AND A CASE STUDY

The developed methodology follows a method of combining 'business fields' and the customer's 'generalized needs' through morphological analysis. The methodology for creating blockchain business ideas is as follows.

First, choose a 'business fields' and find objects that belong to that field that can be the subjects. In this case study, 'tourism' will be used as an example to explain how to create new blockchain business ideas. According to the chosen business field, 'real-time information of the travel destination', 'visitors reviews', 'native's recommendations' and 'traveler's courses' can be derived as objects.

Second, select 'generalized needs' and combine them in one sentence with the derived objects, and list additional objects associated with them. According to the objects derived above, 'real-time information of the travel destination' can be connected to 'want to integrate', 'want to get information', and 'want to get economic benefit'. The statement 'I want to provide and integrate real-time information of the travel destination and receive financial benefits for the reward' can be the sketch of a business idea. Regarding the statements described, 'degree of congestion', 'real-time video', 'visitor' rating', and 'native's rating' can be listed additionally.

Finally, develop a business model idea that can operate integrally across multiple items through the act of brainstorming. In other words, business ideas can be created by developing previously combined sentences and newly derived items. In the case study, advanced business ideas expressed in the form of customers' needs can be derived such as 'I want to receive financial rewards by updating real-time information (such as degree of congestion, real-time video, etc.) and visitor's/native's evaluation information (such as ratings, recommendations, reviews, etc.) on a platform where location information is integrated'.

DISCUSSION

A method of creating new blockchain business ideas by combining the 'business fields' and customers' 'generalized needs' was proposed. Dapps and businesses were investigated to derive representative 'business fields' and customers' 'generalized needs'. In the process, 'business fields' were reflecting the trends of the blockchain business in the real market, and 'generalized needs' were derived by exploring why users use the business, so both factors can be considered user-centered aspects. In addition, since the 'generalized needs' were derived in consideration of the previously derived 'what blockchain does', it can be seen that they reflect the characteristics and capabilities of blockchain technology. In other words, the suggested methodology has both the nature of a technology-driven and market-driven approach in that it is a method of creating business ideas by combining the two factors through morphological analysis.

Since the suggested methodology was designed to create a business that applied blockchain technology, representative keywords were derived by investigating only businesses related to blockchain. Therefore, this method has the advantage of reflecting the characteristics of blockchain technology.

If the scope is set with new technologies in the preceding business investigation, it will be possible to devise a methodology of creating business ideas by applying similar methods to new technologies that will emerge in the future, not blockchain technology.

This methodology has the advantage of reflecting market trends and customer needs well because it is based on existing businesses when deriving each factor, but has the disadvantage that it is difficult to create ideas that can be applied in a completely new field. Since business ideas developed through this methodology have not been proven to be more competitive compared to existing ones, verification through experiments is needed in future works. In addition, since the trend of the applied business of blockchain is rapidly changing, it is necessary to supplement this methodology through further trend research in the future.

CONCLUSION

This study suggests a methodology for creating blockchain business ideas using a morphological analysis method. A total of 521 blockchain businesses and Dapps were surveyed and analyzed to derive 6 representative business fields. In addition, the role that blockchain plays in the business and the customer problems that blockchain solves in the business were analyzed to derive customers' generalized needs. A methodology for creating blockchain business ideas was developed by combining 'business fields' and 'generalized needs' through morphological analysis. Business ideas derived from the methodology can be expected to be market competitive while solving the problems of high-tech businesses in that the nature of the market-driven approach and the technology-driven approaches are combined. In the future, the competitiveness of business ideas developed through this methodology will be verified, and the methodology will be developed through further trend research.

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