The Influence and Development of Distributed Business Model on Traditional Business Model

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Abstract: By comparing Airbnb, a traditional business model homestay leasing platform, this article analyzes in depth the advantages of distributed business model homestay leasing platform Beenest in revenue management, community management, and information management. In this paper, first, through summarizing domestic and foreign literature, the concept of business model, the characteristics of blockchain technology and the concept of distributed business model are obtained. Secondly, the typical cases comparing distributed business model and traditional business model Beenest and Airbnb, and elaborated the basic situation of the two platforms. Then through the use of cooperative game K-S solution, user game payment matrix, and case analysis, the advantages of the distributed business model in increasing the proportion of revenue, the equilibrium solution of the game without intermediary management, and the security and stability of user information in the distributed business model are obtained. Therefore, the Beenest bed and breakfast platform based on a distributed business model can create greater value under the condition of information security and reliability than Airbnb while properly solving disputes between users.

1. Introduction

The term "business model" were originated in the 1970s at the beginning, and it didn’t get the attention of academia and industry until the famous management scientist Peter Druck (1994) interpreted the business model as business theory [1]. The fundamental definition of "what is a business model" has not yet reached consensus, while a generally accepted view is that business models describe the basic principles of how companies create value, deliver value, and acquire value[2,3]. Combining the results of a large number of documents, this study is convinced that the business model is a logical system for enterprises to create value.

The concept of "block chain" was born in a groundbreaking paper published in 2008 called "Bitcoin: Peer-to-Peer Electronic Cash System". At present, the existing research results at home and abroad recognize that block chain technology has the characteristics of decentralization, collective maintenance, time series data, security and credibility (Li et al) (Yuan et al) [4,5]. Zhang et al hold the view that the emergence of block chain is of subversive significance, and traditional payment methods, commercial activities, or other human social activities will be changed by its characteristics in the future [6].

Three distinguishing feature popularized the block chain:

(1) Non-tamperable time stamp: to ensure the traceability of data information. The block chain database stipulates that when recorders create blocks, they need to put a "timestamp" in the block to indicate that this information was created at this time, which is equivalent to adding an immutable proof, making all information in the database traceable and verifiable, having unforgettable real records. The timestamp can be used as a proof of existence of block data, helping to form a non-tamperable and unforgettable block chain database, thus building the foundation for block chain to be used in time-sensitive fields such as notarization and intellectual property registration.

(2) Safe trust mechanism: establish trust mechanism through pure mathematics to ensure high

efficiency and low cost of system operation. The block chain technology adopts the principle of asymmetric cryptography to encrypt data, and at the same time, it uses the powerful computing power formed by the consensus algorithm such as the proof of work of each node of the distributed system to resist external attacks and ensure that the block chain data cannot be tampered with or forged.

(3) Decentralized distributed structure: high fault tolerance data information storage mode can save a lot of intermediary costs. The block chain database structure allows each node involved in data transactions to record and stored all data. The accounting, propagation and storage functions of block chain technology are allocated to each participating node. As long as there is no crash or error of all nodes, the entire system will always be able to function normally, and it will not affect all data storage.

2. Brief literature review

Any kind of system will inevitably be constantly explained and supplemented, and it will also change with the development of the times and technological progress. As early as 1993, Normann & Rafael proposed that in the future to deal with the separation of customer value and enterprise value, value remodeling is the solution, and this change involves the entire value creation system and is not limited to a certain enterprise or industry [7]. Zhang Qixiang et al. (2006) pointed out that the business model has the characteristics of life cycle, which also reveals that the business model will continue to change due to different internal and external factors [8]. Yuan Lei (2007) puts forward the concept of restructuring business model reform from the perspective of the enterprise, and points out that the reform is applicable to the intensely turbulent and non-linear changing operating environment, and it occurs during the recession and initial stages of the industry. The industry is usually accompanied by breakthrough technology and application innovation [9]. Wang Qin (2011) analyzes value exchange logic from the perspective of value ecology, and explores different paths of business model innovation from the perspective of network reconstruction.

In general, the current research on business model change is mostly from the perspective of individual enterprises, and individual enterprise reform will inevitably have an impact on the overall reform of the industry that it constitutes. Under the condition of life cycle theory, the existing business model is bound to face a recession. Future business models of the entire industry and even the industry need to be further explored.

3. Aims

With the emergence and development of the Internet, the original business model has evolved from the traditional supply chain model (manufacturer-agent-retailer-customer) to three types of business models based on the Internet: the first is "tools + community + business model" ", followed by the "long-tail business model", and the third is the "cross-border business model." The emergence of the Internet has caused tremendous changes in the entire business model, and changed people's consumption habits. The business model is constantly innovating with the help of the Internet economy platform. The Internet spirit of equality, openness, collaboration and sharing is subverting and reconstructing the traditional business model. But no matter what stage it is in, the generally visible business model today is still a centralized business model.

The existing research has reached a consensus that the emergence and characteristics of blockchain technology will produce distributed systems. However, there are few research results on what kind of business model distributed systems will present, and no systematic, scientific and rigorous relevant literature has been produced on the concepts, characteristics and prospect prediction of distributed business models. The information presented by the a bunch of platforms through search shows that most practitioners in related fields believe that the business model is facing a change from a centralized business model to a distributed business model, but no opinion about the definition, characteristics and prospect prediction of distributed business models. This article will discuss the concept, characteristics and development prospects of distributed business

models on the basis of this research gap.

4. Case analysis

Airbnb, as the world's largest bed and breakfast (B&B) leasing platform, provides travellers with booking services for travellers in 191 countries around the world as an intermediary. Although Airbnb currently occupies an absolute leading position in the global market, this traditional centralized business model inevitably has deficiencies in transaction fees, data security, and dispute resolution. The development of block chain technology makes it possible to make up for the shortcomings of traditional business models. Beenest is a B&B leasing platform with decentralization as its distinctive feature, known as "Airbnb in the block chain world". Compared with Airbnb, the same type of B&B leasing platform, Beenest removes the link of the middleman. Lessors and renters can directly use Bee coins for transactions on the platform, which has improved the cost and benefit distribution and platform order compared to traditional business models.

In the transaction of shared leasing of homestays, the suppliers of homestays with idle homestays and consumers with the demand for homestay leasing are the essential drivers for the realization of this lease transaction. But in the traditional business model, due to technical reasons, intermediaries have become necessary to facilitate transactions. A considerable portion of the profit from this leasing exchange is allocated to middlemen. The shared leasing of B&B supported by block chain technology has greatly reduced intermediate fees. At Airbnb, this part of the profit is collected in the form of service fees, ranging from 3% to 14%. In Beenest, only 1% of the token fee is charged to maintain the operation of block chain technology. In addition, in the shared leasing transaction of the homestay, both parties mainly use the homestay product as a shared resource, so the authenticity of the information and the security of the transaction have become the key. Identity verification and payment verification have also become important links in maintaining platform order. The risks in the traditional B&B leasing platform (take Airbnb as an example) are passed on to the real owners of the rights and interests through transactions, which does not solve the problem of information and transaction security; the (B&B) sharing leasing platform under the distributed business model (taking Beenest as an example)) Solves this security risk through block chain technology.

Table 1

	Airbnb	**Beenest**
Service fee	3%——14%	1%bee coin
Service fee for	Keep the platform	Keep the platform

Through the comparison between Airbnb and Beenest, it can be concluded that the emergence of a distributed business model saves middlemen, and at least brings three advantages to the homestay leasing transaction: one is to exclude other factors. The income received by landlords and platforms increases; second It provides a more efficient and efficient method of dispute resolution; third, the platform has higher information security. The following will conduct a comparative analysis from the three aspects of revenue management, community management and information management.

5. Revenue comparison

5.1 Model assumption

The product supply model established in this paper is based on the following assumptions:

(1) The product supply chain consists of the homestay supplier and the homestay supply platform. The homestay supplier only supplies one homestay product;

(2) B&B supply platform is the maker of sales price of accommodation products$p$, The market demand for the product is Q, the elasticity coefficient is α, and the market demand function is $Q = \beta P^{-\alpha}$, where $\beta > 0$, $\alpha > 1$.

(3) The cost of accommodation products supplied by the homestay supplier is constant at c, and the price supplied to the platform is w;

(4) H_1 is the profit of the homestay supplier; H_2 is the profit of the homestay supply platform; H is the total profit of the supply chain under the distributed business platform; and $H*$ is the total profit of the supply chain under the traditional business platform.

(5) In the model, the homestay supplier adjusts the profit of the platform with the price w it supplies to the homestay supply platform, and the platform adjusts the profit of the homestay supplier with the sales price P, and sum is the two decision variables w and P in the supply chain system. The relationship between c and$w$, P is: $0 < c < w \leq P$;

(6) Both the homestay supplier and the homestay supply platform are rational people, and the information between the two is complete.

5.2 Description

According to the basic assumptions of the above supply model, the profit expressions of the homestay supplier and the homestay supply platform can be obtained separately, $H_1 = (w - c)Q$and $H_2 = (P - w)Q$.

The expression of the total profit of the supply chain is $H = (P - c)Q$.In the two scenarios of Beenest distributed business platform and Airbnb traditional business platform, the profits and total profits of both sides of the B&B supply chain are different.

Both sides of the supply chain profits and total supply chain profits under the Airbnb traditional business platform

When users use the Airbnb traditional business platform, the homestay supplier and the homestay supply platform have not established any sincere cooperation. Both parties, as individual rationalists, choose the optimal decision variables from the perspective of maximizing individual interests. Therefore, the relationship between the user and the Airbnb platform at this time is a non-cooperative game relationship. Assume that the user makes a decision first, and the price of the product supplied to the platform is w and Airbnb specifies the best product sales price P.According to the given market demand function, the product sales price set by the platform directly affects the product sales. Therefore, users modify their own supply price according to the optimal sales price set by the platform, and the modified optimal supply price is set tow'. In the same way, the platform is again based on the principle of maximizing its own profit, and adjusts its optimal sales price to p' according to the user's modified supply price.

If we choose w as the price, the profit function of the homestay supply platform is, $H_2 = (P - w)Q = (P - w)\beta P^{-\alpha}$

We could get this $\frac{\partial H_2}{\partial P} = \beta P^{-\alpha} - (P - w)(\alpha\beta P^{-\alpha-1})$, after Differentiation.

Thus, the optimal sales price is$P = \frac{\alpha w}{\alpha - 1}$.

Meanwhile, the profit function of the B&B supplier is $H_1 = (w - c)Q = (w - c)\beta P^{-\alpha}$

We know that $P = \frac{\alpha w}{\alpha - 1}$, so we could get $H_1 = (w - c)\beta \frac{\alpha w}{\alpha - 1}^{-\alpha}$.

If we differentiate$w$, get $\frac{\partial H_1}{\partial w} = \beta \left(\frac{\alpha}{\alpha - 1}\right)^{-\alpha} [w^{-\alpha} - (w - c)(\alpha w^{-\alpha+1})] = 0$

So the optimal supply price is$w' = \frac{\alpha}{\alpha - 1}$.

We know$w' = \frac{\alpha}{\alpha - 1}$, so we can get the function$H_2 = \beta P^{-\alpha} - \beta \frac{\alpha c}{\alpha - 1} P^{-\alpha}$.

Get $\frac{\partial H_2}{\partial P} = (1-\alpha)\beta P^{-\alpha} + \alpha\beta\frac{\alpha c}{\alpha-1}P^{-(\alpha+1)}$ in the same way.

Thus the optimal sales price is $P' = (\frac{\alpha}{\alpha-1})^2 c$

As a result, under the Airbnb traditional business platform, the profits of users and the platform are:

$$H1 = \beta c^{1-\alpha}(\frac{1}{\alpha-1})(\frac{\alpha}{\alpha-1})^{-2\alpha}$$

$$H2 = \beta c^{1-\alpha}[(\frac{1}{\alpha-1})^{2(1-\alpha)}(\frac{\alpha}{\alpha-1})^{1-2\alpha}]$$

So, under this condition, the profits of supply is

$$H* = \beta c^{1-\alpha}(\frac{1}{\alpha-1})^{-2\alpha} + \beta c^{1-\alpha}[(\frac{1}{\alpha-1})^{2(1-\alpha)}(\frac{\alpha}{\alpha-1})^{1-2\alpha}]$$

Profit of both sides of the supply chain and total profit of the supply chain under the Beenest distributed business platform

When users use Beenest distributed business platform, users and platform parties cooperate sincerely, and both parties will consider the maximum profit of both parties on the basis of information sharing. The platform will determine the best selling price from the perspective of the entire supply chain. At this time, the profit of the supply chain is:

$$H = (P-c)Q = \beta P - \alpha(p-c)$$

If we differentiate P, we could get the function of $P* = \frac{\alpha}{\alpha-1}$

So, we know $H = \beta c^{1-\alpha}\frac{1}{\alpha-1}\frac{\alpha}{\alpha-1}^{-\alpha}$

Compared the two conditions, we know that no matter $(\alpha>1)$ or $(0<\alpha<1)$,Compared with the Airbnb platform for non-cooperative games, users can improve the overall profit of the supply chain through cooperative games with the Beenest platform. However, in addition to the aforementioned cooperation conditions, a successful cooperation game requires a set of mechanisms that can be accepted by both parties for a reasonable distribution of cooperation profits so that both parties can voluntarily execute the cooperation contract. This profit distribution mechanism will determine how to distribute the profits generated in the cooperation process. Therefore, this profit distribution mechanism needs to follow the principle of more work and more benefits, the principle of benefit sharing and win-win, and the principle of proportionality of risks and benefits.

6. Conclusion

By analyzing the comparison between Beenest and Airbnb, it is concluded that the distributed business model is a subversion and reconstruction of the traditional business model in the three aspects of revenue management, community management and information management, which overcomes the shortcoming of the poor distribution of benefits in the traditional business model, costing a lot of in disputing resolution, unsafe information. The profit distribution mechanism based on the KS solution distributes the increased profits according to the size of the contribution of the partner to the supply chain, so that the cooperation contract is accepted and consciously executed by both parties, so as to achieve the optimal solution of the game between the two parties. Maximize the overall revenue. Therefore, the bed and breakfast platform based on the distributed business model can create greater value while the information is safe and reliable while properly solving disputes between users.

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