Developmental Path of Sharing Economy and Its Countermeasures Based on Blockchain Technology

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As a key product of the Internet Age, sharing economy is still a kind of Internet technology in nature. Especially, big data technology reuses idle resources in society to create new market value. However, as a result of its unique developmental characteristics, sharing economy relying on big data technology faces various problems, such as information leakage, defective basic data and the unimproved integration with conventional industries. As a decentralized system and distributed database technology, blockchain is a kind of technology which links relevant data in single blocks to form a central system in a cycled chain pattern by encrypted signature verification. The fusion of blockchain technology and big data technology can not only conquer the bottleneck of big data technology, but also provide new methods and ideas for the development of sharing economy, so as to upgrade the developmental mode of sharing economy and promote the rapid growth of sharing economy.

Keywords: big data, blockchain, sharing economy, industrial integration

1. Introduction

As a key product of Internet Age, sharing economy is a brand new mode of economic development, which, relying on emerging Internet technologies, such as big data, cloud computing and IoT, reuses some social resources that cannot participate in economic production due to limitations of technology and commercial mode previously in social and economic operation. The mode of sharing economy breaks spatial and temporal limits, solves the problem of social and economic information asymmetry and recombines idle resources in society and reuses them in multiple ways, so as to maximum social benefit. As a new commercial mode based on sharing of idle items and services in the age of Mobile Internet, its idea and developmental mode has penetrated in various industries. Sharing economy is a key trend in the economic transformation and upgrading under the new normal of Chinese economy, which is of great significance for the elimination of social and economic information asymmetry, the

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innovation of the mode of economic development, as well as rapid economic growth.

Since the strategy of Internet Plus was put forward in 2015, sharing economy enterprises have flourished and gradually penetrated into various industries, such as finance, lease and medicine, with diverse modes of development. For example, the most well-known DiDi represents a typical mode of product sharing, which engaged in the flied of transportation and travel by means of equity financing. Zhongchou.com, Renrendai.com and Lu.com have swept the whole country by the mode of finance sharing. Xiaozhu.com, E-Express, Ma3 Office and SOHO 3Q grow rapidly by the mode of space sharing. The mode of promoting sharing economy by big data technology is spreading into and integrating with various industries. Relying on big data technology, sharing economy enterprises have achieved rapid growth. However, as many accompanying problems are increasingly prominent, such as information security, privacy protection and inadequate supervision, it is difficult for sharing economy to sustain by only relying on big data technology. In virtue of its characteristics, such as encrypted sharing and distributed ledger, blockchain technology provides new methods and ideas for data circulation and sharing, complementing big data technology mutually. Therefore, this mode can not only conquer the bottleneck of big data technology, but also sere sharing economy better. Besides, the gradually maturing big data technology also needs an application entity to embody its own value. The complete integration of big data and blockchain, two independent Internet technologies, will require the solving of technical problems, as well as a fusion of them by government and enterprises through market. As a kind of Internet technology more advanced than big data technology, blockchain retains the openness, equity and interconnection characteristics of the Internet with higher security and accuracy. Therefore, when the development of sharing economy that relies on big data technology is stagnant, the future of sharing economy will be improved by the integration of blockchain technology into various fields of sharing economy (such as finance, medicine and energy) to take technical advantage of blockchain by the inner optimization, transformation and upgrading of the developmental mode of sharing economy. Therefore, the integration of blockchain technology and big data technology will improve and upgrade the developmental mode of sharing economy and overturn the traditional business mode of sharing economy, so as to create brand new opportunities for the development of sharing economy.

The near-zero cost of information transfer is the epochal precondition for this blockchain movement. Through the popularization of blockchain technology, the traditional Internet based on information is transformed into a value-based Internet. The status of traditional economy is mapped into the virtual world, further integrating reality and virtuality. In respect of economic nature, the popularization of blockchain is an asset transfer movement. Traditional economic behavior, including currency issuance, will be virtualized. Centralized and intermediate traditional organizations

will retire step by step. AI will be combined with IoT, and the time of resources collaboration will come. Token will become the tool of value circulation in the age of AI and IoT. USD will gradually quit from circulation in the future. The popularization and solution of blockchain technology is the result of the transition in respect of wealth from centralization to decentralization and collaboration since the industrial age. The maturity of quantum technology in the future will end this movement.

2. Connotation and Evolution of Sharing Economy

2.1. Connotation of Sharing Economy

In 1983, the concept Sharing Economy derived from the concept "Collaborative Consumption", which was brought up by Marcus Felson, a sociology professor from University of Texas and Joe L. Spaeth, a sociology professor from University of Illinois. Collaborative Consumption is not only a new mode of trading and consumption, but also a new lifestyle. In 1984, American sociologist Paul Ryan put forward the idea LOHAS (Lifestyles of Health and Sustainability), which focuses on those sustainable and healthy lifestyles. Limited by the reality at that age, it was hard to implement these lifestyle ideas advocated by Paul Ryan, which are more environmental, more convenient and more harmonious. With the emergence and application of the Internet, people's idle resources are utilized to the maximum extent, and their sharing lifestyles also develop. Sharing economy emerges as a new economic mode. In 2010, American scholar Rachel Botsman brought forward developmental phases of sharing consumption based on the operation of the Internet, which can be divided into three stages. The first stage is code sharing. For example, Linux allows users to use information provided by the Internet to make decisions. The information collection is unidirectional and communication and evaluation is not allowed among information providers. The second phase is life sharing and content sharing. For example, facebook, QQ and other social platforms achieve mutual exchange and information sharing in people's lives. In this stage, the information transfer is bidirectional.. However, this stage has no trading and is restricted to information exchange. The third stage is sharing of offline resources. Online information starts to develop into offline trading. Thus, sharing economy emerges, forming another life and consumption style.

From the development of sharing economy, it can be found that sharing economy emerged through the transformation from information sharing involving no trading to online and offline resource exchange involving trading. Thus, the sharing business mode formed. In 2010, the O2O business mode of Uber and Airbnb started to emerge and it has gradually been accepted and demanded by the public. In both taxi market and house lease market, there appears potential consumption and market inclusiveness. As the originator

of business modes of sharing economy, they provided referable theoretical basis and successful experience for sharing economy in other fields in this age of sharing economy.

The definition of sharing economy is still inconclusive. The understanding and definition of sharing economy is various among scholars. In addition to the most common Sharing Economy, there still are other expressions, such as Collaborative Consumption, P2P E-conomy, Mesh Econom, Gig Econom, Access Economy, and On-Demand Economy. These expressions for sharing economy are all based on its features, and outline sharing economy from different perspectives. Some scholars gave their definitions according to the nature of sharing economy, such as the requirement of sharing economy for cooperation and collaboration. They defined it as collaborative consumption and collaborative economy. Based on existing literature, the current sharing economy is just a narrow explanation of sharing behaviors, a certain stage in the development of sharing economy. When such consumption mode becomes a normalized and formal commercial mode, it can be called as sharing economy.

2.2. Elements and Types of Sharing Economy

Based on existing literature, elements of sharing economy include: Sharing ideas and trust among strangers, idle resources and capacity, and platform to achieve sharing. Among these elements, idle resources are an inevitable product of social and economic development. The utilization of idle resources forms a potential market for social and economic development. The appearance of sharing economy is based on the existence of idle resources. Network sharing platforms are the core of sharing economy, because the maximum combination of the owners and demanders of idle resources can be achieved only through the popularization of the Internet and the application of network technology. Participants in sharing economy are the entity of sharing economy and also the entity to achieve individualized demand and provide idle capacity.

Sharing economy can be classified into three types. The first type is product service systems. This type aims to trade the use right of product, including lease and other means. The second type is redistribution markets. This type aims to trade the ownership of commodities, a proposal method of idle resources and capacity, including trading of second-hand products. The third type is collaborative lifestyles. This type includes the innovation and exchange of lifestyles by exchanging and lease. The author also found that the form of sharing economy shall include the manifestation of human labor exchange for traditional services in sharing economy, such as the at-home services of cooks and beauticians.

Sharing economy emphasizes the sharing of resources, especially the cooperation and exchange among people. It disseminates such values as “Mine is Ours” “I Help Others and Others Help Me”. Benefit exchange is achieved between two strangers by value exchange among products. Material exchange is achieved among material

demanders through market mechanism. Besides, competitiveness is retained at a proper level, so as to achieve the balance between two entities of sharing economy. In nature, sharing economy is the sharing of ownership. The analysis and reuse of remaining resources and capacity by the distribution of the right of use is the core and key of sharing economy and collaborative consumption.

2.3. Rapid Development of Sharing Economy

After the financial crisis, sharing economy grew rapidly in the world, especially in America. It constantly expanded to over a hundred of countries in Asia-Pacific, Africa and other regions. Sharing economy quickly penetrated from the original fields, such as auto and housing, to many other fields and segments, such as catering, space, logistics, education, medicine and infrastructure. Besides, it also accelerated the expansion to more fields, such as agriculture, energy, production and urban development. A batch of representative enterprises and platforms of sharing economy have grown up.

Table 1. Business and Major Enterprises of Global Sharing Economy

Mode	Major platforms
Sharing finance	China: CreditEase, WDZJ, Zhongchou.com, Renrendai.com and Lu.com United States: Lending Club
Sharing transportation	China: DIDI Hitch United States: Uber, Boatbound (yacht Sharing), Splinlister (Bike Sharing) Germany: Park Tag (Sharing of Parking Space) France: BIaBIaCar
Sharing space	China: Tujia.com, Xiaozhu.com United States: Airbnb, Wework, Homeaway, Dogvacay, Storefront
Sharing health care	China: All Love Fitness United States: Classpass, Paper
Sharing food	China: Mishi, ShaoFanFan United States: Opentable, Kitchit
Sharing public resources	China: Ping'an Wifi United States: Solarcity Spain: Fon

As there is no uniform official data, various institutes estimate the total volume of sharing economy mainly by two indexes: trading volume and financing volume. As estimated by iiMedia in its research report, the scale of sharing economy in China reached RMB 283 billion, and rose to RMB 2236 billion by 2015, with annual growth rates over 80% and the highest growth rate up to 118.5% (2014). Other market research institutes also estimated the scale of global and Chinese sharing economy. Although these estimations adopt different criteria and have great difference in their data, they can still reflect the approximate market scale of sharing economy (see Table 2).

Table 2. Scale of Sharing Economy at the End of 2015 Estimated by Some Market Research Institutes

Publishing institutions	Time	Transaction size (USD billion)	Financing scale (USD billion)
Tencent research institute	2015	164.4	1.42
iiMedia consulting group	2015	223	1.42
Sharing economy research center of state information center	2015	1810	146

With the prevalence of sharing economy, a great deal of newly established enterprises grew rapidly, and many "unicorn companies" emerged. According to data published by CB Insight, by February, 2017, among all unicorn companies in the world, the number of Chinese enterprises reached 42, including 15 sharing economy companies, accounting for over 35%. It is noted that many enterprises took less than five years from their establishment to get a valuation over USD 1 billion. For example, DiDi was founded in 2012, and its valuation reached USD 33.8 billion. Its valuation doubled just over the year of 2016 (see Table 3).

Table 3. Valuation of Some Unicorn Enterprises in the Field of Sharing Economy

Company	Valuation (USD billion)	Industry
Didi Chuxing	33.8	Travel services
Lufax	18.5	Financial service
China Internet Plus	18.0	Catering service
Eleme	4.5	Catering service
Huimin.cn	2.0	Life service
Weiying	2.0	Entertainment service
Guahao.com	1.5	Medical service

Compared with traditional industries, the development of sharing economy is more rapid and easier. By comparing housing lease and auto rent industries with traditional hotel and taxi industries, it can be found that the market of traditional industries kept increasing its saturation as a result of higher trading and time cost and various limitations forming by these industries. However, sharing economy emerged. For example, Airbnb achieved great success in past few years and such success of operation attracted new financing constantly (see Table 4). Through the development in five years and 10 months, the valuation of Airbnb has reached USD 30.1 billion, making it a non-listed company with the highest valuation.

3. Developmental Barriers of Sharing Economy Relying on Big Data

As Chinese economy has stepped into a new normal, the demographic dividend

has disappeared and environmental pollution is aggravated, sharing economy is an inevitable trend in the transformation and upgrading of Chinese economy. Especially after the strategy Internet Plus was proposed, the developmental mode of driving sharing economy by big data is diffusing and integrating to traditional industries. Those sharing economy enterprises relying on big data have grown rapidly, but still face many barriers.

3.1. Imperfect Basic Data and Big Data Technology

The key to the development of sharing economy is the accuracy of the collection and analysis of credit data. In the mode of traditional sharing economy, basic data is mostly subject to oligopoly. The ability of enterprises of real-time dispatch and control on data shall be enhanced. Even if some small enterprises have new and innovative modes of sharing economy, it is hard to realize such modes. Therefore, the lack and deficiency of credit data has greatly hindered the development of financial institutions. In addition to different informationzation degrees in various industries and the severe lack of basic data, original data is inaccurate, because the big data sharing and transmission mechanism among industries is undefined and there is no specific and uniform standard for data information between industries, resulting that collected data cannot be used directly before further processing and translation. Therefore, we need a new technology to start a data reform, making data social public resource and infrastructure like water and electricity in daily life. Such technology is blockchain. The maturity and security of big data, an underlying technology for the operation and development of sharing economy, needs to be improved.

3.2. Different Informationzation Degrees in Various Industries and Severe Deficiency of Credit Data

As an underlying technology for the operation and development of sharing economy, the maturity and security of big data will determine the sound development of sharing economy, because the key to the development of sharing economy is the accuracy during the collection and analysis of credit data. Especially, the lack and deficiency of credit data has greatly hindered the development of financial institutions. From a macro perspective, although there are various data in society in the age of Internet, original data is inaccurate because there is no specific and uniform standard for data information between industries, resulting that collected data cannot be used directly before further processing and translation. Meanwhile, as the big data sharing and transmission mechanism among industries is undefined, it is possible that data may be lost during transmission, which will also prejudice the accuracy of data. From a micro perspective, those enterprises with data advantage is not willing to make public their data due to interests, since more data

means more opportunities to earn profits. Besides, as individual and corporate privacy may be included in data, they does not like to make data public due to security. As shown above, currently, the maturity and security of big data is unimproved, which has greatly hindered the further development of sharing economy.

3.3. Data of Sharing Economy Cannot Guarantee Information Security and Safety Regulation Needs to Be Enhanced

The right of use for commodities is complete in traditional economy, which is obtained by purchasing and can be separately utilized by the owner. While sharing economy collects and centralizes scattered resources in society and achieves additional benefit by transferring the right of use for commodities at certain time. When the right of use and the ownership are combined, information data is occupied only by the owner, so the security of such information data can be guaranteed. When the right of use and the ownership are separated, they will be shared by many persons, which will definitely lead to leakage of the information and privacy of customers. With the increasingly growing data size of sharing data system, the excessively centralized data is easy to suffer theft and loss. The information and data of customers are increasingly grasped by others. As the owner of information the customers don't know how their information and data will be used and where it will go after collection. Besides, in the age of sharing economy, scattered social resources will be efficiently used by various combinations and distributions, and the right of use for data, information and commodities are shared by many persons. For example, the use of bike sharing requires the user to scan the QR code and fill in personal information by social software. However, as a result of the lack of regulation, the data of sharing economy cannot guarantee the security of personal information, and the leakage risk of customers' privacy increases accordingly.

4. Feasibility Analysis on Application of Blockchain Technology in Sharing Economy

4.1. The Value of Blockchain Technology

Blockchain is a kind of digital, decentralized and distributed ledger. As a decentralized system and distributed database technology, blockchain is a kind of technology which links relevant data in single blocks to form a central system in a cycled chain pattern by encrypted signature verification. In blockchain system, each single block node has complete information of the system and all information is traceable. The technology of blockchain can help eliminate information isolated island

and improve the efficiency of resource utilization. The traditional big data sharing form has a high requirement for hardware, while the data sharing of blockchain adopts the mode of node synchronization. As long as the data storage is finished at a node, all other nodes in the blockchain system can query the new data. Relying on the ability of big data technology to collect and analyze data, plus the storage mode, confidentiality and low use cost of blockchain technology, the collection and updating of data will be accelerated, ensuring real-time sharing of data.

In addition, the traditional development mode of sharing economy relies on the Internet technology which is featured by high speed of information transmission and low cost, which can collect idle resources in society. As additional resources are used to create value, the cost for value creation is much less than the cost for enterprises to provide products and services. As an Internet technology more advanced than big data and in virtue of many characteristics, such as decentralization, trust-free, reliable data and non-tampering, blockchain can not only help eliminate information isolated island, improve the credit system, improve the industrial ecological system and improve resource utilization rate. In virtue of trust-free, decentralization, reliable data and other features, the fusion of blockchain technology and big data technology can not only conquer the bottleneck of big data technology, but also provide new methods and ideas for the development of sharing economy, so as to upgrade the developmental mode of sharing economy and promote the rapid growth of sharing economy. In other words, the fusion of blockchain and big data technology has greatly promoted the development of sharing economy and improved the commercial mode of sharing economy. Therefore, the mode of sharing economy "Blockchain + Big Data" will help more efficient utilization of resources, solve the problem of information isolated island and information asymmetry, and improve resource utilization efficiency.

4.2. Feasibility of Application of Blockchain Technology in Sharing Economy

As a kind of Internet technology more advanced than big data technology, blockchain retains the openness, equity and interconnection characteristics of the Internet with higher security and accuracy. With the development of digital economy, digital storage and trade can be applied to any asset. In virtue of digital encryption and non-tampering of data, smart contract based on blockchain technology can achieve efficient management on assets. In view of technical characteristics of blockchain technology, if the blockchain technology is applied into actual economy, it will link up social economy, improve asset management efficiency, intelligentize social asset, optimize social structure and create many other business values.

First, in virtue of its characteristics of trust-free and openness, the blockchain technology may optimize social structure and help improve the credit system. This technology distributes data in each node inside the blockchain, so it is hard to steal

such data. With the technology of blockchain, the uploading and query of data adopts the mode of P2P, namely point-to-point. Both sides of a trade can query the credit record of the other side in the blockchain system, which can help eliminate the defects of traditional credit collection and improve the reliability of credit information. The authority of data query can be set for each node in the blockchain. If one needs to query data in this node, he shall have the key and address to access the data, which can ensure the security of data. Besides, in a blockchain system, one can freely browse the information in the node when he has obtained the key of such node, facilitating the search of information. The technology of blockchain can ensure that all credit data is public and transparent without any forgery, which can be used as credit endorsement. In addition, as for public decision-making, the traditional mode of voting may lead to favoritism and fraud. However, if the voting is conducted by the distributed ledger with complete trust-free in the blockchain system. Voters can completely trust the result of the voting, so as to optimize social structure. Therefore, the blockchain is a kind of reliable database that executes commands completely according to machine language. In virtue of its feature of trust-free, it can effectively solve the problem of credit in economic trading, and thus improve the efficiency of social and economic management.

Second, in virtue of its characteristics of trust-free and openness, the blockchain technology may optimize social structure and help improve the public policy. The trust-free and openness of blockchain technology makes possible decentralized autonomy of the society, namely social participants have the same right and duty in a standard system of circulation. The advantage of blockchain is that its information recording and reading requires verification each time. Since an actual trade process requires many times of information recording and reading, the trading in the blockchain system requires many verification to achieve the final purpose of the trading. Therefore, the technology of blockchain that executes commands completely according to machine language is a reliable database, which can effectively solve the problem of credit in economic trading. The data and information in a blockchain system is non-tamperable. The data sharing of blockchain adopts the mode of node synchronization. As long as the data storage is finished at a node, all other nodes in the blockchain system can query the new data, ensuring real-time sharing of data. Based on the design idea of the blockchain system, any modification on data information in the system requires the grasping of over 51% nodes in the system. As for nodes in a single participating block, it will be impossible for them to grasp 50% data information in the blockchain system. Therefore, in virtue of its characteristics of trust-free and openness, the blockchain technology may optimize social structure and help improve the public policy.

Besides, in virtue of its feature of non-tampering, the technology of blockchain can improve the efficiency of social and economic management. This technology of blockchain will establish a new value network. In virtue of its feature of non-tampering, blockchain can establish a value network that is safer than the current

Internet. In a value network based on the blockchain technology, enterprises can freely enjoy its products and services, and consumers can also share their extra resources with each other. Besides, compared with the economic market, the value network of blockchain has no absolute monopolist. Each participating node in the blockchain system has the same advantage in respect of information, which is consistent with the connotation of sharing economy. In addition, the electronic currency Bitcoin uniquely owned by blockchain technology can achieve good cooperation among countries and industries, effectively solve many problems that hinder the integrated development of industries and global integration, such as law and exchange rate, conquer the barrier of information sharing among industries and fully realize the health and transparent development of industries. Smart contract means that, in the current legal system, contract codes are written into the underlying layer of a blockchain system and can not be modified, so as to ensure that trade will happen whatever the cause is and effectively prevent any dispute arising from credit issues.

5. Change of Sharing Economy Mode by Blockchain Technology and Status of Application of Blockchain Technology in Sharing Economy

The change of sharing economy caused by constantly developed blockchain technology is increasingly prominent. The processing of Internet information by blockchain has revolutionarily changed the development of sharing economy, achieved sustainable development of sharing economy, created advantages that the traditional economic development mode does not have, and promoted the transformation of the Internet from information-based to value-based Based on the development of sharing economy, the technology of blockchain is used to achieve development and innovation, revolutionarily changing the business mode of sharing economy.

5.1. Innovation of Existing Economy Mode by Blockchain Technology

Initially, by connecting strangers on a platform, sharing economy conducted the integration of resources and information, so as to effectively allocate idle resources, reduce the cost of trade and time, and achieve mutual benefit and win-win result among consumers. However, traditional sharing economy has defects in respect of information processing and collection, namely a lack of exchange and communication among platforms and isolation between trades of each platform. In such case, multiple platforms has not only scattered consumers, but also hinder the effective allocation of idle resources. In order to obtain more information resources, participants in sharing economy have to register as users in various platforms. But they cannot freely cross between platforms, making credit accumulation unstable and increasing trade cost between entities. The incompleteness and asymmetry of information hinders

the development of sharing economy. The development of blockchain technology effectively prevents these issues.

5.2. Technical Base for Innovation of Sharing Economy by Blockchain

Sharing economy derived from a series of physical sharing platforms, such as Uber and Airbnb, and achieves the sharing of idle capacity by linking up different users. However, sharing economy is a centralized system forming from 2010, which achieves information and resources sharing by commercial organizations or platforms founded by government. With the development of the Internet, the technology of communication and cryptology also keeps advancing. The application of blockchain in sharing economy also keeps developing. With the decentralized mode of information creation, sharing economy has achieved broader expansion. The technology of blockchain promotes the development of sharing economy in two aspects. First, under the conditions of the Internet, the blockchain innovates the application of the Internet and achieves fundamental change for the Internet in respect of information technology. Second, the trust conditions that sharing economy relies on is also quantized through blockchain technology. To sum up, the technology of blockchain provides sharing economy with a natural development platform.

The core and key of blockchain technology is decentralization, which just matches the wide sharing behaviors of sharing economy. The application of blockchain based on distributed ledger improves and develops sharing economy that mainly relies on the Internet and credit mechanism, facilitating the allocation and effective utilization of resources, reducing trade cost constantly and conquering the problems that cannot be solved by systems and laws.

6. Problems and Developmental Countermeasures of Application of Blockchain in Sharing Economy Mode

6.1. Challenges in Application of Blockchain in Sharing Economy

Although the application of blockchain in Bitcoin is well known, such technology has not been generalized in sharing economy, because there are many prominent problems during the application of blockchain in sharing economy even if such technology has so many advantages.

6.1.1. The Development of Blockchain Is Restricted by Existing National Institution

On the one hand, in virtue of its feature of decentralization, blockchain evades the

national regulation, impacting the economy of such state. For example, its application in Bitcoin embodies strong autonomy, which can totally ignore the currency issuing mechanism of central banks, affecting the mode of currency circulation and harming the stable and efficient development of economy. On the other hand, relevant authorities have not formed mature regulative technology for the application of blockchain. As a kind of revolutionary technology in respect of information creation, blockchain has not acquired effective regulation. So, the broad application of blockchain will lead to huge instability and risk.

6.1.2. The Integration of Blockchain Technology into Sharing Economy Requires Great Cost

Although the development of Chinese sharing economy is rapid, it is still not mature. And blockchain technology is still not obviously developed. In current situation, the technology of blockchain faces a lot of problems. The integration of blockchain into sharing economy will increase the operating cost of financial institutions. The relevant risk and instability is prominent. Therefore, banks have not taken into consideration the application of blockchain.

6.1.3. Blockchain Is Not Mature at Technical Level

Although many solutions have been proposed for problems of blockchain, such as Lightning Network, Chinese blockchain technology is still not mature as a whole. On the one hand, the technology of blockchain is still in the early stage of development, and even developed countries have not improved their blockchain technology. On the other hand, China invests less in the research of blockchain than developed countries. The utilization of blockchain by China is also less than that of developed countries, causing inadequate experience. Besides, the threshold for blockchain is relatively high, which is not practical for entities in small markets.

6.2. Developmental Countermeasures for Accelerating the Integration of Blockchain and Sharing Economy Based on Big Data Technology

6.2.1. Promote the Rapid Fusion of Big Data and Blockchain at Technical Level

With the on-going development of sharing economy, the integration between blockchain and big data technology is an inevitable trend. On the one hand, the technology of blockchain can conquer the bottleneck of big data technology, so as to serve sharing economy better. On the other hand, the gradually maturing big data

technology also needs an application entity to embody its own value. The complete integration of big data and blockchain, two independent Internet technologies, will require the solving of technical problems, as well as a fusion of them by government and enterprises through market. As the technology of big data has developed for a period, it can be seen as a relatively mature Internet technology. Therefore, in actual operation, it is relatively easier to integrate blockchain (as a new technology) into big data technology with big data technology as a carrier. First, it is relatively easier to integrate blockchain (as a new technology) into big data technology with big data technology as a carrier in actual operation. Blockchain technology can be used as a data collection technique for big data technical platform to eliminate data isolated island. With current computer technology, as long as a set of programs and interfaces meeting the requirement of blockchain technology is developed for big data platforms, the fusion between blockchain technology and big data platforms can be achieved directly and served and the integration of blockchain technology and big data technology can be achieved directly. Second, data stored in the blockchain system can be freely traded as assets in big data platforms, so as to integrate these two technologies. For example, a data credit system can be established. When an enterprise uploads data into the blockchain system, some credit can be assigned by the system based on the value of such data. When an enterprise requires querying data, some credit will be deducted. By deeming data as assets, the integration between blockchain technology and big data technology will be achieved in the form of trading.

6.2.2. Government Promotes the Integration of Blockchain and Big Data Technology

Blockchain is a kind of mature Internet technology. In nature, it is a distributed database technology and an underlying technology of computers. As indicated in a research report issued by McKinsey in 2016, the technology of blockchain is a revolutionary technology after steam engine, electric power and Internet technology. The advantage of blockchain is that its information recording and reading requires verification each time. Since an actual trade process requires many times of information recording and reading, the trading in the blockchain system requires much verification to achieve the final purpose of the trading. In virtue of its feature of trust-free and openness, blockchain can optimize social structure and improve the public policy. The trust-free and openness of blockchain technology makes possible decentralized autonomy of the society, namely social participants have the same right and duty in a standard system of circulation. Data information is stored in a single block in the blockchain system, forming a cycled chain from single blocks by encrypted signature verification. In blockchain system, each single block node has complete information of the system and all information is traceable. Therefore, government shall issue laws

and regulations upon big data and blockchain, so as to enhance the regulation on data information. Besides, government shall also provide technical and financial support for industrial transformation and pay attention to the combination of industries, university and research in the digital development of industries. It shall formulate uniform standards for digital development of industries and encourage universities or research institutes to cooperate with industries in digital transformation. Government shall put up the digital development of industries as a national strategy and push ahead digital reform in various industries.

6.2.3. Enterprises Promote the Integration of Big Data and Blockchain Technology

Blockchain technology is a distributed storage technology in nature, and an underlying computer technology. With current computer technology, as long as a set of programs and interfaces meeting the requirement of blockchain technology is developed for big data platforms, the fusion between blockchain technology and big data platforms can be achieved directly and served and the integration of blockchain technology and big data technology can be achieved directly. Enterprises shall establish and improve uniform standards for digital development of industries step by step, make use of the validation of data by blockchain and use blockchain data as data source of big data platforms, so as to protect the security of data. Blockchain alliance platforms shall be established separately to add enterprises (as nodes) in an industry into the blockchain system, so as to provide foundation for the development of blockchain and big data technology. Meanwhile, the combination of industries, university and research in the digital development of industries shall be paid attention to. Universities or research institutes shall be encouraged to cooperate with industries in digital transformation. Only economic entities with authorities can access data, so as to form a benign development cycle of difficulty encountering, difficulty solving and difficulty discovering. Besides, enterprises can cooperate with universities to foster Internet versatile talents for blockchain or big data technology, or recruit talents with Internet skills through education and training institutions as reserve of talents.

7. Enlightenment of Blockchain Technology for Chinese Sharing Economy in Future

Chinese blockchain technology is still developing, but its application prospect tells us that grasping this developmental opportunity will create a good future for Chinese sharing economy. When sharing economy has become an inevitable trend in the development of Chinese economy, the development of sharing economy driven by blockchain is extremely urgent. China shall invest a great deal of funds and human

resources in the research of blockchain technology and strive to grasp core technology, which will promote the sustainable development of Chinese economy.

7.1. Chinese Blockchian Alliance Shall Be Established with Great Effort

In the trend of economic globalization, blockchain alliance has been a mainstream trend. Such alliance can not only achieve technical sharing but also form blockchain organization, so as to promote the development of blockchain technology among different alliances. The sharing mode of financial institutions is the main pattern of blockchain alliance. Currently, R3 launched by R3CEV is the largest blockchain alliance in the world. The blockchain technology advocated by R3 will be rapidly applied in international financial payment and clearing. This alliance has absorbed 43 banks across the world. R3 alliance aims to establish common standards. Technical giants, such as Microsoft, IBM and Amazon, provide technical support for this alliance. Multi-cooperation will reduce the cost of collaboration. In January, 2016, the People's Bank of China started the development of blockchain technology in China for the first time, attempting to apply it in currency issuance. Thereafter, Zhongguancun Blockchain Alliance was established. The first financial blockchain alliance was co-sponsored by 11 institutions, including INTEROTC. At present, in response to the call of the central government, other financial institutions at home are also actively preparing to establish similar blockchain alliances to promote the development of Chinese blockchain technology.

7.2. Research of Blockchain Technology and Establishment of Infrastructure Platform Shall Be Promoted

The key work for the research of blockchain technology is to solve the problems in the application of blockchain technology, including industrial regulations, risk control and business scenario. The establishment of infrastructure platforms for blockchain shall be also paid much attention to. Research shall be conducted in respect of regulation policies of blockchain. The application of blockchain in respect of digital identity recognition shall be enhanced. Meanwhile, digital bills shall be created. The breakthrough and updating of blockchain technology relies on three elements: policies and measures of government, research of academic circle and the application experience of industries. The full development of blockchain cannot be achieved without the close combination of these three elements. First, government shall play the role as regulator and guide. It shall actively support the research and development of blockchain and also prevent lawbreakers seeking personal gains. Besides, government shall invest a great deal of research funding in respect of the establishment of research platforms of blockchains. Second, the academic circle shall conduct in-depth research

on the theoretic basis of blockchain technology and find out those industries that blockchain technology may be applied to, as well as potential problems during such application, so as to lay a solid foundation for actual application of blockchain. Especially, different algorithms in various fields shall be combined, so as to guarantee the feasibility, safety and applicability of the technology. Last, the industrial circle shall actively attempt to establish blockchains, apply blockchain technology in various industries, and detect technical defect in practical application, so as to improve the possibility of application in practical fields.

7.3. Talent Cultivation for Blockchain Technology

The cultivation of talents determines the depth and width of the development of blockchain technology in future as blockchain can be applied in other industries requiring decentralization, the application of blockchain in different demands different professional talents. For example, the application of blockchain in financial field requires the combination of professional financial talents with the education of blockchain technology, so as to meet the requirement of practical application. Currently, the research on blockchian technology demands professional teams, which requires not only funds but also advanced theories. Therefore, the cultivation of talents for blockchain cannot be achieved by private organizations. Government shall organize, and institutions shall provide funds for, talent cultivation and research on blockchain technology. The talent deficiency will not be conquered unless the central government pays much attention to talent cultivation and the demand for versatile talents.

8. Conclusion

Based on the analysis in this paper, sharing economy has become an inevitable trend in the development of Chinese economy. However, there still are some problems in the development of sharing economy, which requires us to find out proper solutions. The use of blockchain technology is one of the approaches of the development of sharing economy. Besides, as a result of its features of decentralization, the ability and form of point-to-point information processing, blockchain technology has become a key approach to solve the information asymmetry caused by the centralization of sharing economy platforms. The development of the Internet is the precondition for the application of blockchain technology. Currently, the Internet is transforming from information-based to value-based, promoting Internet reform and governance based on consensus, sharing and co-governance. The development of blockchain also enhances the value credit system online and offline, quantizes the credit degree, crystallizes the establishment of credit mechanism, and strives to build a credit system and mechanism for social communication and product & service trading. As a whole, blockchain

technology is an inevitable path in the development of sharing economy and social life.

The value and prospect of blockchain technology is recognized. However, as a brand new technology, blockchain also accompanies potential risks. Public authorities and legal system of the government shall learn about and embrace this new technology, and conduct proper adjustment in management philosophy. Besides, the technology of blockchain itself shall meet the requirements of government's regulation and shall not develop itself freely. As long as both can mutually embrace and integrate, this technology can promote efficiency, control risk and push ahead social development.

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