



Practice of Inclusive Finance in China

Technology Drives Transformation



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Preface I



Since "to develop inclusive finance" was introduced in the Decision of the CPC Central Committee on Some Major Issues Concerning Comprehensive Deepening of Reform at the Third Plenary Session of the 18th Communist Party of China (CPC) Central Committee, inclusive finance in China has achieved certain progress in the aspects of system and practice, including overall promotion of financial infrastructure, deepening and diversification of participants, innovation of products and services, enlargement of service scope and development of direct financing channels.

To see from the basic functions of finance, In the finance system, under the condition that there is still certain proportion of customer groups not covered by traditional finance system, the development of inclusive finance is an optimisation of financial resource allocation: by identifying new financial demands that have not been covered

by traditional finance system, It organises resources to meet financial demands at various levels, Improve operating efficiency and resource allocation efficiency of the whole economic system. In addition to numerous explorations conducted by traditional financial institutions, emerging institutions represented by CreditEase and All etc. also explore new approaches for combined development of all tools, technologies and Inclusive finance, attempt to expand the boundaries of financial service and provide more extensive groups and enterprises with comprehensive financial service. Many contents of Practice of Inclusive Finance in China: Technology Drives Transformation, summarising the explorations and practice of inclusive finance at current stage, are of active value to the development of inclusive finance in the next stage.

Whereas, from the research and tracing, we may also see that, many institutions explore into inclusive finance,

the risk models are mostly established based upon the customer behaviours and economic data in the economic upturn period, the credit risk database does not pass periodical inspection, which has risks of inadequate anticipation on credit quality declination to different degrees. With the barrier to entry to inclusive finance becoming lower and lower, the explosive growth of internet financial companies and the gradual exposure of credit risks in economic downturn, problems and risks relating to the exploration into inclusive finance began to expose. Specifically, such risk factors include not only internal issues such as uneven qualifications of participants, unregulated information disclosure, uncontrollable operating costs and the increasing of non-performing loans, but also external difficulties such as coexistence of supervision overlapping and supervision vacuum, inadequate social credit reference system, higher ethical risks and imperfect credit information sharing mechanism.

Based upon the tracing and research, such report attempts to raise relevant suggestions on developing inclusive finance. Including: I. To improve supervision policy system and enhance risk control capability. To broaden access polices and encourage legitimate financial institutions to develop the business of inclusive finance. To standardize all kinds of emerging financing channels and institutions including but not limited to small loan companies and pawnshops; II. To strengthen legal institutional improvement and infrastructure construction, optimize credit environment of inclusive finance and gradually improve the credit awareness of the whole society. To establish national unitary and complete enterprise and individual credit information database; III. To enlarge the innovation of products and services, integrate all kinds of financial tools and technologies, proactively explore the risk control models and means applicable to inclusive finance in the economic downturn period and economic transit process and explore sustainable business modes.

Facing the complicated situations of rapid development of financial market, intensification of financial market fluctuations and economic transit entering into deepening stage etc., as for the exploration into the business mode, product shape, credit measurement, technological application and risk control system, it is highly necessary to constantly summarise, attempt and learn from errors and keep on moving in the practice, may such report be an important start to motivate more discussions and thoughts of the industry, academic field and supervisors etc. and commonly facilitate the development of inclusive finance in the theory and practice.

Ba Shusong, Chief Economist of China Banking Association

Preface 2



The concept of inclusive finance was formally articulated by the United Nations in 2005, and was firstly introduced in the resolution of the Communist Party of China in 2013. It has been 10 years since inclusive finance was included in the national strategic planning of China and became an important part of improvement of financial system in China.

Adhering to the idea that “everyone has credit, and credit has value”, CreditEase, established in 2006, serves the people who have not been covered by traditional financial institutions by concept innovation, mode innovation and technology innovation and satisfies their demands by adopting better service means, for the purpose of finally opening up the door of finance to everyone. It has been 10 years since CreditEase insisted on pursuing its dream and mission and became engaged in the field of inclusive finance.

From a global perspective, after a decade, the theoretical discussions and market practices of inclusive finance are still new research projects, even in the European countries and the United States that have developed financial markets. As to China, experiencing economic transition and in-depth financial reform, the implementation of inclusive finance is the test of wisdom and courage for universities and research institutes as well as policy-making agencies. For practitioners, they need to find continuous momentum and balance point among business practice, entrepreneurship, and social

responsibility.

The customer demands and distribution characteristics of inclusive finance made the credit assessment very difficult and costly, resulting in scarcity of supply. So, the effective implementation of inclusive finance ideas needs disruptive innovations in the aspects of business mode, organizational structure, financial product coordination, service mode and personnel training etc., even the “infrastructure of inclusive finance”. In the past 10 years, CreditEase has made numerous explorations and practices in such field.

Innovations in science and technology are key elements of each in-depth reform in the history of mankind. The internet and big data-centered innovations in financial technologies are transforming financial service modes in a deep-going way. Inclusive finance is national strategy as well as social welfare. With more and more institutions devoted to such cause, we are willing to share the experience and practices of those years for the purpose of jointly promoting common development.

Tang Ning, CEO and Founder of CreditEase

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Introduction



The concept of inclusive finance system originates from the “International Year of Microcredit (2005)” jointly launched by the United Nations and World Bank. In recent years, under the policy background of regulating inclusive finance development, Chinese financial institutions, supported by the Internet Plus, have been striving to explore new development path of inclusive finance by conducting innovations. In China, there are many micro and small economic entities, including about 19 million micro and small-sized enterprises, 51.65 million individual business owners, and two billion

productive farmer households. To develop inclusive finance is of great advantage to the development of national economy and the creation of job opportunities. Therefore, this report is dedicated to the interpretation of new exploration into inclusive finance of finance industry in China which is standing on the wind hole of Internet Plus.

New development path of inclusive finance in China

Inclusive finance falls under the category of finance,

thus the research on this topic must be started from the nature of finance. The connotation of inclusive finance is rich. Since the Third Plenary Session of the 18th Communist Party of China (CPC) Central Committee, the exploration into inclusive finance under the new normal includes at least the following four connotation points: the first is to offer comprehensive financial service in a fair way; the second is the sustainability of financial service; the third is to offer innovative products and service; the fourth is new support by Internet Plus. By introducing new technologies represented by Internet, the institutions of inclusive finance reduce costs, improve efficiency, assess credit, control risks, and constantly expand service boundaries, so as to offer comprehensive financial service extensively. The inclusive finance in China has achieved great progress both in terms of institutional building and practice, of which the development of practice includes comprehensive promotion of financial infrastructure, deepening and diversification of participants, advancing of innovation in product and service, enlarging of service scope and development of direct financing channels etc.

But with the barrier to entry to inclusive finance becoming lower and lower, the explosive growth of Internet financial companies and the gradual exposure of credit risks in economic downturn, problems and risks relating to inclusive finance began to expose. Specifically, these include not only internal issues such as uneven qualifications of participants, unregulated information disclosure, uncontrollable operating costs and the increasing of non-performing loans, but also external difficulties such as coexistence of supervision overlapping and supervision vacuum, inadequate social credit reference system, higher ethical risks and imperfect credit information sharing mechanism. Though the exploration into and practice of inclusive finance have achieved great progress, the final results still need time to be tested. Therefore, the future development of inclusive finance can be started from the following three levels: the first is to conduct research on and formulate coordinated regulatory policies; the second is to establish national credit information database covering both enterprises and individuals; and the third is to reduce costs by using technological means.

Technological change and inclusive finance

As a financial service mode featuring more extensive coverage, higher availability and stronger long tail effect, inclusive finance can be realized by means of batch processing, high efficiency and low cost. Technological change in the aspects of information technology, internet, cloud computing and big data provides potential solutions for the realization of inclusive finance. The Docker-based distributed architecture provides latest technological support for the infrastructure building of inclusive finance. The characteristics of large data sets, fast calculating speed and iterative development of the technologies are highly consistent with the demands of inclusive finance. By using big data, cloud computing and other technologies, inclusive finance builds knowledge graph-based risk control system in order to boost financial capability, especially the risk control capability. Furthermore, through identifying new financial demands in the field of inclusive finance and conducting reconstruction and innovation for traditional financial products by combining with new financial technologies, the width and depth of inclusive finance have been developed to a certain extent. Meanwhile, it should be noted that technological change is still at the stage of exploration, some problems such as information filtering deviation and information absence still exist, resulting in financial information security risks. Those issues should be highly prioritized in practice.

Technological change and credit management

With the features of data mining, bulk storage and fast processing, big data technologies have opened up new path for modern credit management system, laying a foundation for the development of inclusive finance. Under the backdrop of big data, previously irrelevant data can be integrated as credit information, and then changed into credit value. Everyone has credit, and credit has value. The mining and processing of mass data, improvement of credit assessment procedures and constant optimization of credit rating system provide the way for solving credit difficulties in China, expand boundaries of traditional credit database, improve credit calculation efficiency and make credit management more economical, laying a solid material foundation for full coverage of inclusive finance. Convenience, low cost, and availability are prominent

characteristics of inclusive finance. By relying on big data technologies, more people will have the chance to enjoy inclusive benefits brought by credit, while the idea of credit value will be deepened by constant credit accumulation and value creation.

Technological change and risk management

For the particularity of the service objects of inclusive finance, the risk management of inclusive finance is particularly important. With the advance of financial reform and interest rate liberalization, the way of internet technology-based new financial experience gradually breaks down the technological barrier of finance sector, rewriting the competition pattern of finance industry. The big data technologies attempt to improve and optimize various work procedures of risk management. In the process of risk identification and quantification, big data can promote the development of risk signal capture and quantitative identification technology; in the process of risk matching, diversification and transfer, big data can conduct reliable prediction of future risks by designing risk differentiated financial products; in the aspects of risk monitoring and early warning management, big data can provide technological environment for risk monitoring, and lay foundation for early warning system. The process improvement and innovative development of risk management guarantee about service of inclusive finance, enlarge the service scope and improve the service capability of inclusive finance.

Technological change and customer experience management

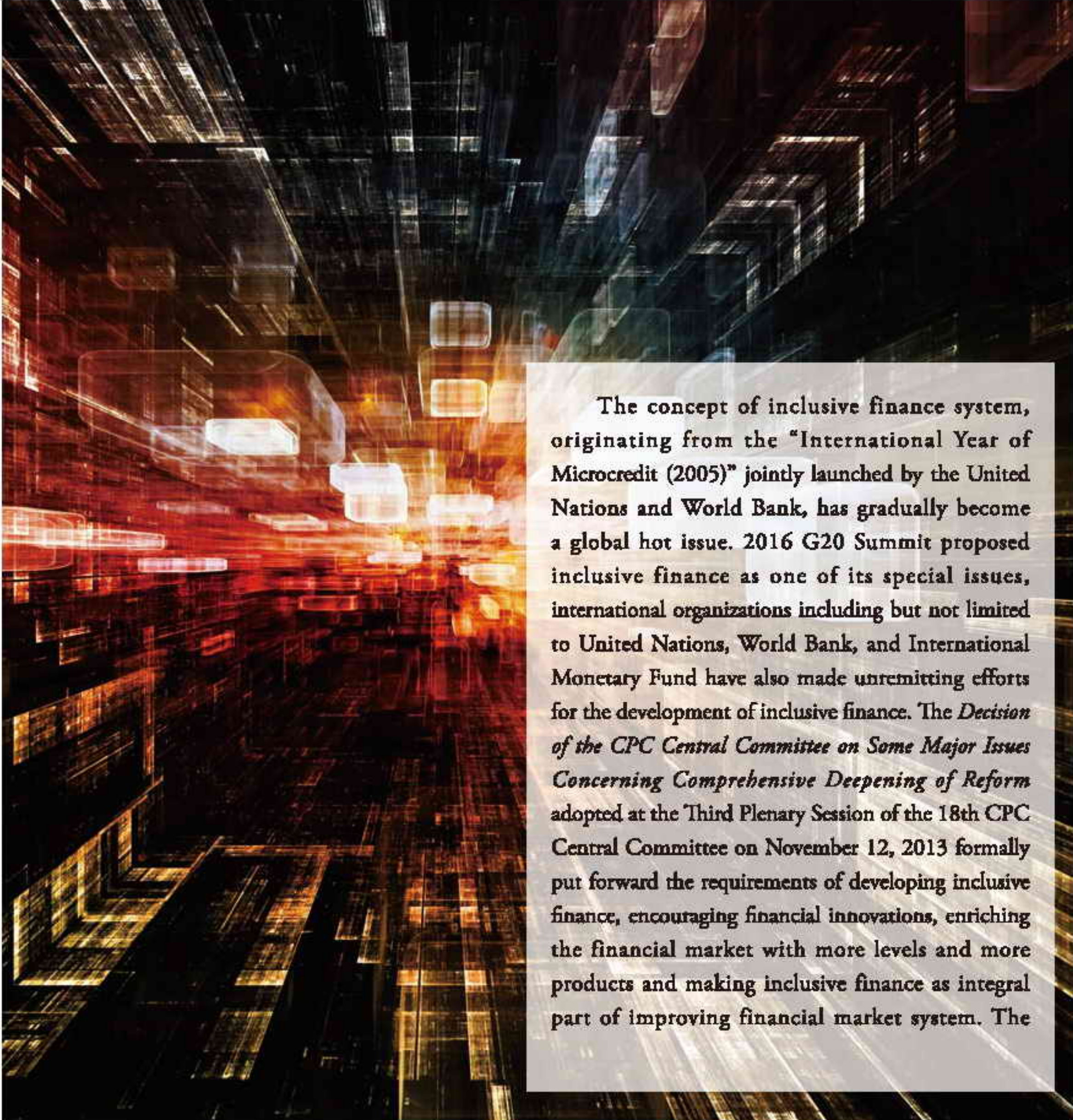
Starting from scratch, inclusive finance has gradually changed from “product-centered strategy” to “customer-centered strategy” in the aspect of internal operation. Using innovative technologies to optimize inclusive financial products and services and improve customer experience has become an important content of management mode transformation of inclusive finance. In the aspect of customer marketing optimization, internet, mobile terminal and big data-based advanced technologies can establish interlinked, mutual beneficial and trusted customer relations by using real time, reachable and measurable methods to better optimize customer

experience and effectively improve corporate operating performance and market competitiveness. In the aspect of business process optimization, it should focus on customer demands to reconstruct and optimize existing procedures, so as to improve customer satisfaction and loyalty. Furthermore, on the basis of meeting the basic demands of customers, diversified value-added services should be offered, so as to further enhance customer retention, open up broad prospects for the sustainable development of inclusive finance.

Building ecological environment for inclusive finance

The building of ecological environment of inclusive finance can be started from the aspects of enhancing top-down design, optimizing industrial environment, and improving customer experience. As a systematic project, inclusive finance needs not only the financial institutions to introduce new service ideas and products, but also need the State to perfect top-down design, resolve the issue of theoretical guidance for inclusive finance and conduct research on and formulate policies and laws, regulatory system and credit environment matching with the financial market. Strategic alliance is the medium between market and enterprises, exerting the function of “organized market”. On the basis of strategic alliance theory, enterprises will build network organization alliance to expand resource use boundary, improve efficiency and reduce cost. On the development road of inclusive finance industry, strategic alliance can also play important roles: the first is the sharing of credit data and regulating of industrial development; the second is the sharing of infrastructure and further expanding of customer groups. In addition, inclusive finance also needs to highlight the protection of rights and interests of financial consumers, strengthen education and improve confidence of financial consumers, prevent and resolve financial risks as well as maintain financial stability and security, which is helpful for the establishment of social environment featuring fairness and justice in the sector of finance and for the development results of financial reform to benefit more financial consumers in a fairer way.

Chapter I: New development path of inclusive finance in China



The concept of inclusive finance system, originating from the “International Year of Microcredit (2005)” jointly launched by the United Nations and World Bank, has gradually become a global hot issue. 2016 G20 Summit proposed inclusive finance as one of its special issues, international organizations including but not limited to United Nations, World Bank, and International Monetary Fund have also made unremitting efforts for the development of inclusive finance. The *Decision of the CPC Central Committee on Some Major Issues Concerning Comprehensive Deepening of Reform* adopted at the Third Plenary Session of the 18th CPC Central Committee on November 12, 2013 formally put forward the requirements of developing inclusive finance, encouraging financial innovations, enriching the financial market with more levels and more products and making inclusive finance as integral part of improving financial market system. The

Suggestions of CPC Central Committee on the 13th Five-Year Plan for National Economic and Social Development adopted at the Fifth Plenary Session of the 18th CPC Central Committee on October 29, 2015 explicitly pointed out the necessity to develop inclusive finance for the purpose of increasing financial services offered to micro, small, and medium-sized businesses as well as rural areas, especially poor areas. The *Plan for Promoting the Development of Inclusive Finance (2016-2020)* formally released on December 31, 2015 stressed that the goal of developing inclusive finance is to improve the coverage, availability and satisfaction of financial services, meeting the increasing financial demands of the masses; the plan also required to conduct innovations in financial products and service means as well as strengthen education on inclusive finance and protection of rights and interests of financial consumers. The Central Document No.1 issued by the CPC Central Committee and the State Council on January 27, 2016 also emphasized the necessity to "boost the establishment of multilayer, extensive and sustainable rural financial service system, develop inclusive finance in rural areas, reduce financing cost and fully improve the rural financial service chain". During the Two Sessions of 2016, "inclusive finance" became one of hot issues once again. Chinese Premier Li Keqiang explicitly pointed out in the *Report on the Work of the Government* that it is necessary to "make a major push to develop inclusive and green finance". The Governor of the People's Bank of China Zhou Xiaochuan also interpreted the connotations of inclusive finance in details, pointed out that the goal of inclusive finance shall be "making all people follow the steps of social progress and modernization", and indicated the inherent meaning of "consumer protection" in inclusive finance. The *Outline of the 13th Five-Year (2016-2020) Plan for National Economic and Social Development of the People's Republic of China* issued on March 17, 2016 also put the development of inclusive finance and multi-form micro, small, and medium-sized financial organizations in an important position, and emphasized the significance of developing inclusive finance in rural areas.

Under such background, the industry in China constantly explores into the development path of inclusive finance under new normal, offering comprehensive

financial services more extensively by using new information technologies represented by internet.

1. Theoretical basis of inclusive finance

It is difficult for people of low income to enjoy financial services, thus many people simply think that inclusive finance is equal to the concept of poverty alleviation loan. In fact, inclusive finance falls under the category of finance, thus the research on this topic must be started from the nature of finance.

Finance can be defined as collection of all transaction behaviors involving both money and credit as well as the integration of money and credit.¹ Generally, the role of finance is to optimize resource allocation for the purpose of realizing the maximized expected utility by mismatching time and space. Just because of existence of mismatching, credit assessment and risk management should be conducted. Therefore, from the perspective of the nature of finance, the exploration into new path of inclusive finance in China is the attempt of expanding the boundary of financial services by applying various technologies.

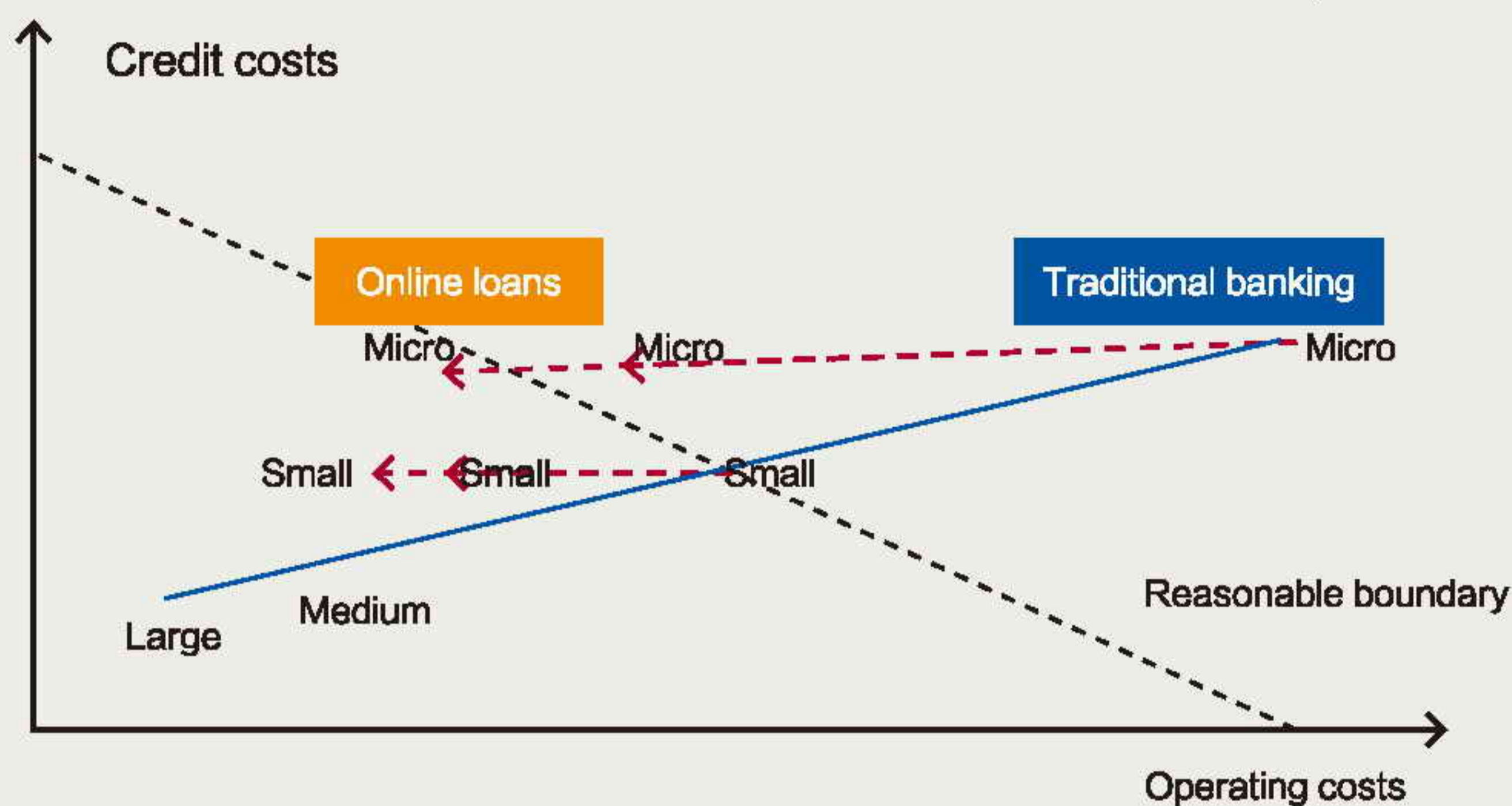
Specifically, the existence of financial service is determined whether the benefits could cover the costs. The costs can be divided into the factors of operating costs (manpower, capital and technology) and credit costs (default loss). Technically, under given conditions, there would be certain extent of financial services. With social and economic development, improvement of risk control and operating mode could reduce the unit cost. The scarcity of inclusive finance products is the result of high service costs, that is, the benefits could not cover the costs. The emerging new technologies could reduce the unit cost. For example, the application of big data, cloud computing and mobile internet in finance industry reduces the operating costs to a great extent, effectively measures the credit of customers and push up the unit cost from the blue line to the orange line in Figure 1-1, thus integrating the micro and small financial services into reasonable boundary.

2. Connotation and nature of inclusive finance

The practice of inclusive finance have witnessed changes in the historical development. The earliest

Figure 1–1: Costs of Micro and Small Financial Services

Source: Edited by the research team



practice could be traced back to the pawnshops established by the Catholic churches in Italy in the 15th century, making it possible for the poor to get loans. In the 1970s-1990s, with the development of modern microcredit, the customer coverage has been gradually enlarging, some specialized projects and organizations that offer micro loans to women emerged, for example, Grameen Bank in Bangladesh, ACCION International in Latin America and Self-Employed Women's Association (SEWA) in India etc. During the period from the 1990s to the early 21st century, modern microfinance began to emerge: on the one hand, microcredit developed towards comprehensive financial services, on the other hand, more and more institutions began to provide microcredit and microfinance services. Entering into the 21st century, the progress of internet and mobile internet technologies provides the possibility of comprehensive development of inclusive finance.

Opinions are different on the definition of inclusive finance in both academic and industrial circles. The concept of inclusive finance was proposed by the United Nations and World Bank in promoting the "International Year of Microcredit", "to make people with financial demands enjoy convenient high-quality financial services with dignity at affordable price and in a timely

manner". The *Plan for Promoting the Development of Inclusive Finance (2016-2020)* released on December 31, 2015 defined inclusive finance as "providing financial services to all social strata and groups with demands for appropriate and valid financial services at affordable costs based on the principles of opportunity equality and commercial sustainability", and noted that "micro and small businesses, farmers, urban low-income groups, impoverished groups, the disabled, the aged and other special groups are key service objects of inclusive finance in China". From the nature of finance, inclusive finance shall at least include the following four characteristics.

2.1 Offering comprehensive financial services in a fair way

2.1.1 Availability of financial services

The so-called "access to financial services in a fair way" refers to providing capital and services to the capable people with financial demands, measuring their credit in a fair way and offering opportunities of equitable development to a wide range of individuals. Therefore, inclusive finance not only serves the people of low-income, but the people of all walks of society.

To conduct research on indirect financing issues from the perspective of information economics, we will find

that there is strong information asymmetry between the financial institutions such as banks and the organizations such as enterprises, for the latter have motivations to keep secret of or fake the operating results. Therefore, the Macmillan Gap² exists between the banks and the micro and small-sized enterprises. On the one hand, the costs of measuring credit and assessing risks are relatively high for the common issues of lacking information transparency and the invalid financial data existing in micro and small-sized enterprises, on the other hand, the lack of collateral cuts down recognition by financial institutions. So, these issues lead to the scarcity of traditional financial services. On the contrary, because of standardized operation and sufficient collateral in large-sized enterprises, the supply of financial services provided for them exceeds the demand, which is unbalanced. So, inclusive finance needs to help resolve the issue of information asymmetry by carrying out technological innovations (including but not limited to information technology, financial product and business mode), so as to measure the credit of each and every person or firm in a fair way, and make more people enjoy financial services.

2.1.2 Comprehensiveness and diversification of products and services

“Comprehensive financial services” not only include credit business, but shall also include other financial demands of customers. For example, with social and economic development and improvement of living standard, the demand for financial services of the micro and small business owners is also increasing, the demands in the aspects of insurance, lease and wealth management appear. Therefore, the inclusive financial services provided for micro and small customers must also be comprehensive, which is helpful for the development of micro and small-sized enterprises and improvement of people’s living standard.

2.2 Sustainability of financial services

2.2.1 Demand sustainability of financial services

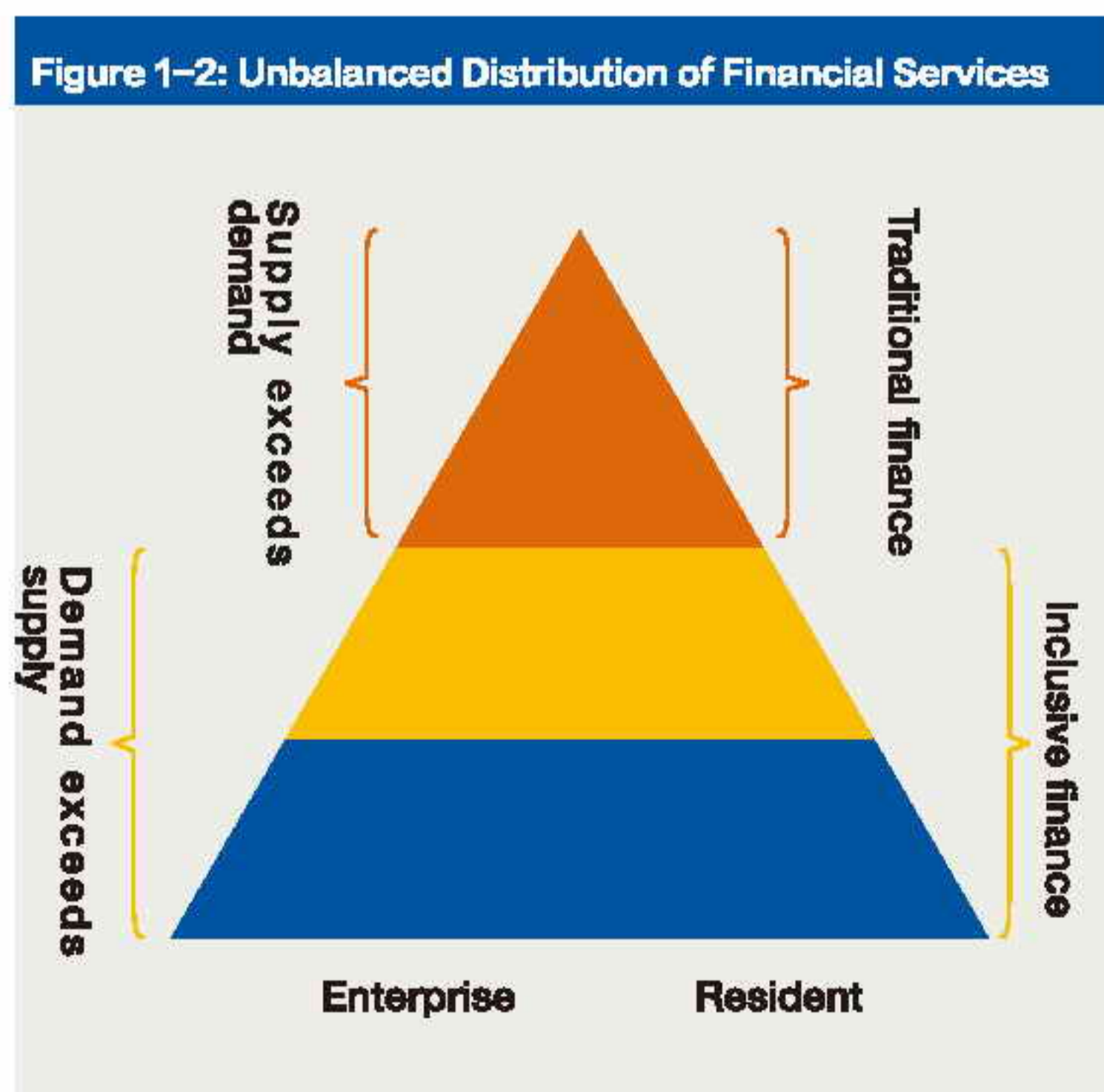
China has numerous micro and small economic entities, including about 19 million micro and small-sized enterprises, 51.65 million individual business owners and two billion productive farmer households. They are the

main force of “mass entrepreneurship and innovation” as well as the main body for creating job opportunities.³ According to a survey, 78 percent of micro and small-sized enterprises held that it was difficult to get loans from the banks, mainly because of insufficient collateral. So, publicity and education for the idea and practice of inclusive finance shall be conducted among the masses, making capable people with dreams understand the possibility of getting financial services, thus fully tapping the potential demand for financial services.

According to the statistics of Morgan Stanley⁴, as an effective supplement to traditional banking industry, the size of marketplace lending (MPL) in the United States has reached USD 1.9 trillion, but in the past few years, the market penetration rate was less than two percent, among which the overwhelming majority of market shares are still held by traditional banks and credit card companies. It is forecasted that the annual MPL lending will reach 150 billion dollars by 2020, and the market penetration rate will reach about 10 percent. The strong demand for financial services is the basic condition for sustainable development of inclusive finance.

2.2.2 Sustainable profitability of business operation

As mentioned above, from the nature of finance, inclusive finance falls under the category of finance, it cannot be simply considered as poverty alleviation plan or poverty alleviation loan. Therefore, the development



Source: Edited by the research team

Table 1–1: Policies Relating to Inclusive Finance Since the Third Plenary Session of the 18th CPC Central Committee

Source: Edited by the research team

Category	Relevant policies
<p>Institutional building</p>	<p>(1) Circular of the State Council on Approving and Forwarding the Opinions of the National Development and Reform Commission on Key Work for Deepening the Reform of Economic System (Guo Fa [2016] No.21)</p> <p>(2) Opinions of the State Council on Work Division of Departments for Implementation of Key Work in the 'Report on the Work of the Government' (Guo Fa [2016] No.20)</p> <p>(3) Several Opinions of the CPC Central Committee and the State Council on Implementing and Developing New Concepts, Accelerating Agricultural Modernization and Realizing Full Moderate Prosperity (Zhong Fa [2016] No.1)</p> <p>(4) Plan of the State Council for Promoting the Development of Inclusive Finance (2016-2020) (Guo Fa [2015] No.74)</p> <p>(5) Opinions of the State Council on Work Division of Departments for Implementation of Key Work in the 'Report on the Work of the Government' (Guo Fa [2015] No.14)</p> <p>(6) Several Opinions of General Office of the State Council on Financial Services for the Development of Agriculture, Rural Areas and Farmers (Guo Ban Fa [2014] No.17)</p> <p>(7) Opinions of the State Council on Work Division of Departments for Implementation of Key Work in the 'Report on the Work of the Government' (Guo Fa [2014] No.15)</p> <p>(8) Circular of the State Council on Deepening the Administration and Reform Schemes for Science and Technology Plans of Central Finance (Special Projects and Funds etc.) (Guo Fa [2014] No.84)</p> <p>(9) Opinions of the State Council on Supporting Sound Development of Micro and Small-Sized Enterprises (Guo Fa [2014] No.52)</p> <p>(10) Implementation Opinions of General Office of the State Council on Providing Financial Support to the Development of Micro and Small-Sized Enterprises (Guo Ban Fa [2013] No.87)</p> <p>(11) Several Opinions of General Office of the State Council on Financial Services for the Development of Agriculture, Rural Areas and Farmers (Guo Ban Fa [2014] No.17)</p> <p>(12) Circular of the State Council on Issuing Outline of the Plan for Building Social Credit Reference System (2014-2020) (Guo Fa [2014] No.21)</p>
<p>Support policies</p>	<p>(1) Guiding Opinions of General Office of the State Council on Promoting the Integrated Development of the Primary, Secondary and Tertiary Industries in Rural Areas (Guo Ban Fa [2015] No.93)</p> <p>(2) Guiding Opinions of General Office of the State Council on Strengthening the Protection of Financial Consumers' Rights and Interests (Guo Ban Fa [2015] No.81)</p> <p>(3) Guiding Opinions of General Office of the State Council on Taking Various Measures Simultaneously to Focus on Alleviating the Problem of High Cost of Corporate Financing (Guo Ban Fa [2014] No.39)</p> <p>(4) Circular of the State Council on Approving and Forwarding the Opinions of the National Development and Reform Commission on Key Work for Deepening the Reform of Economic System (Guo Fa [2014] No.18)</p> <p>(5) Guiding Opinions of General Office of the State Council on Taking Various Measures Simultaneously to Focus on Alleviating the Problem of High Cost of Corporate Financing (Guo Ban Fa [2014] No.39)</p> <p>(6) Circular of China Banking Regulatory Commission on Improving and Innovating Loan Services for Micro and Small-Sized Enterprises and Enhancing Financial Services for Micro and Small-Sized Enterprises (Yin Jian Fa [2014] No.36)</p> <p>(7) Interim Measures for the Administration of Special Fund for the Development of Small and Medium-Sized Enterprises of the Ministry of Finance, the Ministry of Commerce, the Ministry of Industry and Information Technology as well as the Ministry of Science and Technology (Cai Qi [2014] No.38)</p> <p>(8) Circular of the People's Bank of China on Conducting Relending Business for Enhancing Credit Support to Micro and Small-Sized Enterprises (Yin Fa [2014] No.90)</p> <p>(9) Implementation Opinions of General Office of the State Council on Providing Financial Support to the Development of Micro and Small-Sized Enterprises (Guo Ban Fa [2013] No.87)</p> <p>(10) Guiding Opinions of General Office of the State Council on Providing Financial Support to the Adjustment, Transformation and Upgrading of the Economic Structure (Guo Ban Fa [2013] No.67)</p>

of inclusive finance should follow the universal law of market economy development, make innovations in the means and methods of risk control, reduce overall costs and realize sustainable profitability of business operation, only in this way can more and more institutions join the

inclusive finance industry, which is helpful for healthy and sustainable development of this new financing mode, forming a virtuous circle.

2.3 Providing innovative products and

Table 1–3: Policies Relating to Private Capital Since the Third Plenary Session of the 18th CPC Central Committee

Source: Edited by the research team

Category	Relevant policies
Private capital access	<ul style="list-style-type: none"> (1) Guiding Opinions of China Banking Regulatory Commission on Promoting the Development of Private Banks (2) Opinions of the State Council on Accelerating the Development of the Financing Guarantee Industry (Guo Fa [2015] No.43) (3) Guiding Opinions of General Office of the State Council on Accelerating the Development of Financial Leasing Industry (Guo Ban Fa [2015] No.68) (4) Opinions of the State Council on Accelerating the Development of Modern Insurance Industry (Guo Fa [2014] No.20) (5) Measures for the Administration of Financial Leasing Companies Issued by China Banking Regulatory Commission

Table 1–4: Policies relating to multi-level capital market since the holding of the Third Plenary Session of the 18th CPC Central Committee

Source: Edited by the research team

Category	Relevant policies and regulations
Private placement bonds	<ul style="list-style-type: none"> (1) Pilot Measures of Shenzhen Stock Exchange for the Issuance of Private Placement Bonds by Small and Medium-sized Enterprises (2) Pilot Measures of Shanghai Stock Exchange for the Issuance of Private Placement Bonds by Small and Medium-sized Enterprises
New Third Board	<ul style="list-style-type: none"> (1) Decision of the State Council on the Issues Concerning National Equities Exchange and Quotations (2) Business Rules of National Equities Exchange and Quotations (for Trial Implementation) (3) Detailed Rules for Stock Transfers on National Equities Exchange and Quotations issued by National Equities Exchange and Quotations (Trial Implementation) (4) Detailed Rules for Stock Transfers on the National Equities Exchange and Quotations (Trial Implementation) (5) Circular of the Ministry of Finance and the State Administration of Taxation on Stamp Tax Policies for Securities (Stock) Transactions Concerning the Transfer of Stocks on National Equities Exchange and Quotations (Cai Qi [2014] No.47)
Industry funds	<ul style="list-style-type: none"> (1) Several Opinions on Financial Services for the Development of Agriculture, Rural Areas and Farmers printed and issued by General Office of the State Council (2) Circular of the Ministry of Finance and the Ministry of Science and Technology on Printing and Issuing Interim Measures on the Administration of Guiding Funds for Investment in Technology-Based Small and Medium-Sized Enterprises (Cai Shui [2007] No.128) (3) Interim Measures on the Administration of Innovation Funds for Investment in Technology-Based Small and Medium-Sized Enterprises (Guo Ke Fa Ji Zi [2005] No.60)

exploration into new path of inclusive finance.

2.4.1 Improving information transparency and credit management, laying foundation for providing comprehensive financial services in a fair way

Information asymmetry is the root cause restricting provision of financial services to micro and small-sized enterprises by traditional financial institutions. The application of internet technologies provides new

solutions but not traditional ways including but not limited to collateral and guarantee. Specifically, internet technology could integrate multidimensional information to conduct cross validation, numerous and dynamic data processing can reveal detailed information that cannot be displayed by application of sampling statistics. The data and information collected by the channels of e-commerce sales, mobile terminal software and social apps etc. could be used to establish credit identification mechanism and

Table 1–5: Comparison of data source of credit reference system

System		Alibaba's Sesame Credit System	Credit Reference Center of the People's Bank of China
Number of business owners/ persons	Corporate credit reference	More than 6 million business owners (Taobao platform only)	More than 10 million enterprises
	Individual credit reference	145 million persons (Taobao platform only)	600 million persons
Credit contents	Corporate credit reference	Seller identity information, commodity trading volume, store activeness, customer satisfaction, inventory, cash flow, water and electricity bill payment, and other data relating to store operation	Information relating to corporate identity, credit, environmental protection, social security insurance and housing provident fund payment, quality inspection, arrear of wage, and telecommunication fee payment
	Individual credit reference	Buyer identity information, expenditure of online shopping, utilities payment and social activeness etc.	Information relating to individual credit, citizen identity, and social security insurance and housing provident fund payment, etc.
Data source		Automatically registered by the system	Commercial banks and government departments

Source: Li Xiaoxiao, "Challenger to Banks: Alibaba's Small Business Loans"

to conduct cross comparison. Therefore, the use of new technologies can measure the credit of individuals in a relatively fair way, expanding the effective boundary of inclusive finance, realizing the so-called "Pareto Improvement".

2.4.2 Reducing transaction costs, managing credit risks and achieving sustainable development of financial services

On the basis of transaction cost theory, Ronald Coase holds that the solutions to negative externalities are helpful for effective allocation of resources, improving efficiency and reducing transaction costs. High costs of financial services to micro and small-sized enterprises are mainly because financial institutions shall spend much time and vigor in investigating about, following up and handling with relevant business; the transaction process is disordered and non-transparent. Internet finance reduces transaction costs, achieves the matching of costs and benefits of micro and small business finance as well as realizes the sustainable profitability in terms of business operation. By utilizing some innovative organizational

modes such as the P2P and crowd funding, internet finance makes various parties cooperate with each other in a better way, in order to reduce transaction costs, control credit risks and constantly improve resource allocation efficiency.

2.4.3 Conducting innovation in products and services, improving work efficiency and developing potential customers both at supply and demand sides

Generally, supernormal profit is long-standing in monopoly industries and temporary in competitive industries of unbalanced markets. In China, the finance industry is still in monopoly, taking on an unbalanced situation where the supply of high-end customers exceeds demand and the demand of basic customers exceeds supply, which results from low profitability of business operation. (Referring to Figure 1-2: Unbalanced Distribution of Financial Service).

Internet finance could break through absolute monopoly of traditional financial institutions, exploit potential supply of and demand for financial services and bring

about more competitors, forcing the improvement of production mode and boosting increase in the overall productivity of the industry. In this sense, internet finance points out a new development direction, which is improvement of low efficiency and unbalanced financial services of the finance industry. It makes the financial institutions lower service threshold and enhance service efficiency, thus assisting financial services in becoming truly “inclusive”. For example, internet e-commerce platforms use their own customer resources for providing online business owners with financial services; the P2P platforms provide bridging financing channels to idle funds and investment projects; the farm machinery leasing products improve the operating efficiency of farmers; the crowd funding platforms help ordinary people who are committed to innovation and invention activities realize their dreams.

In conclusion, inclusive finance has rich connotations. Since the Third Plenary Session of the 18th CPC Central Committee, the new exploration into inclusive finance in China under the new normal includes at least four connotations: 1) to offer comprehensive financial services in a fair way; 2) the sustainability of financial services; 3) to offer innovative products and services; 4) the new power of Internet Plus. By using the new technologies represented by internet for reducing costs, improving efficiency, measuring credit and controlling risks, inclusive financial institutions constantly expand the boundary of financial services and provide comprehensive financial services more extensively.

3. Development of inclusive finance since the Third Plenary Session of the 18th CPC Central Committee

Since “to develop inclusive finance” was included in the Decision of the CPC Central Committee on Some Major Issues Concerning Comprehensive Deepening of the Reform at the Third Plenary Session of the 18th CPC Central Committee in 2013 and the development of inclusive finance was first proposed in CPC Central Committee document, to establish an effective and all-around inclusive finance system that serves people of all walks of life and all groups has become one of the important development goals. On December 31, 2015,

the Plan for Promoting the Development of Inclusive Finance (2016-2020) was formally released. As a programmatic document for the development of inclusive finance since the Third Plenary Session of the 18th CPC Central Committee, such Plan offers guidance on regulating the development of inclusive finance in China.

3.1 Institutional building of inclusive finance

3.1.1 Centering on support to agriculture, rural areas and farmers as well as micro and small-sized enterprises, enlarging inclusive finance coverage

It is relatively easy for the people of high income or from developed areas and large and medium-sized enterprises to access financial resources. To provide more financial services to the people of low income or from less developed areas and constantly improve the availability of financial services has become the focus of developing inclusive finance.

Since the Third Plenary Session of the 18th CPC Central Committee, China has not only formulated several national policies on support to agriculture, rural areas and farmers as well as the micro and small-sized enterprises, but also issued many policies in the aspects of enlarging service bodies, enhancing poverty alleviation as well as implementing tax deduction and exemption. (Referring to Table 1-1: Policies Relating to Inclusive Finance Since the Third Plenary Session of the 18th CPC Central Committee). These policies mainly support agriculture, rural areas and farmers as well as the micro and small-sized enterprises from two aspects: one is the institutional building, it is proposed to continuously deepen the reform of financial system, vigorously develop inclusive finance, insist on drawing experience from international practice and combining with reflection of Chinese characteristics, combining governmental guidance with market domination as well as combining perfection of basic financial services with improvement of financial services in key sectors, in order to make all market bodies share the benefits of financial services; the other is about support policies, on the one hand, it is necessary to optimize the layout of county-based operating outlets of financial institutions, promote the full coverage of basic financial services in rural areas and intensify efforts in

finance-based poverty alleviation; on the other hand, it is must to formulate more preferential tax policies for micro and small-sized enterprises, fully exert the guiding role of various support funds and encourage local support funds for small and medium-sized enterprises to include the micro-sized enterprises in support scope.

3.1.2 Supported by big data, proactively promoting Internet Plus building and constructing comprehensive financial infrastructure

The focus of inclusive finance is to provide people of all walks of life with effective and comprehensive services. Therefore, the depth and breadth of inclusive financial services must surpass that of the traditional financial services. The Plan for Promoting the Development of Inclusive Finance (2016-2020) requires the financial institutions to improve the application level of science and technology, encourages financial institutions to use emerging technologies such as big data and cloud computing so as to build internet financial service platform, for the purpose of providing customers with comprehensive financial services, including information, capital, product, etc. In the era of Internet Plus, internet technology can lower the entry barrier and expand the coverage of inclusive finance.

In recent years, China successively issued several policies to support and encourage Internet Plus initiative: (Referring to Table 1-2: Policies Relating to Internet Plus Since the Third Plenary Session of the 18th CPC Central Committee) on the one hand, it shall be encouraged to accelerate the application of modern information technologies such as mobile internet, big data, internet of things, and cloud computing to the business segments of certification, transaction, payment and logistics etc., and guide professional institutions and industrial organizations to use big data for improving services. On the other hand, professional service institutions (including but not limited to banks, securities companies, trust companies, financial leasing companies, guarantee companies and insurance companies), industrial associations and chambers of commerce shall be encouraged and supported to use big data to provide enterprises with convenient and effective services, for the purpose of supporting their development. The policies also require promoting innovation in internet finance, regulating internet financial services, carrying

out accreditation on non-financial institution payment facilities, building safe and reliable public service platform for mobile finance and boost the development of multi-level payment system.

3.1.3 Lowering entry barrier for private capital and enlarging financial service scope

Relatively long financing chain, high financing costs and high financing risks commonly exist in the field of the micro and small-sized enterprises and in the sector of agriculture, rural areas and farmers, which also leads to financing difficulties and other issues. To encourage private capital to enter into finance industry and develop small-sized banks, financial leasing firms and other financial institutions in an orderly way has become one of reform measures to resolve the problems of financial services. (Referring to Table 1-3: Policies Relating to Private Capital Since the Third Plenary Session of the 18th CPC Central Committee).

At present, there are four modes for private capital to enter into banking financial institutions: private enterprises initiate and establish any and all financial institutions independently; private capital and the main financial institution(s) jointly establish any and all financial institutions; private capital participates in the reorganization and reform of any and all existing financial institutions, private capital invests into any and all financial institutions.

3.1.4 Broadening financings channel and building multi-level inclusive finance system

It is difficult for the overwhelming majority of micro, small and medium-sized enterprises to get direct financing from stock and bonds markets; they can only rely on indirect financing of bank loans. The lack of collateral assets in micro and small-sized enterprises results in financing difficulties. Therefore, it is necessary to develop innovative financing platforms and broaden direct channels to fill the existing market gaps and expand the financing channels of micro and small-sized enterprises. Currently, financing channels including but not limited to private placement bonds, New Third Board, regional financial assets exchanges and industrial funds have become the bridge between the micro, small and medium-sized enterprises and industrial capital. Relevant authorities have successively introduced a series of policies,

on the one hand to clarify direct financial channels and make clear that the position of National Equities Exchange and Quotations is to serve the development of innovative, entrepreneurial and growing micro and small-sized companies; on the other hand to regulate the development mode of direct financing channels mainly for the purpose of serving the corporate development and the entry and exit of capital, but not for transactions.

3.2 Development of inclusive finance practice

3.2.1 Comprehensive promotion of financial infrastructure

(1) Acceleration of social credit reference system building and diversification of credit reference markets

The core issue of loans is credit risk management, that is to assess the credit of customers, and then determine upon the loan interest rate and conditions accordingly. The overwhelming majority of financial institutions conducting small loan business face the problem of low transparency or limited data in the aspect of risk control. Due to lack of traditional credit information in micro, small and medium-sized enterprises, traditional credit reference system can no longer meet the development need of inclusive finance. In recent years, big data-based credit technologies have been extensively applied to internet lending. Compared with traditional credit reference system and based upon more extensive data sources of big-data based credit technologies, big data-based system has more extensive coverage. (Referring to Table 1-5: Comparison of Data Sources of Credit Reference System).

2) Constant improvement of payment and liquidation infrastructure

The payment and liquidation system is the basis for many innovative tools of finance. In some townships of China, there still exists vacancy of financial services. Thus, the balancing of payment service resource allocation between urban and rural areas shall be deemed as the breakthrough to promote inclusive finance, for the purpose of fully exerting the payment and liquidation service functions. The People's Bank of China and other departments have taken measures to improve payment environment in rural areas.

Firstly, to make it easier for farmers to open up

accounts or apply for cards in financial institutions with governmental transfer payment as the entry point, transferring the subsidies directly to the farmers' accounts. By the end of 2015, there were 3.304 billion personal bank settlement accounts in financial institutions in rural areas, with average of 3.55 accounts per person; the number of transactions for transferring funds relating to new rural pension insurance, new rural cooperative medical care and financial subsidies involved in agriculture by non-cash means including but not limited to transfer to bank accounts and bank cards etc. reached 2.68 billion, and the total amount was 512.246 billion yuan.

Secondly, to enlarge the coverage of payment and liquidation network and expand the radius of payment services in rural areas. By the end of 2015, there were 83.1 thousand banking outlets in rural areas that have accessed to the large and small amount payment system of the People's Bank of China and 32.3 thousand of correspondent banking outlets. With those 115.4 thousand operating outlets in total, the whole coverage rate reached 94.91%.

Thirdly, to facilitate financial institutions involving in agriculture in carrying out cash withdrawal services for farmers and other special services tailored to rural migrant workers, for the purpose of constructing retail payment system benefiting farmers. By the end of 2015, there were 997.5 thousand banking outlets helping bank card-holding farmers withdraw cash, covering 534.9 thousand administrative villages, and the coverage rate reached more than 90%. The farmer assistance banking outlets conducted 436 million payment businesses and the amount was 400.848 billion yuan. In 2011-2015, the annual average growth rates of withdrawal business quantity and withdrawal amount were 80% and 82% respectively.

Fourthly, to encourage financial institutions to conduct innovations in payment service mode in rural areas and develop non-cash payment tool system that suits to the conditions of rural areas. By the end of 2015, there were 6.3805 million bank card acceptance terminals in rural areas and the number of ATMs reached 309.2 thousand. In addition, online payment, mobile payment and other emerging payment modes have been frequently used in daily life payment, purchasing of agricultural and

Table 1–6: Some government guiding funds with a size of 10 billion yuan or above established in 2015

Source: PE Data, September 2015

Guiding funds	Target size (billion yuan)	Date of establishment	Notes
National Development Fund for Small and Medium-Sized Enterprises	60.00	Sept. 2015	The central finance authorities integrate and invest 15 billion yuan, conduct innovations in the system, exert leverage effect and multiplier effect to attract private enterprises, state-owned enterprises, financial institutions and local governments etc. to jointly participate in setting up national development fund for SMEs with a size of 60 billion yuan.
National Venture Capital Guiding Fund	40.00	Jan. 2015	The size of the fund is 40 billion yuan, and the contributors include central finance special fund for the development of strategic emerging industries, infrastructure investment fund of Central Government, and social and private capital including enterprises with strength and large financial institutions.
Chongqing Equity Investment Fund for Strategic Emerging Industries	80.00	May 2015	The fund is jointly set up by Chongqing government guiding fund for equity investment and state-owned enterprises of Chongqing, and the size is about 80 billion yuan. The initial authorized capital of the fund of funds is 25.5 billion yuan, contributed by Chongqing Industry Investment Fund and Chongqing Yufu Capital Management Co. according to a capital allocation proportion of 1:2, the fund of funds and the social capital jointly set up several sub-funds including fund for strategic industries, fund for strategic groups, major special fund, and so on.
Xiamen Industry Guiding Fund	10.00	Feb. 2015	The initial size is 10 billion yuan. It is forecasted that the fund could leverage 20 to 30 billion yuan of social capital. The fund has signed strategic cooperative agreements with 12 large equity investment institutions including but not limited to Fosun, SAIF, CCB International, Shenzhen Capital Group, and Shenzhen GTJA Investment Group.
Shanxi Provincial Investment Fund for Strategic Emerging Industries	10.00	Apr. 2015	The size of the fund is 10 billion yuan, including 2 billion yuan of government guiding fund.
Shandong Provincial Equity Investment Guiding Fund	10.00	Jan. 2015	The provincial finance authorities would allocate more than 10 billion yuan in three years from 2015 to support the transformation and upgrading of traditional industries, modern agriculture, modern service industry, science and technology venture capital investment and achievement transformation, capital market development, urbanization and so on. In 2014, the provincial finance authorities allocated 2.528 billion yuan to support the establishment of 14 funds of funds including but not limited to Shandong provincial guiding fund for the development of modern agriculture, guiding fund for the transformation of science and technology achievements as well as guiding fund for industrial transformation and upgrading.
Tangshan Industry Investment Guiding Fund	15.00	Apr. 2015	The fund is striving to increase its size to 1.5 billion yuan in five years. With the joining of financial institutions, fund managers, and social capital, the size will reach 15 billion yuan. The initial size of the fund is 250 million yuan (130 million yuan for industrial sector, 50 million yuan for agricultural sector, 50 million yuan for service sector, and 20 million yuan for science and technology venture capital investment).
Tianjin Industry Innovation Guiding Fund	20.00	Feb. 2015	The target size of the fund is 20 billion yuan, contributed by Tianjin Binhai High-Tech Industrial Development Area, Zhongding Factoring Co., East Innovation Equity Investment Fund and Panlin (Tianjin) Medical and Health Equity Investment Fund. The establishment of the fund is to support the development of innovative industrial clusters and the building of industry innovation centers.

sideline products and mobile phone fee payment etc.

3.2.2 Deepening and diversification of participants

In recent years, with the lowering of entry barriers for private capital to enter into finance industry and special innovations in traditional financial institutions, the participating entities in the field of inclusive finance have become diversified. Firstly, the support to policy-based financial institutions has intensified, and the coverage of physical outlets of rural credit cooperatives and rural banks has enlarged. Secondly, with deepening of the transformation of traditional financial institutions, by adopting the modes including but not limited to community banks and direct banks or building e-commerce platforms or promoting mobile finance etc., some commercial banks make financial services closer to customers. Thirdly, as constant lowering of entry barriers for private capital to enter into financial institutions, the financial services provided by private banks and companies of micro-credit, pawns, financial leasing, guarantee, venture capital, P2P and crowd funding benefit more people. Currently, China has set up five private banks, seven private financial leasing companies and two private consumer finance companies.

3.2.3 Innovation in products and services and enlargement of financial service scope

1. Innovations in traditional financing institutions

Traditional financial institutions mainly rely on mobile internet and other relevant technologies to conduct innovations in rural areas in the aspects of payment and settlement. For example, the payment and settlement tool of "smart phone + payment box" launched by Agricultural Bank of China has made the customer in rural areas enjoy more convenient financial services including but not limited to agriculture supporting loans, fee payments, new rural medical care, new rural pension insurance and utilities payments. As to the business operation, the institutions realize the terminal processing by establishing cooperative relations with mobile operators.

Innovations in internet companies

By using their own platforms, channel advantages and with the support of big data, the internet companies constantly launch innovative services. Taking Alibaba's affiliate Ant Financial as an example, its business includes

payment, micro-credit, insurance, information technology and so on. The cross-border mode represented by Ant Financial shows the value of inclusive finance. Firstly, internet-based products reduce the costs significantly and enlarge customer groups; secondly, large amount of data accumulated in the transaction process is of great importance for the establishment of user and business reference system and is helpful for the improvement of social credit reference system; thirdly, internet-based cross-border financial institutions enlarge the market participating team, which helps promote market competition, forcing traditional financial institutions to carry out reform and innovation activities.

3.2.4 Development of direct financing channels and enrichment of multi-level inclusive financial system

Information asymmetry and pricing are main difficulties for small and medium-sized enterprises in terms of financing. The transaction mechanism of New Third Board resolved the two issues: one is to use constant information disclosure of listed companies to make investors understand the micro, small and medium-sized enterprise, and the other is to use public transfer and transaction to achieve the valuation and pricing of small and medium-sized enterprises. Moreover, Chongqing Financial Assets Exchange, China OTC Market Co., Guangdong Equity Exchange and other regional equity and financial assets exchange platforms carry out credit enhancement and asset transfer business by cooperating with internet finance platforms, becoming important asset transfer platforms for micro-credit institutions.

Meanwhile, by encouraging the establishment of a series of industrial funds, China boosts the development of technology-based small and medium-sized enterprises. The Interim Measures on the Administration of Government Investment Funds (Cai Yu[2015] No.210) issued by the Ministry of Finance on November 12, 2015 regulates the establishment, operation and risk control, termination and exit, budget management, asset management as well as supervision and management of the government investment funds. By the end of 2015, there were 780 government guiding funds in China, and the size of the funds reached 2.183447 trillion yuan. As to the establishment of government guiding funds,

local governments set up angel funds, equity funds and industrial funds etc. in accordance with investment direction and priorities. By setting up fund of funds and direct investment funds and with market-oriented approach, the government focuses on supporting small and medium-sized growing enterprises in the seed and start-up periods. The funds, in principle, adopt limited partnership system, and the fundraising, establishment, management, income distribution and exit all follow market rules. By taking measures such as letting the private investors enjoy dividends preference and the government confers some proceeds, more private capital will be attracted and the vitality of mass entrepreneurship and innovation of small and medium-sized enterprises will be strengthened.

From continuous cancellation of and adjustment to administrative approval items to a national venture capital guiding fund for emerging industries with a size of 40 billion yuan established in early 2015, and to a newly established national development fund for small and medium-sized enterprises with a size of 60 billion yuan, Chinese government puts more emphasis on the role of market-based operation in promoting mass entrepreneurship and innovation.

4. Issues and difficulties of inclusive finance exploration in China

As an effective supplement to traditional finance, inclusive finance expands the service boundary, making more extensive people enjoy financial services conveniently and fairly. On the basis of policy support and technological change, inclusive finance in China has achieved great progress. In recent years, the development of inclusive finance took on the characteristics of diversified service entities, wide service coverage, and frequent use of mobile internet payment. The basic financial services such as the average number of bank cards held by each person and the density of banking outlets has reached international middle upper level, though there are still many problems and challenges: unbalanced inclusive financial services, imperfect inclusive financial system and legal system, weak financial infrastructure and business sustainability. Meanwhile, with the lowering of entry barriers of inclusive finance, the explosive growth

of internet financial companies, and gradual exposure of credit risks in economic downturn, issues and risks relating to inclusive finance begin to expose.

4.1 Internal issues of inclusive finance in the process of exploration

4.1.1 Uneven qualifications of participants and breaching of regulatory boundary

At present, private participating entities of inclusive finance are mainly registered as internet finance companies and P2P online lending companies. As of the end of April 2016, there were more than 4000 P2P platforms reaching 4029 (including closed and defective platforms) in China. Uneven qualifications of participating entities lead to market chaos. And as the supervision system has not yet covered all internet finance business, the supervision chain needs to be further sorted out, many P2P platforms conduct non-compliance business under the flag of internet finance, breaching regulatory boundary. The registration requirements of P2P lending companies are the same as those of ordinary internet companies, but private lending companies are required to obtain business permit of China Banking Regulatory Commission. Therefore, many private lending companies carry out lending business by using the shell of P2P internet lending platforms. This practice, on the one hand, avoids the regulation on interest rate on borrowings, and on the other hand, avoids the market access system. Moreover, some P2P companies use internet platforms to provide financing for their own entities, which increases market risks.

4.1.2 Unregulated information disclosure and accumulation of business risks

In the development process of inclusive finance, internet technologies could effectively reduce transaction costs, manage credit risks and improve transparency, but they still could not resolve the unregulated information disclosure from the source. From the wealth management products of the banks to the vigorously growing P2P platforms, the issues relating to unregulated information disclosure and information fabrication always exist. On the one hand, many P2P maliciously platforms release fake subject matters, or do not perform review obligations on borrowing subject matters, which leads to

fake financing, many funds are used for illegal financing or self financing, which increases the investment risks of borrowers. On the other hand, based on the business data including but not limited to transaction occurrence information, transaction balance information, transaction concentration information, transaction delay information and platform customer situation provided by the internet platforms, investors cannot make good judgment on risk control level, profitability and cash flow of the platforms, which also increases regulatory difficulties.

4.1.3 Uncontrollable operating costs and to-be-optimized business mode

To fill the service blank of traditional finance, inclusive finance needs to face more customers of low-income and from rural areas. The characteristics of large demand for credit, small amount of single transaction and large quantity of transactions increase the operating costs of inclusive finance. Though technological change could improve operating efficiency and reduce business costs to some extent, the development of inclusive finance in rural areas still needs large amount of funds and manpower due to incomplete information. The development of inclusive finance also needs stable and diversified lending capital. To attract idle social capital, the inclusive financial institutions assume relatively high interest costs. Previously, the average yield of P2P platforms was from 8% to 15%, and plus the management fee, consulting fee and service fee etc. charged by the platforms against the borrowers, the borrowing costs are even higher, which is not good for the sustainable development of inclusive finance. The existing business mode of inclusive finance has not yet resolved the issues of high operating costs and capital costs, and still needs to be optimized.

At present, the prevailing business mode of internet finance is based on the amount of lending. Without lending, the yield will be greatly impacted. The low capital reserve rate of inclusive financial market is irresistible to the lack of liquidity in economic crisis period, and the uncertainty of future regulatory policies also impacts the business mode, profitability and feasibility of inclusive finance. So, through strict risk modeling, monitoring and updating, how to conduct comprehensive risk pressure test, increase the proportion of low-cost, long-term and non-recourse capital, broaden business mode, optimize

risks and ROE, appropriately increase in capital reserve ratio at the same time. timely follow up the trend of regulatory policies and adjust business mode to make it suitable to the development trend of supervision mode are the issues to be resolved in the future for sound development of inclusive finance.

4.1.4 Increasing of non-performing loans in economic downturn, the business has not experienced complete cycle

The concept of inclusive finance was introduced in China after the 2008 financial crisis, the practice of inclusive finance also began to occur thereafter. In the upturn stage of economic adjustment and revival, with the growth of residents' wealth and the increasing wealth management demands, inclusive finance, with the help of internet technologies, has achieved better resource allocation and met financial demands of various fields. But since 2015, suffering from the pain of so-called "Three Period Superimposed" macroeconomic cycle, economic development speed has slowed down, and the rate of non-performing loans of banks also increased significantly. With great increasing of non-performing loans, Standard & Poor's said "non-performing assets of China's banking industry would continue to increase in the forthcoming two to three years, and the release of credit risks was still in initial stage, even the first half has not ended". Most P2P platforms and private financial institutions have not disclosed the rate of their non-performing assets, but unquestionably, the rate is higher than that of banks. Currently, many P2P platforms take only 1% of total loans as loan loss provision which is far from being enough to cover all non-performing assets.

On the other hand, in China, the risk modes used in the field of inclusive finance are established on the basis of limited historical data, especially the customer behavior and economic data in the economic upturn, risk of underestimation of credit crisis possibly exists. With gradual release of cyclical credit risks, more internet companies conducting inclusive financial business would face operating difficulties, resulting in industry reshuffle. How to establish sustainable business mode and enhance risk control capability are new challenges for the industry of inclusive finance.

4.2 External difficulties faced by inclusive finance in the process of development

4.2.1 Coexistence of supervision overlapping and supervision vacuum

In the initial development stage, the supervision environment for inclusive finance was relatively loose. The updating of business mode and financial products injects new vigor to the improvement of financial system. But with constant enlargement of business scope, inclusive finance constantly expands internet financial business with the business contents involving the characteristics of multiple industries, which causes it to face supervision difficulties. Currently, China has specified supervision authorities of main internet financial business: People's Bank of China is responsible for the supervision of third-party payment, China Banking Regulatory Commission is responsible for the supervision of P2P lending, and China Securities Regulatory Commission is responsible for the supervision of crowd funding, but there is no single supervision department that could play a leading role in guiding the institutional and orderly development of the whole internet finance industry. Due to the factors such as cross-industry supervised entities, there exists supervision competition or vacuum. Supervision overlapping and supervision vacuum lead to internal problems including but not limited to market chaos, breaching of regulatory boundary, incomplete information disclosure.

4.2.2 Inadequate social credit reference system

The sound operation of financial market requires participating entities to strictly follow the basic transaction rules of financial market in transaction activities. Credit is the core to establish transaction rules of financial market, and intact social credit reference system is the basis for developing inclusive finance. Recently, People's Bank of China has approved the operation of eight private individual credit information intuitions, marking an important step forward for the improvement of credit reference system. However, the credit system in China is still incomplete, higher ethical risks and incomplete credit information sharing mechanism are important elements that restrict the development of inclusive finance.

4.2.3 Higher ethical risks

The credit enhancement mode based on collateral

and pledge rules many micro and small business owners, the unemployed and farmers out of the financial service scope. To provide the whole society with financial services, inclusive finance needs to break the defects of the existing credit enhancement mode, promote credit financing mode on the basis of ensuring that transactions entities follow credit rules. But in China, there is no clarified punishment mechanism for credit default. The existing risk prevention measures such as the cross guarantee and government guarantee cannot fully prevent ethical risks. The intentional default of borrowers and defrauding of small loans from financial institutions or subsidies from the government commonly exist. The service entities of inclusive finance in China are socially disadvantaged groups. Weak credit awareness, lack of credit education of those groups and incomplete laws and regulations relating to credit result in higher ethical risks in inclusive financial business. The financial institutions face difficulties in preventing credit defaulting risks of transaction entities. Due to strong conductivity, it is possible for partial credit default to trigger overall financial risks and therefore jeopardize the stability of financial market in China.

4.2.4 Imperfect credit information sharing mechanism

Credit information is a public good featuring high acquisition costs and low use costs, and currently its demand exceeds supply. In China, the coverage of the basic credit information database is not broad enough. The country lacks extensive available, high reliable and unified credit rating criteria. At present, the credit reference system can be divided into two categories: the credit reference system of the People's Bank of China, and the credit reference systems independently established by internet financial companies. The credit reference system of the People's Bank of China is mainly for traditional financial institutions but not all financial institutions and the public, and is independent from the credit reference systems established by internet financial companies. At present, there is no reliable credit information exchange mechanism among the enterprises in China, significantly increasing the difficulties and costs of loan approval. Moreover, the obstacles of credit information exchange among financial institutions increase costs of getting customer credit information, reduce the timeliness of

credit information, and possibly lead to “multiple loans” and other problems.

5. Development direction of inclusive finance in China

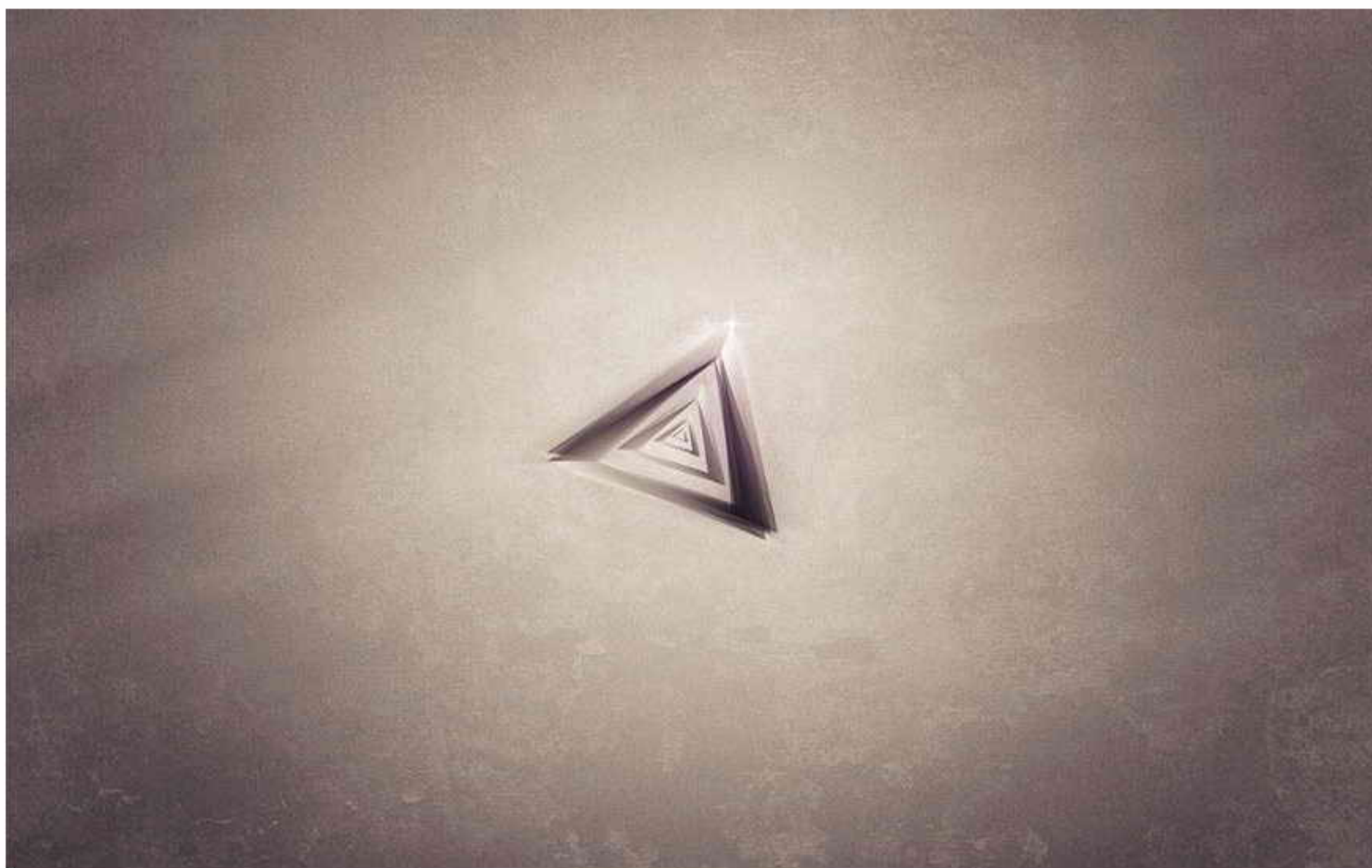
The Plan for Promoting the Development of Inclusive Finance (2016-2020) has taken “improvement of coverage, availability and satisfaction of financial services” as the overall development objective of inclusive finance in China. To achieve this objective, the planning of the development direction of inclusive finance must be started from the aspects including but not limited to legal system building, infrastructure building, institutional system improvement, innovations in products and services, protection of consumers’ rights and interests. Specifically, the first is to improve supervision policy system and enhance risk control capability. The development of inclusive finance needs to be started from the top-down design, and requires government to relax access policy and encourage financial institutions to carry out inclusive financial business. It is necessary to enhance supervision on inclusive financial institutions and internet finance business, supervise and guide the development of inclusive financial market from the perspective of risk prevention; regulate the development of microcredit companies, pawnshops, and other newly emerging financing channels and institutions, accelerate the credit information access system building, establish risk compensation mechanism

and incentive mechanism and improve the financial services for micro and small-sized enterprises. The second is to optimize credit environment of inclusive finance and gradually improve credit awareness of the whole society. It is necessary to quickly build unified and integrated corporate and individual credit information database, for the purpose of realizing interconnection, interworking and sharing of credit information; enhance social credit culture construction, formulate punishment and incentive measures and urge credit entities to hold right operating ideas and business value direction. The third is to resolve the high cost issue by using internet technologies. It is necessary to use advanced technologies including but not limited to big data and cloud computing to standardize the product elements, realize batch processes and professional operation, and to reduce the operating costs of inclusive finance by scale effect; break through the time and space limitations by using internet finance, shake off the “information island” mode of traditional financial institutions, achieve the interaction and interworking of information among inclusive financial institutions, build a sharable big data system, reduce costs of financial services and improve the use level of science and technology. The fourth is to actively explore risk control modes and approaches that suit inclusive finance in the economic downturn, constantly optimize the organizational structure as well as the products and services, and find sustainable business modes and profit modes.

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Chapter II

Technological change and inclusive finance



As a financial service mode featuring more extensive coverage, easier access, and stronger long tail effect, inclusive finance needs more mass broadcasting and processing approaches than traditional finance to reduce costs and achieve sustainability of economic benefits, so as to better realize the goal of “inclusiveness”. The technological change in the aspects of internet, cloud computing, big data as well as constant innovation and improvement of financial technologies offers all possibilities.

1. Technological change and infrastructure building of inclusive finance

Generally, the application of technological innovations in financial sector is mainly from the financial system itself. The mismatching of supply and demand of financial ecological system is the precondition for extensive application of technological change. For example, relying on the accumulated customer data and risk management tools, e-commerce companies offer small

loans to customers for meeting their credit demands. Those companies also develop online financial products to meet customers' wealth management demands. Technological change has driven innovations in payment and risk management tools, which enlarges the financial service scope, improves financial service efficiency and promote the development of the financial system.

In the past few years, with rapid growth of data source supply and extensive application of big data technologies, the internet financial lending industry in the USA has developed risk control mode better than FICO score-based mode used by traditional industries. Fast development of mobile internet technologies also make consumers and small-sized enterprises be used to conducting transactions via internet and mobile equipment. The customers and small-sized enterprises can get loans in an easy and convenient way and grow rapidly in all aspects of the society beyond financial lending and financial service activities of traditional bank system. From this perspective, we can see that the technological change and the development of inclusive finance are closely related and of benign interaction.

1.1 Technological change provides inclusive finance solutions

As for the high costs and limited coverage of physical outlets and manpower, traditional financial institutions face difficulties in providing disadvantaged groups (farmers, urban residents of low-income, micro and small-sized enterprises, etc.) with financial services and suitable products and in maintaining sustainable business mode for disadvantaged groups. Technological change is promoting further development of inclusive finance in the aspects of universality and sustainability.

The infrastructure building in the field of inclusive finance mainly refers to the development and building of the technology sector. Technological change in the fields of cloud computing, big data, smart terminal and internet of things has formed a new force, providing the mankind with new tools, which effectively reduces the operating costs of inclusive finance, expands the coverage of inclusive finance, improves the service mode of inclusive finance, thus creating unprecedented opportunities for the transformation of finance industry in China.

As a key medium, the most important function of a financial intermediary is to resolve the information asymmetry among transaction entities. In the field of inclusive finance, large number of entities at both supply and demand sides, low degree of information transparency and small amount of single transaction increase the information processing difficulties and costs. Only by relying on the strong computing and storage capabilities brought by computer, cloud computing and other advanced technologies can we effectively resolve the entry barrier issue of inclusive finance.

[Case] Internet technology-based "credit factory" mode -- China Minsheng Bank

The so-called "credit factory" mode is to build unified back office operation center by using internet technologies, completing loan review and approval operation in bulk, so as to realize the centralized processing of credit business in the aspects of business procedures, modes and data. In October 2013, the retail credit products of China Minsheng Bank began to be operated in accordance with the credit factory mode, which changes the previous mode - the account manager is responsible for collecting materials, inputting into the system and scanning the paper archives, and then submitting the materials to a higher unit for review and approval. According to the new mode, the materials will be directly submitted to the unified back office once after the investigation is completed, realizing online review and approval and centralized processing. The interworking between the back office credit factory mode and the front office mobile terminal improves the operating efficiency significantly, while the unified credit scoring mode and decision-making system conduct the review work, enhancing the automation of online loan processing. China Minsheng Bank also introduced automatic search and check system for third party information in its centralized operation center, integrated information sources of court enforcement system, industry and commerce administrative system, taxation system, and non-performing loan database as the basis of

loan review, effectively resolving the information asymmetry issue in promoting inclusive finance.

Under the credit factory mode, the operating efficiency and the loan review and approval mode in the sector of microcredit have been optimized, meaning that the internet technologies have had a deep impact in microcredit services. They fundamentally changed the management mode, operating mode and business procedures of inclusive financial services.

1.2 Docker-based infrastructure platform

Traditional financial institutions, especially the banks, mainly adopt the classic IOE architecture, that is, IBM's small computer system, Oracle's centralized database system and EMC's high-end storage system. The price of such centralized architecture equipment is relatively high, and with rapid increasing of data size and calculated amount, more advanced equipment will be needed. So, for inclusive finance featuring low profit of single transaction and large amount of transactions, such architecture is not suitable.

Globally, the inclusive financial institutions mainly adopt Docker-based distributed architecture to build infrastructure of underlying business. As an emerging technology, the container technology represented by Docker has integrated namespace, cgroups, UnionFS, netfilter, and other advanced Linux kernel technologies, put forward the new concepts of image, container, registry, and docker hub, and facilitated the work of application building, management, sharing and cooperation, realizing the so-called "to build, ship and run distributed applications anywhere".

Since release of the first version in 2013, Docker has quickly become the latest trend of cloud computing industry, receiving widespread attention. Docker is an open-source project, and has attracted a large number of companies including industrial giants such as Google, Microsoft, Alibaba and Tencent to join, forming a large ecological circle. There is a common view that the container technology will become solid foundation for the next generation of cloud computing.

Compared with traditional centralized architecture,

Docker-based distributed architecture can deal with large amount of data at a lower cost. There is no need to purchase more advanced equipment to meet the demands of increasing data size and calculated amount. Only by increasing the number of equipment can resolve the issue and realize linear growth in terms of information technology investment.

[Case] Docker-based financial infrastructure – CreditEase "Finance Cloud"

By taking Docker technology as the core, CreditEase Finance Cloud establishes a complete set of integrated infrastructure platform, and all the components of the Finance Cloud are operated on this platform.

Finance Cloud takes full advantage of Docker technology and built Docker-based underlying infrastructure, providing an integrated framework of development, test, deployment and monitoring for its various sub-systems of financial capability and overlying business applications. With support of this framework, the sub-systems and applications can quickly respond to business demand changes, focus on the realization of business logics. There is no need to put large manpower in infrastructure building, operation and maintenance, manpower costs are reduced while the service development speed and service stability are improved.

Moreover, Finance Cloud integrates the Hadoop-based big data platform, realizing mass storage of data and large-scale parallel computing. In combining with Docker technology, the overlying application can call the cluster computing conveniently, making big data analysis become possible. For example, the "Yisou" system of CreditEase, by using mass storage and elastic computing of Finance Cloud, can quickly acquire large amount of customer data and conduct parallel analysis, forming knowledge graph for business inquiry and helping build credit granting and anti-fraud capabilities.

Finance Cloud is also embedded with abundant security strategies in default, turning DDoS defense,

network firewall, application firewall, ID verification, attack behavior detecting, security audit and other security strategies of CreditEase into platform-based packaged services. There is no need to do extra work to operate the applications on CreditEase Finance Cloud, because all the applications are protected by the system. By using the agility of Docker technology and SDN technology, Finance Cloud has realized the network-based dynamic isolation among applications, pushing the security defense line from zone boundary to application boundary, thus achieved the application level security.

1.3 Infrastructure sharing and output of inclusive finance

The rapid development of Docker-based infrastructure of Finance Cloud saves information technology costs, improves output efficiency and ensures about stable operation of various businesses on Finance Cloud, especially inclusive financial business. The cloud computing-based elastic architecture can not only act as technological infrastructure of a single company, but also provide other social organizations and individuals with highly-available cloud services conveniently and output the storage and computing capabilities necessary for the development of inclusive finance. With optimized social costs, rapid development of inclusive financial business is promoted.

2. Technological change and enhancement of inclusive financial capability

Financial capability is an important guarantee for the financial institutions to win competitive edge and realize sustainable development. Historically, the understanding of core financial capability has experienced change from profit capability to risk control capability. How to achieve maximized profit with the lowest risk exposure is of great important for financial institutions to realize sustainable development. Compared with traditional finance, inclusive finance features high risks and low returns. It is an inevitable choice for inclusive financial institutions to use technological approaches in order to enhance risk control capability.

2.1 Risk control shows financial capability

Constant improvement of infrastructure building lays solid foundation for boosting financial capabilities of inclusive finance, among which the most important is the development and enhancement of financial risk control capability. Inclusive finance, especially the loan-based inclusive financial business, requires more strict risk control because of its extensive coverage and non-uniform business standards.

As a scientific management approach, financial risk management means that the financial companies conduct risk identification, assessment and analysis in the process of fund raising and operation, effectively control and deal with financial risks, and use the lowest costs i.e. adopt the most economical and reasonable method to achieve maximized security guarantee.

Compared with the risk control measures taken by traditional financial institutions, those taken by the internet financial companies, P2P platforms and other extensive inclusive financial firms supplementing the gap of traditional finance do not have obvious advantages, do not show unique characteristics of internet technology-based platforms in the aspects including but not limited to talent reserve, experience accumulation, institutional design and due diligence mode, internet is more like a tool for fund raising and loan lending. Essentially, it is innovation in marketing, which is helpful for expanding size, but not useful for risk control.

For financial institutions, it is easy to expand market size, but very difficult to achieve such objective under the condition of low risks. Therefore, the core issue for inclusive finance to realize sustainable development is to enhance risk control. Using big data and cloud computing to make breakthrough in the aspect of quantitative loans is of great importance for the development of inclusive financial capability.

The advantages accumulated by foreign internet financial lending companies in the aspects of risk control and its modes is worth attention. Traditional banks focus on good-quality assets in lending business, adopt pool-level analysis to analyze collateral for the business of small and medium-sized enterprises, retail and mortgage loan for house purchase, while internet financial lending companies extensively adopt advanced big data and

machine learning computing modes and use loan-level analysis, improving risk identification capability and expanding the service scope, especially those customer groups ignored by traditional banks.

Internet financial lending industry not only uses social network data sources, but also applies many innovative risk control technologies. For example, SoFi Introduced free cash flow approach to substitute DTI approach; Upstart applied GPA scores and employment ability in assessment, and some other platforms adopt financial personality approach. Those new risk control means and approaches are of high value for the development of inclusive finance. It is noted that, many of those approaches emerged in the booming period of the economic cycle, whether they are suitable in economic downturn still needs to be tested.

2.2 Knowledge graph-based risk control capability

To realize risk control capacity by technological means is to judge the risk degree by forming individualized knowledge graph with respect to the financial service customers through mass data collection and computation and identify relevant characteristics of the knowledge graph.

Knowledge graph is an inter-relationship among entities. The entities can be divided into different types which further produce inheritance relations. Therefore, the entities and the relations in knowledge graph are respectively corresponding to the dots and sides in the graph theory. Each entity is of multiple attributes, and the relations in the knowledge graph are corresponding to the graph sides in the graph theory.

For example, a borrower can be called an entity. The type of the borrower inherits from the natural person, his gender and age are attributes of a natural person. His work organization is another entity inheriting from institution. The relation between the two entities of the borrower and the work organization is employment relation. The entity of the work organization has contact telephone numbers and other employees. While conducting risk assessment on this borrower, the personal information and the information about the work organization and his colleagues can be used.

The knowledge graph can show heterogeneous data better than that of traditional database. For example, in traditional relational database, a person is showed by a sheet, a company is showed by a sheet, and the relation between the person and the company is also showed by another sheet. Different relations are showed in different sheets. So, it needs many sheets to show different heterogeneous data, and the comprehensive information about a person needs combination of many sheets. The knowledge graph could easily eliminate the difficulties and directly show various heterogeneous data.

2.3 Credit database optimizes financial capability

Risk control capability an important manifestation of financial capability. Based upon big data and cloud computing technologies, knowledge graph is applied to improve risk identification and control capabilities, which has become a consensus among many practitioners of inclusive finance. In current era of information, a natural person living in the society leaves traits more or less on the internet, and those data can also be used for credit assessment.

[Case] Big data and knowledge graph-based risk management approach – CreditEase “Yisou”

By using the advantages of Docker-based distributed architecture in the aspect of data computation iteration, CreditEase integrates internal and external data as well as internet data to build credit data warehouse usable for improving risk control capacity, and Yisou is the output port of such data warehouse. By using vertical search and with support of knowledge graph technology, Yisou helps enhance the risk management on all sections of loan business.

1) Pre-loan management

Based on the data accumulated by CreditEase in the past nine years and third-party data provided by partners as well as large amount of data acquired by the distributed crawler system from the internet, Yisou conducts comprehensive risk identification and

assessment with respect to each customer submitting materials to CreditEase. The risk identification engine is mainly used at the stage of loan application review.

In pre-loan risk management, Yisou provides two functions of "credit review with one click" and "credit review tool Xiaoyi". By using the materials provided by customers as clue, the "credit review with one click" verifies and supplements customer materials through internet information, trying to restore the full view of customers to a maximized degree, and then conducts cross comparison by using the data accumulated by CreditEase and the third-party data, giving the credit review staff an accurate reference. Besides, Yisou also identifies the information in the aspect of meaning to delete irrelevant and select the data highly related to the risks so as to improve their risk identification level and work efficiency. The "credit review tool Xiaoyi" helps the staff complete credit review in a faster and more accurate way by adopting high-tech approach.

The developing of Yisou risk identification engine increases CreditEase's manual review efficiency by 34% and risk identification ratio by 60%. The use of crawler system to capture, analyze, follow up and automatically report data in a real-time manner reduces costs. Moreover, Yisou conducts public opinion monitoring through the information on the internet. For example, the loan cheating methods discussed at some internet forum could be acquired by Yisou, and the issue would be timely reported to anti-fraud department.

2) In-loan management

Risk management is a dynamic process. The completion of lending does not mean the end of risk control, but the beginning of a new round of risk control. Data analysis finds that much abnormal information emerges after loan granting. Some borrowers would release information relating to the loans or the sale of fixed assets through internet after they get the loans. That kind of information is unpredictable, and the cost of manpower processing is very high due to large number of customers and small amount of each loan. By using the real time data acquired by the crawler system, Yisou automatically trace the post-loan internet behaviors of CreditEase's

customers. While finding risk information, it will send warning to the collection department, and then the department will take steps to reduce loss to the utmost extent.

Based on the knowledge graph technology, Yisou provides duplicate checking, account classification, blacklist and graph search services. Wherein, the duplicate checking and account classification are mainly used at the stage of credit review, through screening clients' history to effectively improve the bull liabilities, blacklist and graph search are mainly used in the process of anti-fraud. Blacklist information is of great importance for judging credit fraud. Therefore, the maintenance and friendly interaction of blacklist database is of high importance. Blacklist service supports real-time inquiry and updates information in real time. Graph search is visualized service of knowledge graph. The complicated relations of different customers can be clarified by graph search, which is especially useful for cases involving in fraud gang, as the members can be accurately locked.

3) Post-loan management

As for the credit business of inclusive finance, the biggest problem in the collection process is the loss of communication. Traditional collection mainly relies on the telephone numbers provided by the customers. Basically, loss of communication means to the end of the rope. But by using so-called "six degrees of separation", Yisou integrates relational data involving people and institutions, forming a large and well-connected network - the "knowledge graph". This graph is better than a simple application sheet in helping collection department find more clues.

For example, social media such as Weibo can be used to find the people who have close relation with the customers, because they may know the latest information about the latter. The telephone numbers of the nearest police stations or the neighborhood committees of the registered permanent residence or residential address can also be used to find the customers. When entering an ID number in Yisou, those kinds of information would be showed immediately, and the clues can be breakthrough for turning "loss of communication" into "long-term

communication”.

2.4 The development of inclusive finance requires appropriately addressing information security risks

The technological change including but not limited to internet finance, big data and cloud computing has provided effective solutions to infrastructure building and risk control capability of inclusive finance, but the information security risks brought by technological change itself cannot be ignored. At present, the information security awareness of internet finance customers is generally weak. While enjoying convenient services of new financial business, they easily ignore the potential risks brought by information technology. The users do not emphasize on personal data or sensitive information, nor do they have the protective measures. Their personal terminal equipments also lack necessary security protection. Once terminal equipment is lost or attacked by phishing websites or malicious codes, information leakage may easily cause the funds to be filched.

At the supply side, inclusive financial institutions use internet, big data and cloud computing technologies to collect and analyze the behaviors of users and their financial status, providing diversified, customized and high-quality services. But there is a dilemma between information security and customer experience. Some financial service providers store the operation data and production data at the same place, resulting in potential risks.

The rapidly developing internet, cloud computing and big data also inevitably have risk vulnerabilities, leading to security challenges including but not limited to data loss and hacker attack. The existing information security defense system is not enough to isolate changing online attack, and the centralized big data is more likely to be attacked. So, in the process of using technological change and information technology approaches to explore into inclusive finance, it is also imperative to enhance emphasis on and protection of information security.

3. Financial technological innovation and sustainable development of inclusive finance

Besides information technology revolutions in the fields of big data, cloud computing, and internet, the financial technological innovations in the field of traditional finance also facilitate the in-depth development of inclusive finance. For example, in the field of rural inclusive finance that lacks credit information, how to conduct innovations in financial products and service modes in accordance with the actual conditions of customers has become a challenge for practitioners of inclusive finance.

3.1 Financial technological innovation demands in the field of inclusive finance

Most people believe that the definition of “financial innovation” derives from a view of Austrian-born American economist Joseph Alois Schumpeter who defines innovation as setting-up of a new production function, that is, innovation combines factors in a new way.

According to this view, innovation can be divided into innovation in technologies (product innovation and process innovation) and innovation in organizational management, because both kinds of innovations lead to change in production function or supply function. Specifically, innovation includes five types of situation: new product introduction; new process application; new resource development; new market expansion, new production organization and management mode establishment which is also called organizational innovation.

As for the inclusive finance, the issues relating to costs, availability and risks are finally reflected in specific products and services. Therefore, the nature of inclusive finance requires the providers to conduct innovation in products and services.

Taking the credit products involving the most extensive scope in the field of inclusive finance as an example, at present, the design of a loan product tends to integrate all the factors including but not limited to loan period, repayment method, pricing method, process management and control method, risk filtering or screening method and post-loan management and control method into the definition of such product. For certain type of customers, to use one credit product may result in breach, while the use of another product may maintain good operation. So, in this sense, whether the

customers can get loans is determined not only by their qualifications, but also by the design of credit products.

Under the theme of inclusive finance, in terms of main innovative direction of credit products, the first is to use data processing technology to conduct credit assessment on customers and launch products that could meet the demands of various customer groups. The second is to conduct innovation in process management and risk control methods and integrate them into the products. And the third is to promote pure credit products in accordance with features of customers and combine the skill training, promotion of science and technology, entrepreneurial knowledge training and other services with the design of credit products.

Moreover, the innovation in inclusive finance lies in the lowering of availability threshold of financial services and the enlargement of financial service scope, especially the provision of optimized solutions to productive fund demands. Most poor people in rural and urban areas wish to change the poverty-stricken conditions by conducting small businesses. They may have good ideas, but lack initiation capital for business start. In fact, those people can move out of poverty through inclusive finance. In addition to micro entrepreneurial loans, to attract small funds for or joint investment in small business is another exploration direction of inclusive finance to serve low-threshold entrepreneurship and innovation.

3.2 Financial technological innovation in the field of inclusive finance

The contradictions between strong financial demand and insufficient supply are wide-spread in the field of inclusive finance. On the one hand, financial technological innovation has optimized traditional financial products, enhanced their accessibility and availability, which is better for promotion in the field of inclusive finance. On the other hand, financial technological innovation has driven new financial products and services and expanded the coverage of inclusive finance, which effectively supplements the gap of supply and demand.

Taking rural inclusive finance as an example, under the dual effect of urbanization and population aging, the labor force in rural areas is decreasing. With increasing concentration of lands and the rapid development of

agricultural mechanization and modernization, the comprehensive level of agricultural mechanization in China is forecasted to reach over 70% by 2020. During this process, with the improvement of farm machinery equipment manufacturing industry, upsizing, intelligence and automation will become the mainstreams. The situation will raise the prices of farm machinery and increase financial pressures of farmers. Though China has granted subsidies for buying farm machinery, farmers still face difficulties in purchasing large and medium-sized farm machinery products due to lack of capital. Another example is the breeding industry. In this sector, the assets are mainly creatures, thus it faces major epidemic risks and more uncertainties than traditional agriculture in operation. So, it is difficult for traditional finance to provide the breeding industry with support, resulting in large gap of supply and demand.

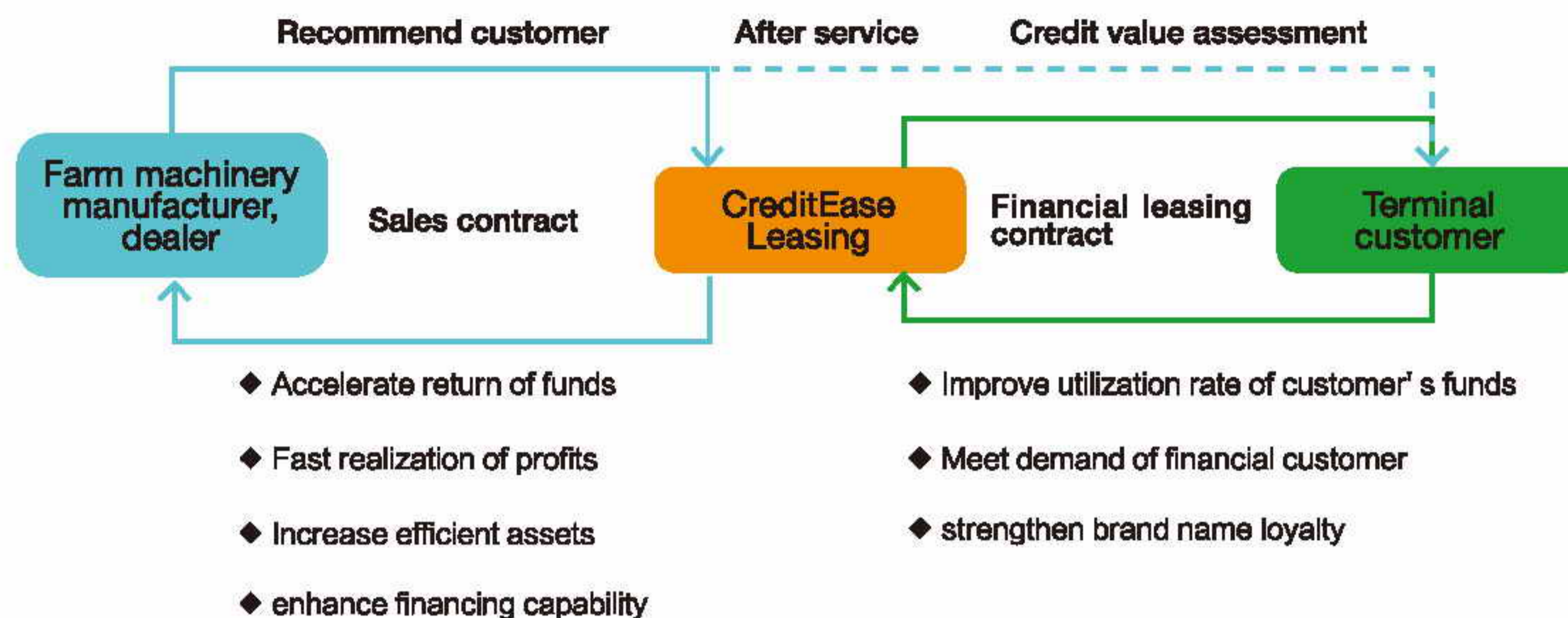
[Case] Financial technological innovation optimizes traditional inclusive financial services – farm machinery leasing

Currently, the supply entities of farm machinery financing can be divided into three categories: banking institutions represented by Agricultural Bank of China, Postal Savings Bank of China, local urban commercial banks, local rural commercial banks and rural banks; farm machinery manufacturers that are also financial leasing companies; third-party financial leasing companies involving micro and small agricultural business. However, from the perspective of actual business development, the first two categories cannot meet the demands of farmers in the aspect of farm machinery financial services due to the cumbersome procedures of traditional financial institutions and low willingness of small financial institutions to single-case loan. The property-based financial leasing products have become important financial products for farmers in purchasing farm machinery for modernized production.

To better promote the development of farm machinery leasing business and meet the demand of customers, CreditEase has conducted in-depth investigation and research tours in rural areas, carried

Figure: Process innovation of CreditEase's farm machinery financial leasing

Source: Edited by the research team



Notes: At the end of the financial leasing, the leasing equipment would transfer to the terminal customer.

out innovation in farm machinery business in the aspects of leasing term, type and review process. It tried the best to minimize loan default risks from design, satisfying the actual demand of farm machinery leasing customers while reducing business promotion risks of inclusive finance.

Specifically, the leasing term, which is from four months to three years, is determined by the various factors including but not limited to the financing amount and the seasonality of agricultural production. The repayment method is very flexible, including monthly matching principal repayment, matching repayment of principal and interest and lump sum repayment. The farmers are entitled to choose repayment method in accordance with own financial capability and cash flow. The leasing rate is basically equal to the interest rate of local rural credit cooperative and lower than the interest rate of private lending. In the aspect of business process, the farm machinery leasing procedure is simple; under the precondition of controllable risks, it removes unnecessary procedures of small loan practices in rural areas such as five-household joint guarantee and family-based investigation, facilitating the financial services provided to extensive farmers and guaranteeing the

use of farm machinery in a timely manner

As a replicable and scalable new financing mode, the farm machinery leasing business is sustainable in terms of social and economic benefits and can achieve win-win results. With small amount of initial investment, farmers become entitled to use large and medium farm machinery equipment, which can not only improve their own agricultural production efficiency, but also increase their income by conducting agricultural work for other farmers. The dealers receive financial support, accelerating the return of funds and improving the market share while effectively increasing sales. The financial leasing companies use this innovative approach to “tap into blue sea market”, creating new values, thus realizing the sustainability of economic and social benefits.

[Case II] Financial technological innovation expands inclusive finance scope – “animal leasing”

Designing repayment method of farm machinery leasing products in accordance with seasonal income of farmers is further optimization of financial technology in the field of traditional inclusive finance,

while “animal leasing” is important practice of financial technology to further expand the coverage of inclusive finance in accordance with newly emerging financial demands.

In recent years, China’s dairy industry has experienced a good development period, witnessing increase of output, sales and profits of dairy products. The State Council has introduced several policies to support large-scale farming of cows. The promising market and the policy support lay solid foundation for the sound development of dairy industry. The business owners in animal husbandry face serious shortage of funds in the process of scale expanding. The issue is that the breeding industry is not included in the category of traditional leasing. In addition to traditional market and operation risks, the industry also faces major epidemic risks. Moreover, there is uncertainty in terms of forestry land, because some land rented by business owners, despite of long-term lease, is state-owned land which may be withdrawn in advance.

Focusing on those issues, CreditEase Leasing has conducted comparison of cow leasing and traditional leasing. In line with rating standards of Yili Co. for downstream pasture, it introduced cow property insurance and protection mechanism and reached agreement with a farming company in Luanxian County of Hebei Province, conducting leaseback business of 200 lactating cows. The subject matter of leasing has changed from traditional farm machinery into cows, which is the first of its kind in “animal leasing”. The close combination of financial technological innovation and financial demand creates new financial service modes, which promotes the development of modern agriculture and is helpful for the building of multi-level financial service system and the development of inclusive finance in more business sectors.

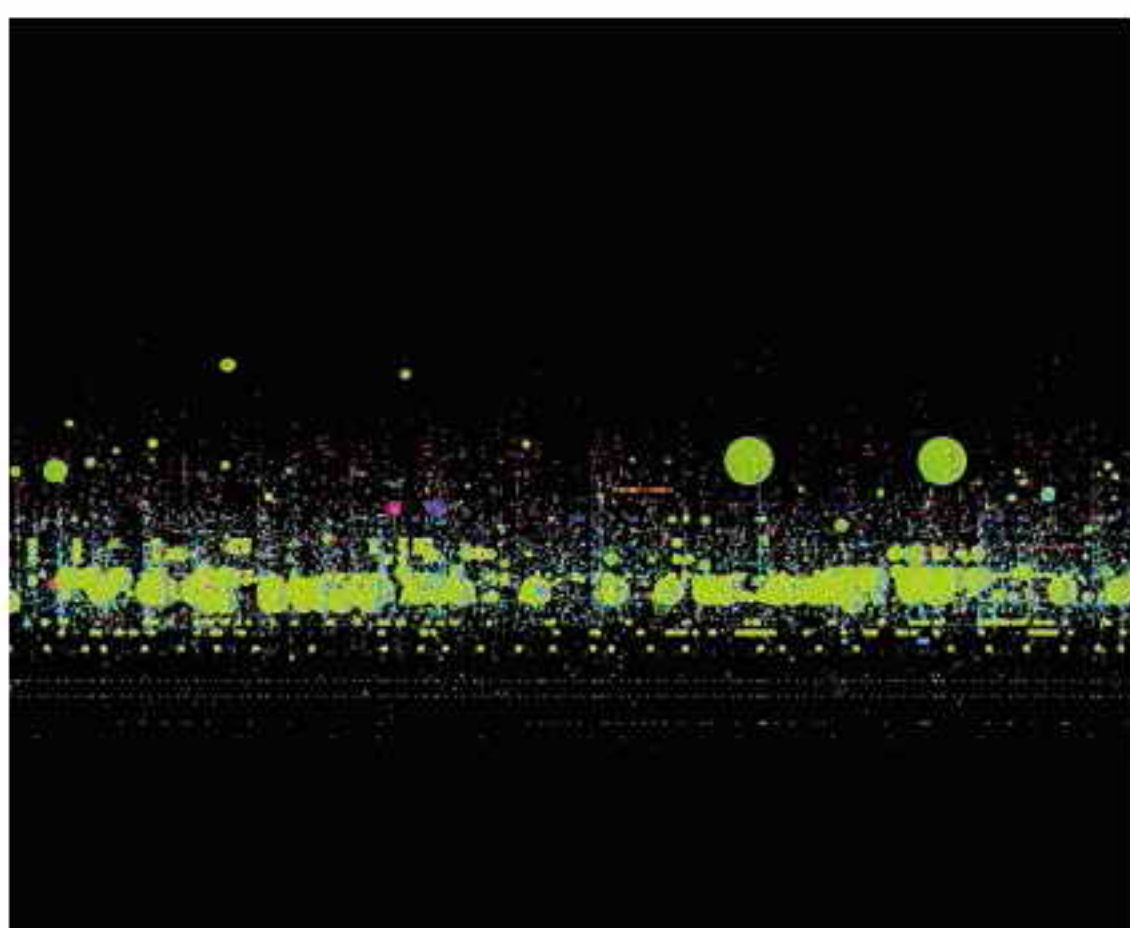
[Case III] Financial technological innovation fills up the gap in supply and demand of inclusive finance – PSBC

In the practice of rural inclusive finance, Postal Savings Bank of China (PSBC), starting from the actual situation of rural areas, has taken the initiative to conduct financial technological innovation, effectively filling up the gap of supply and demand in the field of inclusive finance. Beijing branch took the lead in offering land contract management right-based mortgage business, effectively stimulating the land resources and improving the income of farmers. Heilongjiang branch launched small business loans of “pledge on farm land contract-based right of charge”, granting about 40 million yuan of loans in 2014. Xin-jiang branch launched loan products for family farmers in corps and Hubei branch developed new mode that integrates four entities of “cooperative, farmer, government and bank”.

In the practice of urban inclusive finance, PSBC launched new service mode for micro and small-sized enterprises by using financial technological innovation, relieving their financing difficulties by promoting small loan guarantee insurance. PSBC Xuzhou branch developed small guarantee insurance loan product with Xuzhou subsidiary of the People's Insurance Company (Group) of China (PICC), offering financial services to customers. The loans are guaranteed by special government guarantee fund, and the bank provides 10 times of funds of the government fund. PICC Xuzhou Co. offers small loan guarantee insurance to customers. The loss of loans would be jointly assumed by the government guarantee fund, the bank and the insurance company by a proportion of 1:2:7, which is useful attempt in filling up the gap in financial supply and demand.

Chapter III

Technological change and credit management



1. Technological change creates credit value

1.1 Everyone has credit, and credit has value

“Credit” has been given multiple meanings in modern society. Simply speaking, credit refers to being honest and credible, keeping promise and following rules. From the ethical perspective, credit refers to honesty and trustworthiness-based contract implementing behavior built by parties in social and economic activities. From legal perspective, credit is the responsibility and obligation in the contract performance. From economic perspective, credit refers to value movement in commodity exchange or other economic activities in which the credit grantor grants loans to the credit receiver based on contractual obligations; and the grantor also needs to guarantee the return of principal and its value increment. Therefore, credit is essential for interpersonal communication, transaction realization and debtor-creditor relationship.

The value creation of credit is closely related to

transactions in economy. Credit is the precondition and an important bond of transaction, while transaction is the source of value increment. Economic man knows a lot of about the importance of credit as lack of credit results in breakdown of transaction, thus cuts off the path of value creation. Meanwhile, the integration of transaction process enhances credit. Only by constantly accumulating credit can enlarge the scope and size of transaction, increase personal or corporate values. Therefore, creating value by credit has surpassed the ethics itself. The fundamental value of credit is to reduce transaction costs, minimize fluctuations and pursue for value increment.

In daily life, credit has a variety of forms. Every social man directly or indirectly participates in activities relating to credit and accumulates credit, that is, everyone has credit. According to the nature of credit receivers, credit can be divided into organization credit and individual credit. Organization credit includes credit of government, company, and other social organizations, while individual credit is the reflection of individual behaviors and the basis of organization credit. From the perspective of data, there is a credit database including basic information, transaction data and financial data. In modern society, credit is created both in interpersonal communication and transactions and can be easily captured by big data technologies. Every piece of credit information can be used as the basis of value creation. To form increase in value scale by using value creation of credit and interaction of transactions is a process that credit creates value.

1.2 Credit management and credit value maintenance

The value creation of credit cannot be separated from credit maintenance and effective credit management. Credit management refers to specialized technologies used by credit grantor to conduct scientific management on credit transactions and to control credit risks. The main function of credit management includes five aspects: credit information management (credit archives management), credit line management, account control management, business account collection management and the use credit database to expand market or promote credit payment tools.

In modern society, individual credit information management mainly refers to the basic information (permanent residency, learning and working experience, income and property, and performance of contract, etc.) relating to individual credit recorded, collected and edited by national authorities in a dynamic, comprehensive and systematic manner in accordance with laws and regulations in the process of social management and law enforcement, forming national unified individual credit information database. National authorities have the right to use the information within the statutory power and procedures, and individuals also have the right to use their own credit information. As legal entities and important participants of credit management, the enterprises need to provide office location, operating performance, financial results and other basic information, comprehensively measure, record and edit capital flow and tax payment and other related corporate information in accordance with laws and regulations, forming unified corporate credit database. They can use the credit information within the stipulated statutory power and procedures.

Credit information is stored in the form of data. With the occurrence and development of credit activities, credit information will be accumulated, becoming direct reflection and judgment basis of credit value. The individual and corporate credit information has been extensively used in credit review process. For financial institutions, good credit management could reduce the possibility of default risks and improve the sustainability of subsequent credit loans.

1.3 Big data and credit value realization

By relying on data mining, quantitative storage

and fast process of big data technologies, modern credit management system and its performance have been greatly improved. In a sense, big data is a new gold mine of credit management. Under the backdrop of big data, all sorts of data can be turned into credit data, then financial data and then important source of value increment.

Firstly, the big data integrates all accessible and storable data, greatly expanding the boundary of traditional manual data information. The amount of data stored on the internet and cloud systems is counted in billions, which includes basic individual or corporate information, work information, consumption record, information relating to hobbies and interests, word of mouth, criminal record, social networking and so on. But the data also shows the characteristics of internet information such as communicability, instantaneity, scattering and scrambling, which greatly increases the difficulties of manual data collection, and is unfavorable for data cleaning. Big data technologies provide effective solutions to data selection and cleaning. By using big data technologies, internet information can be automatically captured and processed, which effectively improves the efficiency and quality of credit information collection. Secondly, big data technologies accelerate the efficiency of credit identification and greatly improve the quality of credit service. The use of internet and big data technology can speed up the credit review and approval process, precisely identifying associated information. The CreditEase's Yishou is a good example. Lastly, big data technologies provide support to credit reference system building in China and guarantee the realization of credit value. Essentially, the building of corporate or individual credit reference system is data collection. How to obtain comprehensive and effective data in real time directly determines the role and meaning of credit information building in the future economic activities. The collection and processing of credit big data provides a good solution to resolving "data island" issue and improving credit reference system building.

2 Technological change resolves credit dilemma in China

2.1 Credit dilemma in China

2.1.1 Incomplete and scattered credit

information of social members

At present, China has not yet established a credit reference system that covers the whole society. According to the data of the People's Bank of China, as of the end of 2014, the corporate credit reference system has recorded 19.69 million enterprises and other organizations, individual credit reference system has recorded 859 million natural persons, approximately accounting for 63.3% of 1.354 billion people in China, while in the United States, the credit reference system covers 85% of the population. The Opinions on Accelerating Credit Reference System Building of Micro and Small-Sized Enterprises and in Rural Areas printed and issued by the People's Bank of China in February 2015 clarifies the guidelines and the objective, contents and mechanism of the work of building the two systems, and identifies 63 pilot areas for credit reference system building of micro and small-sized enterprises and for rural credit reference system building. Initial progress has been made. Due to the incomplete information, the data of credit reference system still needs to be improved.

As for the credit reference system of the People's Bank of China, credit records of natural persons and legal persons are mainly involves in transactions with banking system, that is, the information coverage is mainly concentrated in credit reference system, lacking credit reports of other economic and social activities.

The banks have financial debit and credit data; industrial and commercial authorities have records of corporate registration, credit, fines and so on; transport authorities have traffic violation records; telecommunication companies have mobile phone billing records; public security authorities, prosecutorial authorities and the court have records of case filing, lawsuit, case proceedings, enforcement and so on. But such information does not interact with each other, is not shared or summarized, but only one by one data island, which leads to lack of integration effect.

2.1.2 Due to immature credit service market and restricted by incomplete credit reference data obtained, credit reference agencies can not provide the products and services satisfying the demands of credit reference market

Official data shows, there are more than 150 credit reference institutions and rating agencies in China with annual revenue of only more than 2 billion yuan. According to the official website of Credit Reference Center of the People's Bank of China, credit reference institutions collect data from the information sources. Specifically, the credit information is from the following two kinds of institutions: the institutions conducting credit business, including but not limited to specialized institutions providing credit business such as commercial banks, rural credit cooperatives and microcredit companies; other institutions including but not "limited to" housing provident fund centers and pension insurance institutions. At present, several emerging internet financial companies have been integrated into the credit reference system of People's Bank of China. But compared with the number of internet financial institutions, the credit reference difficulties have not yet been resolved. Generally, credit reference institutions in China featuring small size and few services and products face difficulties in acquiring information, the demands of social and economic development are hardly satisfied.

The lack of comprehensive complete credit data support leads to many issues, for example, the heads of some companies run away with all the money. Information asymmetry not only causes great loss against investors, but also hinders the healthy development of inclusive finance. Currently, most of the inclusive financial services provided by internet financial companies have special requirements on risk control mechanism and the review and approval process of loans is relatively fast. As for the non-collateral and non-guarantee characteristics of inclusive finance, the lack of credit data leads to more review and approval risks and credit risks, which is also the fundamental cause for credit dilemma in China.

2.2 Big data helps resolve credit difficulties

As an emerging technological means, big data has gradually become cornerstone of credit development. On the one hand, the advanced processing technologies of big data can find the credit information and credit relations of customers from their behaviors, habits, hobbies, interests and so on. On the other hand, the analysis on customers and market by using big data is favorable for the design

of credit products and the innovation of services. From this perspective, big data has become cornerstone of credit development.

In China, it is breakthrough as well as useful supplement for traditional credit information collection mode, which is conducted by field investigation and research, requiring huge manpower and material resources, and it is difficult to avoid interference by the human factors. Thus, from the perspective of costs and benefits, banks would only conduct credit investigation on high-quality customers. As for lack of credit information, vast ordinary people and the micro, small and medium-sized enterprises cannot enjoy the same financial services as the large customers. The emerging of big data, by using advanced data process technologies and brand-new thinking ways on data analysis, has promoted the countrywide credit reference system building and greatly expanded the existing credit reference system.

3. Technological change enhances credit management

3.1 Big data expands credit data boundary

Big data technologies have greatly expanded the acquiring approaches and boundary of credit data. From the perspective of data composition, the proportion of traditional credit data (credit data of banks) has decreased to 40% or lower. And the non-traditional credit data which includes behavior data and relation data on the internet has become main source. As for the coverage, big data can cover those who have not been covered by traditional credit reference system, that is, the people who do not have credit records. And as for the timeliness, the information provided by big data technologies is not confined to historical data; the current information is also included.

[Case] Non-traditional credit data-based microcredit services – QQ Cash Loan

QQ Cash Loan is a money-borrowing product based on a mobile social app – QQ. At present, it mainly serves mobile QQ customer groups. If someone wants to get QQ loan quota, he or she can

complete the process of application, borrowing and repayment process on the mobile QQ platform. The review is fast, and the loan is received in two hours. There is no need to provide collateral or materials of proof. Only by binding a bank card of the borrower, he or she can apply for a loan with the amount from 1 yuan to 3000 yuan online, enjoying interest-free preferential policy if the loan is repaid in three days.

QQ Cash Loan use Tencent credit rating system as credit review standard, and the loan review and approval process completely relies on non-traditional credit data. Tencent credit rating system includes four major indexes including consumption, wealth, security and performance of contract. The consumption index is mainly determined by consumption behavior and preference of customers on the platforms of WeChat and Mobile QQ. The wealth index is mainly composed of assets and wealth management records produced by Tencent products. The security index includes real-time verification and related digital certificates. And the performance of contract index is measured by records of consumer loans, credit card, housing loans and so on. At present, the service is only opened to some borrowers who meet the screening conditions. The application of borrowers is reviewed and approved by a smart system, and the qualification of borrowers, QQ credit reference system and other criteria would also be considered. Those who have high degree of activity, real-name verification of bank card, frequent using of Tenpay, online consumption records and higher QQ credit scores can easily obtain the loans.

The accumulation of credit has given people the right to enjoy high-quality financial services, which fully shows the value creation of credit. And non-traditional credit data-based credit mode has also expanded the boundary of traditional credit reference system, making more people who have not been integrated into the credit reference system get the chance to enjoy financial services.

3.2 Big data technologies optimize credit calculation

The big data-based credit financing for a company

relies not on traditional earnings-based credit rating but the “big data” produced by the company, which includes all the information of production, distribution, sales and so on. Based on the information, a credit rating mode featuring large scale, efficiency, risk control and low cost is created, and the corporate credit line is not calculated by staff members but computers.

[Case] Big data-based credit rating institution -- ZestFinance

American financial technology startup ZestFinance conducts analysis and quantitative credit assessment on individual consumers by using the data purchased from third parties (including credit card data of banks, legal records, relocation times and other non-traditional data), captured from the internet and directly obtained from users by inquiry, but not completely relying on traditional credit system. The company has developed a big data-based credit assessment system, which is improvement and supplement to traditional credit reference system. It has abandoned FICO credit assessment mode, adopted machine learning-based mode and introduced more variables, which not only improves the efficiency of credit assessment, but also reduces default risks.

By integrating multi-source information and adopting forecast mode of advanced machine learning and strategy of ensemble learning, ZestFinance conducts big data mining and credit assessment, improving efficiency and quality of credit calculation. The specific optimization process is as follows: firstly, to integrate original data from third parties and borrowers into the database; secondly, to find the correlation among data and conduct data conversion; thirdly, to integrate variables into large measurement indicators on the basis of data correlation (each variable reflects the characteristics of a borrower in some aspect, for example, fraud possibility, long-term and short-term credit risks as well as repayment capability, and then the variables would be integrated into different data analysis modes); fourthly, to use the conclusion of each mode

in order to form the final credit scores.

ZestFinance has developed 10 machine learning-based analysis modes, conducted analysis on each borrower by using more than 10 thousand pieces of information, which would give over 70 thousand measurement indicators. All the work can be completed in just five seconds. As for the 10 modes, the voting principle is like inviting 10 smartest friends of the borrower to give suggestions on one matter. The decisionmaking performance of this mechanism is far better than that of the average level of the industry. The use of big data and the development of new computer-based analysis modes have greatly simplified the traditional process of credit assessment.

3.3 Big data makes credit management more objective

Computer can easily conduct data processing work. The emerging of large amount of data has made the forecast advantages of random sample analysis eclipse. With the advent of big data, it is more useful to utilize integrated data and expand the data sample to full data. The full data mode provides us with more perspectives, enables us to accurately examine details and analyze micro aspects, and guarantees the objectivity of credit management. As for the use of third-party credit data, the precondition is that the data should be real and objective. The strong point and one of the core capabilities of third-party credit reference institutions must be their data mining technology which guarantees the objectivity and authenticity of data.

[Case] Classifying data objectively by using three axes-- “full data mode” of 3GOLDEN

The data classification of 3GOLDEN Beijing Technologies Co., Ltd. (3GOLDEN) which was established in 2007, is a typical case in using full data mode in practice. As a specialized institution that provides innovative credit services for financial and social management, 3GOLDEN has created a big data and cloud computing-based credit assessment system.

3GOLDEN classifies corporate data type into

three axes. The first is horizontal axis: large amount of supply chain data (which is used to calculate the credit scores of a company), the data relating to the orders of previous years, payment collection and inventory, and all original data would be integrated, forming a data series representing the process of corporate value creation. The second is vertical axis, which represents a series of results in the process of corporate value creation, and the data includes cash flow, taxes, profits, changes of fixed assets, financial results and so on. The corporate data includes not only the present data, but also historical data back to 3-5 years or even longer period.

Greatly different from pure financial statement-based analysis method commonly adopted by traditional banks, 3GOLDEN tries the best to collect detailed data of mi-cro, small and medium-sized enterprises, for example, the specific order, logistics, inventory, remittance, added-value tax invoice and so on. The data size is thousand times or 10 thousand times of the data in financial statements.

The data sources produced by these three axes fully show the credit standing of a company. The final results could effectively resolve the issue of information distortion and make non-collateral and non-guarantee credit assessment possible, which greatly lowers the threshold of corporate credit financing.

The main scientific research direction of 3GOLDEN is "data cleaning", including auto-correlation, historical correlation and database correlation. The big data technologies have greatly improved the data cleaning capability and realized data authenticity and objectivity.

3.4 Big data technologies make credit management economical and efficient

To resolve traditional credit issues by using big data technologies could reduce man-power fundamentally and make credit management more economical and efficient.

For the perspective of data collection, big data saves manpower costs. The big data-based credit adopts cloud computing technology and use data crawling to replace

manual collecting, which not only relieves manpower pressure, but also expands sources of reference data.

From the perspective of data processing process, on the one hand, it is necessary to avoid subjective judgment and guarantee the authenticity of data, and on the other hand, it is necessary to effectively reduce the demand for manpower. The process from data input to result output can be completed by computer, avoiding subjective judgment. And as for data auditing, it is necessary to conduct cross verification and effectively verify the authenticity of the data; even when dealing with multiple subjects, it still ensure the fast and accurate efficiency, avoiding possible mistakes caused by manual labor. Conducting overall assessment on a customer's credit level and giving independent credit labels to different industries and professions are helpful to resolve the errors of experience-based assessment method adopted by auditors.

As for the data processing results, big data technologies guarantee the timeliness of credit. Big data-based credit can achieve synchronization of assessment results and credit information. When the credit information of any customer changes, it can guarantee the timeliness of credit updating by using real-time calculation.

[Case I] Data optimization-based consumer credit assessment -- TransUnion

With the involvement and business development of big data, TransUnion Limited has become one of the three largest listed internet credit service provider in the U.S. market. On the early days of its establishment, TransUnion has developed the first online information data processing system, leading to revolution in consumer credit reference industry. By using the first-hand materials stored at the data processing system, TransUnion forecasts and responds to the future demands of consumers. The system can also use credit reference data to help make credit granting decisions and reduce the labor of staff members, which not only saves time and cost, but also promotes the rapid development of

consumer credit reference industry.

The in-depth application of big data requires TransUnion to expand the scope of existing data, enhance analysis tools and technologies, improve analysis and decision-making capabilities. At present, the technologies of TransUnion has shortened the time of offering new solutions to market from several weeks to a few days, guaranteeing rapid response to customers' demand. In the future, TransUnion will increase investment in the aspects of data, technology and analysis to accommodate the increasing demand of cooperations and consumers; and to improve credit management efficiency, constantly release manpower operation and guarantee the timeliness and accuracy of credit information.

[Case II] Big data runs through whole credit management process – CreditEase “Shang Dai Tong”

The “Shang Dai Tong” of CreditEase is an internet financing service platform for resolving the financing difficulties of small and medium-sized e-commerce companies. On the basis of big data and financial cloud computing, CreditEase has innovatively achieved real-time credit granting within dozens of seconds for customers and helped business owners on Taobao, Tmall, Amazon and other e-commerce platforms resolve financing difficulties.

(1) Big data expands credit data source: taking multi-dimensional data as the source

The data source of CreditEase Finance Cloud includes not only real data of more than one million customers accumulated in the past nine years and the traditional credit reference data, but also the open data acquired from the internet and large amount of data from third-party partners. In addition to the transaction data acquired at eBay, Amazon and other

platforms with user authorization, Shang Dai Tong also collects third-party data from logistics, EPR and other channels. Cross verification of large amount of data helps Shang Dai Tong understand customers in a comprehensive and dynamic way, improves the efficiency of credit review and collection work and provides effective guarantee on risk control and anti-fraud.

(2) Big data optimizes credit calculation: taking machine learning as the core

The purpose of data gathering is to get the credit assessment results by using data analysis and mining technologies. In addition to conducting analysis on structured data, Shang Dai Tong also acquires large amount of non-structured data, such as good reputation of credit entities on social media and audio/video data of customers used as reference for credit granting and credit line allocation.

3) Big data makes credit management more objective: taking knowledge graph as the basis

Shang Dai Tong uses the complicated dot and line on knowledge graph to analyze the personality, credit condition and wealth property of customers thoroughly, providing valuable data reference for rational credit granting.

4) Big data makes credit management more efficient: online operation guarantees convenience and efficiency

The customers of Shang Dai Tong can get forecasted credit line in just 30 seconds. There is no need to submit offline materials: from loan application to credit assessment to loan making to repayment, all the process can be completed online. During the credit granting process, Shang Dai Tong, by using large amount of data on the platform of Finance Cloud, conducts effective analysis, so as to avoid potential fraud risks and give rational credit line in real time.

Chapter IV: Technological change and risk management



1. Overview of technological change and risk management

With the advancement of financial reform and interest rate liberalization, and the establishment of new financial modes based on internet channels and products, big data technologies are gradually breaking through technological barriers in the financial realm and reconstructing the competition landscape of the finance industry. Risk management and control have always been regarded as critical link in the development of internet finance.

Risk management refers to the process of weighing up the benefits and the costs of lowering risks and thus deciding what measures to take, including the measurement and evaluation of risks and coping strategies. The process of risk management incorporates risk identification, risk modeling and evaluation, selection of risk management technologies, early risk warning mechanism and risk coping, risk management effects and feedbacks. Generalized risk management consists of an overall risk management system that covers credit risks, liquidity risks, operational risks and so on, but for Internet

finance enterprises that are mainly engaged in new modes of credit service, credit risks are the most essential risk elements that require rigorous prevention and control.

Big data has improved and optimized each link of risk management. In the process of risk identification and quantification, big data drives the technological development of risk signal capturing and quantitative identification; in the process of risk matching, diversification and transfer, big data helps predict and transfer future risks by designing financial products that match risks; as to the aspect of risk monitoring, early warning and prevention and control, big data provides technological environment for risk monitoring and lays foundation for early warning system. What's the real relation between big data mining technologies and risk management and control? And how will internet finance establish effective ecological system of risk control? We will expound on these questions below.

2. Technological change optimizes risk management process

2.1 Risk identification and quantification

The generation and identification of customer risks is often an evolving process of generation, development and exposure. The aim of risk identification is to make timely judgment on various risk signals or transaction behavior that may cause risks in the early stage of customer risk evolution. What's worth notice is that problems of adverse selection and ethical risks in inclusive financial service still remain weaknesses in risk identification – early stage credit review in most cases cannot grasp the risk exposure of customers and can hardly identify potential risks. Borrowers who are willing to pay higher interest for loans will usually find it easier to get loans, but due to high risk of their business pattern or investment activities, they also face higher ethical risks. Therefore, risk identification and quantification should be regarded as the critical starting point of risk management; no matter how traditional commercial banking or internet financial services are concerned, risk identification will be one of the major areas to explore and extend.

By integrating large quantities of data resources including commodity flow, capital flow and information flow, capturing the characteristics of risk exposure as well

as new laws and new features of risks, credit identification mode is timely adjusted and optimized. For identified risks, the quantification and modeling of risks based on internet data and risk monitoring data are more reliable than the traditional method. Previous risk management is often based on samples, while big data provides full sample that includes all the data in the analysis.

The in-depth analysis on corporate production and management data over the years with big data technologies can faithfully reflect the status quo of their operation and growth. On the basis of accurate grasp of enterprise development, big data technologies work out quantified corporate risks and greatly improve the auditability of corporate risks. The application of big data technologies in risk control and prevention by financial institutions can help realize 24-hour quantified risk tracking.

[Case] Big data helps realize risk identification and quantification – 3GOLDEN

3GOLDEN's basic product is "objective credit rating system" under the mode of big data analysis, based on which a series of products have been developed, such as objective credit financing, micro and small-sized enterprise credit-enhancing bond, post-loan supplemental risk management, enterprise selection and so on.

As a credit financing management service provider of several banks including China Minsheng Bank, China Merchants Bank, Postal Savings Bank of China, after many years of practice in operation, by using big data technologies and risk monitoring mode, 3GOLDEN has provided thousands of micro, small and medium-sized enterprises with non-mortgage and non-pledge pure credit financing services. In the aspect of post-loan risk oversight, 3GOLDEN has provided several financial institutions including China Development Bank and China Guangfa Bank with oversight service on a scale of tens of billions yuan.

From the second half of year 2013, 3GOLDEN carried out investigation on the enterprises in industrial parks. It mainly conducted modeling for credit and

risk evaluation of human resources, and with the help of big data credit analysis, it can thus evaluate risks for enterprises in scientific and technological industrial parks so as to make pre-diction of fund utilization efficiency and risks of these enterprises.

2.2 Risk matching, transfer, and diversification

Risk matching is the optimal match of risk and return, which pursues higher return under the condition of same risks and lower risks under the condition of same return. Before the application of big data technologies, the difference analysis on special groups and projects relied on verbal description which could not reveal the characteristics of risks and return effectively. But, the emergence of big data makes risk matching and risk quantification possible. By using big data information and technologies, we can search for and determine upon the regions of borrowers and the characteristics of borrowers from a certain region; industry of borrowers, characteristics and operation status of the industry can all be quantified or visualized. For historical records of borrowers, especially those related to loans, risk reminder can be generated immediately in the form of pop-up window. This is an example of a good supporting tool for the convenience of credit review. With this tool, risk-matching financial products can be designed, and risks can also be predicted to remind enterprises of transferring and diversifying risks in time.

2.2.1 Design of risk-matching financial products by using big data

With experimental design, big data can better identify the relation between return and risks of a product for better product design and sales. Risks and return of financial products are influenced by many factors; only by correctly recognizing these factors and accurately measuring the influence of these factors can we carry out product design and adjustment in a more appropriate way. Big data can just provide a series of experimental design modes and, according to the defined factor and response, automatically select test modes, provide design evaluation toolkit, help conduct mode evaluation and ensure about normality of experimental design. Finally, risk-matching

product can be designed and will be sold according to the user credit assessment. Suitable products of different risks and returns will be sold to users of different credit ratings so that sales turnover can be improved while sales risks reduced. Therefore, based on the application of big data, financial products can be organically combined with its users and risk-matching financial products can be designed to help financial platforms improve return and lower risks.

2.2.2 Big data predicts future and helps transfer and diversify risks

The most direct reflection of risk transfer and diversification is that if traditional credit review is adopted when borrower customers are numerous, risk control costs will be so high for default risk evaluation on loan repayment ability and repayment willingness which are difficult to be measured with a unified standard that the business mode may not even be able to afford, which also causes many platforms to risk making large-sum loans. Big data provides risk control with new techniques and methods significant for risk transfer and diversification.

(1) Big data helps realize the extreme diversification of the object of financial service. Based on comprehensive and three-dimensional information content, big data incorporates every enterprise – no matter large, medium, small or micro – and every individual – no matter working class, individual business, poor farmer, or university student – into the scope of risk control so as to help realize the extreme diversification of the object of financial service. In terms of social benefits, extreme diversification of the object of financial service will allow every enterprise or individual to access financial service, thus truly bringing wealth management and loan service to the general public and realizing financial inclusion.

(2) Big data can divide the amount of financing. The amount is divided into “small sums” to avoid “small sample bias” in statistics. For example, with respect to one billion yuan loan a platform offers, if each customer borrows 30 thousand yuan on average, there will be 33 thousand borrower customers; if a single loan is 10 million on average, there will be 100 customers. In statistics there is “law of large numbers”, that is only when the number of samples is large enough (exceeding tens of thousands) will

they conform to normal distribution law to greater extent and thus be statistically significant. Therefore, if bad debt rate of borrowers is 2%, the bad debt rate of 33 thousand customers is far more possible to actually be 2% than that of only 100 customers, while the bad debt rate of 100 people can reach 10 percent or even higher, which is the risk of “small sample bias” in terms of statistics.

(3) Big data helps realize automatic decision risk control and transfer risks timely. To see from the data source, big data is massive amount of data fetched in a real-time manner; as to operation method, big data uses computing technologies to consolidate risk control modes with good data in the risk decision engine and service process. Therefore, big data helps realize automatic risk control and decision. Because of timeliness of information, big data reflects real-time risk signals and remarkably favors timely transfer and diversification of risks.

[Case] Big data prediction-based risk-return-matching product -- Ant Financial's “Yu'eobao”

Yu'eobao is a value-added service created for account balance of Alipay. When users transfer the money into Yu'eobao, it means they buy Yu'eobao money fund provided by Tianhong Asset Management Co. and can then expect returns. Money in Yu'eobao can still be used at any time to make payment for online shopping and withdrawn flexibly. Due to the match of return and potential risks of cash savings, Yu'eobao has become a wealth management product known by every household, which combines dual functions of investment, wealth management and the life service.

Since its launch on June 13, 2013, over the past two years and more, Yu'eobao has accumulated massive customer data; by the end of June 2015, the number of Yu'eobao users reached 226 million, and its service ecology has also been improving and becoming more mature. As of the launch of Yu'eobao, Tianhong Asset Management has already begun the practical application of big data. By analyzing and mining user data of Yu'eobao, they can precisely predict the amount of daily purchase and redemption of

Yu'eobao so as to estimate cash position for supporting the liquidity management of Yu'eobao; the estimated error rate is within 1%. Such data have already been used in various aspects including investment management, product development, service operation and customer service. Meanwhile, Yu'eobao lowers the entry barrier to the minimum degree and sets no minimal invested amount, thus fully dispersing the amount of financing. Based on full consideration of market risks, competition risks, dispute risks and regulatory risks, Yu'eobao has launched Zhaocaobao and Yulebao, introducing financial service to various aspects of life.

2.3 Risk monitoring, early warning, prevention and control

2.3.1 Big data facilitates building of early risk warning mechanism

In the era of big data, to build early risk warning mechanism by using large amount of data accumulated by the company and massive information from internet makes it possible to replace a lot of manual work with automatic early warning system. However, problems of out-of-control scale and default risks faced by inclusive finance cannot be ignored. Multiple liabilities are the most prominent problem in microcredit service. As with rapid development of microcredit service, some financial institutions offer repeated loans to certain customers, and when the borrower cannot repay interest and principal due to insufficient profitability, default will happen in a large scope, causing out-of-control scale and intensified default risk exposure. The coordination of construction of risk precaution mechanism with risk monitoring, prevention and control system plays an essential role in solving the problem of multiple credit loans.

Big data lays foundation for the development of early risk warning technologies. First, it is the extensive acquisition of internet information. Big data is internet-oriented and provided with massive information sources. It can thus monitor negative public sentiment among customers in a real-time manner and issue early warnings. Second, it is the dynamic monitoring of funds. Big data builds a visual platform for the flow of funds and can thus monitor daily changes of customer account information in

a real-time manner and intelligently analyze if the account is suspected of default or major risks. Third, it enhances review efficiency. Using open database and internet loan information sharing platform provided by the People's Bank of China will make it possible to warn of each related party's loan transactions in a real-time manner during the review to raise the business personnel's attention and for them to take measures of declining the loan application or limiting loan limit. Fourth, it facilitates overall response to emergencies. When early warning information is generated in the early warning system, after preliminary examination, some clear-cut caution signals will be automatically sent to post-loan processing positions of related service systems for analysis and processing.

Big data provides sufficient elements for early risk warning and judgment and plays an important role in the identification, transmission, tracking and processing of overall early risk warning, which is mainly reflected as follows: big data facilitates full utilization of internet sentiment, construction of visual early warning picture, related loan transmission and precaution mechanism and improvement of early risk warning system.

2.3.2 Big data monitors risks in a real-time manner to guarantee fund safety

Relying on online platforms and systems, both traditional financial institutions and internet financial services can develop real-time risk monitoring system to collect transaction history of customers from different channels in this one system and break through barriers among information isolated islands, providing strong support for risk appraisal and analysis. Based on the result of risk appraisal of customer's transactions, the platform can choose to take optimal subsequent measures, such as second-time authentication, on-site examination or direct approval of the customer, for the purpose of ensuring good user experience on the premise of effective risk control.

By using big data technologies with historical data as the basis for analysis, through data mining and mode set-up, automated judgment together with pre-appraisal estimation and treatment suggestions can be given while real-time intervention can be performed on high-risk deals that may possibly be closed otherwise so as to ensure fund

safety.

2.3.3 Big data analysis visualization demonstrates risk prevention and control process

Big data brings new opportunities of risk prevention and control for traditional financial institutions. Big data analysis technology can help effective sorting, analysis and visualized demonstration of complicated correlations of massive data, and has played an irreplaceable role in internal control and compliance, anti-fraud, credit risk prevention and so on.

Big data has become the most fundamental element in the risk prevention and control of internet services. The mode of acquiring users on a large scale, in high speed and with low cost and high quality through risk control, precision marketing and trend prediction driven by big data perhaps will become a standard example of internet financial service's survival and development. Currently, major microcredit services mainly rely on big data risk control modes to analyze users' social and behavioral data so as to make credit granting decisions quickly. However, risk control and risk pricing as important directions of development in the next stage hold the lifeline of the development of the industry. Only with adequate data acquisition and abilities of mode set-up and analysis based on big data can low-risk customers and high-risk customers be effectively distinguished, ensuring predictability and controllability of risks.

[Case I] Big data-based early warning mechanism –China Everbright Bank's big data risk management

Risk management is the core competence of financial services offered by banks. Centering around risk management, in recent years, China Everbright Bank has been building an "early risk warning platform" which utilizes internet big data mining technology, text data analysis technology and risk and fraud data mining modeling technology to conduct correlation analysis of internet sentiment, regulatory information, historical corporate transactions and financial statement data, covering beforehand early risk warning of credit risks, account risks, financial

risks, co-related risks, reputational risks and business risks with event-driven strategy. On the basis of single customer precaution, it also digs deeply into the relations between enterprise and related enterprises, enterprise and related individuals, individual and related individuals so that identified early risk warning signals can be transmitted to other customers related to the customer in question and risks can be identified more efficiently, thus setting up a powerful defense of big data information for post-loan risk management of the bank.

[Case II] Official big data risk monitoring platform – Inspection Platform of Bei-jing Municipal Bureau of Financial Work

In the field of local finance, it used to be hard to monitor and issue early warnings on private finance and financial institutions of different realms, but effective risk monitoring is made possible when all data is collected by big data technologies. Beijing Municipal Bureau of Financial Work has made rewarding attempts at big data risk monitoring.

First, it is a platform for public sentiment monitoring. By searching throughout the whole network with big data technologies, the positive and negative evaluation information about every private financial institution will all be collected in the database. For runaway platforms that are suspected of illegal fundraising, Beijing Municipal Bureau of Financial Work has developed a fixed mode and set up a “smoking index” to timely identify the business suspected of illegal fundraising. The smoking index is examined from five dimensions including feature word matching index, transmissibility index, complaint and tip-off index, income deviation index and compliance index.

Second, it is a cloud risk monitoring platform. Based on cloud data, each P2P platform is required to back up data in the cloud storage space for unitary inspection so as to monitor the operation of private finance in the region. After analysis of the whole network, information related to formal finance can also be obtained to provide support for the precaution

work of the industry and the platform.

3. Technological change guides risk management innovation

3.1 Big data technologies obtain massive data materials

Relying on the vast data contents of internet, big data technologies point out the direction for risk control data mining, screen and sort out data with emerging internet tools and methods, providing sufficient materials for subsequent risk control data analysis and risk appraisal. Among massive and complicated internet big data, there are six categories of big data related to risk control as follows:

(1) Big data of e-commerce. Ant Financial is the industrial herald that uses e-commerce big data for risk control and has established a rather complete big data mining system in its early years. Some data materials of Ant Financial’s big data system come from large quantity of transaction and payment data of e-commerce platforms including but not limited to Alibaba, Taobao, Tmall and Alipay(the most fundamental data materials); others are from sales data, bank statements, water and electricity bills and even marriage certificate information provided by sellers (supplemental data materials). When all the information is gathered, data value will be put in the online behavior rating mode for conducting credit rating.

(2) Big data of credit card websites. Big data of credit card websites is also of great value for risk control of internet finance. The year of credit card application, whether it is approved or not, credit limit, card type, repayment amount and attention to special offers can all be used as reference data for credit rating. For example, 51credit, which is the earliest online credit card application service agent in China, launched a credit risk management platform named “Xinyongbao” which offers internet financial loans to micro and small-sized enterprises in combination with FICO risk control mode they have used in early years and based on the data and flow advantages accumulated by 51credit.

(3) Big data of social media. A typical example that uses social media application and mobile social platforms for online loans is Tencent Credit. By establishing a data

collecting platform based on social media, it has built a module of microcredit loans and realized the value creation of credit. It makes use of relational data of SNS and mutual trust among friends to gain popularity and conducts credit risk appraisal and management control on such basis.

(4) Big data of microcredit websites. Credit big data accumulated by microcredit websites includes credit loan limit, default record and so on. But, the deficiency of a single enterprise's database resides in the small quantity and significant regional limit. Some microcredit websites will complete their credit data by transferring the data collected offline to online. In the whole country, there are hundreds of microcredit platforms with available data and statistics, while the well-known ones include Yirendai, Wealth Evolution, Ppdai, Hongling and Xinyongbao.

(5) Big data of online payment websites. The future opportunity of third-party payment platforms resides in the possibilities of using users' consumption data for credit analysis in the future. Payment direction, monthly payment amount and purchased brands can all be used as important reference for credit rating. Typical products include Yeepay, Tenpay and others.

(6) Big data of life service websites. Big data of life service websites such as bills of water, electricity, gas, cable, telephone, network fee and property management fee objectively and truthfully reflect basic information about individuals and form an important type of data used in credit rating.

3.2 Big data and risk control data processing

Big data provides not only favorable data materials for risk control but also supports and guarantees for risk management and evaluation. As a leading link in risk decision, the position of risk control data processing in risk management should not be overlooked. In front of massive data materials, big data can ensure certain breadth and depth of historical data used for risk control. The breadth of data is the diversification of data sources, while the depth is the numeric logic of risk control data that decides whether the data can restore the original service procedures. Then, big data precisely locates the boundaries of risk control data, that is to say, it automatically identifies the subject and industry of risk control and

deeply explores its major characteristics and key points accordingly. For example, the characteristics of university student group should be clarified if consumption loans are offered university students, the orientation and demand of the industry should be considered in loans for farm machinery and implements. At last, big data technologies facilitate the data processing and credit appraisal process. After obtaining specific data, intelligent collecting and processing of various types of data through mode calculation or machine learning will lay solid foundation for credit appraisal and decision-making.

3.3 Big data promotes risk decision-making mode

The application of big data brings about innovation in risk decision-making mode for financial enterprises. The increasingly large overall quantity of structured data and non-structured data together with more and more complicated analytical tools drive constant change toward data-driven decision-making. On the one hand, data collected through various channels helps grasp the information about borrowers in a more comprehensive, accurate and real-time manner and thus effectively reduce risks brought by information asymmetry. On the other hand, big data technologies can be utilized to find the internal relations between different variables and help build more accurate decision modes. Meanwhile, the use of big data also accelerates the efficiency and quality of risk decision-making. The emergence of big data, along with the progress of other technological, greatly shortens the response time and significantly extends the scope of real time decision-making.

[Case] Big data-based risk management and control system – “Zhicheng Credit” of CreditEase

Zhicheng Credit, which integrates Zhicheng Credit score, borrowing data and risk list data, is risk control solution of microcredit industry that is specially designed for P2P platforms, microcredit institutions and credit department of banks.

(1) Risk identification and default management
Relying on the rich experience in risk control

and credit review and accumulation of large quantity of data, Zhicheng Credit can help credit institutions inquire about individual credit status. Once authorized by any object of credit review, the institution can only provide name and ID number of the target client to obtain the information relating to the following aspects: whether he/she has been involved in fraud, whether he/she has applied for loans from other credit institutions, whether he/she has overdue repayments, whether there is any other institution that is also inquiring about his/her information, and among these, 90-day and above overdue records will also be highlighted. In addition to these clear-cut clues, Zhicheng Credit will also integrate all the credit information to provide a Zhicheng credit rating score and a corresponding default rate for the institution to help estimate the default possibility of the investigated customer.

(2) Anti-fraud and credit risk management

Zhicheng Credit has established a credit rating system and a massive data network based on nearly four million sets of data, which can run multiple correlation matching and relational search with multi-

dimensional user information, risk list of CreditEase and information captured from the internet so as to screen risk customers one by one through multi-level logical relation judgment and improve the abilities of anti-fraud support.

(3) Post-loan early warning solves problem of multiple liabilities

Zhicheng Credit offers a solution of "post-loan early warning" service to counter the risk control conundrum of multiple liabilities. This service can do continuous monitoring on the borrower's information after one inquiry, and once the borrower is inquired about by another institution, the institution that has ordered "post-loan early warning" service will be sent a reminder in time. It helps the institution know about credit status changes of the borrower in a timely manner so as to anticipate and prevent the risk of multiple liabilities effectively.

By improving the efficiency and practicality of risk management, Zhicheng Credit has gradually established a whole-process risk management and control application system that covers risk matching, risk identification, risk monitoring and early warning.

Chapter V: Technological change and customer experience management

With the rising of mobile internet, smart terminals, cloud computing and big data, the era of internet brings along unprecedented challenges against the development of traditional inclusive finance. How to realize the transition from “product-focused” to “customer-oriented” is an important aspect for adjusting internal operating strategies in the process of inclusive financial development, and improving customer experience has gradually become the core element for management mode transformation of inclusive finance.

As for the development of inclusive finance, only by constantly improving business process, using wise way to attract, expand and consolidate customer groups,

making management strategy focus on customer nature and offering convenient and efficient services to customers can meet the demands of customers and create first-class customer experience.

1. Technological change drives business mode innovation

The term “business mode” first emerged in the 1950s, becoming popular in the mid-1990s. Specifically, business mode is a solution aiming at achieving value maximization for customers; it integrates internal and external resources to form a kind of intact and efficient operation system featuring unique core competitiveness,

Table: Main categories of Internet business model

Business mode category	Typical companies	Key factors
Portal mode	Yahool, Sina, Sohu, Hexun, Eastmoney, etc.	Traffic, number of registration, click rate, user viscosity, content richness and information timeliness
E-commerce mode	Alibaba, JD, YHD, etc.	supply and demand information as well as value-added service
Online games mode	Shengda, NetEase, Kingsoft, Giant, etc.	Free, customer experience and value-added service
Search engine mode	Google, Baidu, Qihoo 360, etc.	Accurate and extensive information inquiry as well as competitive bidding rankings
Information intermediary mode	51Job, Ctrip, dianping.com, etc.	Information symmetry, integration and customer experience
Social networking mode	WeChat, QQ, etc.	Interaction, interests, corporate media and self-media operation
O2O mode	S.F. Express' Heike, CreditEase, etc.	Integration of online and offline processes
Hardware and communications service provider mode	Intel, Huawei, etc.	Cloud service, sensors and other capabilities as well as value-added service

guaranteeing the realization of potential interests and corresponding earnings of every participant and solution of constant profitability.

The rising of business mode has profound social background. The emergence of internet at the end of the 20th century attracted attention of mainstream society to business mode. Internet changes transaction venues, expands transaction time, enriches transaction categories, accelerates transaction speed and reduces transaction segments. In this way, internet disrupts the previous business modes. Traditional barriers have been broken through, and empiricism has been proved in vain. The traditional well-known electronic manufacturers such as BlackBerry, Nokia, Toshiba and Motorola either declared bankruptcy or entered into mergers.

Specifically, internet business mode, which includes traditional mobile internet business mode and new internet business mode, is a brand new business operation and organizational structure mode featuring high innovativeness, high value, high profits and high risks. It

uses internet as medium, integrating traditional business types and linking various channels. The core of business mode concept is value creation. Internet business mode covers three levels: focusing on product; focusing on platform and community building. In this way, the social business (contents + social group + business) emerges: the contents are media property, used as the entry of traffic; social group is relation property, used for depositing traffic; the business is transaction property, used to realize traffic value. Good products, contents and tools as well as common value and interest attract customers to form social group, and in turn, the social group enhances the interaction and association among members.

After more than one decade's development of internet economy, some successful business modes have emerged in China. Currently, internet business modes include the eight categories.

2. Technological change improves customer experience management

Figure: Sketch map of experience economy era

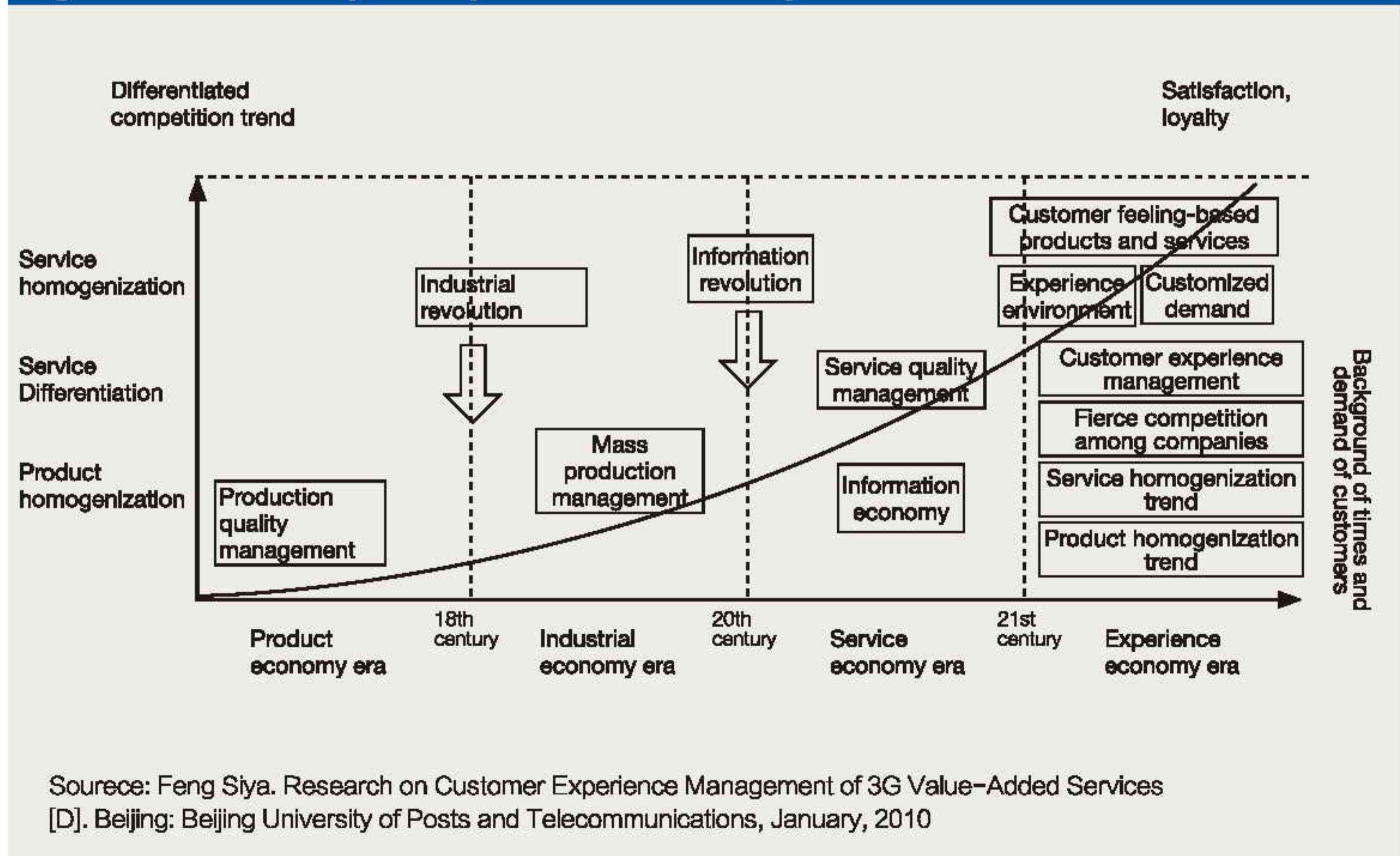


Table: Comparison of production and consumption behaviors at different economic stages

	Agrarian economy	Industrial Economy	Service Economy	Experience Economy
Production behavior	Production of materials	Manufacturing of goods	Functional integration of products	Improvement of services and customer satisfaction
Consumption behavior	self-sufficient	Function-oriented	Service-oriented	Using goods as properties to seek for feeling and experience pursuits, creating memorable activities
summary	Understanding and emphasizing products and services from the perspective of production, and paying attention to functions, prices and designs			Emphasizing customer experience, shaping sense judgment and thinking identification, and paying attention to customer participation

According to the definition⁵ in “Customer Experience Management” written by Bernd H. Schmitt, the customer experience management is “the process of strategically managing customers’ entire experience with a product or in a company”. It takes improving total customer experience as the starting point, pays attention to each contact with customers, delivers target information to customers by coordinating and integrating sales links and contact points or channels purposely, seamlessly delivers the target information to customers, creates positive feelings to brands, builds differentiated customer experience, enhances loyalty of customers and strengthens perceived value, as so to increase corporate revenue and assets value.

2.1 Focusing on total customer experience in experience economy era

Spiritual consumption and experience mode are main ways of future economic development. With the advent of experience economy era, more and more enterprises begin to pay attention to customer experience, elaborately planning sales experience, for example, the windows experience launched by Microsoft and the total customer experience launched by HP and Lenovo. Apple, Starbucks, Disney, McDonald’s, IKEA, Sony, Samsung, Impression Wonders and many other companies have practiced the experience economy. We are entering or have entered a new era of economy – experience economy. From product experience to experience economy, there are different characteristics and customer demands (as shown

in the figure below) as well as different production and consumption behaviors (as shown in the table below at each different stage).

2.2 Customer experience improvement in internet era

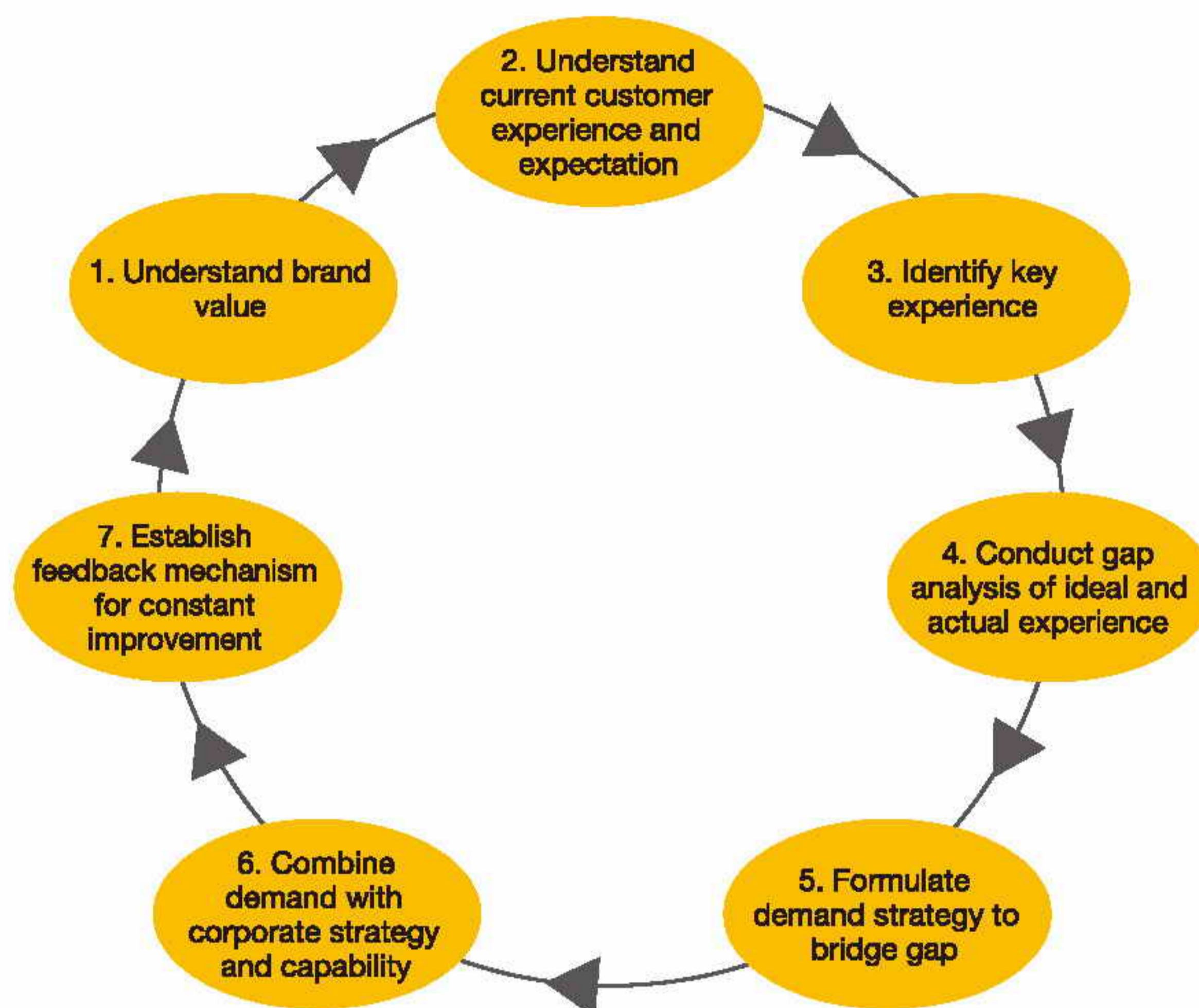
The customer experience management method includes seven major steps: understand brand value; understand current customer experience and expectation; identify key experience; conduct gap analysis on ideal and actual experience; formulate demand strategy to bridge gap; combine demand with corporate strategy and capability; establish feedback mechanism for constant improvement. In internet era, having a big data strategy to collect, store, organize, and analyze extensive customer data is of great importance to carry out customized customer interactions in a timely manner. Fortunately, by taking right technologies, infrastructure, and analysis method to fully release the potential of big data, the in-depth communications with customers can be realized.

The big data-based analysis mode provides viable operation path for improving customer experience and enhancing customer experience management.

(1) Big data taps potential demand, facilitating full understanding of customers

At the early stage of big data technologies, the information acquired from e-mails and websites has helped financial companies locate customers accurately, reshape market-ing plan, launch new marketing activities and bring along more featured experience. With rapid

Figure: Basic method for customer experience management



development of big data technologies, the use of new data types and more advanced tools, technologies and analysis approaches based on the prediction of behaviours and facts has found more customer information in a deep-going way. By fully using the valuable information, the marketing activities have moved to single segment market from major clients segment market, beginning to offer specific and detailed information and contents to internet customers.

(2) Data-oriented strategy enhances communications with customers

The data-oriented strategy is not simply to learn the historical credit records of customers. It requires finding the extensive input variables such as behaviors, interests, and preference of customers. Wherein, the key points are of great importance to promote the sustainability of customer sources. The data-oriented strategy means that big data analysis is based on multi-touch spots and period of time, but not the simple intuition and knowledge of

experienced decision makers.

(3) Developing ecosystem to link different types of data

In a world with new data types and large amount of data, it is necessary for financial companies to find right platform to store data and develop customer-oriented analysis ecosystem, which is based on customer types and different demands. In this way, customers can enjoy convenient services. In the future, credit business will take complete credit reference platform providing application, audition, loaning as the basis, offering all-process and integrated services. During this process, the information about customers will be fully showed.

(4) Constantly developing new capabilities and technologies

Big data technologies are changing. Generally, new capabilities and new technologies bring along better customer experience and publicity effect. Customer experience-based technological upgrading greatly speeds up

processing and enhances the quality simplifies manpower processing costs and optimizes customer experience of financial services.

3. Technological change accelerates upgrading of marketing mode

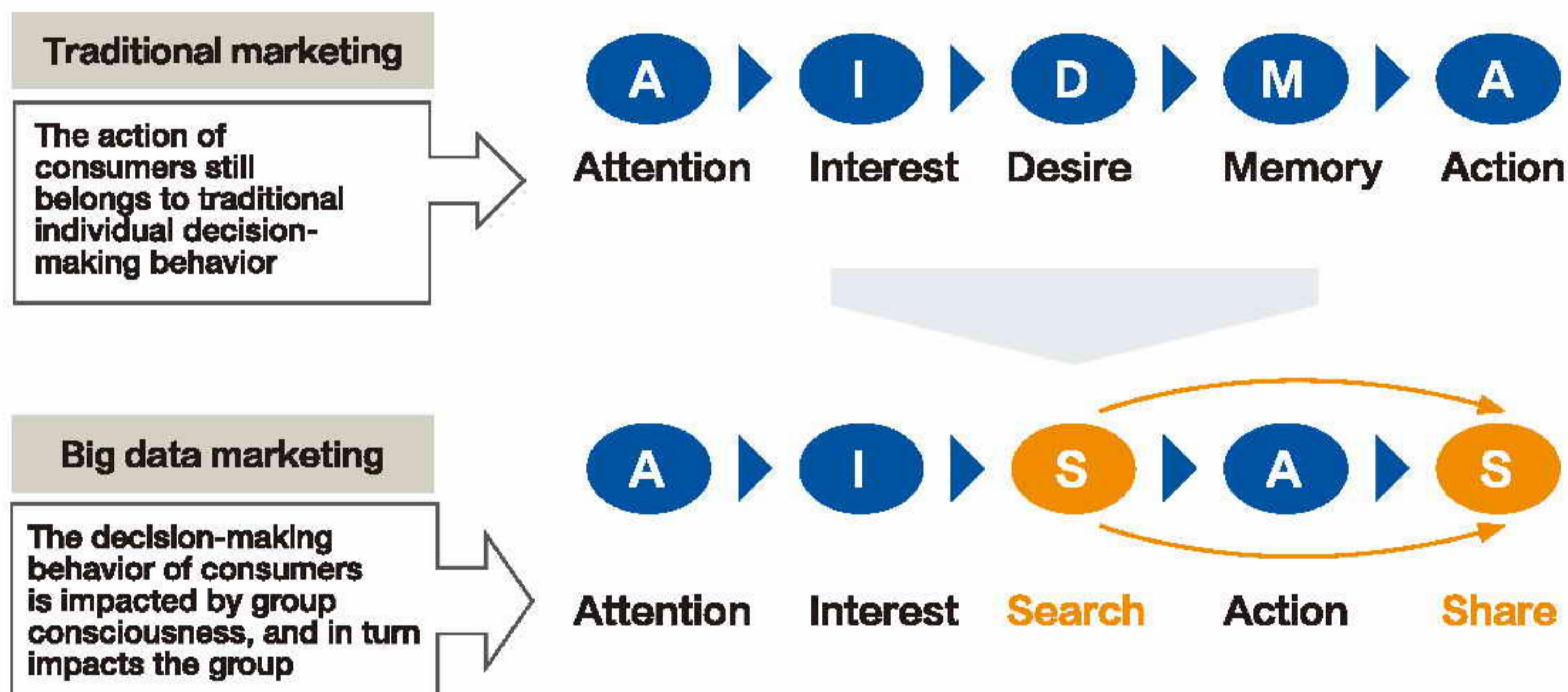
As an innovation of Internet business mode, big data marketing is a modern big data technology with the internet, mobile and social characteristics. It takes real-time, accessible and measurable methods to build interactive, mutual beneficial and trustful customer relations and effectively integrate strategies and tactics to improve corporate performance and market competitiveness.

3.1 Comparison of big data marketing and traditional marketing

From the perspective of customers, the consumption decision-making behaviors in big data era are fundamentally different from those in the traditional era. To differentiate the big data marketing and traditional marketing is of great importance to understand internet business mode.

As for the big data-based internet financial platform, the above figure shows that the two key experience points of “search” and “share” is of great importance in marketing. The search and share of users has formed a good closed loop by using data as medium, which not only meets the selection demand of users, but also meets the promotion demand of enterprises.

Differences between traditional marketing and big data marketing



Characteristics of big data marketing

1. User behavior and characteristics analysis
2. Precision marketing information push
3. Guide product and marketing activities to respond to customers' demands
4. Competitor monitoring and brand broadcasting
5. Brand crisis monitoring and management support
6. Brand image monitoring and public opinion management

7. Marketing clue collection and expanding
8. Key customers screening
9. Using big data to improve customer experience
10. Customer hierarchical management support
11. Finding new markets and new trends
12. Market forecast and decision-making analysis support

3.2 Viable path for big data marketing

Specifically, to clarify application thought and marketing logic of big data, and to be a new marketing pioneer, not a follower, the big data marketing practice can be conducted, as shown in the graph below, from the following aspects.

[Case] Incentive promotion process and approach – CreditEase “Umbrella”

The “Umbrella” is a promotion program for improving the number of Yirendai registered users launched by CreditEase in 2014, aiming at providing account managers with free internet tools to expand business. By using rewarding approach, it encourages employees to recommend people to register as Yirendai users and download Yirendai App.

Essentially, the purpose of “Umbrella” is to utilize promotion activities conducted by emerging broadcasting tools such as social media, Weibo and WeChat and rewarding mechanism for the purpose of improving the enthusiasm of participants. “Umbrella” offers various functions such as mobile office, smart inquiry, cross-field marketing and all-around customer tracking.

4. Business process reengineering and customer experience

Business process reengineering is fundamental restructuring of corporate operation system or business system and required by the long-term development strategy. The approaches include the use of operational research, management science, information-technology and so on.

The core connotation of business process reengineering is to redesign the existing process by introducing new management ideas and information technology means, focusing on customer demand-oriented business process and breaking down traditional management mode of division of labor, so as to achieve

performance improvement in various aspects. Customer satisfaction and demand shall be the aim and focus of all corporate activities. Only by meeting the demand of customers can a company achieve success in market competition. One of the important tasks of a company is to understand the information of customers and offer good services to them. While one of the purposes of business process reengineering is to shorten the time of reporting customer demand information and thus make corporate decision makers adjust operational direction in accordance with customer demand in a timely manner, that is, all for customer demands.

[Case I] Improving management mode and optimizing management mechanism -- Lean Six Sigma

Lean Six Sigma is the organic combination of lean production and Six Sigma management, aiming at eliminating waste by integrating strong points of the two approaches. Lean Six Sigma is more than “Lean Management plus Six Sigma”, it is in fact the mutual completion and organic combination of these two factors. In the aspect of business process, Six Sigma focuses on customer demand and business process, and uses rigorous steps to help enterprises promote and implement the improvement, optimization and design of process, achieving fruitful results in practice. Business process reengineering focuses on business process relating to corporate strategy, value and mission, conducts analysis on process conditions, and uses vertical integration and horizontal compression to shape the adaptive capacity and flexibility of companies, meeting the demands of customers and market development. Both Six Sigma and business process reengineering use process management to help companies improve existing management mode, optimize management mechanism, enhance benefits and boost efficiency. Currently, the two approaches have been extensively adopted by various companies in promoting management.

[Case II] Simplifying business process -- Wells Fargo

Wells Fargo is the largest small business lender and one of the banks with strongest profitability in the United States. It holds that the factors resulting in customers' adverse selection include complicated loan application procedures, products without attractiveness, lower credit line, higher interest rate and fees etc. For small business, business owners are the main decision makers. Saving time and simplifying procedures are of great importance for them. So, in the process of designing loan process, Wells Fargo tries the best to reduce the contents of tables. Taking the 100 thousand dollars loan application table as an example, the borrowers only need to fill in two items of corporate and personal materials, and then affix the signature of the borrower. All the contents are in just one piece of paper.

Wells Fargo has conducted optimization and innovation work in various aspects of business process. For example, according to traditional approach, customers need to submit application to bank branches or loan officers; with the new approach, customers can either submit application to bank branches or apply via telephone or e-mail. As for financial review, traditional approach requires providing tax returns and detailed financial results, while the new approach simplifies reporting statements and does not require tax returns and detailed financial results. With the traditional approach, borrowers need to be assessed individually, while with the new approach, most of the loan lending decisions is automatically generated. Traditional approach requires annual regular evaluation, while new approach doesn't. Traditional approach requires collateral, while the new approach cancels the request. Traditional approach emphasizes loss of loans, while the new approach has higher tolerance to the loss.

[Case III] High efficiency optimizes customer experience – CreditEase “three-hour-long mode”

CreditEase has launched offline “three-hour-long mode” for credit loans, controlling the time of loan granting process in three hours. Application, review and approval, and agreement signing are necessary steps that cannot be omitted, which also has a complex and sophisticated logical relationship. The “three-hour-long mode” requires smoothing each step of the process.

As for the optimization of loan application, the key point is to reduce the complicated manual procedures by adopting such measures as equipment upgrading and post resetting. After optimization, CreditEase changes the serial work of self-recording of application, material uploading and credit reports analysis into parallel work. By taking those measures, the time of front office application process has been shortened from four hours to an average of 43 minutes, laying solid foundation for the improvement of the whole process.

As for the credit review and loan granting, the main measures are to update systems and open up green channel. Based on the data of millions of customers and by using big data risk control tool “Yisou”, CreditEase takes different risk control measures for different categories of customers. The customers must pass the anti-fraud system of CreditEase firstly. With the help of Finance Cloud, the anti-fraud system can not only locate the customers with borrowing records in CreditEase inclusive finance, but also more widely grasp the e-commerce trading data, search engine data, social data and multi-dimensional data from the internet, then use special calculation mode to change the data into credit reference information.

Once customers pass the anti-fraud system of CreditEase, the credit review team would conduct fact-checking on the information for the purpose of identifying the repayment intention and capability. The optimization of front office application process has resolved some material submitting issues, but

there is still room for improvement in the aspects of order classification and review operation. After comprehensive analysis, the project team would open up green channel at credit review terminal in order to separate order pool for customers. Therefore, the work would be given priority in processing when entering into the system. By taking those measures, the time of credit process has been shortened from more than 10 hours to just one hour. According to the “three-hour-long mode”, the customers also have priority in the contract signing and loan granting links. Thus, in three hours, customers could get the loans.

5. Value-added service optimization and customer experience

With the transformation from “product-focused” operation ideas to “customer-focused” operation ideas in financial institutions, the operation mode has changed fundamentally from the previous “products are main profit sources” and “services focus on making products sell better” to “products are platform to provide services” and “services are the main profit sources”. To achieve profit maximization, financial institutions are all actively exploring the ways to meet the demand of customers and striving to realize value-added service.

Value-added service is in contrast with basic service, which is fundamental service to meet the demand of customers. The reason the customers buy products or services is to meet their demand. As the new service idea of modern enterprises, the core contents of value-added service are providing service surpassing the scope of conventional service and aiming at improving customer experience by enhancing value-added service.

In addition to the basic financial service of payment, settlement, investment, wealth management, loan lending and financing, the modern financial institutions have also launched diversified value-added service in order to improve customer experience.

[Case I] Comprehensive service for life – Alipay

The Alipay is not only a mobile payment tool, but also an application delivery platform. At present, Alipay software in mobile terminal includes payment application (money transfer, mobile phone recharging, credit card repayment and daily life fee payment etc.), other applications of Alibaba (Diandianchong, mobile Taobao and Ku-aidi etc.), and third-party life service applications (Ddmap, Baidu Nuomi, YHD and Gome etc.). Alipay Wallet uses payment as the bond to integrate applications involving payment into the Wallet, not only enriching the functions of Alipay Wallet, but also increasing the using viscosity. In some sense, it plays the role of mobile application delivery platform.

Alipay also creates payment scenarios and cultivates payment habits, aiming at enjoying more market share. It has set foot in various aspects of life, covering daily life service, medical insurance, public transport, catering and tourist applications. By creating payment scenarios and cultivating payment habits, Alipay has made mobile payment the first choice of shopping, forcing business owners to access the platform, which in turn increases the number of business owners of Taobao and Tmall, improves payment transactions and enhances the market position of Alipay. This is also the future development direction, which helps improve customer experience.

[Case II] Helping customer expand sales channel – CreditEase's “Apple Project”

The inclusive agricultural loan business of CreditEase not only provides credit and fund services, but also pays attention to ways of improving planting and sales capability of customers, boosting their experience satisfaction by offering a series of value-added services including but not limited to technological support, channel expanding and information consulting.

Since October 2014, CreditEase, by using the inclusive agricultural loans, has helped sell apple in Jingning County, Gansu Province, achieving packaged service of booking, inventory management

and express delivery and selling over 10 thousand kg of apples. In 2015, "Apple Project" continued to promote the marketing modes of crowd funding and customization with all kinds of patterns, Chinese characters as innovative services.

Besides the izhongmeng.com-based crowd funding, CreditEase has also launched "consumption + finance" mode (also called contracted consumption mode) to raise funds. According to the contracted mode, if a customer invests in a financial product, he or she would get a package of apples; the price of the apples is equal to the investment amount of the customer. After the maturity of the financial products, the original investment funds will be automatically reimbursed to the consumers' bank accounts. From the perspective of customers, they get free apples by buying financial products.

In the "Apple Project", in addition to the services of money borrowing and sales, the CreditEase Jingning Co. has also actively offered value-added services such as inviting agricultural experts to give lectures relating to grafting, disease control, and fertilizer application for the purpose of improving the production quality and management level of orchard farmers.

[Case III] Small business financial service practice of traditional financial institutions

(1) Payment and settlement service tools

The "Le Shou Yin" launched by China Minsheng Bank for micro and small-sized wholesale trade

companies is a new payment and settlement service product, supporting personal debit card and corporate settlement account in effecting payment and settlement. By combining the strong points of POS machine and many third-party telephone payment terminals, "Le Shou Yin" has the functions of card payment, money transfer, fee payment, credit card repayment and so on.

"Business One-Card" launched by China Merchants Bank for micro and small-sized enterprises and individual business owners can realize the integration of loan drawings and entrusted payment, achieving the "cycle using" and "easy turnover" of the loans.

"Cash Management Platform for Micro and Small-Sized Enterprises" of China Ever-bright Bank and "Shou Yin Bao" of Ping An Bank also provide micro and small-sized enterprises with payment and settlement solutions, such as money transfer and "T+0" receipts

(2) Innovative tool relating to internet and third parties

China Minsheng Bank has launched mobile banking and direct banking for micro and small-sized enterprises in the past two years. Catering to the special needs of small business customers, mobile banking service can realize centralized management of personal and corporate accounts, self-help withdrawal and repayment, QR code-based payment, account management and so on. Direct banking service can break through the limitations of time, space and operating outlets, letting customers access banking products and services via website and mobile phone.

5. Schmitt, B.H., Customer Experience Management: A Revolutionary Approach to Connecting with Your Customers [M]. America: CMA Management, 2003: 17-17

Chapter VI: Building ecological environment for inclusive finance



The financial ecological environment, composed of macro, meso, micro and other levels, is the result of the social and natural factors which interact with the finance industry in its existence and development. Covering all the factors which interact with the finance industry, such as legal system, administrative system, social integrity status, development of the industry and user experience, it is one of the fundamental conditions for sound and orderly operation of the industry.

In spite of significant development of inclusive finance in China and emergence of many new explorations, we should still see the inherent problems and external difficulties of inclusive finance in its development, along with information security, lack of integrity, out-of-control scale, adverse selection and other business risks. In an entire business cycle, in particular, the development

of inclusive finance requires the risk control modes to be optimized based on continuous change of social environment to explore sustainable business modes. As a result, it is necessary to further strengthen the creation of ecological environment for inclusive finance which will serve as a good and well-regulated environment for the future development of inclusive finance.

1. Macro environment: top-down design

Inclusive finance is a systematic undertaking. It requires not only financial institutions to develop innovative service ideas and products, but also the State to improve the top-down design, solve the theoretical guiding issue of inclusive finance, conduct research on and formulate complete policies, regulations, regulatory system and credit environment coordinating and interacting with

and use information technology approaches to improve the efficiency of macroeconomic control and financial regulation. The Internet technologies such as big data and cloud computing should be used actively to have a fuller and sharper insight into the overall development and changes of the finance industry in China in a more timely manner, and quantitative approaches and methods should be used to understand the risk situation in the financial market to protect the information and funds of financial institutions and the safety of customers.

On the other hand, it is necessary to integrate appropriate regulation with differentiated regulation. Following the inclusive regulation ideas, China should encourage the Internet financial enterprises to develop innovations reasonably and build a transparent regulatory system which can effectively prevent risks and take into account both efficiency and justice. As there are many inclusive financial institutions, which have different financial businesses and risk features, it is difficult to establish unified regulatory standards and modes. For different types of financial modes, regulatory scopes should be subdivided and regulatory approaches and measures applicable to the specific types of the institutions should be promulgated based on the types of the financial institutions, complexity of businesses, mass involvement, industry relevance and other factors, to implement differentiated regulation. Financial regulatory pressure should be enhanced on financial institutions with big hidden risks and extensive influence which involves a great number of people, and industry self-regulation should be given full play to reduce costs for regulation over those with limited customers and credit capital. The regulatory body, line of business and organization form of every Internet financial platform should be defined to avoid supervision by multiple authorities or regulation dead zone. Emergency measures should be formulated in advanced to address the hidden risks in Internet financial businesses.

1.3 Optimizing credit environment of inclusive finance

An excellent social credit reference system, serving as foundation for the establishment of inclusive financial system, can help restrict the breach of agreements by bor-

rowers and improve public credit awareness step by step. It should take measures in two aspects to accelerate the establishment of an excellent social credit reference system to serve the inclusive financial system.

On the one hand, it is necessary to build an open and unified national credit database. All the government functional departments and financial institutions in China have established credit database, among which the national enterprise credit information basic database built by the People's Bank of China based on the bank credit database is regarded as the most complete credit database in China by far. In addition, The State Administration for Industry and Commerce has established national enterprise credit information publicity system to release information regarding the registration and filing of and supervision over market entities. As the credit database built by government functional departments, however, are different with those built by financial institutions in several aspects such as statistical standards used and amount of information, some financial institutions cannot access the credit information regarding enterprises and individuals recorded in the credit reference system database developed by the People's Bank of China, which affects the security of the loans to be granted to a certain extent. China should allow all financial institutions to access the said database and establish a unified and complete enterprise and individual credit information database as soon as possible through cooperation between government functional departments, financial institutions and trade associations, to make their credit reference systems interlinked and accessible for all.

On the other hand, it is necessary to strengthen the establishment of social credit culture. An excellent social credit reference system can effectively restrict the bounded rationality of economic man under market economic environment and enhance the credit awareness of whole society. The government functional departments, financial regulators and financial institutions may spread credit knowledge, promote credit transaction rules and the principle of integrity and help enterprises and individuals build credit awareness through media publicity, school education and lectures at the outlets of financial institutions as well as other means. In addition, it is important to develop a punishment mechanism for breach

of contracts and incentive measures for keeping faith, supervise and urge credit subjects to consciously follow correct business ideas and business value orientation, to optimize the ecological credit environment in the finance industry of China.

2. Industrial environment: platform building and data sharing

2.1 Strategic alliance theory

The concept of strategic alliance was first proposed by J. Hopland, President of DEC and R. Nigel, a management scientist. There are many definitions of strategic alliance, and in general, it refers to “long-term or short-term cooperative relationship established between two or more independent parties to pursue their own strategic goals”. It is characterized by vague boundary, loose relation, flexibility and efficiency. In the 21st century when the society and the economy both develop quickly, the framework of a strategic alliance gains favor from more and more enterprises, and the main direct drivers are: 1) to raise corporate competitiveness; 2) to obtain economies of scale and share risks and costs; 3) to enter into new markets at lower costs; and 4) to address the “large enterprise dilemma”.

Serving as intermediary between the market and the enterprises and functioning as “organized market”, a strategic alliance can satisfy the requirement on integrating market competition with organizational management and comprehensive operation in an information technology era in a better way. It can give full play to the multiplier effect and enable the factors to be shared through effective organization of resources within the alliance which are ensured to be “saved” from input to the output. The basic economic principle of a strategic alliance which serves as a system connecting enterprises is to give the fullest play to external economies of scale. When enterprises cannot take full advantage of its internal experience accumulated, technologies and talents or do not have such resources, they can share resources with each other by establishing a strategic alliance and address their own resource problems, in order to prevent their existing resources from being wasted and repetitive acquisition. The strategic alliance established can expand the boundaries of using resources by enterprises and raise the utilization rate of resources

of enterprises, reduce sunk costs as well as fully and reasonably allocate resources.

2.2 Building industrial platform

According to the strategic alliance theory, enterprises will build and organize an alliance to expand the boundaries of using resources, raise efficiency and reduce costs. In the course of the development of inclusive finance industry, strategic alliance can also play a critical role.

On the one hand, it helps to enable credit data available to all financial institutions and regulate the development of the industry. At present, there are some circumstances requiring governance and regulation in the practice of inclusive finance in China, wherein, the most principal problems are: more than one loan granted to one customer, credit loan fraud and so on. On September 15, 2015, the internet financing risk information sharing system of the Payment and Clearing Association of China went online officially, and 13 P2P institutions joined the system which enabled them to access credit information in the industry and pursue mutual benefits. The system supports search through easy input of conditions to obtain information related to a borrower and see his/her historical loan data in those 13 P2P institutions, which on the one hand can better address the problem of more than one loan granted to one customer which is one of the major reasons resulting in delayed repayment by micro and small-sized enterprises according to the actual practice, and on the other hand, in this way, unnecessary loss can be avoided by searching historical records and analyzing the possibility of any credit loan fraud. In recent years, P2P internet finance industry has been developing rapidly, and more than 2,000 P2P institutions have been established, which is far more than the 13 institutions which have joined the system. Therefore, it urgently needs to upgrade the system for further recruiting more members, enriching the types of inquiry and create good industrial environment for the sound development of inclusive finance.

On the other hand, it is necessary to share infrastructure building and further expand the customer groups. As Internet Plus is booming in China, the application of various kinds of new information

technologies lays critical foundation for the development of inclusive finance system, therefore, it results in the rebuilding of the whole process of the system. Therefore, infrastructure building is especially important to financial institutions. In order to promote the development of the entire industry, leading institutions may build strategic alliances in the industry to share infrastructure to some extent. As the development of an industry benefits enterprises thereof, the customer groups can be enlarged, the service objects can be broadened and real inclusive finance can be realized.

3. Customer experience: inclusive financial education and protection of financial consumers

The Plan for Promoting the Development of Inclusive Finance (2016-2020) adopted at the 18th Session of the Central Leading Group for Comprehensively Deepening Reforms on November 9, 2015 stressed the importance of strengthening inclusive financial education and protecting the rights and interests of financial consumers.

3.1 Enhancing inclusive financial education

Carrying out financial education to raise consumers' financial literacy is important foundation for the sound and sustainable development of the finance industry in a country. The financial literacy of the citizens in terms of financial knowledge level and credit culture status determines the depth and width of the development of the finance industry in the country to a large extent. The development goal of inclusive finance is to make financial service fairly available to customers from all walks of life and all groups. As it is difficult for people with poor financial literacy to participate in the activities in the financial market and conduct reasonable financial planning, it is highly possible for them to have debt problems, which may result in great loss against them and the society. The development of inclusive finance needs customers to master financial knowledge, get to know and be able to use all kinds of inclusive financial products. The financial consumers can learn the knowledge and skills for effectively managing money through financial education and use the knowledge and skills learnt to make better decisions concerning their money with an aim of

improving personal economic status.

On the one hand, the State shall provide comprehensive education programs concerning inclusive finance to citizens from all walks of life. China should put financial education into national development strategy and develop a national financial education development plan to promote inclusive financial education in terms of comprehensiveness and full coverage. Comprehensiveness means that the financial education should not only cover knowledge and skills for using professional financial service but also cover knowledge and skills for personal and family financial management and help build the financial awareness of consumers and regulate their financial behaviors. Full coverage means that financial education should cover all the citizens, including the consumers, providers and regulators of financial services. In addition, financial education for farmers, children and the elderly should be stressed. Farmers are the key target group of inclusive finance, but they have poor financial management awareness and poor skills in using internet technologies. They need to understand financial institutions and services and choose proper financial products through financial education. As there is no school financial education for children in China, it should be put in the primary and middle school curriculum to guide children to build correct money awareness and form good financial management habits. It is also important to provide financial education to the elderly to guide them to manage their assets and help them build risk awareness and avoid property loss due to lack of financial knowledge and following others to invest blindly.

On the other hand, financial institutions should take initiative to carry out inclusive financial education. Besides schools and financial regulators, all kinds of financial institutions should conduct financial education programs. There are a lot of grassroots credit practitioners who are familiar with the features and procedures of their financial products, and they can conveniently provide inclusive financial education and financial product promotion to residents around their outlets, to mitigate the dilemma of asymmetric information and difficulty to get loans financially underdeveloped areas are facing, help to raise the financial institutions' capability to provide service, and expand their line of business. As a result, the operation

mode which is assisted by relevant government functional departments, gains extensive support from the public and is implemented by front-line grassroots credit practitioners will work effectively. However, please note that the financial education carried out by financial institutions should focus on the spreading of financial knowledge and skills, and financial institutions should conduct financial education in good faith and fully state the risks of their financial products, and should not just be dedicated to the promotion or marketing of their financial products.

3.2 Strengthening protection of rights and interests of financial consumers

To protect the rights of financial consumers including but not limited to citizens' right to participate in financial activities and the right of fair transaction is one of the goals of building inclusive financial system. To develop inclusive finance, consumers need to master financial knowledge and effectively use financial products. When any of their rights above mentioned is infringed in the course of any financial service, they can be protected in a timely manner. The Guiding Opinions of General Office of the State Council on Strengthening the Protection of Financial Consumers' Rights and Interests (Guo Ban Fa [2015] No.81) issued on November 13, 2015 points out that, to strengthen the protection of the rights and interests of financial consumers is important for preventing and defusing financial risks and is of positive significance to the increase of financial consumers' confidence, maintenance of financial security and stability as well as promotion of social fairness, justice and harmony.

On the one hand, financial institutions shall consciously protect the rights and interests of financial consumers. To protect financial consumers is the duty that shall be assumed by financial institutions and the work ethics that shall be followed by financial practitioners. To protect the rights and interests of financial consumers is foundation for financial institutions to display good images, improve their popularity and realize stable operation. Financial institutions should adhere to the corporate value of "people first, and customers foremost", integrate their development goals with the realization of the value of financial consumers, maintain the rights and

interests of financial consumers and make contribution to the establishment of fair, just and open financial market order and environment while developing their business. To be more specific, in the course of any financial transaction, financial institutions should prudently operate and take strict risk prevention measures to protect the safety of the funds of financial consumers; should take initiative to introduce the information concerning financial products and services including but not limited to the risks, responsibilities and proceeds to consumers, in order to protect their right to know; and should establish internal complaint handling mechanism, improve complaint handling procedures, raise the efficiency of addressing the complaints made by financial consumers, and protect their right to claim according to law.

On the other hand, it is necessary to give full play to the role of self-regulatory organizations and establish comprehensive regulation mode. Comprehensive regulation involves regulation by administrative departments, regulation by self-regulatory organizations and regulation by the society. Regulation by trade associations and other self-regulatory organizations over financial activities is a key element to the realization of orderly, standard and efficient finance industry. In the course of performing their roles as regulators, self-regulatory organizations in the finance industry need to improve their mechanism for detecting problems. In general, regulators find disputes over financial consumption only when consumers file complaints or lawsuits to relevant departments, but they rarely take initiative to find problems by themselves. Self-regulatory organizations should give full play to their advantages of flexibility and independence for the purpose of finding existing and hidden problems in the course of daily regulation over financial consumption activities in a timely manner, and shall be active rather than passive in the regulation over the operation of financial institutions, information acquisition, market risk forecast, accountability and other aspects. Financial self-regulatory organizations also need to take initiative to build a cross-industry financial consumption dispute regulatory platform to address cross-industry disputes regarding financial consumption.

