



INDUSTRY PRACTICE  
OF DIGITAL  
TRANSFORMATION OF  
FINANCIAL INCLUSION

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# Preface 1



In recent years, China's financial inclusion has made significant strides in terms of infrastructure construction, accessibility and customer satisfaction. The role of financial inclusion as an important means of enhancing the ability of finance to serve the real economy has come into play. At the same time, with the continuous changes in the concept and practice of financial inclusion, the bottlenecks of traditional service models are also being exposed in coverage, yield for a single customer, risk control, and so forth. The development of financial inclusion has entered a deep water zone, and there is an urgent need for a new type of business model to break the old patterns.

With the rapid development of China's digital economy, especially that of digital technologies such as Big Data, cloud computing, artificial intelligence, and blockchain, the digital model has become an important impetus for the development of financial inclusion. It eliminates the time and geographical restrictions, lowers the transaction costs and financial services threshold, and effectively expands the coverage of financial services. The accessibility of financial inclusion has been further promoted. In particular, it has shown unique advantages in improvement to the credit approval efficiency and risk control ability, precision marketing of customers, and development of new financial products. It has injected new blood into the development of financial inclusion.

Based on a summary of the main dilemmas facing the development of financial inclusion, this report offers a careful analysis of the important role and practical value of digital technologies. More importantly, this report provides real samples for optimizing the development path of digital financial inclusion by showing the latest frontier practices of the industry. Hopefully, this report could offer product solutions that can be replicated and promoted inside and outside the industry.

We hold that digital financial inclusion is an irreversible trend. Its core lies in the fact that, on the one hand, it changes the credit logic of the traditional mode by actualizing the concept of "data as credit". On the other hand, it curtails service cost of traditional financial inclusion, and improves the operational efficiency. At present, digital financial inclusion is still in its infancy. Both the enterprises and the regulatory authorities need to adapt to the ever-changing development through innovation and promote finance to better serve the real economy. Of course, digital financial inclusion effectively reduces the cost of risk control, but the potential risks cannot be ignored. It is also imperative to use digital technologies to prevent the secondary risks therein, which is a major challenge for the industry and regulatory authorities.

We believe that digital financial inclusion plays an increasingly important role in bringing finance to the "grassroots" in China, promising the lively development of finance for all.

Meng Zhaoli, Dean of JD Finance Research Institute

## Preface 2

A new round of technological revolution and industrial transformation is in full swing. It is leading the human society into the digital age. Caught up in this changing landscape, the choices that all industries must make are not “whether to” make the digital transformation, but “how to make it”. In the face of changes, the basic orientation of policies in different countries is to draw on advantages and avoid disadvantages, obtain the dividends of technological revolution as far as possible, and cushion the impact of the technological revolution on vulnerable groups in the society. The development of financial inclusion to improve finance availability is one of the intersections of technological impact and social protection.

The development of financial inclusion has a bearing on the general public’s access to financial services and is also related to the support and help of finance for poverty alleviation and the building of a relatively prosperous society in all respects. The issue of concern in this report is: How will the new-generation internet technologies accelerate the digital transformation of financial inclusion in China where the finance system reform has entered a deep water zone? To this end, this report carried out the following main tasks. First, centering on the key indicators of financial inclusion development, this paper compared and analyzed the differences between the traditional model and the emerging digital mode in terms of service coverage, service efficiency and risk control. This paper demonstrates why the digital transformation of financial inclusion is the general trend. Second, through the lively cases in agriculture-related loans, financing for small and micro-enterprises and financing for start-ups, this paper stressed that the digital mode redefined financial inclusion in business models, service methods and service principals and so on, and explored the experience gained from typical cases in the industry and whether it can be copied and promoted. Third, this paper has proposed several policy recommendations for the development of digital ways based on key conditions for the digital transformation of financial inclusion.

Integration is the most essential feature of a new round of scientific and technological revolution and industrial transformation. For a high-quality economic development, China needs to promote the deep integration of the Internet, Big Data, AI and the real economy, as well as their integration with the financial services. New means should be used to enhance the ability of finance to serve the real economy. We hope that the trend, application scenarios and growth path of the digital transformation of financial inclusion proposed herein can be supported and verified by more industry practices. We also hope that in the face of the inherent problems of financial inclusion, the industry can make innovative exploration and practice to improve the quality of the digital transformation of financial inclusion, enhance the finance availability of the general public, and increase the sense of achievement for the people.

He Jun, Director of the Institute for Small and Medium Enterprises,  
Chinese Academy of Social Sciences (CASS)



# Key views

01

Development of financial inclusion has entered a deep water zone. Although the coverage, availability and satisfaction of financial services are improving, problems such as uneven services and imperfect systems still exist. There remains huge room for development in the financial inclusion market.

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02

The traditional model has problems such as narrow customer coverage, low profitability for a single customer and high potential risks. The development dilemma is becoming increasingly visible.

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03

Digital technologies have changed the credit logic of the traditional mode, cut service costs and boosted service efficiency. In particular, they inject new vitality into the development of financial inclusion thanks to their unique advantages in segment customers and product innovation for targeted services.

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## 04

At present, digital financial inclusion has accumulated a wealth of vivid, fruitful industry practices, which not only brings new market growth to the important areas such as agriculture, but also taps the new “blue ocean” for the optimization of industry ecosystem. Of these, innovative models such as digital agricultural loans, full supply chain finance, and digital crowdfunding provide a new solution to the financial needs of key groups such as farmers and SMEs

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## 05

From the perspective of development trend, digital technologies are the only way to the development of financial inclusion, and it will exhibit such features as improvement and replacement of the traditional credit evaluation system, increasingly large-scale development, the deep integration of technology enterprises and financial institutions, and necessary attention to secondary risks. From the perspective of development proposals, the top priorities for the development of digital financial inclusion are to strengthen digital infrastructure construction, issue the same standards on data and maintain data security, improve the regulatory framework, and use digital technologies to prevent secondary risks.

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## Financial Inclusion Develops into a Deep Water Zone

- Despite great strides made in the development of financial inclusion, there is room for improvement in financial service coverage, availability, diversity and risk control.
- The financing needs of the target groups represented by farmers and SMEs have not been effectively satisfied, promising great potential for market development.
- The traditional model has problems such as low coverage, low profitability for single customer, and difficult risk control. The development of financial inclusion has entered a deep water zone, and there is an urgent need for a new model to break the old patterns.

Since the Third Plenary Session of the 18th Central Committee of the Communist Party of China put forward the “efforts to develop financial inclusion, encourage financial innovation, and enrich financial market levels and products”, the policies represented by the “Plan for Promoting Inclusive Financial Development (2016-2020)” and “Implementation Plan for Large and Medium Commercial Banks to Set up the Financial Inclusion Business Division” have been promulgated to spur the development of financial inclusion. They provide a good policy environment and promote the construction of financial infrastructure and the regulatory framework is also improving. With the development of digital technologies represented by mobile payment, Big Data, and cloud computing, China has made great progress in financial inclusion. Financial services coverage, availability and satisfaction of key groups such as SMEs, farmers, and urban low-income groups have been further enhanced. However, there are still a slew of problems in the development of financial inclusion in China. For example, the services are not fairly distributed, and the system is not perfect. Financial infrastructure and commercial sustainability still have huge room for improvement, meaning broad market prospects for financial inclusion.

## SECTION I

# Status in Development of Financial Inclusion

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In recent years, the scale of China’s financial industry has been expanding. Financial development is characterized by diversified service targets, wide service coverage, and high mobile payment usage and so on. The basic financial services such as the number of bank accounts held by each person and the density of bank outlets have reached a medium or even upper level in the world. However, there is still a huge room for development of financial inclusion geared to the key service targets, including small and micro-enterprises, farmers, urban low-income makers, the poverty-stricken, the disabled, and the elderly.

### **1. Financial infrastructure coverage still needs to be expanded**

The coverage of financial infrastructure has expanded greatly, but there is still room for improvement. Take rural areas for example. In recent years, financial infrastructure in rural

areas rises up at an astonishing rate. According to the “General Situation of Payment Business Development in Rural Areas” and the “Overall Situation of Payment System Operation” issued by China’s central bank in recent years, in 2017, 3.349 billion transactions in rural



areas (a year-on-year increase of 99.23%) of a combined value of RMB 6.68 trillion (a year-on-year increase of 23.02%) were processed through the Rural Credit Banks Funds Clearing Center. In 2016, the year-on-year growth rate of these two indicators exceeded 50%. Another good example would be the number of bank outlets. At the end of 2017, the number of banking outlets in rural areas stood at about 126,100, accounting for 55% of the total number of 226,700 nationwide. However, it is worth noting that in 2017, the number of bank outlets per 10,000 people in rural areas was 1.30, lower than the national level of 1.63. Also, the average number of ATMs per 10,000 people nationwide was 6.95, while this figure was merely 3.89 in rural areas.

loans cannot be obtained directly from rural financial institutions. Moreover, the “General Situation of Payment Business Development in Rural Areas in 2017” issued by China’s central bank takes the number of self-service terminals in rural areas (innovative equipment other than ATMs and POS, such as multimedia terminals) as an example. By the end of 2017, the number of devices and transactions fell—1.88 units per 10,000 people and 0.53 transaction per year per person while these two figures were 2.07 and 0.69 respectively in 2016. Besides, there are 56 million SMEs in China, and 41% of them have difficulties in obtaining credit loans. More than 23 million SMEs and micro-enterprises are unable to obtain external financing from the formal financial system, or, if they did, it could not fully meet the financing needs. Of the SMEs with constrained credit, there are up to 5 million SMEs, accounting for 42% of all SMEs, while the number of micro-enterprises reached 18 million, equivalent to 41% of all micro-enterprises. This shows that the extensive infrastructure alone is not enough, and the demand for financial services is still not met.

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- The average number of ATMs per 10,000 people nationwide was 6.95.
  - The average number of ATMs per 10,000 people was merely 3.89 in rural areas.

## **2. The demand for financial inclusion services is underserved**

## **3. The risk of financial inclusion services should not be underestimated**

The expanding financial infrastructure does not meet the needs of target groups for diversified financial services. According to statistics from Wind, in 2015-2017, only about 12% of new loans in RMB came from rural financial institutions every quarter, but the proportion of agriculture-related loans in new loans in RMB accounted for more than 20%, indicating that a significant proportion of agriculture-related

Risk control is a major problem for financial inclusion services. The main reasons are that the number of target groups is large and the size of each individual target is small. It is hard to identify and deal with risks in the early stage. Financial inclusion relies on a wealth of micro-finance institutions. The characteristics of small amount, scattered customer groups and wide coverage mean that the risk spillover of

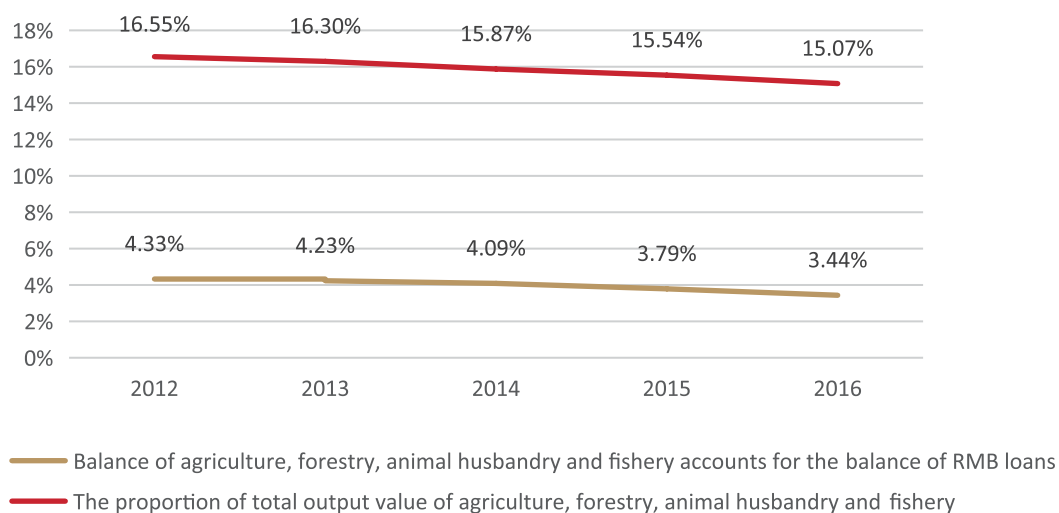
individuals is small. But given that the small and micro-enterprises and the agriculture-related loans group have weak financial strength and relatively high default risks, the overall risk of financial inclusion shall not be underestimated. According to the statistics of China's central bank, by the end of March 2018, the non-performing loan ratio of the SMEs was 2.75%, 1.2% higher than that of large- and medium-sized enterprises and 1% higher than the non-performing loan ratio of China's commercial banks at the end of 2017. For rural commercial banks which regard the agriculture-related loans as the main business, non-performing loans continued to

rise in 2017, standing at 2.55%, 2.81%, 2.95% and 3.16% respectively at the end of each quarter, much higher than the average ratio of commercial banks.

#### 4. The market has huge potential scale

The financial infrastructure coverage still needs to be expanded and the demand for financial services is not fully satisfied, which means that the market has a huge potential scale. As shown in Figure 1, the output value of agriculture, forestry, animal husbandry and fishery contributes to about 15% of GDP each year, but the proportion of loan balance in these areas has fallen under 4% in recent years.

Figure 1: Proportion of the loan balance for agriculture, forestry, animal husbandry and fishery and the proportion of total output value

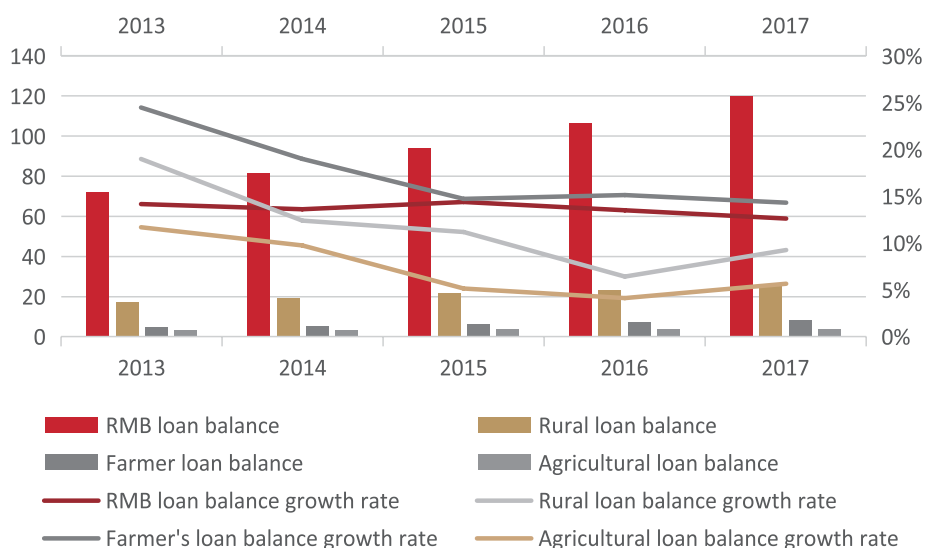


In addition, Figure 2 shows the comparison of loan balances for farmers, agriculture and rural areas and their growth rate with the balance of loans in RMB and their growth rate. The growth rate of loan balance for farmers has been higher than that of all RMB loans. In contrast, the growth rates of balances for almost all loans involving rural areas and agriculture are lower than RMB loans, and have rebounded somewhat in the past two years. The high growth rate of loan balances for farmers indicates that farmers' demand for loans has always been high, but the growth rate of loan balances for agriculture and rural areas has not increased simultaneously. This indicates that financial services are not in place in

agricultural production and rural infrastructure construction. The market for financial inclusion is vast and there is still a long way to go.

In addition to farmers' demand for financial services, small and micro-enterprises also need more financial resources. In recent years, Chinese SMEs have maintained a robust growth. They now account for more than 70% of the total enterprises. As shown in Figure 3, however, their loan balance accounted for merely about 30% of the total loan balance of enterprises, and the increase in recent years is not large. The growth rate of loan balance for small and micro-enterprises has risen steadily, reaching 16.4% in 2017, higher than the growth

Figure 2: RMB loans and agriculture-related loans: balance and growth rate

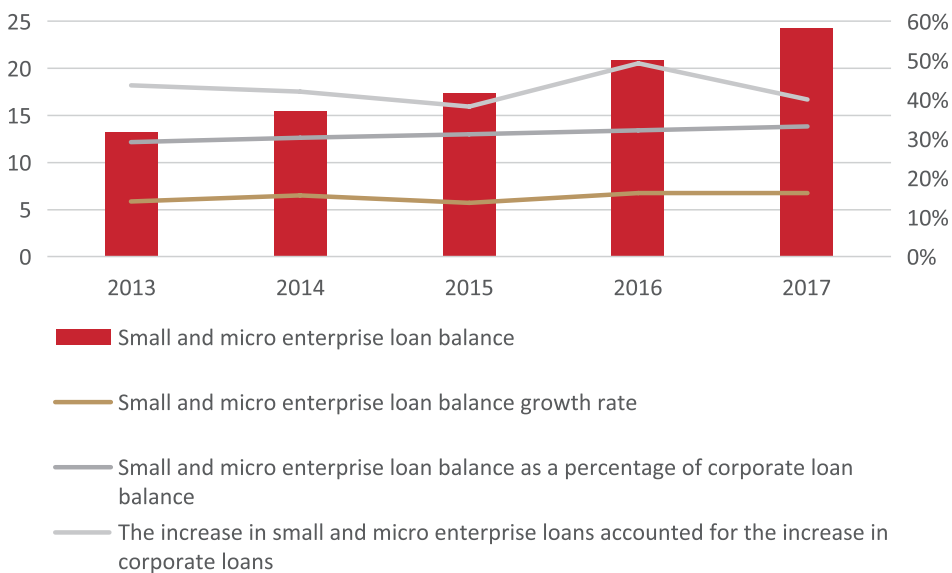




rate of various loan balances. It is also worth noting that the increase in loans for these companies accounted for a high proportion of increase in corporate loans, reaching 49.1% in 2016, which indicates that the demand of small and micro-enterprises for loans is robust. Judging from the shortage of financing amount,

the potential financing demand of China's SMEs is about US \$4.4 trillion, but the existing financing supply is only about US \$2.5 trillion, with a huge gap of US \$1.9 trillion. Therefore, the financial inclusion market for SMEs needs to be developed.

Figure 3: Balance, growth rate and ratio of loans for SMEs



## SECTION II

# Challenges for Traditional Financial Inclusion

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In the context that the development of financial inclusion still needs to be deepened and the potential market needs to be tapped, traditional financial institutions are plagued with difficulties in their path ahead. Traditional financial services are highly dependent on financial infrastructure such as banking outlets and self-service terminals, resulting in problems such as low coverage and low yields for single customers. Furthermore, traditional financial institutions also face difficulties in risk identification due to the small size of service groups, the difficulty in obtaining background information of customers, and information asymmetry.

### 1. Customer coverage needs to be expanded

The people that would benefit from financial inclusion is mainly those at the community level. Because the improvement in the customer coverage of traditional financial services depends on the construction of financial infrastructure such as bank outlets and self-service terminals, it requires high input of human and material resources in the initial stage. In the absence of financial support, it is hard for financial institutions to recover costs of investment in remote areas. With low customer coverage, the financial inclusion development is unsustainable. Further, with the robust development of mobile payment in today's world, the basic financial service provided by traditional financial institutions decreases, and the situation that the initial investment of outlets cannot be recovered in a short period of time is worsening. According to the "General Situation of Payment Business Development in Rural Areas in 2017" issued by China's central bank, the number of payment transactions through telephone banking, the increase in the number of bank cards, the number of ATM transactions, the business volume at POS machines, the number of self-service

terminals and other innovative devices as well as transaction volume and remittance business volume have all declined to varying degrees. Of these, the number of ATM transactions fell by 21.56%, and the transaction volume of POS machines decreased by 36.57%. In contrast to this, mobile payment has an absolute advantage. In 2017, there had been 129.509 billion mobile payments in rural areas, with a value of RMB 42.9 trillion, about 52 times the transaction volume at POS machines and about 5.8 times the amount of POS machines respectively. Apparently, it is hard to further improve the coverage of traditional financial services, and the existing financial service coverage is being squeezed out by emerging digital financial services such as Internet finance and mobile payment.

### 2. Yield per customer needs to be improved

Although the potential market size of financial inclusion is large, the scale of each market entity is small. In terms of collection of customer information in the early stage, traditional financial institutions such as banks and credit cooperatives need to invest heavily in manpower. Moreover, there is a serious

information asymmetry, which means the marketing efforts wouldn't be accurate enough for an efficient business expansion. The service process at traditional financial institutions is highly cumbersome, including review of documents, account acceptance, creditor's rights transfer, credit approval, issue of loans and so forth. For the same business amount, there are huge cost differences between financial business of large- and medium-sized enterprises and the financial inclusion business which mainly serves farmers, urban low-income earners, and small and micro-enterprises. Traditional financial institutions have very low yield per customer from their inclusive financial services. Some large- and medium-sized banks, such as the Agricultural Bank of China and the Postal Savings Bank of China, have a large number of outlets, but because of the low yields, they would not allocate much to the credit loans to rural areas. Rural deposits will even be absorbed and used for operations in cities. The sustainable operation of financial institutions is inseparable from profit. Low yield per customer leaves traditional financial institutions little room in expanding their financial inclusion business, even if they wanted to do so.

### **3. Potential risks need to be prevented**

Information asymmetry brings more than just collection costs to traditional financial institutions; it also brings difficulties in risk management and control. For example, financial inclusion services chiefly involve individual credit business for low- and middle-income earners, to whom traditional financial institutions paid no attention in the past. Target groups for financial inclusion are vast and scattered, with high cost and default probability. With a half-completed credit system, it is

hard to confirm their credit history, making it impossible to carry out risk assessment. This poses great potential risks. Given the small amount of business, the cost of recovery is even greater than the funds recovered in case of breach of contract. In addition, the institutional guarantee of the service groups of financial inclusion is not mature. Bank loans come with a lifelong accountability system. Given the system risks, traditional financial institutions incline to provide services to state-owned enterprises and large enterprises rather than SMEs, micro-enterprises and rural markets. For all these reasons, traditional financial institutions have a higher potential risk in financial inclusion services than others.

In summary, great progress has been made in the development of financial inclusion, and the coverage of financial services has further expanded. However, the existing financial services do not fully match the service needs of the target group, and the gap between the effective supply and the demand of the target group cannot be ignored. The potential market is huge and there are broad development prospects. However, traditional financial institutions encounter bottlenecks in the development of financial inclusion. The expansion of traditional financial services coverage faces difficulties, and traditional service coverage is being replaced by new financial services. As the service targets are special, traditional financial institutions have low yields per customer and high potential risks. Therefore, traditional financial institutions have considerable internal flaws in their development model. New financial models supported by digital technologies are urgently needed to break the old patterns for the development of financial inclusion.



## Digital Technologies Blaze a New Trail in the Development of Financial Inclusion

- Digital technologies cut the cost of obtaining customers for financial services, improves the availability of financial services, and enhances the accessibility of financial inclusion.
- Digital technologies assist financial inclusion services in achieving an accurate customer marketing to provide customized services.
- Digital technologies have improved credit approval efficiency and risk control abilities, and curtailed the business costs of financial inclusion.
- Digital technologies provide the impetus for the development of new financial products to meet the diverse service needs of financial inclusion.



The extensive development of financial inclusion will benefit greatly from the application of digital technologies as they harness digital means to remove time and geographical limitations, enhance the accessibility, and reduce the operating costs. They give the development of financial inclusion a key fillip.

## SECTION I

### **Digital technologies can effectively reduce the cost of customer acquiring**

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Digital technologies have slashed the cost of acquiring customers for financial institutions. Digital technology is a major booster to financial inclusion, mainly thanks to the application of technologies such as Big Data, cloud computing, mobile payment and face recognition. First, the cost of financial institutions in acquiring

customer information has been reduced. Via Big Data, financial institutions can collect the latest information of individuals or businesses on social media, their transaction records on e-commerce platforms, and relevant credit information uploaded by users themselves, so as to reduce information asymmetry and



cut search costs. Second, the accessibility of financial services for target groups such as farmers has increased. By means of remote technologies such as mobile apps and face recognition, financial institutions can process business online such as review of documents, account acceptance, creditor's rights transfer, credit approval, and loan issuance, reducing the cost of acquiring marginal customers. Financial services for individuals and enterprises in poor and underdeveloped regions have solved the problem of low coverage of traditional brick-and-mortar financial institutions, opened up the long-tail market, expanded the financial market capacity, and boosted financial inclusion. Third, the cost of marketing for

financial institutions has fallen. Thanks to the popularization of mobile payment and social networking applications, customers have a better understanding of financial products. Young people, in particular, have a better acceptance of the Internet and participation in financial services. As a result, some financial products that are easy to use and low in risks, such as balance appreciation services and current fund management service products are widely accepted. Digital technologies provide a popularization channel for groups who were unable to learn about financial products due to low financial demand, thereby greatly improving the ability of financial institutions to obtain customers.

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- By virtue of remote technologies such as mobile apps and face recognition, financial institutions can process online business processes such as review of documents, account acceptance, creditor's rights transfer, credit approval, and loan issuance, reducing the cost of acquiring marginal customers

## SECTION II

### Digital technologies can significantly increase the yield per customer

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Digital technologies can reduce the cost of financial inclusion services and significantly boost the yield on single customers for financial institutions. The main reason is that

the information collection capability blessed by Big Data has improved the credit approval efficiency and enhanced the risk control ability. First, the efficiency of credit approval

has been improved and costs have been cut. For small-scale customers or customers in poor and underdeveloped regions, traditional financial institutions have invested heavily in the process of information collection and evaluation, signing of print agreements, post-loan management, and so on. The application of Internet technologies enables such customers to handle the business using their own computers and mobile phones, greatly improving the efficiency of credit approval. This saves the labor and material costs for traditional financial institutions to set up outlets, all the while lowering the financial services costs for customers, increasing their return on capital, and enabling financial service providers and customers to achieve a win-win outcome. Second, the risk identification costs are slashed. Information technologies represented by Big Data can analyze and integrate information from multiple dimensions, and collect information on the way and patterns of risk occurrence. Then, it

automatically decides whether there is risk through data and information integration by means of machine learning and neural network technology. For example, customers' living habits, transaction records, and default records and so on are comprehensively analyzed for customers' credit. Third, the risk management capability has been improved. For the risks identified, data modeling on the Internet can be used to quantify the risks, and the risks can be monitored in real time. Big Data predicts the possibility of customer default, thus facilitating the subsequent loan collection business. It is also possible to design products for the quantified risks. For example, the house mortgage can be sold to other investors through asset securitization, thereby dispersing and transferring the risks faced by institutions. Therefore, accessible digital technologies help solve the problem of low per-customer yield from low-net-worth customers for traditional financial institutions.

### SECTION III

## Digital technologies can boost precision marketing

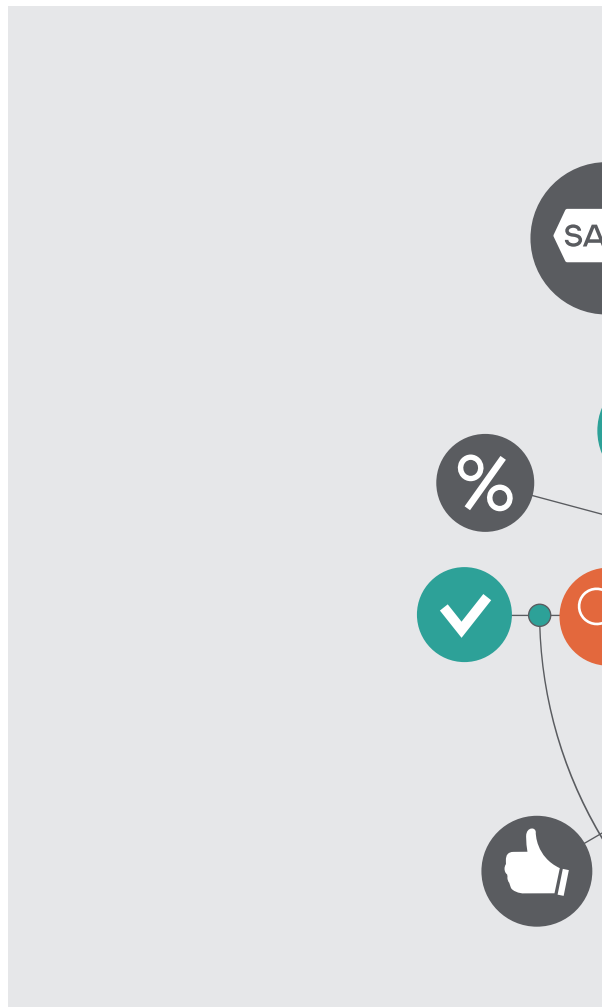
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Digital technologies enable financial institutions to capture individual differences of customers, and divide traditional market into customer segments to help financial

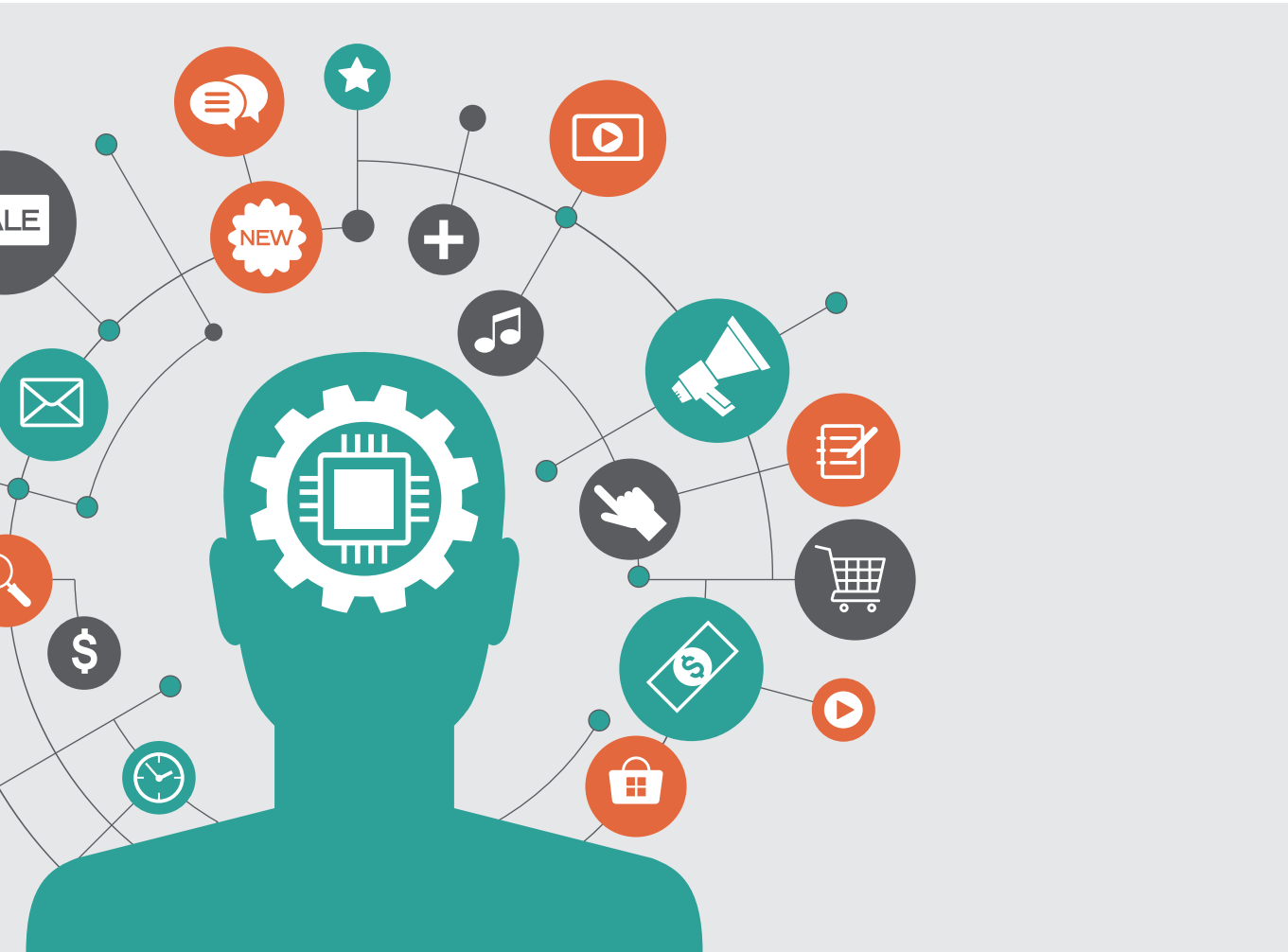
institutions achieve precision marketing. First, the data that financial institutions can collect are more comprehensive in dimensions and higher in timeliness, mainly thanks to the Big

Data technology. For example, data on the customers' behaviors are captured from all aspects, timely and accurately, through the customer's transaction records on e-commerce platforms, latest information on social media, web browsing history and so on. Second, the time lag of financial institutions in decision-making has also been greatly reduced with the aid of Big Data. Currently, data are updated rapidly, but Big Data algorithms can generally give results in seconds. The analysis results can be updated quickly as you enter different data, enabling financial institutions to capture changes in customer demand as soon as possible, and make accurate, timely decisions. Third, financial institutions can provide bulk customized services at an admirable speed, and achieve precision marketing for customer segments, all thanks to AI technology. While making market segmentation, financial institutions can associate them with marketing campaign, provide customized services based on the real needs of different customer groups, and implement the most viable marketing

programs for each type. Therefore, through comprehensive data collection and more timely decision analysis, financial institutions can attach more detailed and accurate labels to customers, and break down customer groups into sub-categories with higher homogeneity. At the same time, campaigns will be aligned to these results to achieve precision marketing.



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- Data on the customers' behaviors are captured from all aspects, timely and accurately, through the customer's transaction records on e-commerce platforms, latest information on social media, web browsing history and so on.



## SECTION IV

### Digital technologies can accelerate the development of new products

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Modern technologies represented by mobile Internet, Big Data, cloud computing and AI help to expand the range of the existing financial services, and its powerful information collection capability is conducive to the development of new financial products. Customer needs will be further subdivided thanks to AI technologies. Apart from precision marketing, financial products can also be more customized. For

example, the “Baitiao”, a consumer finance product, provides young users with the possibility of their first credit and purchase in installments. In the development of financial inclusion, digital technologies can not only equalize and facilitate the financial services, but also make financial products more diversified and customized, thus meeting the needs of various groups.

# Vivid Industry Practice of Digital Financial Inclusion

- Digital technologies have not only brought new market increments for financial inclusion, such as agricultural financial inclusion, but also broadened the new blue ocean for the optimization of industrial industry ecology.
- Digital technologies help the groups with difficulties in obtaining financial services establish systems for credit management and risk control to promote the development of financial inclusion.
- Digital agricultural loan projects reduce the financing cost of agricultural production, and improve the ability of farmers to obtain financial services. In particular, they improve the production efficiency and level of agricultural industry, and are accelerating the development of agriculture.
- The full-supply chain financial model has effectively alleviated the financing difficulties of SMEs. From the perspective of supply chain logic, the financial services are infiltrated into every link of the industrial chain to enhance enterprises' comprehensive capabilities to manage the supply chains.
- The digital crowdfunding model has greatly enhanced the efficiency of crowdfunding with the use of Big Data. In the future, it may be combined with AR/VR and blockchain to provide continuous impetus for entrepreneurship and innovation.

The fact that the farmers, start-ups, SMEs and other groups cannot meet the threshold of credit review and are unable to bear the costs of financial services is a key obstacle to the development of financial inclusion. Digital technologies have not only established a multi-dimensional system for credit management and risk assessment, but also significantly improved the breadth, depth and precision of financial services. It has brought new market increments for the important areas of financial inclusion such as agriculture, and also broadened the new blue ocean for the optimization of industry ecology.

With regard to the promotion of rural financial inclusion by digital technologies, the “digital agricultural loans” have not only changed the logic of traditional collateral-based credit, but also transformed and upgraded the agricultural industry by significantly optimizing the digital management. In addressing the financing dilemma of SMEs with digital technologies, the full-supply chain financial solution not only inserts financial services into all links of the supply chain, but also significantly improves the comprehensive management capabilities in different industries and promotes the transformation of industry development efficiency. Digital technologies have facilitated an innovative model—crowdfunding. Technologies have not only improved the success rate of crowdfunding enterprises, but also achieved a ground-breaking optimization of the development path and accelerated the establishment of a more efficient, open and sustainable crowdfunding platform.

Facts have shown that it is not only digital technologies themselves that need innovation; we also need to innovate in the way in which they are applied to finance and industrial management, as well as how they excavate the market space and reshape the industry. This is a necessary premise for digital financial inclusion to “cover the last mile”.

## SECTION I

# Digital Technologies Promote Agricultural Metamorphosis

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The new model of financial inclusion represented by Digital Agricultural Loans has reduced the production and financing costs of agriculture, improved the ability of farmers to obtain financial services, and is changing the development pattern of the agricultural industry.

## 1. Overview of the Digital Agricultural Loans

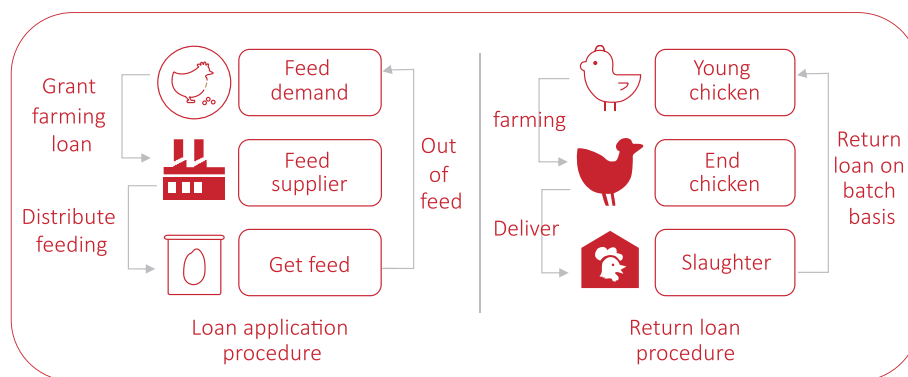
Digital agricultural loans are a brand new micro-supply chain financial model. Projections of future production are made using a data-based model based on agricultural production process and the historical production data of farmers. From the projections made, credits are generated under the whole-process, high-frequency and multi-direction supervision of the production process. The model supports the agricultural production management with capital and risk management. In the past two years since the Digital Agricultural Loans was

launched, have been involved with more than 100 cooperatives in Shandong, Hebei and Henan province in China for about RMB 1 billion granted in loans, and the overdue rate and the bad debt rate are both zero.

## 2. Implementation Process of the Digital Agricultural Loans

Digital technologies are used in risk and production management for every link in the entire process. Figure 4 shows the loan and repayment process of the project.

Figure 4 Digital Agricultural Loans: Loan Repayment Process



In the pre-lending stage, an in-depth study of agricultural farming techniques and collection of historical production data of farmers allow for the establishment of a quantitative model and estimates for the future production. Credit is granted to farmers based on probability counted by the quantitative models.

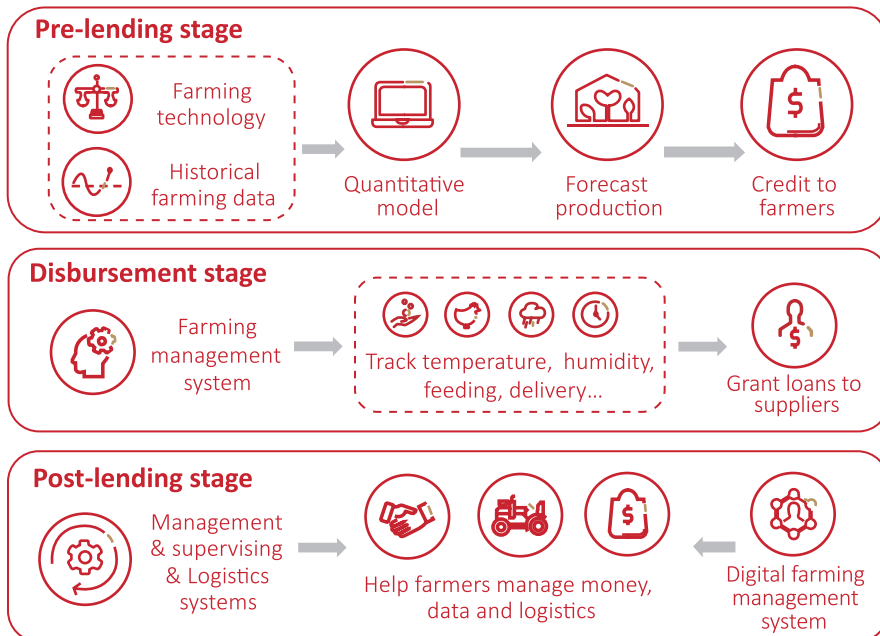
In the disbursement stage, a digital agricultural loan is granted in a high-frequency, real-time

and revolving manner based on farming data with the use of cloud management system. Loans will not be issued in a lump sum; instead, the credit granter (rural professional co-op) will be matched with a professionally customized farming management system. In this way, the whole-process, high-frequency and multi-aspect tracking of the production process can be achieved. In addition, according to actual production needs, the funds are credited to

the receiver's account in equal installments. Take the chicken raising industry as an example. The raising cycle of broiler chickens is about 42 days, and RMB 12 could cover the feed during this time. With a digital agricultural loan, the funds are paid to the upstream feed supplier in installments according to the actual needs of the chicken farmers in each raising link. The supplier will provide the feed after receiving the funds. This lending method allows the chicken farmers to pay only RMB 0.06 in interest, and avoid the idle funds. This cuts nearly half of the costs compared to those of traditional loans. Also, farmers don't need to buy feed themselves anymore and thus can concentrate on the farming management.

In the post-lending stage, thanks to digital technologies, risk management and production management are effectively combined. Digital agricultural loan is not just loan to farmers; instead, as a starting point, it continues to help farmers to manage farming, digitally monitor the production process, and integrate fund management and risk management therein. This include a free farming management system, a monitoring system, a logistics management system, and so much more. These will help farmers establish a modern agricultural farming management system that integrates management of logistics, information and capital flow.

Figure 5 Digital agricultural loan of JD Finance





### 3. Case in practice

An eco-agriculture limited company in Shandong introduced a set of automatic chicken raising equipment from Germany, which achieves full-process automation by automatically boxing the eggs into the chicken house after they are disinfected, sterilized, ultrasonically tested and cleaned and the temperature of the chicken house is adjusted in real time. The chicken house produced about 14 tons of eggs per day, and the company had only 15 employees. However, after the plant was completed and the equipment was all set, there was a problem with the working capital. Nothing constructive came from two months' negotiations with a bank. Upon arriving at the raising base, the Digital Agricultural Loans team immediately agreed to grant a loan in about 15 days. Different from the bankers who had inspected the raising base and were concerned about the collateral and the interest-bearing ability, the digital team focused on their capabilities to raise their animals, the data, the feed distribution and the sales of eggs. They have spent more than one year in collecting data on the livestock-raising industry, carefully studied the raising techniques and management, and discovered the on-demand supply based on the "four fixed factors" (fixed time, fixed quantity, fixed location and fixed orientation) through the detailed decomposition of the raising process: baby chicks require far less feed than adult chickens. A digital agricultural loan would allow for an accurate calculation of the grams of feed each chicken needs per day, and the total price of feed will be paid in installments to the enterprise that provided the feed. Then,

the baby chicks would grow up and need more feed, which means that the loan would increase accordingly. In this way, interests were markedly lowered.

Digital Agricultural Loans has not only greatly reduced the loan cost of this agri-ecological enterprise, but also helped improve the management efficiency and capabilities of laying hens raising. This enterprise has shifted from break-even to profitability, and has embarked on a steady development path.

### 4. Main Experience and Reproducibility of Digital Agricultural Loans

First, Digital Agricultural Loans is a solution to rural financial availability. As mentioned above, farmers have no assets that could serve as collateral, and their credit account is blank, which discourages financial institutions in lending to farmers even if they have the intention. For this reason, farmers are increasingly driven away from traditional financial services. Digital Agricultural Loans, however, establishes a digital quantitative model through in-depth study of agricultural production and breeding processes. Moreover, production estimates are made on the basis of such model and data on the historical breeding of farmers. The project grants credit to farmers based on a probability calculation, and the generation of farmer credit is the result of quantitative analysis on agricultural production process based on digital means.

Second, Digital Agricultural Loans solves the problem of trust in rural finance. The risk control of traditional rural finance has always

been an insurmountable gap. On the one hand, the quantitative model monitors the risk of each loan in real time, which makes it more costly, or inconvenient for borrowers to commit loan fraud by faking things for background check. On the other hand, the credit funds are accurately placed in every link of agricultural production, which means there is no direct capital transaction with the farmer. This measure has completely solved the “weak spot” in agricultural loans—credit meant for production but used for other purposes—and has greatly reduced the trust risks of rural finance.

Third, digital agricultural loans have solved the difficulty of rural financial operation costs. On the one hand, they have greatly reduced the cost of credit review of single account. Small-sized, scattered rural loans means that the interest margin for the traditional institutions from rural finance could hardly cover the cost of credit review. Although the digital agricultural loan requires a higher up-front investment to build quantitative models, there would hardly be any marginal variable cost for credit review to a single farmer’s account. On the other hand, the cost of fund is reduced, and the loan granted in installments allows the farmers to pay the interest for the loan in each link, instead of bearing the cost of using the full loan in the whole cycle. Therefore, the application of digital technologies in rural finance has reduced the cost for financial service providers and acquirers.

Finally, the project has solved the problem of poor management in the agricultural industry, by combining agricultural production management with fund management and risk management.

For example, the digital agricultural loan helps chicken farmers manage credit funds while helping farmers manage the temperature, breeding environment, feed volume and delivery time at the chicken house, and thus improve the efficiency of breeding.

The digital agricultural loan model can be easily reproduced or transplanted. Beyond the breeding industry, it can be expanded and copied to planting, agricultural products processing, and so forth. It can not only be applied to the optimization and adjustment of domestic agricultural structure, but also be promoted to the agricultural development in other countries. It goes without saying that there are certain commonalities in possible application fields, including relatively sufficient competition. In general, the problems such as the low coverage of rural financial services, the difficulty in credit and the lack of protection for informal finance have made the path of financial inclusion more difficult in rural areas, and the root cause is that the traditional rural finance has never broken through the credit logic that focuses on collateral and credit investigation information. However, for the digital model, what really matters is the data and probability of agricultural production and management, which has not only reduced the cost of rural credit, but also promoted the transformation and upgrading of agricultural production relations and productivity.

Therefore, digital agricultural loans are not only an important breakthrough spot for the traditional rural financial inclusion, but also an important “flowing water” to promote the transformation and upgrading of the agricultural industry.

## SECTION II

# Digital Technologies Solve the Financing Dilemma of Micro-, Small- and Medium-sized Enterprises

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The traditional supply chain finance has played an important role in broadening the financing channels and reducing financing costs for micro-, small- and medium-sized enterprises, but it also inevitably revealed some problems. For example, core enterprises with unique advantages are reluctant to endorse for their smaller counterparts in the industry chain, which makes it impossible for financial institutions to obtain data and conduct risk assessment at a reasonable cost. Based on digital technologies, the full-supply chain solution takes the entire supply chain as a scenario and presents the enterprise services and solutions in a visual manner at each node (all or some of them), such as material procurement, warehousing, production, transportation, storage, sales and capital. It can be said that the full-supply chain solution provides a new perspective for accurately grasping the financing needs of enterprises and improving their supply chain management capabilities.

### 1. Basic Information

The core of full-supply chain financial solution is to combine the supply chain management and fin-tech capabilities to release or hedge the risks of different nodes; under the premise of maximized risk control, funds are invested to lubricate the entire supply chain for an efficient, benign operation of supply chain. Supported by the full-supply chain financial products, brand owners or manufacturing companies can quickly reduce the pressure to seek financing at different stages and solve the supply chain demand in a one-stop manner, so that enterprises could focus more on supply chain optimization management, product design and marketing. In this way, the enterprises can

quickly improve their market competitiveness.

### 2. Main Features of Full-Supply Chain Finance

Most of the traditional financial products are based on the priority of financial risk control logic, and the business logic is mostly in a secondary position or even neglected. As a result, the product risks of traditional trade finance or transaction bank focus more on the control of peer-to-peer trading risks, which results in the fragmentation of financial products, and thus a large number of risks distributed in the supply chain have been ignored. In addition, the traditional financial products can hardly break away from the

credit logic of a legal entity that inflicts high requirements on the financing entities, so it is difficult for a large number of emerging technology enterprises and SMEs to raise funds. Moreover, the traditional Internet finance entrepreneurs lacks the accumulation of long-supply chain management capabilities, and more efforts have been put in expanding the data width horizontally so as to achieve volume customer access. As a result, it is difficult for traditional Internet financiers to deal with the complex situation of vertical supply chain. The outstanding advantages of the full-supply chain finance solutions are set out below:

**(1) Big Data analysis capabilities**

The accumulation of data on Internet behaviors, retailer consumption, logistics, suppliers and, in particular, credit data of risk control system not only results in an accurate control of the risks in actual goods sales and the liquidity risk of material-processed products, but also the integration of logistics,

warehousing and other links to reduce the risks of goods circulation, and finally the integration of the standard consideration at each full-chain data output node and effective control of the property rights or creditor's rights at that node.

**(2) Goods disposal capabilities**

The full-supply chain finance solution works with the original design manufacturer (ODM) or the original equipment manufacturer (OEM) to provide floating mortgage for materials and thereby provide financial services to ensure the authenticity of the use of funds. In addition, a detailed supervision and disposal plan for materials has been developed. On the one hand, it controls the supply chain management and production/manufacturing to ensure that the materials are produced into finished products. On the other hand, its cooperation with multiple channels provides diversified disposal methods of materials and goods, minimizes potential losses and risks and thus forms a closed loop of risks.

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**(3) Logistics warehousing integration capabilities**

Through cooperation with supply chain management companies and logistics

companies, a series of services such as customs clearance, shipping space and vehicle booking as well as goods tallying and inspection are provided. In addition, all data are interlinked



with real-time tracking and monitoring through the Internet of Things, and the control of each aspect of logistics and warehousing is presented in a visual form. Furthermore, on the basis of strict monitoring of goods in transit, the movable property financing service is provided in the form of movable property pledge, and the goods in circulation are turned into standard financial pledges through Big Data.

#### (4) Risk control capabilities

The financing consideration is paid early in the ordering phase so that funding gap is filled from the source. In addition, there is an in-depth cooperation with the material manager who will select high-value, high-liquidity primary products for the assembly materials required for the goods on the pre-purchasing order, so as to provide floating mortgage to the supply chain financier, and thus help control the risk exposure during the goods production. Even if there were any accident, the supply chain financier has the first priority to cash the floating collateral assets for risk hedging. After the materials are assembled

into finished products, they can be sent to the warehouse for future sales and delivery. At this point, the vendor that supplies the goods may choose to introduce the movable property financing product to reclaim a portion of the consideration fund, settle the expenses incurred in connection with material management and material assembly, and prepare for product promotion and sales. At this stage, through the switching space between property rights and creditor's rights, the two types of financial products, i.e. factoring and movable property financing are integrated to perfectly solve the funding gap and risk control at the connecting link of the supply chain.

### 3. Typical case

Based on the deep understanding and effective control of the entire supply chain, the integration of the information flow, material flow and capital flow of the supply chain can provide enterprises with one-stop financial solutions that are highly automated and customizable.

A domestic mobile phone manufacturer with



a self-owned brand was in a financial dilemma of supply chain management around 2016. The chain included all links from the top down—procurement, production and sales. Most financial institutions did not fully participate in these links, nor did they understand them enough to objectively assess the credit risk of every company in the supply chain. Their financial products could hardly meet the actual needs. At that time, the company did not have the required size or assets to reach the same rating standard of traditional giants to become a “quality credit customer” for the banks. It was impossible for it to easily get financed compared to quality entrepreneurs under the same conditions. Moreover, due to the lengthy, complex supply chain for mobile phones, the company had to seek financing at different stages. The organizational structure of traditional financial institutions stipulates that working capital loans, order financing, commercial factoring and mortgage/pledge financing are subject to product design and risk approval in different departments, and this easily leads to the fragmentation of the financial service chain. The highly probable

mismatch or gap of the capital and supply chain production demand will cause the enterprise’s failure to complete the products on schedule.

After the mobile phone manufacturer analyzed the supply chain link by link, the most suitable financial products were matched to each one of them, and the financial products such as movable property financing and order financing were integrated. The enterprise was provided with a complete supply chain financial solution. In the process of material procurement, production and finished product warehousing, the use of its own ecological advantages supplemented by payment supervision, logistics monitoring and pledge evaluation technology allowed a quick implementation of the solution.

The core of the full-supply chain solution lies in the ability to understand and control the risks of the entire supply chain through data. It could visualize the status of the enterprise’s supply chain through data, including procurement trade links, immediate production conditions, and goods sales routes to assess its risk characteristics and the status of each node in the supply chain. Subsequently, the credit risk on each node is quantified and controlled through a Big Data analysis modeling. In addition, matching of the partner enterprises on each supply chain node was provided for the mobile phone manufacturer, which further reduced the cost of its supply chain and improved the efficiency. So far, the enterprise has been operating well, and its market share has been increasing year by year. The full-supply chain financial solution has accumulatively provided the enterprise with more than several

billion in funds and no non-performing asset. It is a win-win for the financing service provider and the enterprise.

#### **4. Main Experience and Reproducibility of Full-supply Chain Financial Solution**

First, the full-supply chain financial solution has a thorough grasp of the supply chain thanks to the digital technologies. Its success first relies on the deep understanding of the supply chain, which was made possible by digital technologies. For example, the use of the Big Data technology allows the grasping of the potential risks and financing needs of various aspects of material management, production, assembly and finished product sales in a single industry. Also, the use of dynamic mathematical model and algorithm optimization allows the completion of a pledge or release of pledge within four hours, while the operation cycle of traditional financial institutions takes three or four days. The method greatly improves the efficiency of supply chain management and lays a foundation for further decomposing the supply chain and understanding the financing demand.

Second, the full-supply chain solution uses digital technology to improve the efficiency of financing services for enterprises. For example, the digital technologies allow for a more accurate assessment of the value of pledges. It is often difficult for traditional financial institutions to get a hold of the pledge rate because they are not familiar with the specific industries that they invest in. However, with the use of Big Data and data mining, we

can understand the price of goods and raw materials in the whole life cycle, and thus make dynamic, real-time adjustment to the pledge rate and improve the efficiency of financial services in the same cycle.

Finally, the solution can integrate the financial service capabilities at different links in the supply chain. For example, the traditional financial institutions can better control the subject's credit risks in the supply chain to effectively control the credit risks of core enterprises. Technology enterprises can rely on data models to effectively control the transaction risks. Financial institutions and technology enterprises can carry out in-depth cooperation to develop customized financial solutions of supply chain and thus enhance the coverage of supply chain financial services.

To sum up, with the full-supply chain financial solution, it is not the emerging enterprise with capabilities in advanced digital technologies that monopolizes all businesses. Instead, by exporting these capabilities to traditional financial institutions and core enterprises, they are enabled to fully expand the application space of digital technologies by leveraging their own advantages and constantly explore the methods to improve the efficiency of financial management of supply chain in practice, which will help to create a benign supply chain ecosystem for the technology companies, financial institutions, core enterprises as well as micro, small and medium-sized enterprises to achieve a win-win symbiosis. In this regard, the reproducibility and generalizability of the solution are promising.

## SECTION III

# Digital Technologies Promote “Entrepreneurship and Innovation”

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In recent years, new technologies deeply integrated with crowdfunding. Technologies such as Big Data, artificial intelligence, and blockchain are driving the continuous innovation of the business model. Crowdfunding goes beyond a method for fundraising to become a process of the industrial chain operating.

### 1. Basic situation of digital crowdfunding

The digital crowdfunding refers to a comprehensive crowdfunding service model that provides funds, technologies and talents relying on the mobile Internet and digital technologies such as Big Data, artificial intelligence, and blockchain. This model breaks through the boundaries and connotations of traditional crowdfunding. Thanks to the power of digital technology, the operating efficiency of the entire industry chain is promoted. In addition, the digital crowdfunding model also represents the development trend of the entire crowdfunding industry, and the traditional model that only provides funds for enterprises has gone forever.

### 2. Main features of digital crowdfunding

1) Mobile Internet technology broadens the traffic channels for crowdfunding projects. Due to the lack of stable and sustainable potential users, traditional projects only have single kinds of medium for marketing, which results in many excellent ones stifled in the cradle.

With the continuous development of mobile Internet technology, traffic as a product derived from the Internet is undoubtedly an important means for acquiring users. Crowdfunding projects can use the traffic resources of the Internet platform to greatly expand the number and scope of potential users, break through the time and geographical limitations, and attract supporters from all over the world more quickly to invest in targeted products or creative ideas.

2) Precision marketing and strengthened risk control with the use of Big Data and other technologies. On the one hand, the use of Big Data facilitates an accurate marketing of customers. The marketing efficiency is improved for the best match between the project and the investor by calculating users' investment preferences, life interests and consumption habits through their behavioral path on the Internet, and then sending them projects tailored to their taste. In addition, the Big Data technology will play its role in market projection. With macro data of the market and accumulated information on user consumption,



the crowdfunding platform can predict the consumer psychology and consumption propensity of each age group in the future, and thereby predict the market trend. On the other hand, Big Data can strengthen the risk control. Data mining and analysis enhances the informed, comprehensive assessment of the key dimensions of project sponsor, such as credit, qualification and financial position, which will improve project screening efficiency, promptly block out the unqualified initiators, strengthen risk control and ensure the safe operation of projects.

3) The establishment of a SaaS service platform. This type of SaaS service platform is designed to integrate online and offline resources, and directly connect crowdfunding enterprises with demanders and service providers with the use of digital management tools. This service is characterized by the standardized operation methods provided to the entrepreneurial services, which can effectively improve the success rate of start-ups by reducing the time and capital costs and increasing the transparency of services.

4) Enhanced scientific researches of crowdfunding enterprises by relying on external technology enterprises. Crowdfunding projects are often just the ideas, and there is still a long way to go before they are implemented. This is also an important reason for the premature failure of many crowdfunding projects. The digital crowdfunding model advocates back-end support for crowdfunding enterprises with strong technical strength, which is especially important for the development of technology innovative enterprises. The enterprises are provided with “industry chain services + intelligent manufacturing solutions

+ channel resources” services thanks to the external technology platforms, In particular, the industrialized flexible manufacturing capabilities will back the incubation of technology innovation enterprises.

### **3. Future application of digital technologies in crowdfunding**

#### **(1) AR/VR**

The pain point of the crowdfunding industry is also derived from its uncertainty in “investing in the future”. Projects are often launched with nothing but a novel, interesting idea. There is a significant time difference between the launch of project and its implementation. This time difference will not only increase the consumer’s concerns about future uncertainties, but also result in the failure to achieve the originally promised return and the damage to reputation arising therefrom.

As new technologies such as AR/VR mature, they can significantly increase user engagement and provide users with a broader range of rewards. On the one hand, new technologies make the full participation of project supporters possible. At the beginning of the project, the presentation of project samples is no longer limited to text descriptions or 2D images. The initiator may create physical product in virtual reality and apply it to the corresponding scenes. Users can have an intuitive understanding of crowdfunding in an immersive way, providing a valuable reference for user decisions. After a project is officially launched, users can participate in the whole process of project operation through AR/VR technologies, such as watching the production process of physical products and simulating the shooting scene of a film or television show. They are not

only able to conduct real-time supervision to guarantee the quality of project operation, but also to have closer interaction with the project sponsors. The interactive collaboration will optimize the project process. On the other

hand, AR/VR technologies extend the ways of how the crowdfunding projects pay back their investors, and the aforesaid experience and participation can also constitute a “soft” return as experience consumption.

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- **new technologies make the full participation of project supporters possible. At the beginning of the project, the presentation of project samples is no longer limited to text descriptions or 2D images. The initiator may create physical product in virtual reality and apply it to the corresponding scenes.**

#### (2) Blockchain

As an underlying technology of the current digital ecosystem, the blockchain technology has great potential in its combination with crowdfunding. The core of crowdfunding is the decentralization of people, money, things and intelligence. An individual with limited assets who's not in a group of any kind can also participate in investment projects. The essence of blockchain is the decentralization and the elimination of information asymmetry. Therefore, it can be seen that blockchain will effectively reduce the risks faced by crowdfunding itself and thus maximize the most essential advantages and characteristics. For example, distributed databases of blockchain will facilitate an efficient, accurate fulfillment of crowdfunding terms. Once the conditions of agreement determined by the project's investing and financing parties have been reached, the project will be automatically completed if a certain amount of money has been raised. Otherwise, the funds will be returned to the investors. This not only accelerates the progress of the entire crowdfunding process, but also

improves the accuracy of the crowdfunding agreement performance and enhances the trust of participants. In addition, it avoids human manipulation of results, enhances the transparency of process and provides strong protection for small innovators.

Therefore, the digital technologies can greatly optimize the operational efficiency of projects and optimize the general situation. With the use of digital technology, we can accurately grasp the potential needs of users and achieve a seamless integration between projects and people. Also, it can help users deeply participate in the operation of crowdfunding projects, enhance the transparency of the process, reduce the operational risks of projects and increase the trust of participants.

In summary, digital agricultural loans, full-supply chain finance and digital crowdfunding show that digital technologies are more than just theoretical “magic wand” to improve the financing ability of farmers, micro-, small- and medium-sized enterprises as well as other key target groups. Industry practice has proved that the path of digital financial inclusion is totally feasible.



## Summary and Outlook

- The digital development of financial inclusion is a major trend. Redefining the logic of credit has effectively reduced the service cost.
- Digital technologies will integrate faster into and reshape the traditional credit evaluation system.
- Digital financial inclusion will be characterized by a large-scale development. Fin-tech enterprises and traditional financial institutions have broad space for cooperation in order to jointly address the secondary risks caused by the development of financial inclusion.
- The sustainable development of digital financial inclusion requires the accelerated construction of financial infrastructure, especially mobile Internet and so forth, as well as digital identity recognition mechanism and service platforms. It is necessary to promote the construction of standard data systems, to effectively maintain data security, to promote data integration and sharing; it's also necessary to build a unified regulatory framework, innovate regulatory technologies, and build a secondary risk "firewall" while comprehensively promoting the construction of the financial inclusion market.

Digital technologies represented by cloud computing, Big Data, mobile Internet, and artificial intelligence accelerate the formation of models of digital financial inclusion. Eventually, technologies help respond to the questions on how finance can be inclusive, beneficial, and sustainable, and provide quality services. Of course, there is no denying that the new changes in terms of business model, technology application, and risk characteristics have brought certain challenges to the development of digital financial inclusion, such as the increased difficulty of risk management, insurmountable digital divide, lagging infrastructure construction, and regulatory system to be improved. However, in general, it is inevitable and irreversible for financial inclusion to go digital. Its core lies in the fact that, on the one hand, it changes the credit logic of traditional financial inclusion, and the concept that data is credit becomes a reality. On the other hand, it curtails service cost of traditional financial inclusion, and improves operational efficiency. Therefore, digital technologies are an important force to promote the large-scale, in-depth development of financial inclusion.

## SECTION I

# Development Trend of Digital Financial Inclusion

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### **1. The traditional credit evaluation system will be supplemented or even replaced by AI technologies**

As the application scenarios of Big Data, cloud computing, and AI technologies continue to increase, fin-tech companies are increasing their attention to the use of unstructured data, such as phone call records, web browsing history, and data based on questionnaires to analyze consumer's psychological behavior. The credit evaluation model established on the basis of these data is a useful supplement to the traditional credit evaluation system based on collateral and credit reference information. In the future, it may be possible to rely on the new Big Data- and AI-based system to make a comprehensive, accurate evaluation of user

credit. This will have a profound impact on the traditional credit evaluation system.

### **2. An increasingly large-scale development for digital financial inclusion**

Innovations of AI, especially those in practical application, not only greatly reduce the cost of information collection, customer acquisition, risk identification and management in financial services, but also make financial services more targeted and the risk pricing more reasonable. The development of mobile Internet completely removes the geographical and time constraints on traditional financial services, lowers the transaction costs and threshold of financial services, effectively expands the coverage of financial services, greatly improves the

allocation efficiency of financial resources, and makes the large-scale development of financial inclusion possible.

inclusion development in a short period of time. This is also the inevitable way of growth for digital financial inclusion.

### **3. The in-depth cooperation between fintech enterprises and traditional financial institutions is an inevitable trend**

Digital financial inclusion will not develop on the traditional financial institutions or technology companies alone. It is imperative for all parties to forge a deep cooperation. The advantage of financial institutions lies in the financial licenses for related businesses and sound network systems, and the inherent advantages of acquiring customers. The advantages of fintech companies lie in their technical strength and data resources that could reduce service costs and optimize risk control. Therefore, the multi-level and in-depth cooperation between the two sides will help improve the speed and scale of digital financial

### **4. Digital financial inclusion is vulnerable to secondary risks**

Through the new credit risk control model, digital financial inclusion places the groups out of reach for traditional financial institutions into the financial service system. But it also brings forward the risks that traditional financial institutions are not exposed to. In addition to the original liquidity risks, settlement risks, operational risks, financing risks and data privacy protection risks, digital financial inclusion will also face technical risks and platform risks. The new risks brought by digital finance will intertwine and overlap with the inherent risks of financial services. Coupled with the rapid iteration of products, diversified financial risks will come into play.

## **SECTION II**

# **Sustainable Development of Digital Financial Inclusion**

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### **1. Infrastructure construction**

First, it is necessary to strengthen the construction of infrastructure such as mobile Internet. This is the prerequisite for the development of digital financial inclusion. Second, there must be a safe, reliable digital identity recognition mechanism that capitalizes on advanced technologies such as biometric identification to introduce a

credible digital ID. This would consolidate the basis of the digital credit system. Third, it is necessary to establish a service platform and a centralized settlement mechanism for products and services to link the regulatory authorities, practitioners and consumers.

### **2. A unified data standard and data security**

The existing credit information system is based on the standard of China's central bank. There is not any clear, unified standard for the collection, processing and application of credit data. The digital gap is ubiquitous, and it is hard to integrate and share data information. The regulatory authorities should take the lead in formulating unified standards for credit data, integrate information from public security, taxation, finance and other departments, remove the information silos, enrich the channels and sources of credit information, promote the integration of credit information and other social information, and actively cultivate credit reference agency engaged in SMEs and micro-enterprises' credit reporting and personal credit reporting business. At the same time, on the premise of ensuring data security and privacy, the sharing of data resources shall be strengthened.

### **3. A clear regulatory framework and improved regulatory system**

At present, the government has not established a unified, sound supervision system. Most of the financial institutions in the public sector are directly managed, while the management rules over commercial financial institutions is far from clear. Such problems are not prominent in the initial construction of financial inclusion based on infrastructure construction and marketing. However, in the long run, especially after the formation of a market, excessive intervention by the public sector is likely to result in inefficiency and high threshold. Also, the lax supervision of commercial financial institutions causes frequent risks, which is not conducive to the comprehensive construction and efficient operation of the market. In the

future, the government should improve the regulatory system, incorporate government-led financial institutions and commercial financial institutions into a unified regulatory framework, combine direct intervention and indirect control, guide the construction of financial inclusion market, cut market risks, improve resource allocation efficiency, and ensure commercial sustainability of relevant services.

### **4. Use digital technologies to deal with the secondary risks of digital financial inclusion**

There are more types of risks and faster updates for digital financial inclusion. The comprehensive supervision technology for digital finance should also be timely updated and digital technologies shall be used to prevent the secondary risks. In addition to the inherent regulatory frameworks such as laws and policies, the innovation regulatory model of scientific means such as big data and AI improves the scope and frequency of data collection and reduces the blind spots of supervision. Information collection and sharing technology are used to achieve cross-platform supervision with interconnected, transparent data. Using remote technology rationally promotes communication between financial practitioners and regulatory authorities, and reduces risk misjudgment caused by information asymmetry. The integration of a credit evaluation system, an anti-fraud system, a monitoring/early warning system and other digital finance risk control systems can identify and combat individual risks in advance before they spread out.

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