OLIVER WYMAN | 中证信用
China Securities Credit Investment

CHINA CREDIT-TECH MARKET REPORT

TECHNOLOGY-DRIVEN VALUE GENERATION IN CREDIT-TECH

ACKNOWLEDGEMENT

PREFACE

With the rapid development of the fintech sector globally, almost every aspect in the traditional financial services industry, including investment, transaction services, and financing, have been greatly disrupted. Previously, the industry relied heavily on expert judgment when it came to decision making for lending or investment. However, with an ever-faster pace of data generation and comprehensive data gathering through e-commerce, social networks, and other use cases of mobile internet, financial institutions, as part of the broader internet ecosystem, have been investing more and more heavily in data, technology, and analytics. A lot more decisions, especially with respect to consumer finance, have been automated with the support of data analytics. In the meantime, taking advantage of the data "big bang", fintech players could develop new business models as alternative financial services "platforms" while disintermediating the traditional players. The whole fintech development around the world has thus significantly improved the efficiency of the financial services industry (Exhibit 1).

Exhibit 1: Pillars of fintech industry

CAPITAL/FUNDING → **INVESTMENT** → **TRANSACTION** → **FINANCING** → ASSETS

Traditional banking products/services

INVESTMENT
- Wealth management and asset management
- Money markets
- Capital markets

TRANSACTION
- Checking/savings account
- Payment & transfer
- Cash management services

FINANCING
- Loan
- Trade finance
- Specialty finance

Fintech products/services

INVESTMENT
- Online investment management
- Online equity investment (e.g. crowd funding)
- Online fixed income (e.g. YuEBao)
- ...

TRANSACTION
- Online payment
- Online trading (Forex, securities, commodities, etc.)
- Online account opening and servicing
- ...

FINANCING
- P2P
- Online credit asset trading (e.g. securitization)
- Online consumer finance
- Online factoring
- ...

Mobile internet   AI   Blockchain   Cloud   Big data

Credit financing, sitting at the core of financial services industry, is inevitably affected by the wave of fintech development. A highly specialized area of fintech emerged as credit technology (or "credit-tech"), reshaping the existing credit financing business model with the force of technology. The reach of credit-tech ranges from the most basic credit infrastructure to the customer facing business model and underwriting logic. Leading credit-tech players are leveraging advanced technologies, such as artificial intelligence ("AI"), blockchain, cloud computing, and big data analytics, in redefining the credit financing space. For example, credit bureaus have stepped up their effort in combining big data analytics with their business expertise to better understand borrowers' behaviors, more efficiently derive insights from financial and business data, and thus improving the discriminatory power of their productized credit scores. Credit-tech changes the way how credit risk is identified, assessed, and priced. Credit-tech solutions can improve current business models, lower costs, and improve operating efficiency.

In China, the strong economic growth over the past few decades has generated large unmet demand for financial services, especially in the consumer and small- and medium-enterprises ("SME") space. With an open attitude towards technology innovation, China was among the frontrunners of embracing and scaling up alternative internet powered lending models. With the wax and wane of the credit cycle and the recent rise in default rate across multiple asset classes in China, industry participants have wakened to the importance of data analytics and technology. Given the development, we forecast that China will become a crucial part of the global credit-tech market, if not already, and will lead the world with more impactful and astonishing innovation and disruption as data accumulates and technology advances.

This report – prepared by *Oliver Wyman*, with contributions from *China Securities Credit Investment (CSCI)* – analyses the credit-tech market, and answers the following questions:

1. What is credit-tech and how is it developing in China?

2. How big is the market and how fast will it grow?

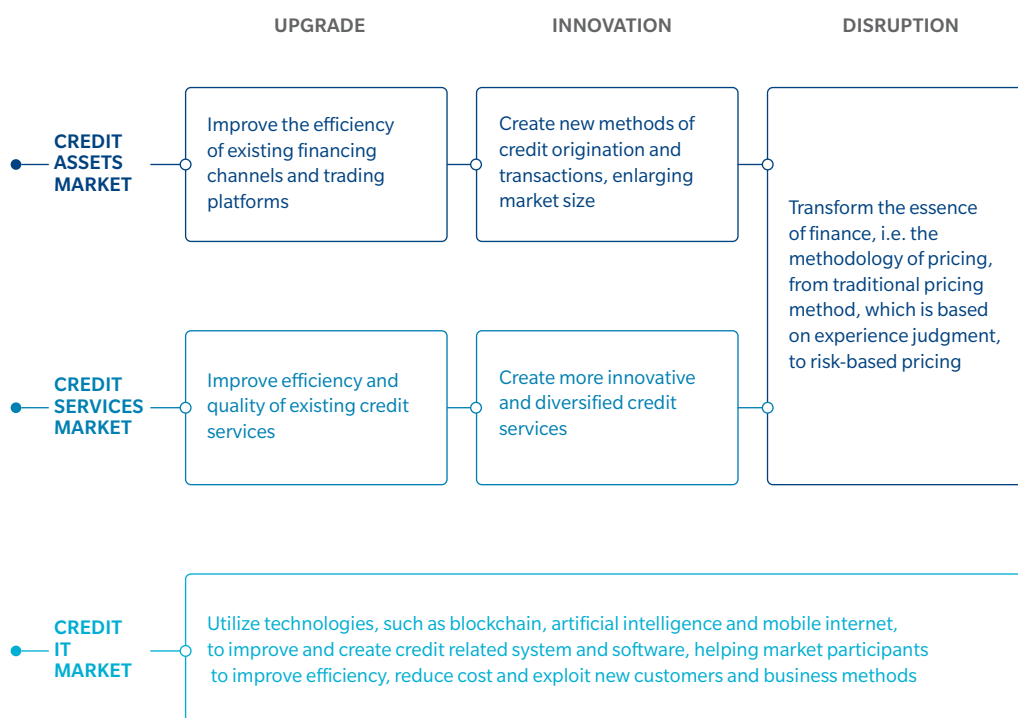3. Which are the leading players and what are the key success factors?

CONTENT

EXECUTIVE SUMMARY

This report aims to provide an overview of the credit-tech market in China and discuss how credit-tech will reshape and disrupt the financial services industry, especially with respect to credit provisioning and credit trading. The first section defines credit-tech and shows its main impacts on the three layers of the credit market: credit assets, credit services, and credit IT (Exhibit 2).

Exhibit 2: Definition and impact of credit-tech

	UPGRADE	INNOVATION	DISRUPTION
CREDIT ASSETS MARKET	Improve the efficiency of existing financing channels and trading platforms	Create new methods of credit origination and transactions, enlarging market size	Transform the essence of finance, i.e. the methodology of pricing, from traditional pricing method, which is based on experience judgment, to risk-based pricing
CREDIT SERVICES MARKET	Improve efficiency and quality of existing credit services	Create more innovative and diversified credit services	
CREDIT IT MARKET	Utilize technologies, such as blockchain, artificial intelligence and mobile internet, to improve and create credit related system and software, helping market participants to improve efficiency, reduce cost and exploit new customers and business methods		

The second section provides an in-depth analysis of the credit-tech market in China. Based on the three-layer market structure, the potential impact of credit-tech is assessed and quantified respectively. In the first layer, credit assets, impact of credit-tech is analyzed in three metrics, outstanding balance, issuance volume, and lastly trading volume. It is estimated that credit-tech enabled/supported outstanding balance will reach 68 trillion yuan

(or 35% of the total balance in the market) by 2022. New issuance-wise, 43 trillion yuan of assets could be driven by credit-tech. By 2022, 183 trillion yuan assets could be exchanged or traded with the support of credit-tech. From a servicing perspective, credit-tech driven revenue may reach 431 billion yuan by 2022 while IT revenue will be 49 billion yuan (Exhibit 3).

Exhibit 3: China credit market structure and market size of credit-tech

		2018 ADDRESSABLE MARKET	CAGR	2022 ADDRESSABLE MARKET	2022 CREDIT-TECH DRIVEN MARKET
CREDIT ASSETS MARKET	Outstanding balance	144 TN	+8.0%	195 TN	68 TN (35%)
	Issuance volume	57 TN	+8.6%	80 TN	43 TN (54%)
	Trading volume	136 TN	+15.2%	239 TN	183 TN (77%)
CREDIT SERVICES MARKET	Credit servicing revenue	367.7 BN	+29.5%	1,034 BN	431 BN (42%)
CREDIT IT MARKET	System related revenue	9.3 BN	+51.5%	49 BN	49 BN (100%)

The main players in the credit-tech market are traditional financial institutions, fintech players and technology companies. However, we believe only those with the following characteristics can be successful:

- Strong integration across technology, business know-how, branding, and resources
- A market-oriented operating model
- An Internet start-up culture
- Competitive talent propositions and incentive schemes
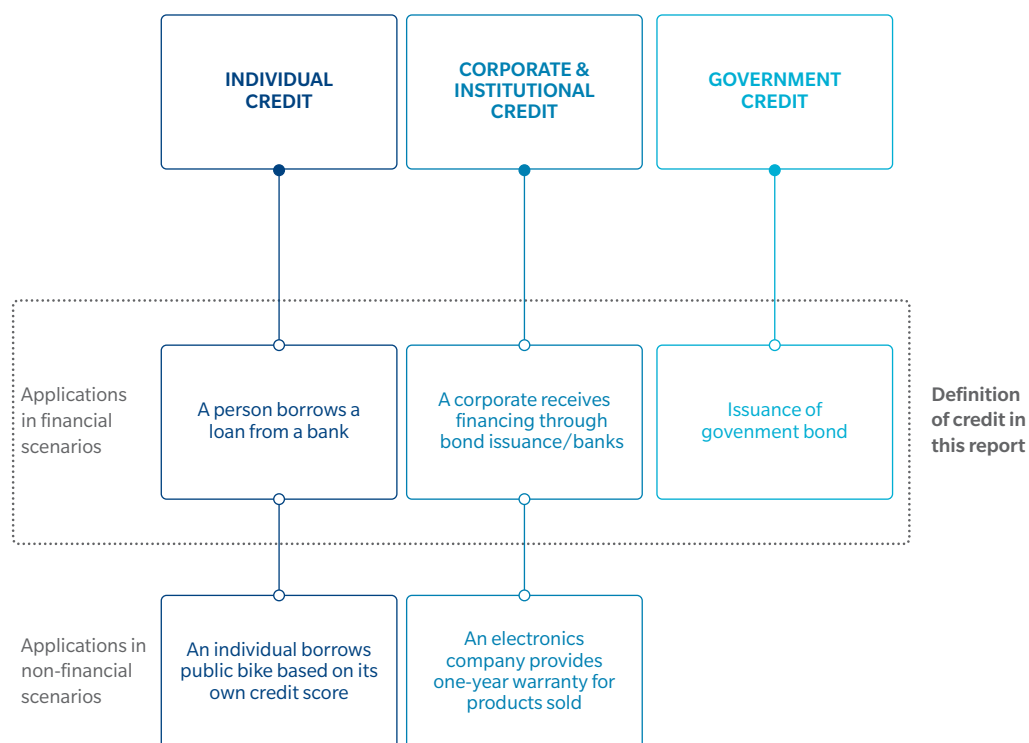
THE CREDIT-TECH MARKET
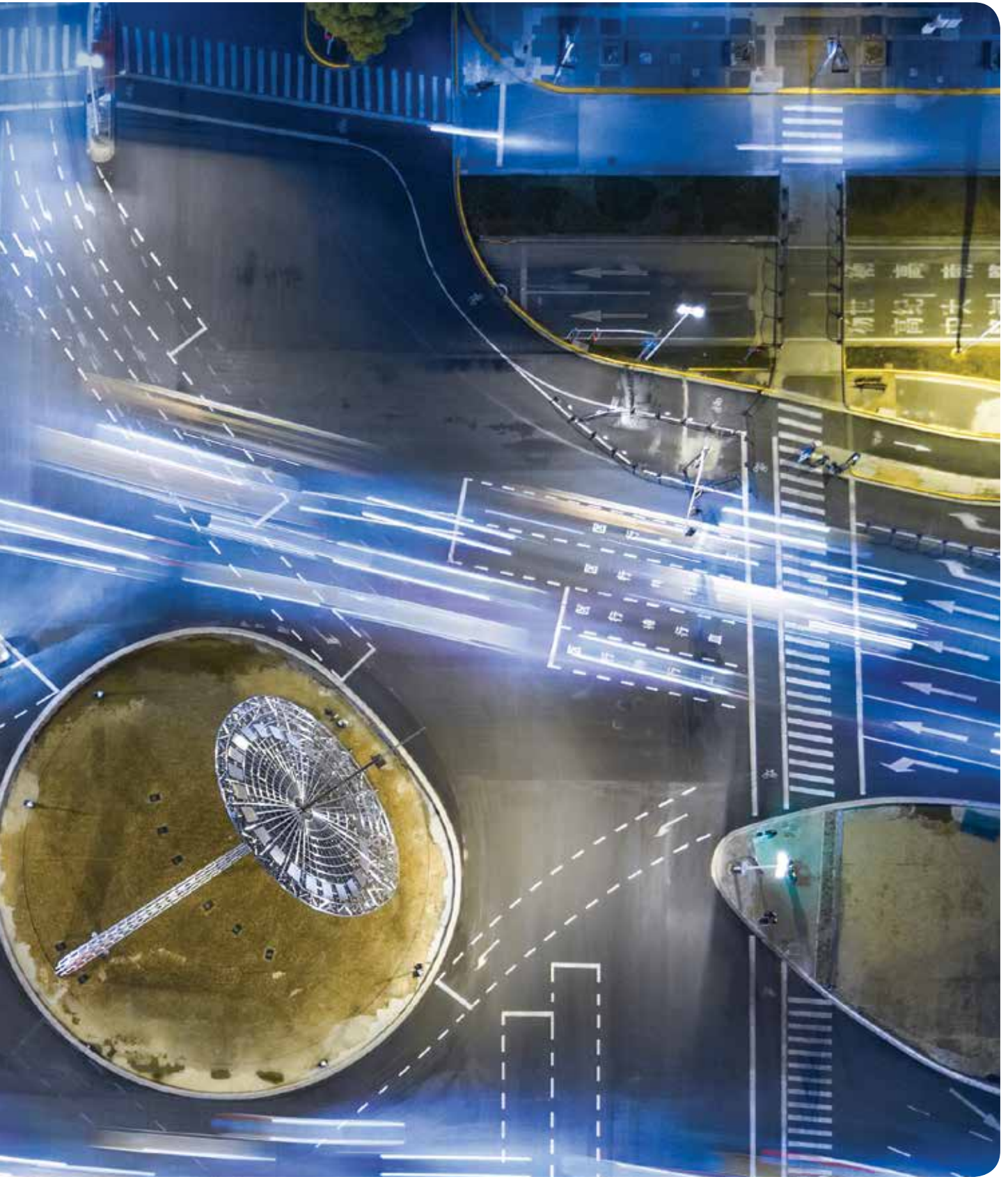
DEFINITION OF CREDIT

Credit-tech will change the environment of China's credit business. Before analyzing the impact of credit-tech, a clear definition of credit is needed.

Generally, credit implies the acquisition of money, goods, services, or other resources with the expectation of future repayment. It implies trust between the two parties involved, as the borrowing party does not reimburse the lending party immediately. Credit can be classified according to three categories of borrowing entity: individual, corporate and institutional, and governmental (Exhibit 4).

Credit can be financial, as when money is borrowed; or non-financial, as when goods are borrowed, for example, a bike. This report focuses on the financial form.

Exhibit 4: Categorization of credit

INDIVIDUAL CREDIT	CORPORATE & INSTITUTIONAL CREDIT	GOVERNMENT CREDIT

| Applications in financial scenarios | A person borrows a loan from a bank | A corporate receives financing through bond issuance/banks | Issuance of govenment bond | Definition of credit in this report |

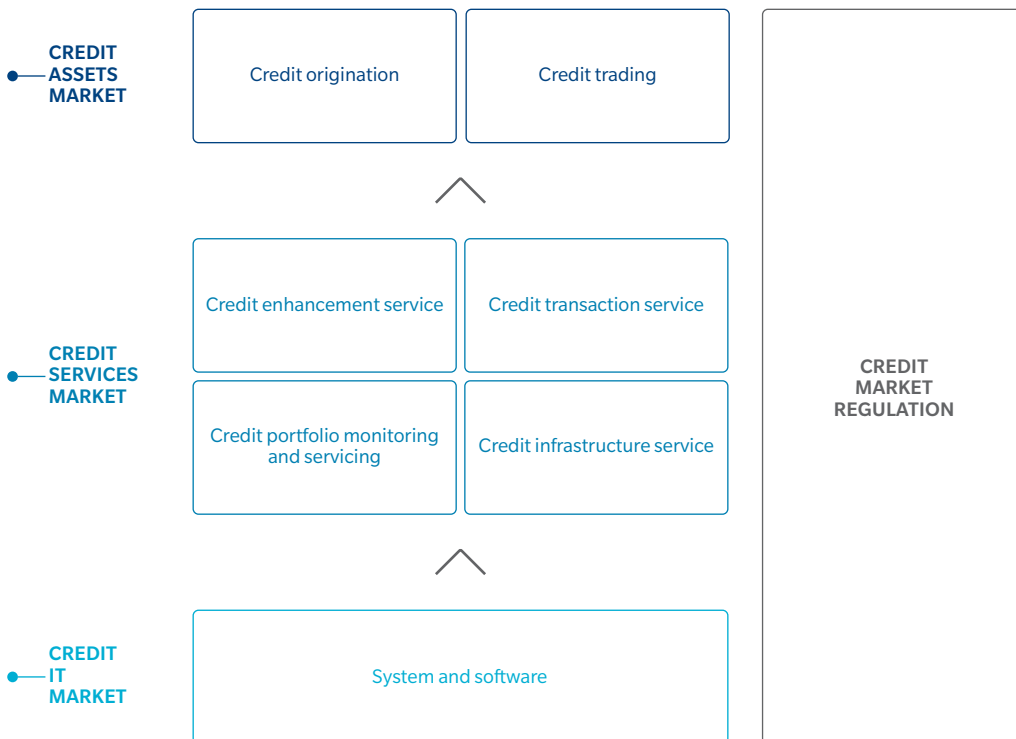| Applications in non-financial scenarios | An individual borrows public bike based on its own credit score | An electronics company provides one-year warranty for products sold | | |

CREDIT MARKET STRUCTURE

There are three layers in the credit market according to the market participants: credit assets, credit services, and credit IT. Regulators supervise the entire market, including all three layers (Exhibit 5).

Exhibit 5: Credit market structure

CREDIT ASSETS MARKET	Credit origination	Credit trading	
CREDIT SERVICES MARKET	Credit enhancement service	Credit transaction service	**CREDIT MARKET REGULATION**
	Credit portfolio monitoring and servicing	Credit infrastructure service	
CREDIT IT MARKET	System and software		

LAYER 1: CREDIT ASSETS

There are two main segments in the credit asset market:

Credit origination: This includes the origination of loans and bonds.

Credit trading: This refers to transactions of credit assets, either on public exchanges or over-the-counter platforms.

LAYER 2: CREDIT SERVICES

There are four major types of credit service that support the credit market.

Credit infrastructure services: Credit infrastructure services include data collection and the identification and assessment of risk. To assess borrowers' credit worthiness, lending institutions first collect data from various sources, both internal and external. Then, based on the credit data, lenders can conduct in-depth reviews of the borrowers' risk profiles through an internal assessment system. For corporate and government credit and asset-backed securities, rating agencies may also be engaged to provide external credit. For individuals, lenders or investors can take the personal credit report and credit scores of credit bureaus into consideration and into the approval process. Besides, through data collection, financial institutions can develop an internal rating system to facilitate the process of credit assessment and decision making at the same time.

Credit enhancement services: Credit enhancement services refer to the provisioning of reassurance to lower the default risk and improve the credit worthiness through additional collateral, reserve funds, insurance, or third-party guarantees. To obtain better credit terms (such as lower rate), borrowers can reach out to the credit enhancement companies for such services in China.

Credit transaction services: Credit transaction services include the pricing, issuance, distribution, and exchange of credit assets. For corporate bonds, securities firms and banks can price the bonds, issue them and distribute them to investors. Credit trading takes place on both public exchanges and private platforms, with the help of traders and brokers for the match-making services.

Credit portfolio monitoring and servicing: Portfolio monitoring and servicing refers to credit services offered after credit origination. It includes the monitoring and servicing of portfolios, as well as the management of non-performing loans(NPL). Portfolio monitoring companies help investors to monitor the underlying assets. Servicing companies are responsible for credit management, such as the distribution of coupons to investors and clearing services. If a borrower defaults on its obligations, the lending institutions (for loans) or the investors (for bonds) may decide to appoint an asset management company (AMC) to liquidate the collateral during the work-out process.

LAYER 3: CREDIT IT

On the bottom layer of the market, credit IT companies help credit-servicing providers improve operational efficiency and service quality by developing systems. For example, these companies are not directly involved in credit services but provide systems and software for other credit market participants to help them increase the accuracy of risk assessment, timeliness of transaction and effectiveness of monitoring.

CREDIT MARKET REGULATION

Regulators oversee the credit market and supervise its participants – the lending institutions, the credit service providers and even the IT companies which offer credit market related system support to ensure the stability of the financial markets.

A variety of players take part in the global credit market (Exhibit 6).

Exhibit 6: Example of credit market participants
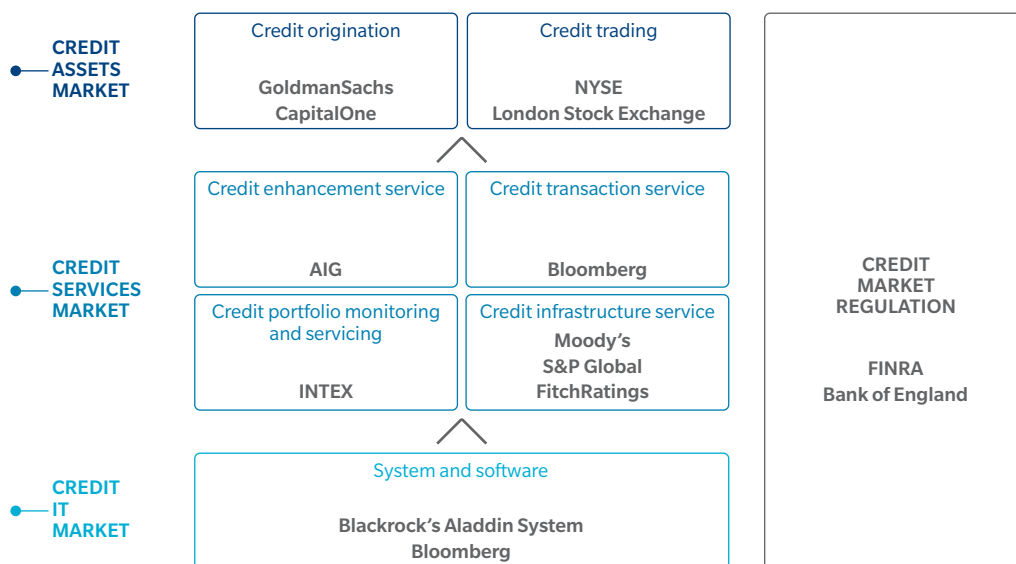
Credit assets: Credit originators are mainly banks commercial and investment banks, such as *Capital One* and *Goldman Sachs*. Credit transactions are facilitated by exchanges, such as *The New York Stock Exchange* and *The London Stock Exchange*, etc.

Credit services: Credit service providers usually specialize in one or two services. For example, *AIG* offers credit insurance to enhance the credibility of underlying credit assets. *Bloomberg* is one of the widely used trading platforms providing transaction related information. *Moody's Analytics*, *S&P* and *Fitch* are the best-known infrastructure service providers, providing rating and data analytics services. For portfolio monitoring and servicing, *INTEX* specializes in monitoring asset-backed securities.

Credit IT: Credit IT providers are usually computer technology companies that provide systems and software, such as *BlackRock's Aladdin system, Bloomberg* and etc.

Credit market regulation: Credit market regulators supervise the market activities. For example, *FINRA* monitors the bond market in the United States, and the *Bank of England* regulates banking activities in the United Kingdom.

DEFINITION OF CREDIT-TECH

Combining credit and technology has the potential to create vast opportunities and enormous potential. Credit-tech mainly refers to the use of technology innovations designed to optimize the cost and efficiency of the current credit market operating model. Technologies such as the mobile internet, artificial intelligence, blockchain, cloud computing, and big data analytics enable the credit market by upgrading, innovating, and disrupting the three-layer model (Exhibit 7).

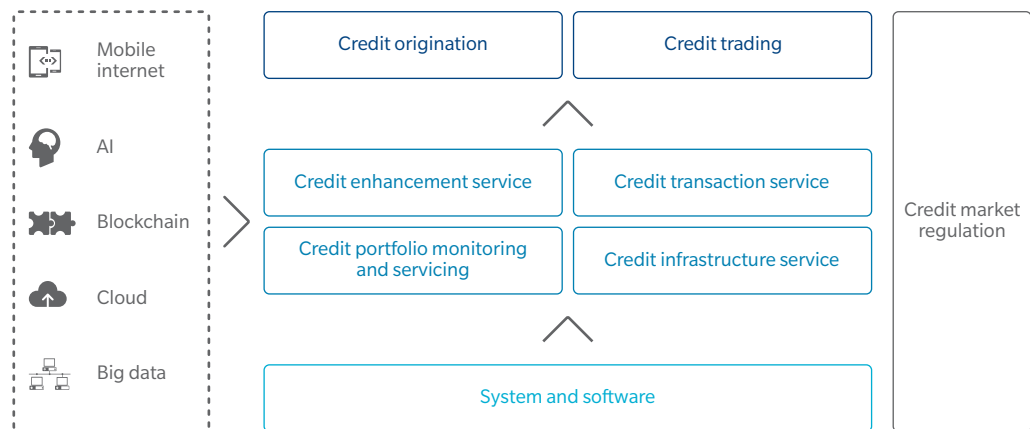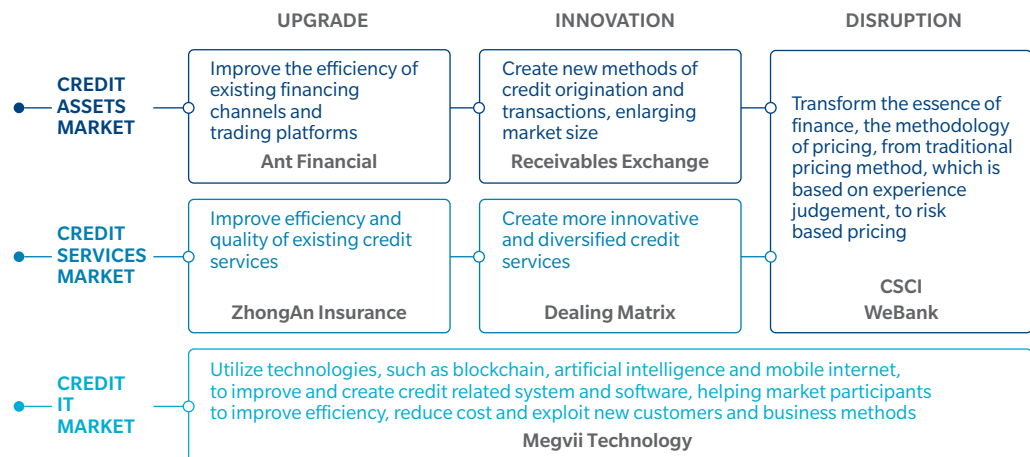Exhibit 7: Segments and drivers of China credit-tech market

Exhibit 8 shows the impact credit-tech has on the three layers of the credit market in three stages: upgrade, innovation, and disruption.

Exhibit 8: Impact of credit-tech on credit-related markets

LAYER 1:
CREDIT ASSETS MARKET

Case study – Ant Financial (Ant Huabei)

Ant Huabei is an online consumer finance product offered by Ant Financial. Based on the Zhima credit score, Ant Huabei provides a credit limit from RMB 500 – 50,000, which allows repayment after consumption. Ant Huabei integrated face recognition and fingerprint verification into its loan application and repayment processes, so that users' identities can easily be verified in a few seconds efficiently comparing to traditional measures. Face recognition and fingerprint verification not only optimize online transactions, greatly increasing the speed of loan payment, but also add an extra layer of security for repayments.

UPGRADE

Technology improves the efficiency of existing financing channels and trading platforms in the credit asset layer, thus reducing costs and expanding client coverage. Traditional financial institutions have started to use technology to optimize and speed up the lending process.

LAYER 1:
CREDIT ASSETS MARKET

Case study – The Receivables Exchange

The Receivables Exchange (TRE) provides large and medium corporates with an online marketplace for trading accounts receivable. Previously, those companies could only sell their receivables to banks, which have stringent requirements for assets, usually making the process slow. By utilizing cloud technology, TRE provides an auction-based platform that links corporates with a broader network of potential qualified institutional investors. In this way, corporates can sell their accounts receivable directly to a wider range of investors to obtain financing in the form of working capital, thus improving their own asset liquidity.

INNOVATION

Technology can also help innovate in the credit asset layer by creating a new customer acquisition model and new transaction platforms, further enlarging the market size. For example, new online channels have emerged to provide financing to individuals and enterprises.

UPGRADE

Technology can enhance the capabilities, qualities, and efficiency of existing credit service providers. For example, banks can collaborate with third party data providers to build risk management models, which help to better assess the risk profile of potential borrowers.

Case study – ZhongAn Insurance

ZhongAn upgraded its traditional enhancement service by introducing a credit insurance product to serve unmet demand in the consumer finance asset-backed securities (ABS) market.At present, the public ABS market has pain points at both ends. On the asset side, vertical consumer finance companies find it hard to enter the ABS market because of their low credit endorsements. Meanwhile, they lack low-cost and stable capital and an effective risk management system for consumer finance because they have not yet accumulated sufficient data. On the capital side, against the backdrop of "asset shortage", consumer finance-related ABS has come into favor in the market. And most securities companies, trust companies, and banks do not have the systems development capability needed in the consumer finance business.

To ease those pain points, ZhongAn provides a credit enhancement service for the top consumer finance platforms by leveraging its big-data and risk-management capabilities. It has also linked those platforms with major financial institutions to ensure a safer and more efficient flow of assets in the ABS market.

INNOVATION
Technology can help create credit services that are more targeted, customized, and dynamic, and that are currently offered. One innovative credit service, for example, matches quotations and transactions, thus linking assets and funding on over-the-counter exchanges.
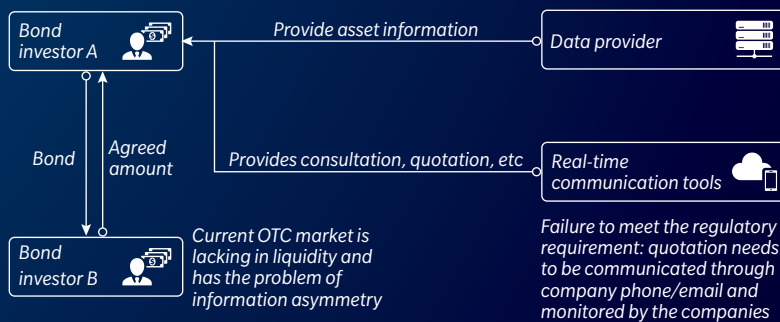
Case study – Dealing Matrix

Dealing Matrix (DM) is one of the largest institution over-the-counter asset quotation platforms in China and is committed to provide the most effective price quotation, with the aim to create the Chinese version of Bloomberg. DM uses big data, natural language processing and intelligent matching engines to help financial institutions better understand customer needs, and efficiently target trading counterparty. Through the aggregation effect of the platform, DM promotes the transaction frequency of credit assets, especially the low-liquidity credit assets. DM also integrates the pricing information into various analytics tools, and combines data such as third-party credit rating information, negative public opinions and industrial and commercial litigation, to provide investors with a comprehensive investment, research and trading platform.

Exhibit 9: Case study – Dealing Matrix

BEFORE CREDIT-TECH ENABLEMENT

Bond investor A

Provide asset information

Data provider

Bond

Agreed amount

Provides consultation, quotation, etc

Real-time communication tools

Bond investor B

Current OTC market is lacking in liquidity and has the problem of information asymmetry

Failure to meet the regulatory requirement: quotation needs to be communicated through company phone/email and monitored by the companies

AFTER CREDIT-TECH ENABLEMENT

Bond investor A

Bond investor B

Bond investor C

Bond investor N

Inquiry and quotation

Asset information

Real-time communication

Research reports

OTC quotation platform
DM provides real-name identity check for traders and an open platform for price inquiry and offering, and stores all communication history and quotation records

LAYER 2: CREDIT SERVICES MARKET

DISRUPTION

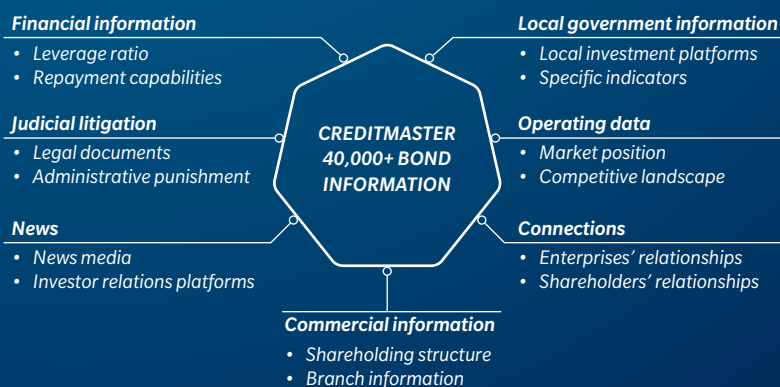As with credit assets, credit services can be transformed by technology. Credit-tech changes the pricing methodology from traditional experience- and product-based pricing to risk-based pricing. For example, online lending platforms have adopted big-data analytics, artificial intelligence and machine learning to analyze real-time data and build an all-round portrait of a customer. The result is more precise pricing.

Case study – CSCI

CSCI offers clients an integrated credit risk management solution for bond markets. Investors make investment decisions based on the limited information provided by bond issuers. The CSCI system, CreditMaster, helps them make better-informed decisions. CreditMaster offers financial data, judicial proceeding, operating statistics, latest administrative, relationships with associated companies and shareholdings structure and algorithms based on the combination of data and rating professionals' experience. The system has changed the way in which investors assess a potential bond investment, since they can evaluate investments based on more information. The alert system will rate automatically, quantify risks and sent warnings to the investors whenever there is information that may adversely affect the credit level of the bond issuer or the bond in the investment portfolio. Hence, timely decision can be made (Exhibit 10).

Exhibit 10: Case study – CreditMaster

Financial information
- *Leverage ratio*
- *Repayment capabilities*

Judicial litigation
- *Legal documents*
- *Administrative punishment*

News
- *News media*
- *Investor relations platforms*

CREDITMASTER 40,000+ BOND INFORMATION

Local government information
- *Local investment platforms*
- *Specific indicators*

Operating data
- *Market position*
- *Competitive landscape*

Connections
- *Enterprises' relationships*
- *Shareholders' relationships*

Commercial information
- *Shareholding structure*
- *Branch information*

LAYER 3: CREDIT IT MARKET

Technology can also be utilized to improve existing credit related systems and software, as well as create new versions. The new systems have the potential to improve efficiency and reduce costs. They can help borrowers, originators, and investors to make the most of new customers and business models.

Case study – Megvii Technology Limited

Megvii Technology Limited is one of the largest AI technology companies in China. It offers facial recognition solutions, including detection, comparison and search. Credit service providers typically integrate the company's facial recognition system into their all-in-one risk assessment solutions for financial institutions such as banks and online consumer finance platforms. By using the facial recognition technology, banks can easily identify users when they log in to a mobile bank application and transfer money to third parties.

DISRUPTION

As with credit assets, credit services can be transformed by technology. Credit-tech changes the pricing methodology from traditional experience- and product-based pricing to risk-based pricing. For example, online lending platforms have adopted big-data analytics, artificial intelligence and machine learning to analyze real-time data and build an all-round portrait of a customer. The result is more precise pricing.
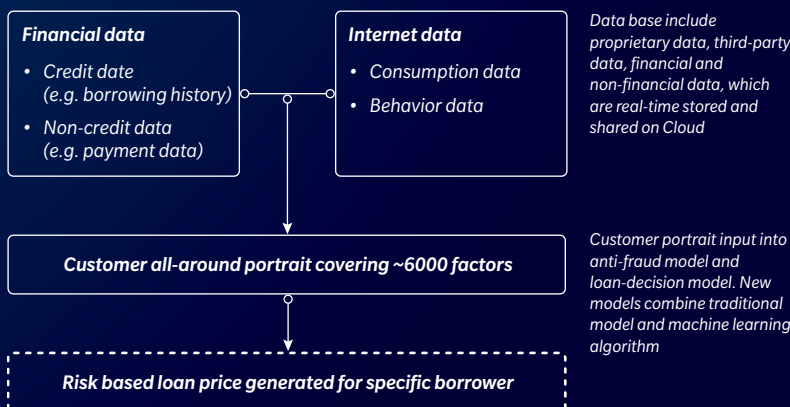
Case study – WeBank

As China's first purely online bank, WeBank is one of the pioneers of online consumer finance in terms of both technology and product. For example, WeBank actively conducts risk-based pricing for certain clients based on a model trained on vast amounts of high quality data, which distinguishes the credit status of different clients. The transformation at this stage mainly comes from leveraging technology to improve the risk-pricing process; then risk can be priced according to customer-specific risk rather than the product. Big-data technology is heavily used in the entire risk-based pricing process. WeBank identifies both financial and non-financial data related to the applicant from proprietary and third-party databases. The data provides an all-around portrait of the applicant based on several thousand factors, which is then used in the decision model to generate a dynamic risk-based price for each borrower (Exhibit 11).

Exhibit 11: Case study – WeBank

BEFORE CREDIT-TECH ENABLEMENT: PRODUCT BASED PRICING

Target group

Migrant workers	
Blue collars, subprime white collars	
University students	
Subprime to prime white collars	

Traditional pricing method is mainly based on experience, proprietary data & credit model; for example, product based pricing set different loan price by borrowers' occupation
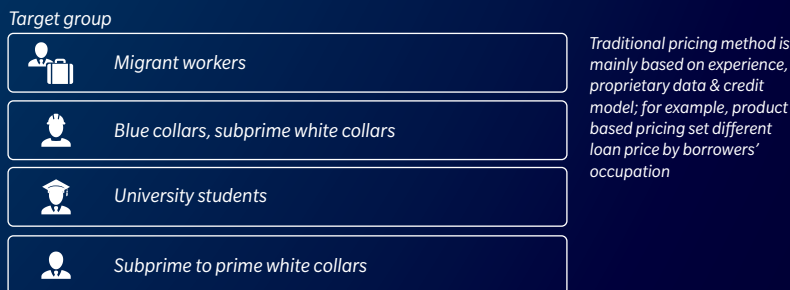
AFTER CREDIT-TECH ENABLEMENT: RISK BASED PRICING

Financial data
- Credit date (e.g. borrowing history)
- Non-credit data (e.g. payment data)

Internet data
- Consumption data
- Behavior data

Data base include proprietary data, third-party data, financial and non-financial data, which are real-time stored and shared on Cloud

Customer all-around portrait covering ~6000 factors

Customer portrait input into anti-fraud model and loan-decision model. New models combine traditional model and machine learning algorithm

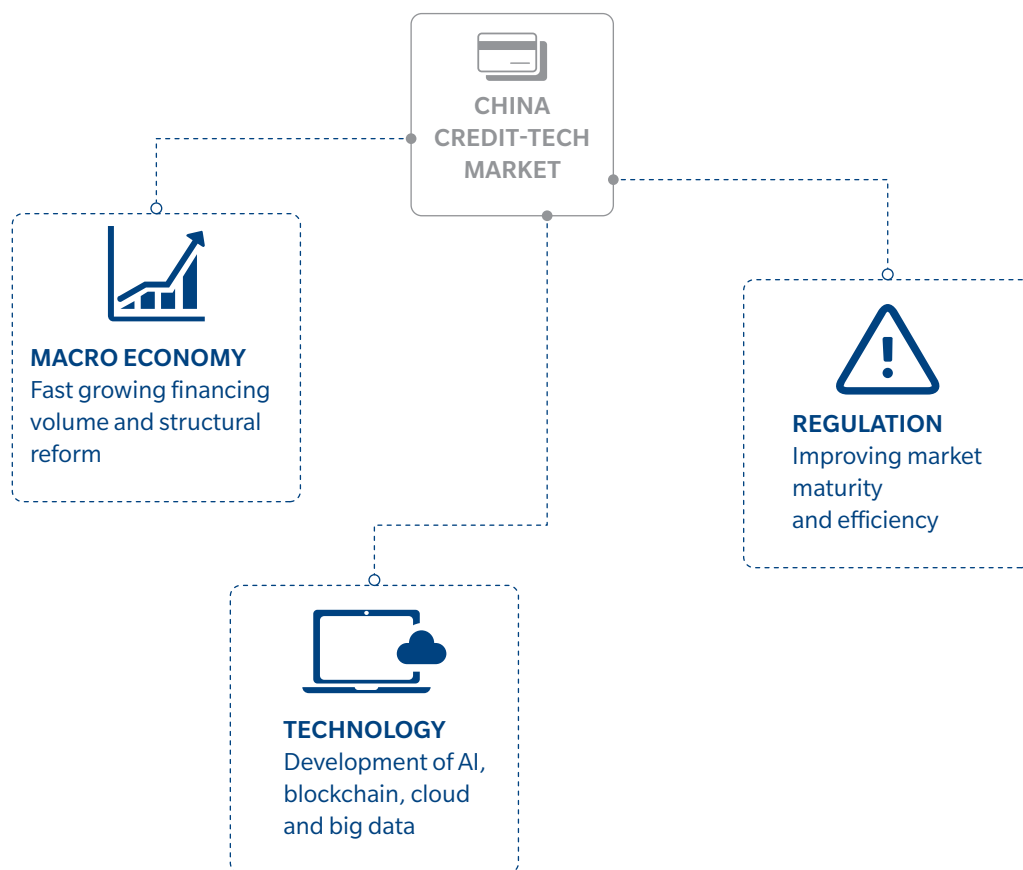**Risk based loan price generated for specific borrower**

CREDIT-TECH MARKET IN CHINA

MACRO DRIVERS OF CREDIT-TECH MARKET

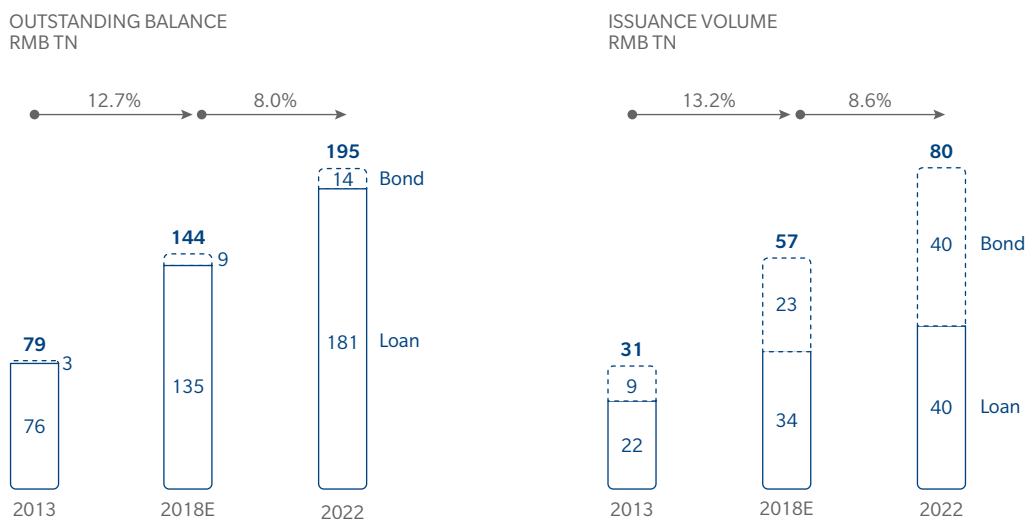The impact of credit-tech in China will depend on macro drivers such as the economy, regulation, and technology.

Exhibit 12: Macro drivers of credit-tech market

CHINA CREDIT-TECH MARKET

MACRO ECONOMY
Fast growing financing volume and structural reform

REGULATION
Improving market maturity and efficiency

TECHNOLOGY
Development of AI, blockchain, cloud and big data

MACRO ECONOMY

Fast growth of credit financing: China has surpassed Japan to become the second largest economy in the world. The continuous fast growth has been supported by the large scale of financing activities, as an expanding credit market creates opportunities for both financial institutions and credit-service providers. The outstanding balance of bonds and loans has increased significantly, from 79 trillion yuan in 2013 to 144 trillion yuan in 2018, at a compound annual growth (CAGR) of 13%. The credit expansion continues to support the development of real economy. As the economy grows, we expect the volume of financing to rise in the future.
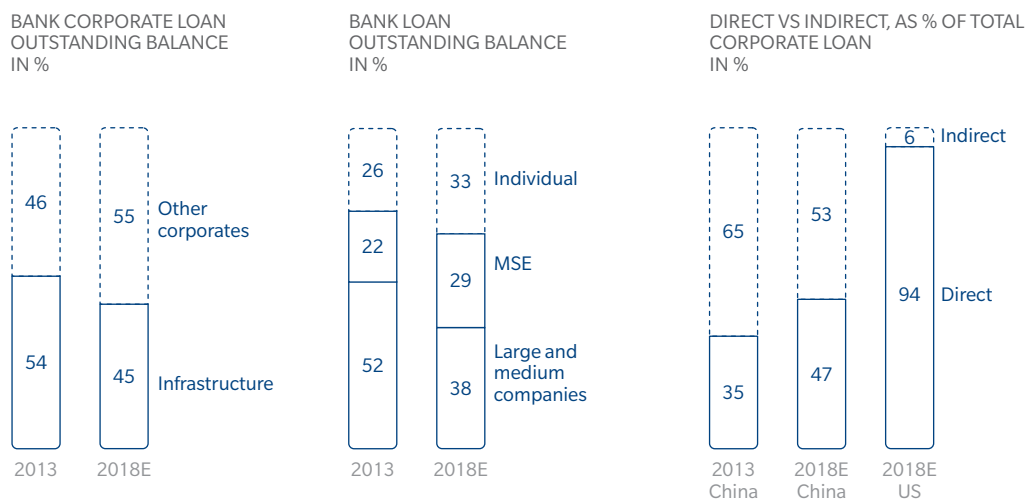
Exhibit 13: Volume of credit assets (2013–2022F)

OUTSTANDING BALANCE
RMB TN

```
       12.7%      →      8.0%      →

                                    195
                                    ┌14┐ Bond
                         144        │   │
                         ┌──┐9      │   │
                         │  │       │181│ Loan
      79                 │  │       │   │
      ┌─┐3               │135│      │   │
      │76│               │   │      │   │
      └──┘               └──┘       └──┘
      2013               2018E      2022
```

ISSUANCE VOLUME
RMB TN

```
       13.2%      →      8.6%      →

                                    80
                                    ┌──┐
                         57         │40│ Bond
                         ┌──┐       │  │
                         │23│       ├──┤
      31                 │  │       │40│ Loan
      ┌─┐9               │34│       │  │
      │22│               └──┘       └──┘
      └──┘
      2013               2018E      2022
```

Source: CRIRC, PBOC, WDZJ, WIND, Oliver Wyman Analysis

Structural reform of the financial system

• **Changes in borrower sector – away from infrastructure, towards other industries:**
Historically, the corporate loan portfolio of Chinese banks was heavily skewed towards
infrastructure sectors, such as railway, highway, and public-utility sectors. After China's
growth in consumption and in other sectors of the economy, the portfolio mix has shifted
towards other industries.

• **Changes in borrower type – away from large and medium enterprises, towards
individuals and micro and small enterprises (MSEs):** Banks have traditionally preferred
to lend to large stated-owned enterprises, but a significant growth in alternative
lending channels has led to a fast expansion of credit to individuals and MSEs. The total
credit offered to individuals and MSEs will further increase as the middle classes and
their disposable incomes grow, as lending institutions improve their risk management
capabilities and as the government launched favorable policies to MSEs recently.

• **From indirect financing to direct financing:** China's capital market is less developed than
those in many developed countries. Therefore, corporates rely mainly on indirect financing, for
example, bank loans. Continuous improvements in the functioning of China's capital market
will cause a shift towards direct financing, such as corporate bonds and equity (Exhibit 14).

Exhibit 14: Structural changes in credit industry

BANK CORPORATE LOAN
OUTSTANDING BALANCE
IN %

BANK LOAN
OUTSTANDING BALANCE
IN %

DIRECT VS INDIRECT, AS % OF TOTAL
CORPORATE LOAN
IN %

	2013	2018E	
Other corporates	46	55	
Infrastructure	54	45	

	2013	2018E	
Individual	26	33	
MSE	22	29	
Large and medium companies	52	38	

	2013 China	2018E China	2018E US
Indirect			6
	65	53	
Direct	35	47	94

Source: CBIRC, PBOC, Wangdaizhijia, The Fed, SIFMA, Bloomberg, WIND, Oliver Wyman analysis

REGULATION AND POLICY

Break of implicit guarantee: As China's credit market matures, the implicit guarantee is expected to be broken, leading to growing bond defaults. Risk pricing will then become significant, as the owners of the underlying assets will need to bear the credit risk.

Market deleveraging: After a rapid expansion, the credit market is approaching a turning point in terms of growth. The government has recently started to push deleveraging and we expect a reduction in debt levels of state-owned enterprises. Despite the potential impact of deleveraging, there is still strong demand in China for financing to support the real economy. This demand will continue to drive the development of the credit market.

Change in trading market structure: There are currently two types of market for credit trading.

The first type is high-quality, high-liquidity public markets, which include public exchanges and the interbank market. Historically, these markets have made massive use of credit enhancement, but they are now being challenged by defaults, creating a need for risk assessment, risk pricing, and trading. This market is undergoing significant transformation.

The second type of market is the various over-the-counter private markets, which have been the major source of shadow-banking and internet finance assets. In general, these markets lack well-developed infrastructure and the assets traded are non-standardized. There are calls to make private transactions more transparent and traceable, so they can better support risk pricing, product structuring and asset liability matching. In the long term, these markets can be transformed into important supplement to the public market in a multitier structure in China.

TECHNOLOGY

Technology has been playing a pivotal role in establishing and improving standards and infrastructure in the Chines credit market. Four main technologies are disrupting the industry.

Mobile internet: Mobile internet has changed the way of credit market operations. Financial institutions can expand the customer coverage with the help of mobile/ Internet despite of the limitation of physical presences of branches. This also helps increase the efficiency of the credit markets.

Cloud computing: Cloud computing refers to storing, managing, and processing data via a network of remote servers, instead of locally on a server or personal computer. This is an innovation approach to faster and cheaper operating infrastructure that efficiently resolves security and transparency issues in data storage, providing a foundation for a more flexible asset-light operating models. For credit market, cloud computing resolves the computing and data capacity issues for financial institutions.

Big data analytics: Big data is a term that refers to data sets of which the volume is too large to be captured, managed, processed and collated in a reasonable amount of time manually or by mainstream software tools for the purpose of more positive business decisions. Through the collection of various kinds of data, including both financial and behavioral data, financial institutions have strengthened their risk identification, assessment, pricing and mitigation process.

Artificial intelligence: AI is the broader concept of machines being able to carry out tasks in a way that we would consider "smart" or human, it combines the machine learning with imitation of human cognitive functions and orchestration of the cognitive components with data and reasoning. One application example is intelligent voice processing, which analyzes news keywords through machine learning and summarizes public opinions of related companies.

Technology will help to upgrade credit-related systems and improve credit-servicing quality. Improvements in internal capabilities and external support will lead to higher credit origination and trading demand. The expected result will be a larger market in terms of both issuance and trading volume.

Going forward, technology can help credit-related companies to explore avenues that credit market participants have not pursued up to now – either because they were not able to or they did not have sufficient incentives. Technology can therefore drive further development in the credit market.

MARKET SIZE

Technology development and upgrades in services are expected to drive further growth in the Chinese credit market (Exhibit 15).
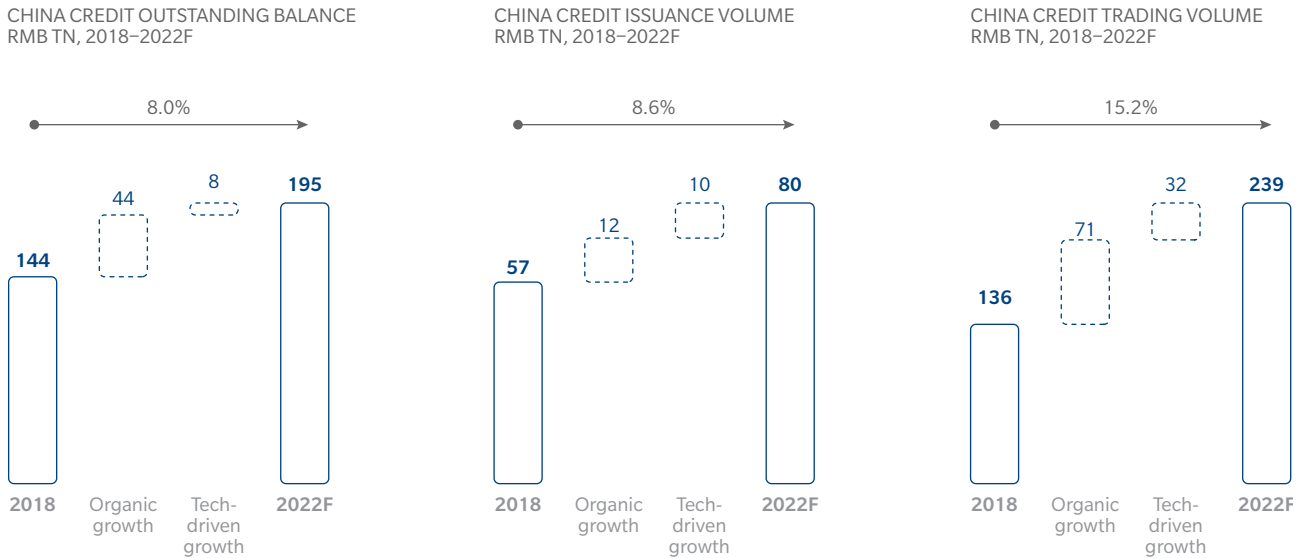
LAYER 1: CREDIT ASSETS MARKET

China's volume of credit asset issuance is expected to grow from 57 trillion yuan in 2018 to 80 trillion yuan in 2022. Of that, credit-tech will contribute 54 percent (43 trillion yuan) in 2022, as credit gradually expands to long-tail customers. These will include individuals and MSEs that have had difficulties in obtaining credit from traditional financial institutions before credit-tech began to provide solutions. Besides, the increasing availability and transparency of credit data enables investors and financial institutions to better identify underlying risks. The data thus facilitate credit and pricing decisions and drive the expansion of bond and bank loan volumes. As more credit is issued, the outstanding balance of credit assets is expected to increase from 144 trillion yuan in 2018 to 195 trillion yuan in 2022, 68 trillion yuan of which will be driven by technology. The credit trading market is projected to grow from 118 trillion yuan in 2017 to 239 trillion yuan in 2022, 183 trillion yuan of which will be driven by credit-tech. The growth will come from both the public and OTC trading markets, but we expect private market growth to be especially strong. Traditionally, transactions of non-standard assets are difficult. In the future, however, OTC trading platforms will be established that increase the transparency of underlying assets, thus boosting the trading volume of non-standard products. The contribution of private market transactions will increase from 16 percent in 2018 to 24 percent in 2022 (Exhibit 16).

Exhibit 15: China credit-tech market size

		2018 ADDRESSABLE MARKET	CAGR	2022 ADDRESSABLE MARKET	2022 CREDIT-TECH DRIVEN MARKET
CREDIT ASSETS MARKET	Outstanding balance	144 TN	+8.0%	195 TN	68 TN (35%)
	Issuance volume	57 TN	+8.6%	80 TN	43 TN (54%)
	Trading volume	136 TN	+15.2%	239 TN	183 TN (77%)
CREDIT SERVICES MARKET	Credit servicing revenue	367.7 BN	+29.5%	1,034 BN	431 BN (42%)
CREDIT IT MARKET	System related revenue	9.3 BN	+51.5%	49 BN	49 BN (100%)

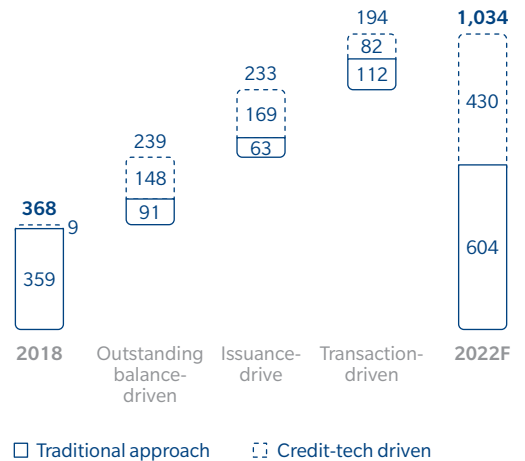## Exhibit 16: China credit market size: Layer 1

CHINA CREDIT OUTSTANDING BALANCE
RMB TN, 2018–2022F

8.0%

2018	Organic growth	Tech-driven growth	2022F
144	44	8	195

CHINA CREDIT ISSUANCE VOLUME
RMB TN, 2018–2022F

8.6%

2018	Organic growth	Tech-driven growth	2022F
57	12	10	80

CHINA CREDIT TRADING VOLUME
RMB TN, 2018–2022F

15.2%

2018	Organic growth	Tech-driven growth	2022F
136	71	32	239

LAYER 2: CREDIT SERVICES MARKET

Revenues from credit services, including data, credit reporting, external rating, internal rating, collateral management, etc., will increase from 367.7 billion yuan in 2018 to 1,034 billion yuan in 2022. Of this, revenue generated by credit-tech will reach 431 billion yuan in 2022, representing 42 percent of the total. The credit services market is closely linked to the credit assets market, and most of the services revenue derived from credit-tech will be related to outstanding balances and new issuances of credit (Exhibit 17).

LAYER 3: CREDIT IT MARKET

System providers' revenues from the credit market are expected to increase from 9.3 billion yuan in 2018 to 49 billion yuan in 2022. Drivers will be growth in the number of financial institutions and in the adoption of new IT credit systems to improve processes and services in credit investment and financing decisions.
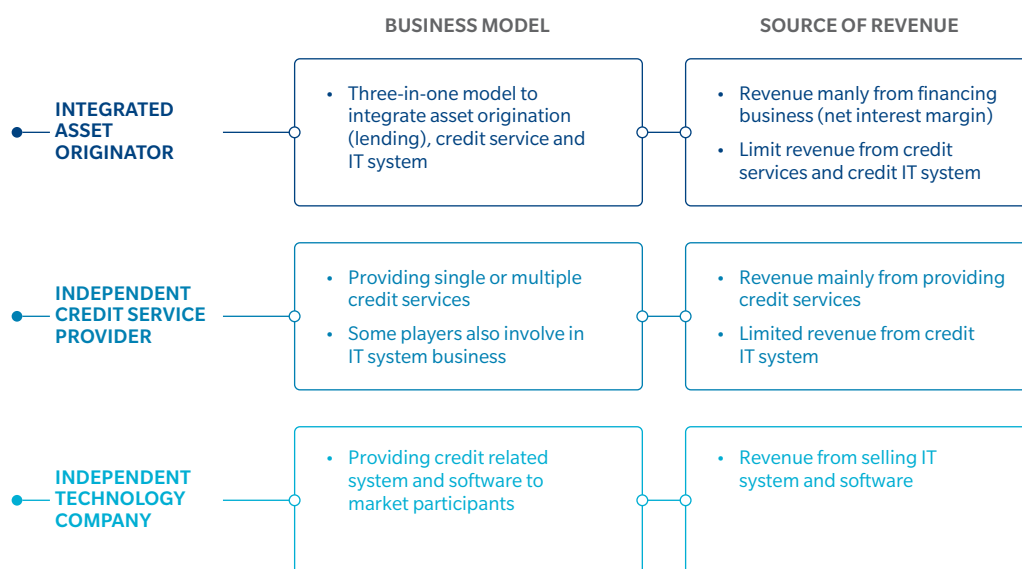
Exhibit 17: China credit services market size: Layer 2

2018	Outstanding balance-driven	Issuance-drive	Transaction-driven	2022F
368	239	233	194	1,034
359	148	169	82	430
9	91	63	112	604

□ Traditional approach   ⬚ Credit-tech driven

MARKET PARTICIPANTS AND THE COMPETITIVE LANDSCAPE

There are three main types of participant in the credit market: integrated asset originators, independent credit-service providers, and independent technology companies (Exhibit 18).

Exhibit 18: Business model of credit-tech companies

	BUSINESS MODEL	**SOURCE OF REVENUE**
INTEGRATED ASSET ORIGINATOR	• Three-in-one model to integrate asset origination (lending), credit service and IT system	• Revenue manly from financing business (net interest margin) • Limit revenue from credit services and credit IT system
INDEPENDENT CREDIT SERVICE PROVIDER	• Providing single or multiple credit services • Some players also involve in IT system business	• Revenue mainly from providing credit services • Limited revenue from credit IT system
INDEPENDENT TECHNOLOGY COMPANY	• Providing credit related system and software to market participants	• Revenue from selling IT system and software

INTEGRATED ASSET ORIGINATOR

Integrated asset originators are involved in all three layers of the credit market. They integrate the asset-origination and asset-lending businesses, credit services, and IT systems. However, their major source of revenue comes from net interest margins from lending, as well as related fee income. Credit services and IT systems support asset origination but contribute limited revenue. *Ant Financial* is an example of an integrated asset originator. The company focuses on lending by offering products such as *Huabei* and *Jiebei*, but it also offers credit services such as *Zhima Credit*.

Independent credit-service providers typically either specialize in one type of credit service or provide a one-stop solution combining multiple types. Some players are also involved in the credit IT business, where they develop IT systems to support credit services. However, most of their operating revenue comes from credit services.

Case study – CSCI, a one-stop credit services provider

As a leading integrated credit-tech services provider, CSCI establishes credit infrastructure services throughout the credit asset life cycle, with the help of the technology. CSCI offers tailored solutions for the clients, which helps reduce the cost of credit risk management, lower the credit asset investment risk and increase the credit asset turnover rate.

CSCI develops its business into credit risk management, credit enhancement, credit asset exchange, with "credit" as the core component. CSCI also focuses on the four business scenarios, including corporate credit, MSE credit, individual credit and regulatory support, and helps the respective clients to solve their pain points.

Using individual credit as an example, CSCI develops core capabilities in data risk management, operation monitoring, project investment and credit enhancement services to link the capital and assets between both parties. CSCI provides borrower rating, asset quality assessment, credit data assessment, active risk management and post-credit management, which facilitates the asset selection process. Through credit enhancement and structural investment, CSCI increases the matching probabilities for the asset providers.

China Securities Credit Technology ("CSCT". 中证信用云", a subsidiary of CSCI), an independent third party, offers database and borrowers profiling. CSCT keeps monitoring the loan performance on a real-time basis after the approval. When loans are securitised as ABS product, CSCI Pengyuan "中证鹏元" (a subsidiary of CSCI) or CSCI can offer rating and credit enhancement services (CSCI Pengyuan and CSCI will not offer services for the same project). In case of default, CSCI Asset Management "证信资管" (a subsidiary of CSCI) is involved for NPL restructure and disposal process (Exhibit 19).

Exhibit 19: Platform providing one-stop consumer finance solutions

INFORMATION TECHNOLOGY COMPANY

Information technology companies only participate in one layer of the credit market, the credit IT market. They provide credit-related systems and software to credit market participants, and their revenues come mainly from selling IT systems.

In the second business model, independent service providers, we find two major types of player currently providing credit services: traditional financial institutions on the one hand and technology and fintech companies on the other (Exhibit 20).

TRADITIONAL FINANCIAL INSTITUTIONS AND CREDIT SERVICE PROVIDERS

The majority of traditional credit-service providers provide only a single type of credit service. They typically have very specialized knowledge and business know-how in this service and rarely expand to others. One example is rating agencies. Traditional financial institutions usually do not focus on credit services for MSEs and individuals, leaving massive business opportunities for technology and fintech companies.

TECHNOLOGY AND FINTECH COMPANIES

In each type of credit service, certain market demands cannot be fully satisfied by traditional financial institutions – especially the demands of MSEs and individual borrowers. Technology and fintech companies have an opportunity to meet such unmet demand. Similar to traditional financial institutions, most tech companies only focus on a single type of credit service. However, we notice that leading tech players have started to explore synergies between different credit services and provide two or more types at the same time.

Exhibit 20: The competitive landscape of the credit services market

		TRADITIONAL FINANCIAL INSTITUTIONS & CREDIT SERVICE PROVIDER	TECHNOLOGY/FINTECH COMPANIES
INFRA-STRUCTURE	Data	Limited third party providers involved	• CSCI • Tongdun • 100Credit
	Credit reporting	• Credit Reference Center, The People's Bank of China • China Chengxin Credit	• Baihang
	Internal rating	Limited third party providers involved	• CSCI • Pintec
	External rating	• CSCI Pengyuan • Dagong Credit • CCXI	Limited third party providers involved
ENHANCE-MENT	Credit enhancement	• China Bond Insurance Co., Ltd. • JSBI Jinshang Bond Insurance	• CSCI • ZhongAn Insurance • Sunshine Credit Guarantee Insurance"
TRANS-ACTION	Pricing	Limited third party providers involved	• Ratingdog (YYrating)
	Match-making	• Beijing Financial Assets Exchange • Dalian FAE	• Dealing Matrix • Lufax • Tongyeyun
PORTFOLIO MONITORING AND SERVICE	Credit portfolio monitoring	Limited third party providers involved	• CSCI
	Collection	• Wansun Financial Services Group	• Cuitx
	Collaterial management	• China Great Wall Asset Mgmt Corp • China Huarong • China Cinda Asset Mgmt Corp • China Orient Asset Mgmt Co., Ltd.	• CSCI • JX AMC

KEY SUCCESS FACTORS

There are four key success factors for leading credit-tech players. The first is a hybrid of technology, business know-how, and branding and resources. Second comes a market-oriented operating model, third an Internet start-up culture, and fourth a talent-and-incentive management system (Exhibit 21).

Exhibit 21: Key success factors for credit-tech players
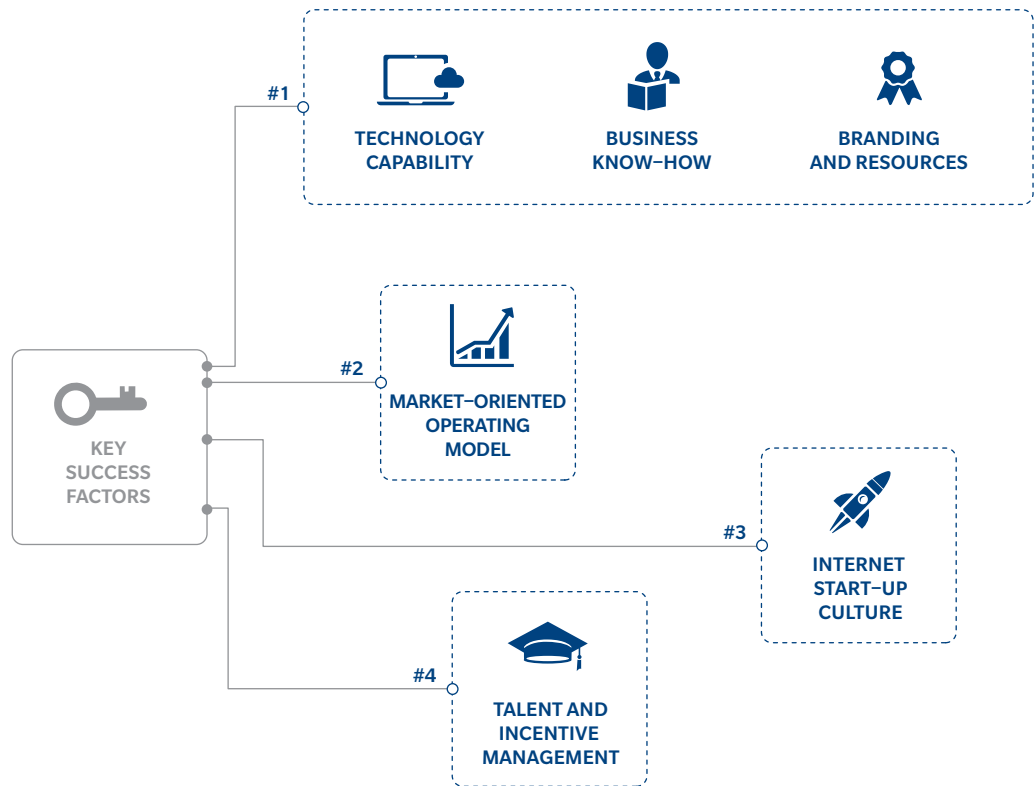
#1 Success factor – A hybrid of multiple capabilities: A successful credit-tech company combines its technology, business know-how and branding and resources.

- **Technology:** This will be both a driver and enabler in the credit market. Leading players should have a designated team for developing technology based on business needs, and they should set aside resources and a budget for technology-related research and development.

- **Business know-how:** Technology development by itself will not lead to success in the credit market. Credit-tech companies also need specialized knowledge in the different business scenarios along the credit value chain, which requires a deep understanding of the credit industry.

- **Branding and resources:** Branding and financial resources are essential for credit-service providers to be able to conduct business. Leading credit-tech companies also need strong financial power, as well as new technology, to develop platforms. A good reputation and branding can attract different market participants, which will then use these companies' services.

Leading players that can integrate technology, business know-how, and resources will undoubtedly benefit from synergies to power its business model to gain success.

An example of a hybrid company is *CSCI*. It develops business know-how by participating in services along the value chain and invests in technology such as AI and big data. At the same time, *CSCI's* diversified shareholder background creates favorable preconditions for the company's business development and core competence improvement.

#2 Success factor – Market-oriented operating model: There are two types of credit-service provider. Government-backed companies mainly focus on credit for governments and large corporations and are reluctant to issue credit to MSEs and individuals. Market-oriented companies focus their businesses according to supply and demand. They leverage technology innovation and identify business opportunities so that they can move ahead of the market and offer services that meet participants' needs. Under the rapid changing market environment, only self-evolutionary enterprises can adapt to the environment and continue to grow.

#3 Success factor – Internet startup gene: Startup companies are known for quick decision making, short processes, and a flat organizational structure. Leading credit-tech companies typically have such gene. They use a results-driven working style and maintain transparency and accountability throughout the organization to shorten processes and raise efficiency.

#4 Success factor – Talent and incentive management system: A strong credit-tech company requires technology experts, credit experts and business development experts – and all need to understand the others' fields. Successful companies usually set up matrix working teams consisting of staff from both the technology and business sides of the organization. It is also important to implement incentive schemes to retain talent.

The latter three factors provide solid support to the first factor. We observe that more and more players are putting efforts on optimizing operating models and improving internal capabilities, which provides a solid foundation for the long-term sustainable development of China's credit-tech market in the future.

ABOUT OLIVER WYMAN

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ABOUT CHINA SECURITIES CREDIT INVESTMENT

CSCI is a leading integrated credit-tech services provider, it establishes credit infrastructure services throughout the credit asset life cycle, with the help of the technology. CSCI offers tailored solutions for the clients, which helps reduce the cost of credit risk management, lower the credit asset investment risk and increase the credit asset turnover rate.

For more information, visit https://www.chinacsci.com/en.

AUTHORS
Oliver Wyman
Cliff Sheng, Partner
Hang Qian, Principal
Morven Mo, Associate

China Securities Credit Investment Company Limited
Hao Chen, Chief Data Officer
Siwen Fan, SVP of Strategy and Development
Wei Guo, Strategy Analyst

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