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Fintech Facilitates the Sustainable Development of Green Finance in China: Cases and Outlook

March 2020

ABOUT THIS REPORT

Fintech Facilitates the Sustainable Development of Green Finance in China is the result of a year-long joint research project conducted by the Paulson Institute Green Finance Center and the Research Center for Green Finance Development of Tsinghua University. The report features case studies that demonstrate how China is using the advent of fintech to enable green finance, resulting in using market mechanisms to promote green development. The research analyzes the opportunities for and challenges of applying fintech to China's green finance development, and provides recommendations for policy makers, financial institutions, and businesses interested in promoting green development.

ABOUT THE AUTHORS

Paulson Institute Green Finance Center

Founded in 2011 by former Treasury Secretary Henry M. Paulson, Jr., the Paulson Institute is a non-partisan, independent "think and do tank" dedicated to fostering a US-China relationship that serves to maintain global order in a rapidly evolving world. The Green Finance Center established in 2018 supports the greening of the financial system by moving green finance from a philanthropic niche to the mainstream of markets. The Center houses the Institute's efforts on green finance and focuses on three core areas—carbon, finance, and fintech—the Center aims to promote market-driven solutions to foster a vibrant international green finance market through convening, advocacy, thought leadership, and our expertise.

More information is available at paulsoninstitute.org.

Research Center for Green Finance Development of Tsinghua University

The Research Center for Green Finance Development of Tsinghua University (GFD Center) was officially established in December 2018 by the National Institute of Financial Research at Tsinghua University. The GFD Center, previously working under the Center for Finance and Development, is dedicated to building a world-leading think tank for policy research, toolkit innovation, capacity building, and international collaboration in the field of green finance. The GFD Center focuses on research regarding green buildings, green consumption, green technology, and green agriculture. It also functions as the secretariat for the Green Investment Principles for the Belt and Road and the Global Green Finance Leadership Program, a point of contact for the Green Finance Committee of China Society for Finance and Banking, and supports the Central Banks and Supervisors Network for Greening the Financial System.

More information is available at greenfinance.pbcsf.tsinghua.edu.cn/.

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ACKNOWLEDGMENTS

The Paulson Institute Green Finance Center and the Research Center for Green Finance Development of Tsinghua University would like to express our sincere appreciation to the Research Bureau of the PBOC for their support and guidance from the very beginning.

We are grateful to the Green Digital Finance Alliance Beijing, Local Bureau of Financial Supervision and Administration, People's Government for Tongzhou District of Beijing, Beijing Green Finance Association, Huzhou Municipal Financial Office, PBOC Huzhou Branch, Huzhou Bank, PICC Property and Casualty Co., Ltd, Beijing Uni Inclusive Technology Co., Ltd, Urban Finance Institute of ICBC, Asia Clean Capital, Beijing Redoop Technology Co., Ltd. China, for contributing to the research for this report and providing valuable input throughout the process.

We would also like to thank Jenny Xu, Tiff Sun, and Qi Bokai who helped with the translation and editing of the report.

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Introduction

Fintech is financial innovation powered by new technology. It can create new business models, applications, processes, and products that can significantly impact the way that the financial markets and financial institutions deliver financial services. Fintech is fairly robustly used for monitoring and regulating, payments and settlement, financing products and services, insurance, robo-advisory, and energy trading services using technologies that include artificial intelligence (AI), blockchain, cloud computing, big data, and Internet of things (IOT), among others.

The genesis of global dialogue around how these emerging technological innovations could be used to support the development of green finance began in 2014 when the United Nations Environment Programme (UNEP) launched the "Inquiry: Design of a Sustainable Financial System" (Inquiry). Following, in 2016, China included green finance in the G20 agenda, which was an important step in creating a global consensus around the need to develop green finance. The next year, UNEP and Ant Financial introduced the Green Digital Finance Alliance to explore the potential of using digital finance to achieve sustainable development on a global scale. In 2018, the G20 Sustainable Finance Study Group listed fintech-powered sustainable finance as one of its three topics of research to study expanding financing sources to mitigate environment and climate-related risks. Together, these efforts have aimed to answer the financing gap for global environmental challenges and to promote green finance innovation.

China is not only the largest and the fastest growing green finance market in the world, but its fintech industry is also growing rapidly. According to a KMPG report, there are three Chinese companies in the top ten fintech companies in the world. Ant Financial Services and JD Technology are number one and number three on that list. In the last four years, China's green finance development has been significant with green lending, green bonds, green funds, and carbon trading figures that are among the largest in the world.

Despite the success, China's green finance market still has great development potential. Take green lending as an example, data from the People's Bank of China (PBOC) and the China Banking and Insurance Regulatory Commission (CBIRC) shows that 21 of the largest banks have issued green lending north of ten trillion yuan, and still, green lending only accounts for about ten percent of total lending in China. Green bonds are another example as they only account for about 1% of all bonds issued in the country. However, the potential of the market is hampered by challenges such as the lack of uniform standards, information asymmetry, high costs for identification and classification of "green," and limited financing access for small and medium enterprises (SMEs). Monitoring and regulatory costs are also significant for green finance in China.

And here, fintech could be an effective tool to address these challenges like increasing capacity for identification and classification of "green," lowering the cost of green certification, or improving green credit ratings systems for SMEs to build greater access to financing. In short, fintech provides new means and methods. Financial institutions can employ fintech within green finance operations to better analyze costs and efficiency and increase data authenticity. In developing standards, accounting, and auditing services for financial regulation, and preventing greenwashing, fintech can help provide more accuracy.

> China is not only the largest and the fastest growing green finance market in the world, but its fintech industry is also growing rapidly.

The Green Finance Center of the Paulson Institute and the Research Center for Green Finance Development at Tsinghua University worked together on this research project by reviewing case studies where China uses fintech to promote green finance development, analyzing the opportunities and challenges of applying fintech in China's green finance development, and providing recommendations for regulatory policies and industrial deployment. This research report aims to broaden the shared knowledge around using fintech to support green finance and sustainable development in China and the rest of the world.

In the development of sustainable finance, international communities especially Europe, the United States, and China have started the work to deploy fintech for green finance. Financial institutions and fintech companies in these countries have used blockchain, AI, big data, IoT, and other emerging technologies to experiment with green finance and fintech integration, or green fintech. This section briefly introduces the developments in Europe, the United States, and China.

1. Europe and the United States

Research by the Financial Centers for Sustainable Development (FC4S) in a report from 2019 finds that more than 100 institutions in Europe are actively working on practical applications of fintech and green finance. The majority of these entities are located in central and western Europe with Switzerland, France, the United Kingdom, and Spain leading the way and accounting for about 50% of Europe's total. In Europe, fintech has encouraged new types of green finance use cases including crowdfunding, energy trading, environmental, social and governance (ESG) analytics, and carbon footprint offsetting (Fig. 1).

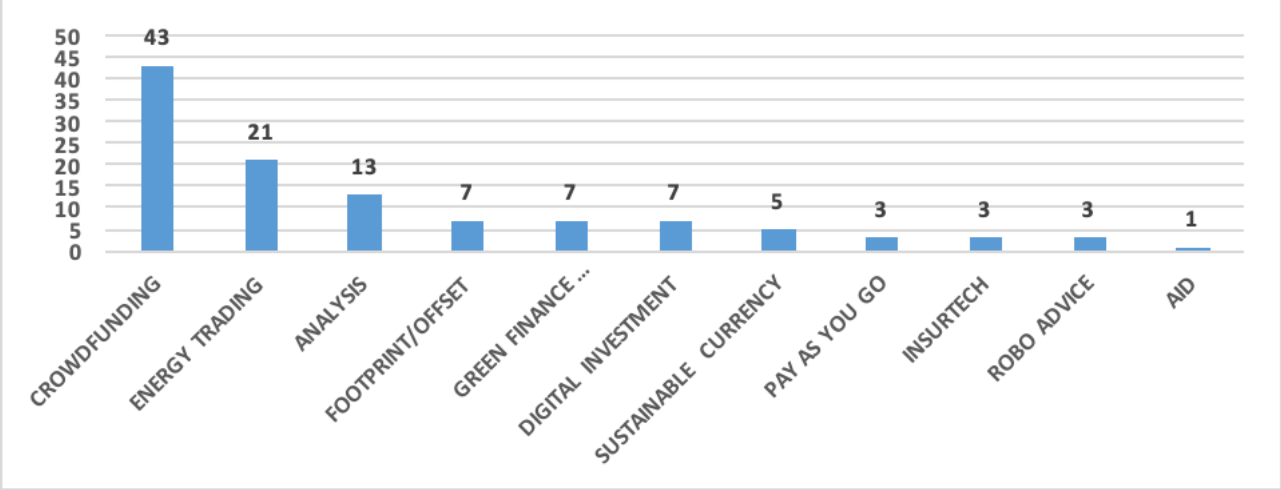


Figure 1
Europe's Fintech in Green Finance Use Cases
Data Source: *Sustainable Finance and Fintech in Europe*

The United States leads in fintech investment and financing. Per CBInsight, total global fintech financing reached $34.5 billion in 2019. American venture capital funding accounted for $17.6 billion of that figure, or about 51% of the global total.

How is fintech funding being used for sustainable development? One way the US is exploring the use of satellite data and machine learning is to map natural carbon sinks globally, according to a Sustainable Digital Finance Alliance (now the Green Digital Finance Alliance) research report. One satellite imaging company in the US is using AI, machine learning, and other technologies to interpret satellite data allowing for real-time information on changes in the earth's natural resources at relatively low costs.

It has even worked with Carnegie's Light Detection and Ranging (LiDAR) data of the Peruvian forests, using its machine learning technology to build spatial knowledge of the forests in order to develop corresponding carbon maps. As algorithms like this get more advanced, these inexpensive methods can be used to obtain data and information on the world's natural carbon sinks effortlessly. As such, there is great potential for these in the green finance context.

2. China

According to a recent survey completed by the Research Center for Green Finance Development of Tsinghua University, there are more than 60 entities in China utilizing fintech to provide services for green finance. These include financial institutions, research institutes and technical service providers mainly concentrated in Beijing, Shanghai, Guangdong, and Zhejiang.

This research also shows that innovative use cases drive the intersection and integration of different disciplines. Emerging technologies such as big data, AI, blockchain, cloud computing, and IoT have been used or adopted for a number of green finance-related services, which include ESG analysis, environmental risk management, measurement of environmental benefits, green credit, carbon finance, and green bonds (Fig. 2).

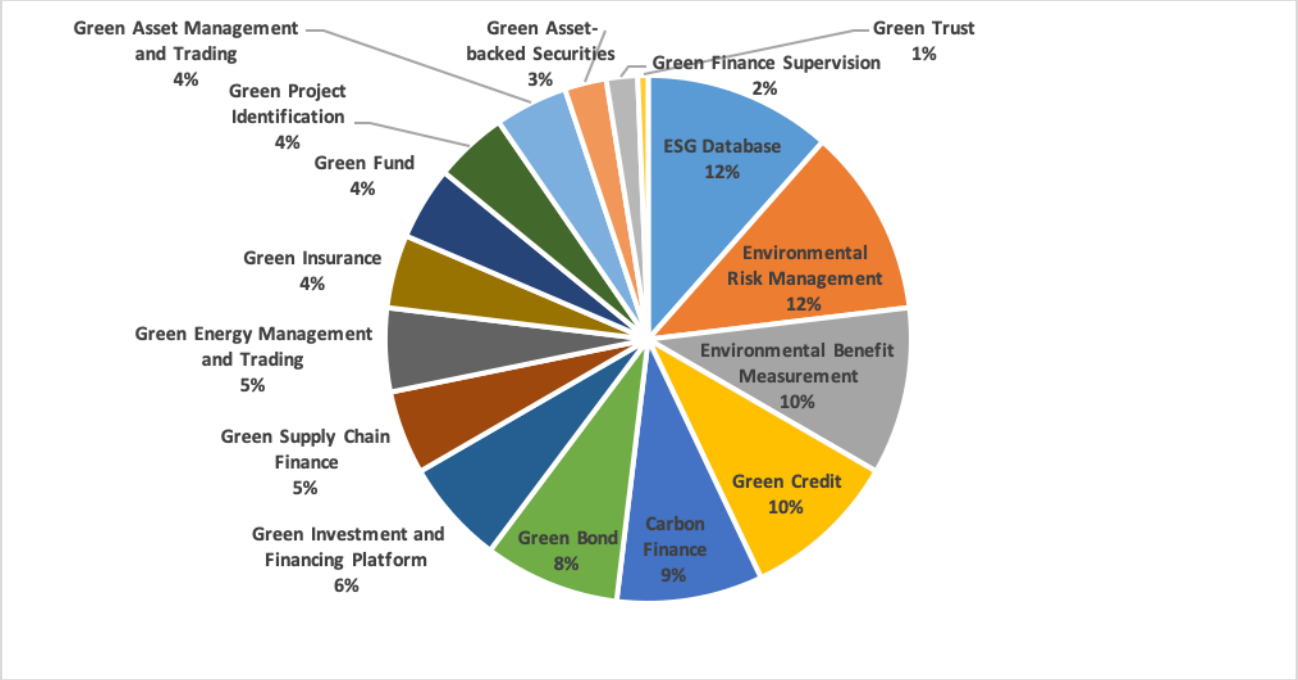
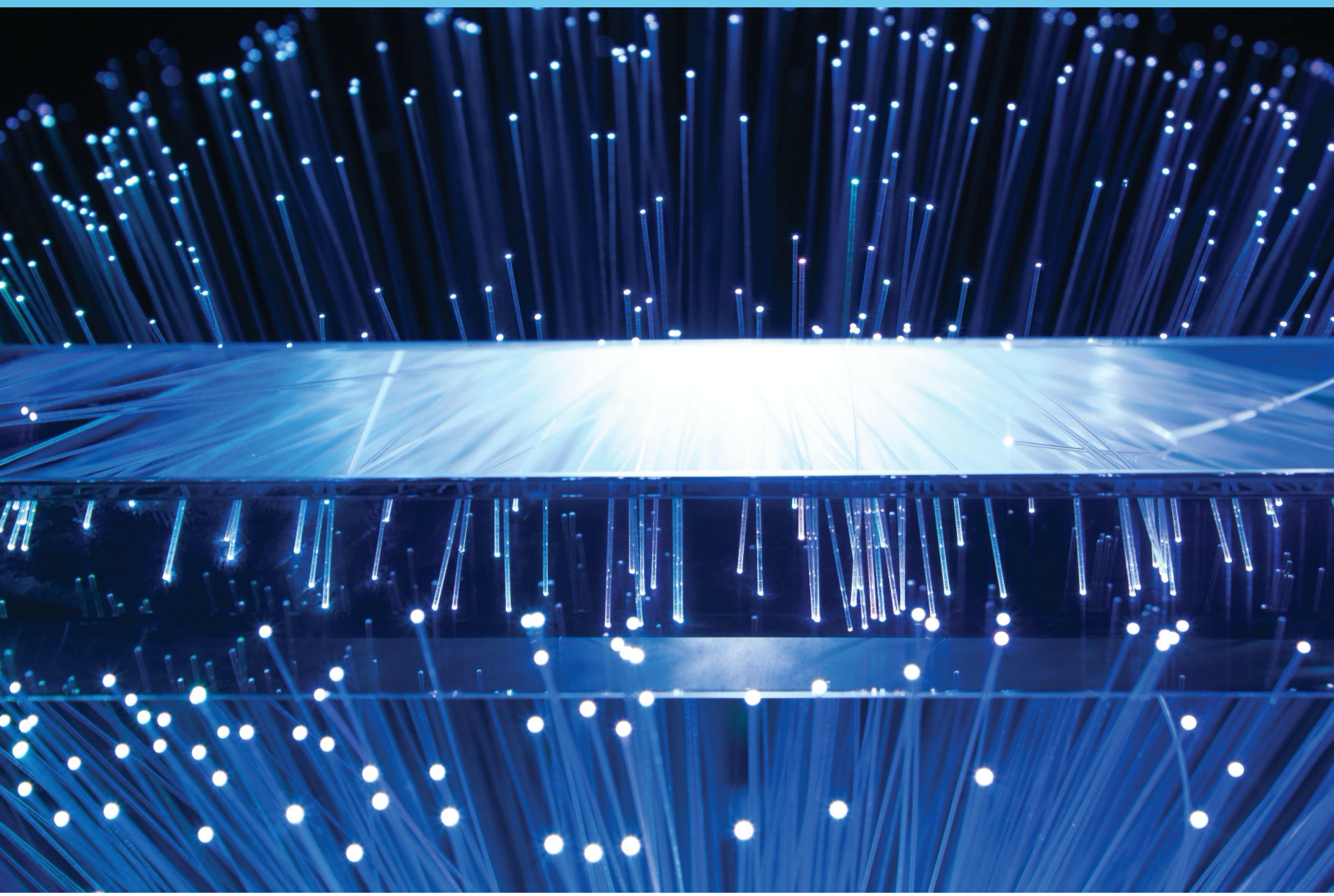


Figure 2
China's Fintech in Green Finance Use Cases
Data Source: *Research Center for Green Finance Development of Tsinghua University, Beijing*

Fintech Facilitates the Development of Green Finance: China Case Studies



The latest developments of China's green finance market and innovation happening in the green finance pilot zones across China provide useful information about how fintech is being used to promote green finance development and sustainable development.

This section highlights case studies from the perspectives of regulators, local governments, commercial banks, and insurance companies to show just how fintech enables green finance development. The selected cases include:

- PBOC Green Finance Information Management System: Fintech Facilitates Green Finance Regulatory Management
- Huzhou City Green Finance One-Stop Service Platform: Fintech Empowers Sustainable Development of SMEs
- Bank of Huzhou Green Credit Management System: Fintech Enables Commercial Green Lending
- People's Insurance Company of China Property and Casualty (PICC P&C) Remote Damage Assessment and Claim Settlement System for Catastrophe Insurance: Fintech Drives Green Insurance Innovation

Case 1: PBOC Green Finance Information Management System

Background

As early as 2014-15, the PBOC, along with other government ministries and commissions and the academic community experts, proposed a series of recommendations for building a green finance system in China. The proposal was based on a robust study of international experiences and practices receiving attention from the highest level of decision makers in China, which elevated building a green finance system to a national strategy. The PBOC is leading the effort to promote the development of green finance in China with the mandate for coordinating green finance policy frameworks, standards, pilot programs, and international cooperation.

As one of the important safeguards for the development, regulation, and amendment of green finance policies, green finance-related data reporting infrastructure is important. But while the green finance system has been advancing, reporting infrastructure lags behind. For example, green lending lacks the support of mechanisms to obtain comprehensive, accurate, and real-time data and does not have harmonized performance review standards. The high costs of the latter are another present challenge.

In 2018, the PBOC announced clear requirements for green lending:

- building a green lending management system;
- improving green lending management capability of financial institutions;
- enhancing the accuracy of green lending data reporting;
- providing data support for macro decision making and policy making in terms of preferred industries, pricing, asset quality and environmental benefits;
- laying a solid foundation for top-level institutional design.

As a way to achieve these goals, the PBOC authorized its research bureau to lead the effort in building an information management system for green finance efforts that was to be tested in the green finance pilot zone of Huzhou in Zhejiang province. This pilot program became an experiment in integrating fintech into the construction of an information management system for green finance.

Action Taken for Fintech Facilitating Green Finance Regulatory Management

The PBOC Green Finance Information Management System is the result of the PBOC research bureau's endeavors that not only connects the PBOC with financial institutions, it also collects green lending statistics and analytics, establishes some regulation of green lending processes, and houses an assessment of green lending policy implementation in one centralized location. The system utilizes big data, AI, cloud computing, and other technologies to make data traceable, comparable, and measurable to address commonly cited challenges for green finance data like the lack of real-time reporting, data quality issues, and difficulty in conducting reviews of policy regulation implementation.

Three Highlights

1. I*ncreasing the speed and reliability of data collection*: Financial institutions are required to report the details of each green lending transaction on a "T+1" basis, so that the PBOC can collect and manage green lending data accurately and in a timely manner.

2. *Enhancing green identification capability and statistical quality*: Data is automatically generated that takes into account the different green identification standards of the PBOC, CBIRC, and local governments across the country. This information adds value to the management capability and statistical quality of the green lending businesses of financial institutions in the system.

3. *Facilitating performance reviews and policymaking*: The data can be used to perform basic functions such as accounting, monitoring, and analytics. It can also be used to support policy implementation such as the PBOC's review of the green lending activities of financial institutions and registration of collateralized green lending assets.

Six Functions

1. *Management Dashboard:* The system offers a comprehensive repository of each financial institution's green finance data and overall rankings for the central bank to have in one central source. The library of information includes numbers on green lending distribution, types of investments, balance of green lending and its share in total lending, green lending borrower quality, environmental benefits, environmental and social risks, and relevant policy support details.

2. *Reporting management*: Listing every green lending transaction and providing detailed information such as green identification standards used and environmental benefits allow regulators to efficiently conduct reviews and evaluations.

3. *Data inquiry*: The system is able to provide statistical analysis of different types of green lending accounting for different standards of the PBOC, CBIRC and local governments including information on specific financial institutions, client locations and associated industries, client size, and green identification categories.

4. *Performance review*: Per the PBOC's green lending performance review requirements, various models, metrics, and scorecards, as well as a weighting structure are part of the system. This allows for a quantitative and qualitative assessment of financial institutions.

5. *Policy support*: In support of banks across China that are implementing green finance policies, the system holds information for the PBOC as the central bank on registration and figures of relending activities based on collateralized green lending assets and monitors financial institutions' relending status.

6. *Information management*: As an educational tool for users, the system presents user-friendly materials on green finance policies and case studies. This helps with information dissemination and acts as a database for easy management.

Results

On August 23, 2019, the PBOC Green Finance Information Management System was officially launched in Huzhou. Thus far, all 36 banks in Huzhou's jurisdiction have been connected to the system via the PBOC's Huzhou branch. With every green lending transaction reported on a quasi-real time basis, the PBOC's Huzhou branch is able to collect and manage accurate information of green lending by all the banks in its jurisdiction and review their performance.

Implications and Future Opportunities

The PBOC Green Finance Information Management System can help financial regulators manage green finance information on a quasi-real-time basis, promote the green transformation of financial institutions, and provide data to support macro policymaking to further promote the development of the green finance system in China.

The current progress on the system is laudable, but in order to achieve the proposed actions and objectives intended for the system, there is much work ahead. There are three next steps that the PBOC plans to undertake in the near future:

1. *Improving the system*: There are several additional features that the PBOC expects to add in terms of capabilities to the system. Plans for tools that calculate environmental benefits and functions to better identify and classify green to effectively prevent "green washing" are top of the list. Additionally, the PBOC will further explore incorporating innovative ideas around collateralization of green lending assets, central bank internal ratings, and the trading of environmental benefits among financial institutions to the system.

2. *Scaling up*: At the appropriate time, the PBOC plans to take the lessons learned from Huzhou and scale up piloting of the system in the other green finance pilot zones. This works toward the eventual goal that sees the system employed across China seamlessly.

3. *Gaining an international perspective*: Exploring possibilities of working with international green finance cooperation platforms, such as the Network for Greening the Financial System (NGFS), to share experience on how to use fintech to promote green finance regulation would bring additional best practices and ideas to advancing the system.

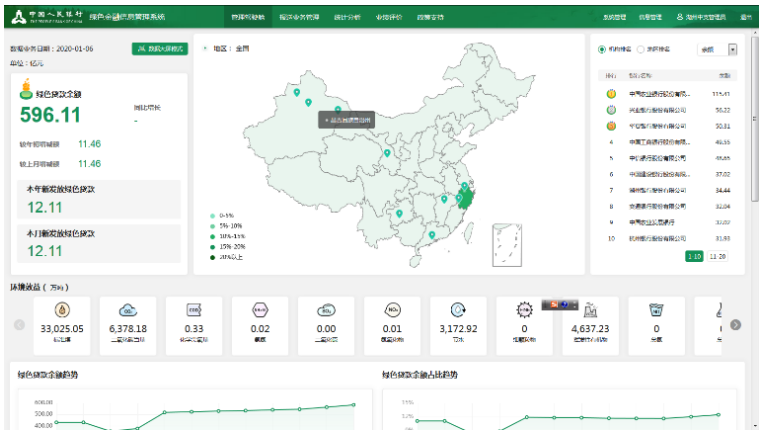


Figure 3
Screenshot of Green Finance Information Management System
Data Source: *PBOC Huzhou Branch*

Figure 4
Screenshot of PBOC Green Finance Database
Data Source: *PBOC Huzhou Branch*

Case 2: Huzhou City Green Finance One-Stop Service Platform

Background

The main players in China's green finance market are financial institutions and large- medium-sized enterprises. The participation of SMEs is very limited. According to the statistics from the Ministry of Industry and Information Technology (MIIT), by the end of 2018, the number of SMEs exceeded 30 million. Further, SMEs contributed more than 50% of tax revenue, more than 60% of GDP, more than 70% of achievements in technological innovation, and more than 80% of job employment for the economy. As such, regulators such as the PBOC, CBIRC, and Ministry of Finance (MOF) have provided guidance to financial institutions through policymaking and inclusive finance pilot programs that encourage increased financing support to SMEs.

Despite these efforts, SMEs still face difficulties in access to financial resources due to challenges with information asymmetry, lack of collateral, expensive guaranties, high risk profiles, and low availability of financial resources. Indeed, how to lower costs, provide efficient identification and certification services for green assets and business activities, and improve the accessibility and affordability of financing for SMES to support their green and sustainable development are difficult questions to tackle.

Huzhou is one of the cities in the first group of green finance pilot zones and is home to many SMEs. According to estimates, there are 40,000-50,000 SMEs in Huzhou from manufacturing to services, accounting for 99% of the businesses in the city. This significant number of SMEs coupled with the endowment of resources and industrial makeup of Huzhou have made supporting their green and sustainable development one of the top green finance priorities in the city. And leading the effort to target green SMEs and provide financing is the Financial Office of Huzhou, which has spearheaded the delivery of the Huzhou City Green Finance One-Stop Service Platform.

Action Taken for Fintech Empowering Sustainable Development of SMEs

The Huzhou City Green Finance One-Stop Service Platform provides bank lending, equity financing, and green credit rating services to SMEs to support their green and sustainable development. It is able to do this through harnessing big data, cloud computing, and other technologies to construct and operate the three segments of the platform focused on green lending, green financing, and green credit rating.

Three Highlights

The development of the Green Finance One-Stop Service Platform by the local government better channels financial services toward green SMEs, which essentially increases the financing for these SMEs, lowers the cost of capital, and improves the corporate finance environment.

1. *Establishing standards for identification of green for enterprises (and projects)*: Huzhou developed the first green credit rating standards for enterprises, which became part of the "Green Credit Rating Platform," one of the three that comprise Huzhou's Green Finance One-Stop Service Platform. The ability to offer rating services to SMEs and projects has made it much easier for SMEs to be identified as green.

Figure 5
Screenshot of Huzhou City Green Finance One-Stop Service Platform
Data Source: *Huzhou City*

2. *Expanding financing channels for green enterprises and projects*: By building the One-Stop Service Platform, the government in effect connects green SMEs with interested banks and investors. By making information on investors and corporate financing needs of green SMEs more available, this helps to address information asymmetry.

3. *Increasing financing for SMEs:* Leveraging the "Digital Hubei" big data platform, the "Green Lending Platform" of the main One-Stop Service Platform consolidates the information of 31 government agencies including the Huzhou Administration of Industry and Commerce, Huzhou Tax Bureau, and Huzhou Environmental Protection Bureau to enable information sharing across government agencies. This and other mechanisms on the green lending platform that afford banks the ability to reduce fees, and thereby lowering costs for borrowers, help to increase the financing for green SMEs.

Three Platforms

1. *Green Lending Platform*: This platform connects enterprises and banks. It uses big data, cloud computing, and other technologies to present over 300 lending products from all 36 banks in Huzhou's jurisdiction to businesses.

In addition, the Green Lending Platform consolidates the information of 31 government agencies including the Huzhou Administration of Industry and Commerce, Huzhou Tax Bureau, and Huzhou Environmental Protection Bureau to enable information sharing across government agencies. Through these functions, green SMEs are more efficiently connected and informed, leading to increased lending activity.

2. *Green Financing Platform:* This platform connects enterprises with investors. The Green Financing Platform expands the equity financing channels for enterprises by bringing together information on what investors are looking for with the corporate financing needs of green SMEs. Since it was launched, it has helped 73 projects find investors, raising more than RMB 6.6 billion in total financing.

3. *Green Credit Rating Platform:* This platform provides a rating mechanism for how green an SME or a project is based on the green credit rating standards developed by Huzhou for enterprises. With the use of technology, it is able to automatically obtain and analyze about half of the green rating metrics required to produce a rating, which has made it much easier for SMEs to acquire green ratings. As a result, the local government has been able to put in place green finance incentive policies that provide subsidized loans to SMEs and projects based on their ratings of dark green, medium green, and light green generated by the platform.

Results

Since the three service systems were launched at the end of 2018, the Huzhou Green Finance One-Stop Service Platform has registered over 16,000 SMEs, 30 financial institutions, and 80 investors. The platform has helped more than 13,000 green SMEs obtain financing exceeding RMB 160 billion from banks and found investors for 73 projects that received financing of more than RMB 6.6 billion. The platform has played a positive role in using fintech to help SMEs finance their green development by addressing the challenges of identifying the greenness of a company or project, information asymmetry, improving the accessibility and efficiency of financing, and lowering the cost of capital.

Implications and Future Opportunities

Applied broadly, local governments will be able to use big data and other fintech technologies to build platforms that connect SMEs with relevant banks and investors to increase access to capital markets thereby providing more financing channels and related services. Platforms like this can assist in solving the problem of information asymmetry, improving the readiness of capital markets, and increasing the amount of available information, which directly support the greening and sustainable development of SMEs.

As for Huzhou, the city's Financial Office plans to begin working on the following:

- *Expanding the platform*: Legal safeguards are likely to be incorporated into the Green Lending Platform. The aim is to create a Huzhou model that combines "big data, inclusive finance, and 'smart courts'" to prevent and resolve financial disputes between banks and enterprises.

> By applying technology to regulatory processes, fintech can improve the efficacy of regulatory measures and reporting mechanisms for green finance regulatory bodies and local governments that are implementing green finance policies.

- *Improving operations*: Action items like developing cross-agency coordination and safeguard mechanisms, meeting regularly to discuss important matters and potential risks for the platforms, further promoting green finance to encourage the sustainable development of SMEs, and exploring ways to build a more open and effective operations model are part of the next steps for the Huzhou One-Stop Service Platform.

- *Scaling up and gaining more international perspectives*: By taking the experiences of the Huzhou One-Stop Service Platform in green lending, green rating and data sharing, the hope is to provide a similar model in other provinces and cities where conditions are ripe. And with the experience gained thus far, the idea is to continue to engage with the international community to exchange insights on practical applications of fintech for green finance.

Case 3: Bank of Huzhou Green Credit Management System

Background

Across the world, while commercial banks are committed to offering sustainable finance and green lending services to clients, they often face challenges such as inadequate capability and the high cost of identifying and managing environmental risks, and a lack of standardized systems, i.e. for business process management.Bank of Huzhou is a local commercial bank based in Huzhou City, Zhejiang Province, which is one of the green finance pilot zones in China. Since 2016, Bank of Huzhou has been dedicated to being a small bank specializing in green finance. In order to re-engineer traditional banking business process management systems for green lending and enhance the capability of managing the green lending business, Bank of Huzhou has leaned on fintech to launch a green lending management system.

Action Taken for Fintech Enabling Commercial Green Lending

Bank of Huzhou's Green Credit Management System uses big data, cloud computing, and AI to power a business process management system for green lending and provide a green fintech-serviced cloud platform. By integrating technology into the entire process of green lending, the system can automatically guide green lending practices, identify the classification type of green projects, calculate environmental and social benefits, and provide early warning for potential environmental risks.

Figure 6
Screenshot of Bank of Huzhou's Green Credit Management System
Data Source: *Bank of Huzou*

Four Features

1. The Green Credit Management System uses AI and machine learning to improve the accuracy of green identification. It automatically determines whether a transaction is suitable for green lending based on project information that has been input. And in order to continue to improve the system, a human touch is used to remedy any mistakes to improve accuracy of the technology. At the same time, the system's embedded environmental benefit estimation capability allows for an estimation of project environmental benefits and continuous monitoring of projects.

2. Using big data scraping and smart identification technologies, the system is able to provide more timely environmental risk management capabilities. The system can automatically extract information on regulatory penalties attributed to companies by the government, which helps identify and assess environmental risks for those enterprises.

3. In leveraging big data scraping with smart decision-making tools to reduce management cost, the system liberates bank employees from the burden of paperwork, which reduces human resources costs and shortens processing time relative to traditional management processes. This helps the bank reduce the cost and improve the quality of green lending management.

4 .Continued experience in operating the Green Credit Management System enhances the appetite for green business and the associated professional skills of the bank. Applying the system in the entire lending process can help the bank increase its capability of green identification, preference for green business, and further green finance product innovation and development.

Two Key Elements

1. *Green lending identification and classification*: The Green Credit Management System provides smart green labels to a project according to applicable national or local green standards. Then, professional staff review the labels and make a final decision on green identification. The system eventually builds a professional-level environmental benefit estimation model based on the specific requirements of financial regulators. It can calculate the environmental benefits of a project according to formulas and parameters input and continuously monitor the environmental benefits.

2. E*nvironmental and social risk management*: The system can make a technology informed decision on the classification and level of environmental and social risk through big data scraping. It can extract data such as a client's pollutant discharge permit and safe production permits to provide early warnings about risk factors such as the lapse and cancellation of permits. The system can also automatically monitor environmental performance such as regulatory penalties and production accidents to provide assessment of environmental risk impact and early warnings as well.

Results

Bank of Huzhou's Green Credit Management System was launched on March 3, 2019, and since then, it has been incorporated across the bank's entire green lending business processes.

It not only has provided greater capacity for the bank to enhance its green lending identification and classification methods and its environmental and social risk management but has also reduced management costs and increased efficiency overall. In July 2019, Bank of Huzhou further demonstrated its commitment to green finance by adopting the Equator Principles, just the third bank to do so in China.

Implications and Future Opportunities

By leveraging fintech, Bank of Huzhou was able to optimize its internal green lending processes and improve upon its environmental risk management. This has promoted the establishment of a green finance system in China and serves as an example of innovation for green financial services. Bank of Huzhou is a model of green finance development in small and medium-sized banks. Bank of Huzhou will continue to develop fintech innovations for the purpose of creating new ways for small banks to become green. Some of their next steps include:

- *Improving the system and providing policy support*: Bank of Huzhou is committed to continuing to enhance the functions of the Green Credit Management System. With the vast amount of data amassed by the system, it can be used as a reference point in green finance policy research on topics such as risk weighting of green assets, for example.

- *Scaling up*: As the Green Credit Management System is refined, it will become more easily replicated and scalable as a model for green finance development. The aim is to test the system in small and medium-sized banks in the green finance pilot zones and eventually throughout the country.

- *Gaining an international perspective*: The Green Credit Management System could be valuable as a pilot project for the UNEP's sustainable banking initiatives and for the UK-China Pilot on Climate and Environmental Risk Disclosure. Its experience could also help inform progress of the Equator Principles and other countries that may be exploring how they could begin to build their own green finance systems.

Case 4: People's Insurance Company of China Property and Casualty (PICC P&C) Remote Damage Assessment and Claim Settlement System for Catastrophe Insurance

Background

Climate change is a collective challenge for humanity, especially when it comes to the uncertainty of cost from climate disasters. The impact of climate change on different financial sectors and the associated financial risks are increasingly attracting the attention of the global financial industry overall. In China, the PBOC has already proposed to conduct more research on the impact of climate change on different financial sectors and the appropriate policy responses. And in terms of looking at the green and sustainable development of the insurance industry, it is important to understand how to improve environmental and climate risk management capability and anti-fraud regulation standards.

Ningbo is a coastal city in eastern China. It is susceptible to natural disasters and bad weather, which can have devastating impacts with regard to the claim settlement in the aftermath of disasters that require immense human and material resources to rebuild. The process is often inefficient and prone to mistakes and disputes. As such, and as one of the first group of pilot cities for catastrophe insurance in China, Ningbo was chosen by PICC P&C to test public catastrophe insurance. A smart and remote damage assessment system for catastrophes and floods was built as part of the infrastructure for the public insurance pilot to improve the capability of risk identification for catastrophe insurance and the efficiency of claim settlement.

Action Taken for Fintech Driving Climate Risk Insurance Innovation

Since 2016, PICC P&C has run pilot programs of catastrophe insurance in Ningbo in order to enhance the insurance industry's risk management capability and related standards such as in surveying and damage assessment.The approach uses big data, modern surveying and mapping, and geographic information technologies to generate flood maps, build a database for floor elevation information of residential buildings, and create a smart remote damage assessment and claim settlement management system for catastrophes and floods.

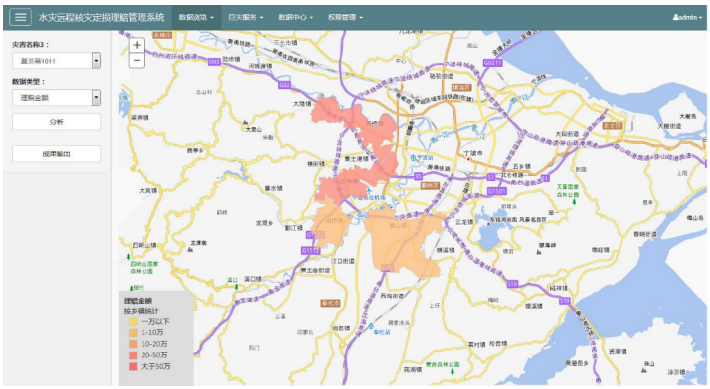


Figure 7
Screenshot of Remote Damage Assessment and Claim Settlement System for Catastrophe Insurance
Data Source: *People's Insurance Company of China Property and Casualty*

The product helps to refine traditional damage assessment and claim settlement approaches, increase the efficiency of settling residential flood insurance claims, and enhance climate risk management capability.

Three Features

1. A*ccurate collection of data*: Using technology-powered modern survey tools, the system collects data about elevation including natural elevation markers and for residential buildings. This data provides a starting point for analysis and the accuracy of the system is within ±3 millimeters.

2. *Enhanced survey and damage assessment capability*: Modern surveying and mapping technology and big data has been leveraged to create a database that houses information on elevation for each home, to build a smart remote damage assessment management system for catastrophes and floods, and to promote smart survey and damage assessment capabilities. The result is that claim surveys can now be completed within three days, during which damage assessment for these claims are fully completed as well.

3. *Faster and more efficient claim settlement:* After a disaster strikes, and based on the information about the disaster that is entered into the system, the number of households affected in each village and the total amount of claims from the disaster are automatically calculated along with other relevant data. The first claim is paid out on the fourth day (including three days for public notification). As a result, the system reduces human resources needed to manage the process by about a third.

Two Key Elements

1. *Damage assessment and claim settlement:* Once a flood occurs, the system collects data to automatically generate a damage assessment list with ID numbers and bank card numbers. Claims are settled after three days of public notification if there are no objections.

2. *Climate risk management:* Big data, modern surveying and mapping, and geographic information technologies were used to generate flood maps for catastrophe insurance in Ningbo, which provided reference data for selecting priority areas ideal for disaster prevention and allocating materials there and for identifying affected areas in the aftermath for shelters and re-building needs. In addition, the system can calculate the damage on town or city levels to provide data points for disaster prevention, disaster reduction, and disaster relief in the future.

Results

By applying fintech in damage assessment and claim settlement processes, the insurance industry has enhanced its environmental and climate risk management capability, improved its ability to provide services, and promoted the sustainable development of communities. Since the smart remote damage assessment and claim settlement system for catastrophe and flood insurance was launched in Ningbo, it has increased the efficiency of damage assessment and claim settlement, and lowered labor costs.

Implications and Future Opportunities

The remote damage assessment and claim settlement system for catastrophe insurance is built on technical innovations in surveying and big data to solve many of the challenges plaguing the traditional claim settlement process for much of the insurance industry, including inherent inefficiencies, being error-prone, and moral hazard risks. The system increases the accuracy and efficiency of claim settlement, laying a good foundation for PICC P&C's green finance business.

Going forward, PICC P&C will continue to explore new ways to apply technology to reduce cost, increase efficiency, develop innovative business models, and promote the sustainable development of green insurance. Next steps include:

- Conducting research on climate disaster risk assessment models
- Further promotion of smart survey and damage assessment tools for climate catastrophe insurance
- Using technology to achieve more green insurance product innovation to address climate risks

As observed from conducted surveys and these case studies, the application of fintech for green finance holds great potential, including in the areas of statistics, monitoring and reporting, asset registration, understanding consumer user profiles, financial trading, supply chain management, and risk management for financial regulatory agencies, local governments, banks, insurance companies, and asset management companies. Successful integration of fintech in green finance could provide benefits in terms of cost savings, increased efficiencies, better security, and data authenticity for financial institutions. Additionally, for financial regulators, the promotion of standards development, greater accounting and auditing capacities, and greenwashing prevention mechanisms can be enabled by fintech. However, achieving these comes with challenges, which are detailed below.

"Green" standards are not uniform or lacking

A number of green finance operational standards are either not agreed upon or remain undeveloped, including standards for environmental data, how environmental benefits should be calculated, green finance products, and how green projects should be identified. For example, the environmental data released by government departments in China adhere to different definition and format standards and operate on different timelines. This creates difficulties for data collection, which makes it hard to guarantee data is viable or comparable. And the calculation of environmental benefits is an example of this; with no standard formula, each entity can use their own methodology leading to results that are not analogous.

For green finance products and green projects, the non-standardized process for identification and classification has led to different versions in various locales and amongst institutions, creating challenges. The patchwork creates a scenario where green products and projects are difficult to compare, materializing in higher costs and increased difficulty in labelling assets and economic activities as green. Lastly, with regard to SMEs and green consumption, there are largely no definitions or standards yet.

Environment data quality needs improvement

Environmental data is the foundation for environmental risk analysis. The quality of environmental data directly impacts the accuracy and effectiveness of environmental risk analysis. Currently, there are problems in both accuracy and comprehensiveness of environmental data in China.

For example, pollutant emissions data is inaccurate as corporate public information disclosures do not reflect the reality of the company's pollution. Corporate data on the National Pollutant Emissions Permit Management Information Platform contains irregularities because of outliers that are included in the reporting and due to a number of SMEs submitting low quality data.

Disclosures are often of limited scope and time horizon leading to an inability to provide more comprehensive environmental data. While the reporting on environmental penalties is quite robust covering a number of years, other relevant environmental data is not sufficient from the disclosures.

There is limited information on energy consumption in disclosures of public companies, and data on pollutant emissions and air quality did not even begin to appear in corporate disclosures until around 2017.

Low levels of professional capacity in the green finance and fintech space

Effective application of fintech for green finance requires the capacity to ably deploy big data and established mechanisms of data governance combined with professionals that are capable in both the fintech and environmental science fields. But currently, Chinese financial institutions have a shortage of green finance and fintech professionals, lack professional environmental risk management tools, and are unable to fully use big data from the insufficient amount of environmental data available. For example, the job of determining how green products and projects of financial institutions is often contracted to third-party environmental service providers that are not as familiar with the finance space and also operate with a low-tech approach that is expensive and slower.

Absence of green finance product and technology industry cluster effect

As the green finance system has developed in China, many new products, services, and businesses have emerged such as green funds, green insurance, green trusts, green public-private partnerships, and green leasing. And the demand for fintech to support this has also grown.

However, the new technologies have been unable to develop to scale due to differences in business applications and products users which need specific tailoring. An added factor is the desire to protect intellectual property within the technologies themselves. With unclear regulatory standards and requirements, some financial institutions are hesitant to be the first movers and invest in development when the application of fintech is synonymous with uncertainty and risk.

As the application of fintech for supporting green finance development is still at an early stage, there are few practical successes and an industry cluster effect has yet to develop—the idea that when linked and like-minded industries are geographically neighboring there is a comparative advantage that develops like Silicon Valley for technological innovation or Hollywood for film production.

International exchange and cooperation is scarce

Europe, the United Kingdom, and the United States are already experimenting with the nexus of green technology and green finance, and the lessons learned and best practices in these locales could be important references for China's own journey. In addition, China's large market potential should also provide ample opportunities for global cooperation on this front. However, international exchange on green finance largely is focused on traditional green finance products and policy incentives with limited exchange and cooperation on the application of fintech case, technologies, and products to green finance.

The cases highlighted in this report provide just a small sample of the nascent breakthroughs in harnessing fintech for green finance. Given the increasing global movement in this space and the trends demonstrated in the case studies, future opportunities are significant. This section reflects on the right combination of regulation and policy incentives that would continue to encourage further deployment of fintech for green finance development.

Deploying fintech for the regulation of green finance

The fintech industry's regulatory technology, or regtech, could begin to advance green finance development. By applying technology to regulatory processes, fintech can improve the efficacy of regulatory measures and reporting mechanisms for green finance regulatory bodies and local governments that are implementing green finance policies. Some examples include:

- *Establishing a green finance and green project matchmaking platform*: To facilitate local green finance development, establishing a green finance (credit and equity investment) and green project matchmaking platform could be a first step. This would help realize a "one stop shop" for businesses seeking green finance that integrates green financing data from various sources, allows for information sharing, and provides real-time monitoring—all of which lead to better alignment between the supply of green finance and demand from businesses. Another added benefit is that the government's preferential policies and green projects can be quickly connected to simplify application and approval processes.

- *Establishing a green credit evaluation system*: One of the major challenges for green finance development is the weak information sharing system between green finance players, especially applicable between finance institutions and the Ministry of Ecology and Environment. Information asymmetry increases financial risk levels. But fintech can address this gap and aid green finance development by integrating information and data from government ministries and corporate ESG disclosures from various industries into a green credit information system.

- *Establishing a green finance statistics repository*: Using fintech to develop a green finance statistics repository would aid financial regulators by improving their efficiency. Data from green finance operations can be collected in real-time, analyzed and applied with fintech, which provides a basis of information to support green finance transactions. And with this ability to realize accurate statistics on energy conservation, emission reduction, and environmental benefits, there is a foundation for future environmental benefits trading. The statistics also enable the ability to conduct performance reviews for green loans, which then inform government policy incentives and regulatory evaluations systemically. Future exploration of automatic ratings for green credit performance and real-time sharing of environmental regulations are high on the to-do list.

Deploying fintech in green finance institutions

Financial institutions can advance their green business operational capabilities with fintech as related to marketing, environmental risk management, pricing, and logistics management. Some applicable cases could include:

- *Facilitating additional identification capacity for environmental risk*: Fintech can enhance corporate environmental performance monitoring capabilities. By using big data to obtain environmental performance information of target customers, such as environmental penalties, production accidents, pollutant discharge, and negative environment-related intelligence, financial institutions are made aware of environmental risks for potential customers early on. With this information and the added capabilities of real-time data collection, analysis and risk evaluation can happen in a more timely manner allowing the financial institution to formulate appropriate strategies for the potential client. At the same time, it helps financial institutions track and monitor their green business, adding a level of transparency. Blockchain is emerging as another fintech application for green finance because it is decentralized, open and transparent, self-governing, anonymous, and tamper-proof. It can further help financial institutions track their green credit and green bonds funded investments, reducing the risk of green washing.

- *Developing risk modeling and smart pricing mechanisms*: Environmental risk management, stress testing, and other requirements for modeling, analysis, and prediction are increasingly complex. However, AI and big data technologies can bring higher performance levels and efficiency. For instance, financial institutions can use big data to continuously adjust factors to feed into risk assessment models and update indicators to provide more dynamic analysis of environmental risks. Additionally, for insurance companies and commercial banks, the ability to quantitatively analyze environmental risk allows for more systematic product pricing. Lastly, for asset management institutions, data from modeling and pricing can now be part of the environmental risks that are incorporated into overall investment decision-making.

- *Establishing a green rating database and framework for green ratings*: Green ratings are starting to be used in the sustainable development space, especially ESG factors, such as for the Dow Jones Sustainability Index, the United Nations Commission on Sustainable Development Goal Indicators, various corporate social responsibility strategies, and ISO 14031 that deals with environmental performance evaluations for environmental management. With the use of big data from corporations, fintech companies can build a corporate green rating system that will help financial institutions calibrate the “greenness” of a company and recognize associated environmental risks. Green ratings can be helpful in providing an indicator to build the case for or against investment.

Deploying fintech to help greening of industry

For a business to be considered green, it needs to undergo the process of green certification, which can be a costly endeavor. Lowering this barrier to entry is one way that fintech can help grow green industries. As a result, fintech has received generous policy support from the government and the backing of the finance industry. Some ways that fintech is helping to green industry include:

- *Providing green certification and advisory services*: Fintech can be used to generate pre-assessments and provide advisory services to organizations seeking green certification for their green businesses and/or green projects. This would in turn allow the entities to receive the subsequent policy support or qualify for certain green financing.

- *Connecting green businesses with the right financial services*: Fintech applications of big data and machine learning can be employed to generate better and more timely understanding of related industrial policies and analyses of green finance products developed by green finance institutions. This information could help create a green finance product database that would assist in connecting green businesses with the right green finance products or services based on industry, development stage, environmental performance, and technological characteristics.

As related to policies and services for the deployment of fintech for green and sustainable development, regulators and industry associations can also contribute through the creation of "public goods." Three specific recommendations could include:

- Regulators should consider facilitating environmental information sharing through development of a platform that brings together scattered sources of information on corporate environmental penalties and corporate pollutant discharge permits that financial institutions can access. In addition, the feasibility studies of green projects could be organized into a public database as well.

- Reference best practices from the EU's General Data Protection Regulation for data protection and management of public and corporate environmental data.

- Establish pilots for development of green fintech products and services in green finance pilot zones and in cities with obvious advantages for fintech expansion. One way to accomplish this is by using a fintech sandbox approach, which allows novel innovations to be tested in a controlled manner.

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