

## HRI Report

# Prospects for New Services & Businesses Provided by Financial Innovation

Kenichi Suzuki, Senior Researcher, 2nd Research Department

## 1. Introduction

“FinTech” has been drawing attention in the financial sector in recent years. “FinTech” is a coined term for Finance and Technology, and it mainly refers to innovative financial services using IT. In fact, IT and the financial system have continually undergone innovation while being inextricably linked. Even so “FinTech” is in the spotlight now because startup companies that are not financial institutions are creating new financial services which satisfy customer needs by providing new user experiences that take full advantage of IT with mobile devices.

Startup companies that have in particular emerged in FinTech directly connect individuals and corporations ahead of regulation reform by connecting communities such as EC (Electronic Commerce) and SNS (Social Networking Service) to the market, and they are accelerating transformation of the supply chain and business models. These startup companies possess different business models, value chains and cost structures from conventional financial institutions, which allow these companies to substitute the financial function that has been provided by financial institutions integrally. They are bringing new “destruction” and “creation” to financial services.

Conventional financial institutions assume the role of “credibility and assurance” by using the asymmetric nature of information between markets which enables transactions with unknown parties. By consolidating trading information in a wide variety of industries, financial institutions have provided advanced specialized services and offered an “intermediary function connecting individuals and corporations”. However, due to the appearance of FinTech, the intermediary role of financial institutions is headed for significant change.

## 2. FinTech Leading Customer Needs

Currently, in the global financial system, FinTech has been advancing in three fields, namely, fund procurement, payment, and service provision. More specifically, there are (1) an increase of investment by crowdfunding (P2P finance) that matches investors and borrowers, (2) expansion of quick payments by mobile payments with mobile terminals, and (3) growth of mass customization of financial services using the activity and characteristic information of individuals such as payment history, SNS and biological information.

### 2.1 Crowdfunding to Match Investors and Borrowers

In the investment sector, crowdfunding has recently taken center stage. Crowdfunding directly connects investors with funds and borrowers seeking funds through the Internet. This fund procurement method is drastically expanding mainly overseas including the U.S., and the procurement value worldwide for the year 2015 reached 34.4 billion dollars (according to Massolution). In crowdfunding, individuals and corporations ask numerous unspecified people for funding for their projects through SNS, etc. and carry out the projects when the funds reach a certain monetary amount (Refer to Fig. 1).

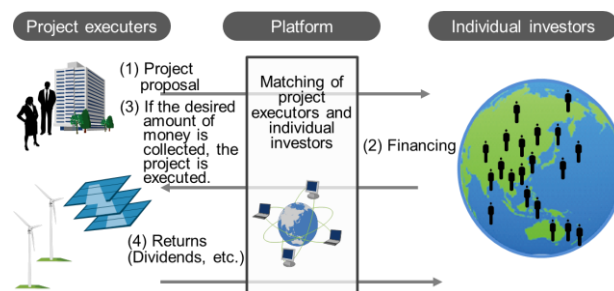


Figure 1. Crowdfunding Scheme Image

Here, the demand for funds in risky small-scale projects that regular financial institutions do not finance is the focus, and “platforms” that play the role of intermediaries match individual investors with those in need of funding based on characteristic information. Credit evaluation of borrowers takes only a few minutes via a website using evaluation data in SNS, etc. before financing or investing contracts are completed. These platforms do not provide financing but only assume the function of matching fund providers and borrowers. The platforms specialize in small-scale projects (roughly up to the hundred thousand yen level) and feature simplified work regarding financing and credit evaluation. As a result, borrowers can procure funds at a lower cost than the market interest rate, and even risky small-scale projects are able to procure funds since a large number of investors with different risk tolerance levels exist. In addition, the return on investment is not limited to money. In some projects, investors can purchase newly developed products which are subject to investment at cheaper prices while in other projects, CSR (Corporate Social Responsibility) such as re-investment in communities and development of developing countries is the main purpose. As seen in these projects, a diversity of payment methods is offered to investors.

**2.2 Disintermediation (Removing Intermediaries) of Finance Progressing Due to Mobile Payments**

In the payment field, the offering of inexpensive mobile payment services is growing mainly by startup companies. In mobile payments, users can transmit money (making payments) with mobile phones including smartphones without using bank accounts if they pay an inexpensive handling charge and complete simple procedures for the payment. The advantages of mobile payments for users are low cost and promptness. For example, in the case of sending (paying) 100 dollars from Japan to the U.S., if existing financial institutions are used, it will cost approximately 6,000 yen to 8,000 yen for the handling fee for an overseas remittance. However, if you use the PayPal (U.S.) service, the handling fee for an overseas remittance is less than 400 yen. In addition, although conventional

financial institutions require 2 to 3 business days for overseas remittance, in the case of PayPal, the overseas remittance is completed in 2 to 3 seconds. Moreover, in most mobile payments, since remittance is carried out by use of mobile phone numbers, email addresses, and SNS accounts, the procedure is simple.

The use of mobile payment services which allow payments to be made “quickly”, “inexpensively”, “anytime”, and “anywhere” is expanding in advanced countries including the U.S. following emerging countries where the diffusion of mobile phones is increasing. For example, the number of PayPal and Alipay accounts significantly exceed the number of accounts at major commercial banks. Some companies are working on business model transformation and cash flow improvement by coordinating mobile payments that have a fast growing number of users with their products. BMW (Germany) offers a pay-per-use rental car service where mobile payments and connected cars are coordinated. Rental car users only need to touch the on-board terminal in the vehicles for personal authentication to start renting. Rental fees are automatically charged via mobile payments according to the condition of the vehicles such as not driving and driving. In these pay-per-use services, whenever users use the services, fees are charged and paid such that corporations can expect continuous and immediate “cash in” (Refer to Fig. 2.).

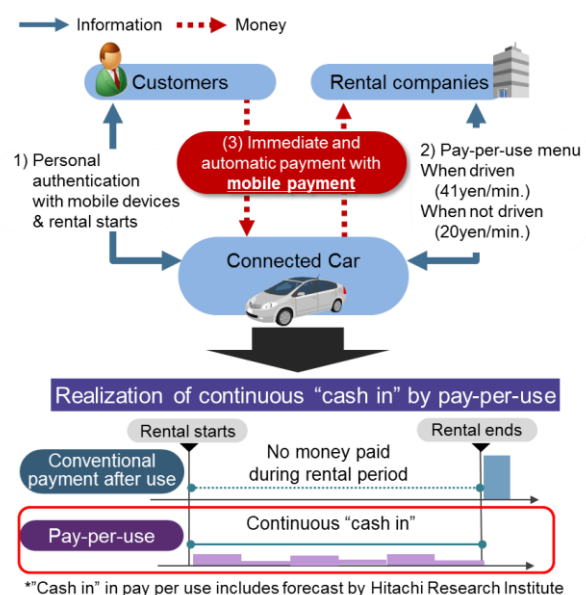


Figure 2. Pay-per-use Service by BMW

### **2.3 Mass Finance Customization Using User Information**

While transactions using smartphone applications, EC and SNS are expanding, approaches to enhance the offering of detailed financial services (easy-to-use) tailored to user preferences and potential needs by using a wide variety of customer characteristic data including service usage history has begun. One such example is transaction lending. In transaction lending, the hosts of online shopping websites can make quick decisions on the provision of loans to sellers in their online shopping website by evaluating the potential for growth and security of the sellers' business based on daily sales data and user evaluations. Another example is recommendation of the most suitable financial products for each customer by analyzing user preferences with text mining of SNS profiles and comments.

In addition, in the field of automobile insurance, risks were calculated in the past by dividing users into clusters (\*1) based on application information obtained in interviews. However, insurance companies can now use micro information such as driving preferences obtained from telematics to directly offer flexible fee setting and incentives for insurance policyholders.

Furthermore, services offering advanced financial services to individuals and small-to-medium companies relatively simply have intensified. These services were once available to markets for professional investors only such as financial advisors. The robo-advisory service is a system of automatically managing the portfolio composition of financial assets such as publicly offered investment trusts and adjusting diversified investment according to investment results based on attribute information related to the risk tolerance level and operation policy of users by use of algorithms. Starting with Wealthfront (U.S.), companies offering robo-advisory provide asset management services with low handling charges. In the future, more detailed management suggestions and execution can be expected by use of log data including management results and the trading history of users. In Japan, the expansion of service provision by major financial institutions that operate most publicly

available investment trusts and emerging operation companies is expected.

(\*1) Cluster is originally a computer term. However, cluster is used to mean "a group of people with similar thoughts and attributes" and is equivalent to a "genre or group".

### **3. Service and Business Innovation Promoting the Coordination of Money Flow and Commercial Distribution**

While digital technology such as IoT and AI is progressing, financial institutions are proactively renovating business models by aggressively incorporating financial innovation led by startup companies. Some examples are coordination with API (Application Programming Interface) and the use of blockchain technology. The Financial Services Agency of Japan established a Study Group on Open API in the Japanese Bankers Association in October 2016, and the study group is currently examining various challenges in open API. API enables the smooth coordination of information related to money flow such as personal authentication, bank account inquiries, and payments between financial institutions and general companies by a standardized arrangement. Coordination with IoT, SNS, EC, and pay-per-use services and public infrastructure via smartphone apps can be expected. Furthermore, in order to realize coordination with services that execute highly frequent transactions due to the acceleration of digitalization, a financial infrastructure to complete agreement-payment-service delivery needs to be built. For this purpose, we need a mechanism that executes coordination and integration management of information and transactions related to complex commercial distribution, money flow, and service delivery safely and at low cost.

"Blockchain" is a mechanism of recording and sharing data in a format that does not allow overwriting or tampering by use of encryption technology and decentralized network technology. The greatest feature is not requiring a large-scale centralized control system since participants in the transactions respectively own identical transaction data and the data refers to other participant's

data. Blockchain has drawn attention as technology of automatic compulsory execution of transactions based on contracts written in the program in the field of trading with complicated verification procedures such as securities trading, trade finance, swap and derivatives.

### **3.1 Coordination of Asset Management and Finance by Use of IoT**

A fund procurement method using inventory and accounts receivable for flexible financing focusing on features of the business without depending on guarantees by real estate and individuals is receiving attention. This is known as the method of Asset Based Lending (ABL) where movable assets and accounts receivables are used as collateral and corporate activities are supported through the evaluation and monitoring of movable assets and accounts receivables. The greatest obstacle of ABL is the scale of administration costs on both borrowers and financial institutions such as calculating the value of collateral and monitoring. As a measure to improve this situation, a new scheme utilizing IoT and Big Data is expected to appear. In this new scheme, wireless sensors are installed in inventories, warehouses, and machinery equipment owned by companies in order to monitor the quality and location of inventories and operation situation of the equipment. With such real time monitoring, collateral value is visualized and appropriate risk assessment can be conducted at low cost, fast speed, and from remote locations. Financial institutions did not handle ABL, but this new scheme allows financial institutions to carry out a full scale launch of ABL. Companies will be able to procure funds appropriately according to the operation situation of equipment.

### **3.2 Coordination Between the Maritime Trade Service and Finance by Blockchain**

In trade finance work, a Letter of Credit (L/C) to cover credit risks and a Bill of Lading (B/L) to guarantee the delivery of shipped items are created, and a large amount of time and cost are required to confirm the consistency of information described on documents and to check the cargo. As a measure to improve this situation, IoT and blockchain

are expected to improve efficiency. After coordinating the systems of exporters, importers and financial institutions with API, IoT and blockchain are used. For example, from large quantities of cargo, corresponding containers can be identified immediately with IoT devices installed in the containers, and information on items in the containers (such as quantity and quality of the products, etc.) can be understood in real time. Next, by using an “electronic Letter of Credit” and “electronic Bill of Lading” using blockchain, credit is secured. Administration procedures can be greatly simplified since related parties in trading share information. The use of cargo information from the IoT devices enables trading and payment where the financial intermediary function is eliminated.

Trade finance work can transform into “trading where payment related to the movement of objects is paperless, inexpensive, quick, simple, and transparent”.

### **3.3 Coordination of Energy Trading and Finance Using Smart Contracts**

In the energy sector as well, the potential for building inexpensive and highly safe trading platforms by eliminating intermediates is expanding. “TransActive Grid”, a joint venture by “LO3Energy”, which handles microgrid for residential areas in Brooklyn in New York, and ConsenSys, which handles blockchain, developed a P2P electricity trading system using Ethereum (\*2) for which feasibility studies are currently ongoing. In this service, excess electricity generated by solar power panels from households is sold and purchased via smart meters. The execution of trading and contracts is automatically executed via smart contracts (\*3) written in the blockchain (Refer to Fig. 3). The P2P electricity trading system targeted by TransActive Grid is not only for individuals consuming electricity but also for enabling the microgrid participants in the neighborhood to directly sell and purchase excess electricity generated with household solar panels.

This approach that encourages “prosumers (\*4)” in energy trading has the potential to reduce operation costs by eliminating duplicate work that is carried out by meter management companies, power companies, and banks such

as the subscriber and application procedures. Another feature is residents in the neighborhoods sharing the same sense of values in regards to clean energy can buy and sell power from and to each other while maintaining transparency. A contribution to the revitalization of local economies can also be expected, and this approach has the potential of becoming an innovative power sharing service. Due to the high transparency of trading with systems using blockchain technology, external audits become unnecessary, and this also contributes to a reduction of electricity trading costs.

We need to watch the development of feasibility studies via smart contracts, and for diffusion, an execution system for payments while maintaining real time such as automated trading and a reduction of time needed for payment are necessary. Since value transfer in the P2P power trading system will likely use tokens with crypto currency, a function to convert the tokens into actual money is also necessary, and coordination with financial institutions is important.

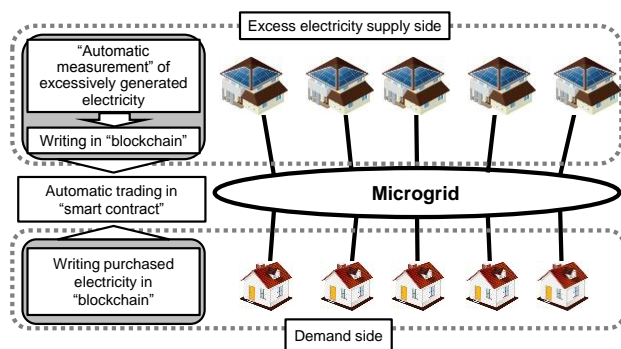


Figure 3 TransActive Grid's Feasibility Image

(\*2) Term for platforms to build decentralized applications (DApps) and smart contracts using blockchain

(\*3) The concept was advocated in "The Idea of Smart Contract" released by Nick Szabo, an American legal scholar and cryptographer in 1997. Smart Contract refers to the "automation of contracts", in other words, contracts are defined in programs and are automatically executed when certain conditions are met.

(\*4) Prosumer is a coined word for producer and consumer and refers to consumers who conduct production activity.

#### 4. Business Innovation of the Industrial System

Blockchain technology that advanced due to financial innovation has the potential of transforming industrial systems in many fields without being limited to the financial sector. Application of blockchain technology's functions of transparency (all participants share a ledger and mutually check each other) and robust resistance property against tampering (Deleting records is difficult and irreversible) to the supply chain is one example.

By writing processing and IDs of products and history and information on owners in each phase of the flow from manufacturing to distribution in blockchain as well as mutually keeping and authenticating such data among concerned parties, data can be protected from loss even if some of the concerned parties go bankrupt and can be traced back anytime. This method can resolve various challenges in traceability. More specifically, (1) improvement of silent change (reduction of risk of suppliers switching to inexpensive similar or imitation products which are different from specifications by those who placed orders), (2) efficiency improvement of recalls (when defects are discovered in products produced in developing countries or by new companies or plants, a detailed check going back to the raw materials is possible), (3) prevention of counterfeiting (early discovery of counterfeiting and imitation products by describing a certificate of origin and manufacturer information and coordinating with product serial numbers) can be achieved. Some startup companies have already launched the commercialization of traceability. For example, Blockverify (U.K.) registers the product ID information of medical products while EverLedger (U.K.) registers the product ID information of diamonds in a shared blockchain ledger to prevent counterfeiting, theft and illegal trading.

The traceability application by blockchain can also be expected to improve the safety of food-related supply chains. International Services International-Dentsu (ISID) is promoting the construction of such a system. This system assures the quality of agricultural products and enables consumers to access data on the production environment by introducing blockchain in data management of the

production environment of agricultural products such as soil condition and properties of pesticides in the quality control of organic vegetables produced in Aya-cho, Higashi-Morokata-gun, Miyazaki Prefecture. In addition, Walmart, the gigantic worldwide supermarket chain, is carrying out a trial of blockchain in the safety control of foods in cooperation with IBM and Tsinghua University. The company is promoting blockchain development for recording the production and distribution routes of pork distributed in China where a series of fraudulent production information was discovered. The goal is to construct a system that enables the tracking of food through the entire supply chain and allow immediate identification and countermeasures if there are any problems.

## 5. Conclusion

Innovation realized by financial innovation will accelerate coordination with industrial systems by connecting with digital technology such as IoT, AI, and blockchain, and realize the integration of three flows of commercial distribution, money flow, and service delivery. Building business models led by end users that do not require a “central controller” without entrusting personal rights and privacy information will be more important in the future. If trading costs in B2B (Business to Business), E2B (End-user to Business), and E2E (End-user to End-user) are innovatively reduced, trading will be on a smaller scale, at a higher frequency, and more verified, and an eco system that does not require an intermediary function will be generated in all industries resulting in a world where trading is completed digitally (Refer to Fig. 4).

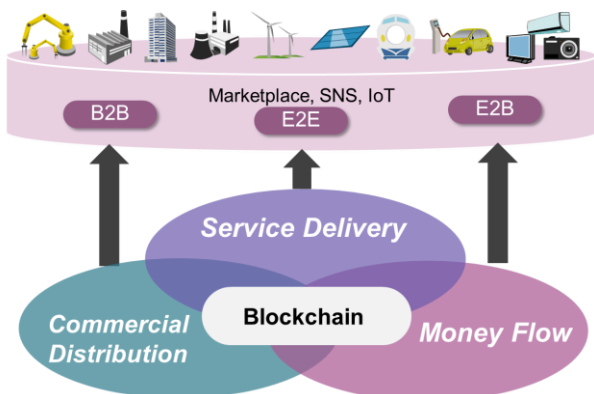


Figure 4. Approach to Business Models Led by End Users

Low interest rate policies have settled down mainly in advanced countries, and the asset management environment for users and financial institutions is becoming more difficult. Amidst this background, an approach to financial innovation using digital technology such as IoT, AI and blockchain will be more and more important. Efforts to realize the establishment of an inexpensive and safe social infrastructure achieved by expansion of the application of blockchain technology also bear watching.

Hitachi Research Institute will continue to search for the directionality of innovation of financial service business models while monitoring trends of cutting-edge digital technology, FinTech-related policy trends, and changes in user needs.

(References)

- 1) World Economic Forum: Future of Financial Service:  
[http://www3.weforum.org/docs/WEF\\_The\\_future\\_\\_of\\_financial\\_services.pdf](http://www3.weforum.org/docs/WEF_The_future__of_financial_services.pdf)
- 2) The FinTech 2.0 Paper: Rebooting financial services:  
<https://www.finextra.com/finextra-downloads/newsdocs/the%20fintech%20%20%20paper.pdf>
- 3) BLOCKCHAIN REVOLUTION DIAMOND, Inc.  
March, 2017
- 4) THE BUSINESS BLOCKCHAIN Nikkei Business  
Publication, Inc. October 2016
- 5) Survey on Establishment of System Evaluation Axis  
Using Blockchain Technologies Mitsubishi Research  
Institute, Inc.  
<http://www.meti.go.jp/press/2016/03/20170329004/20170329004-2.pdf>
- 6) Massolution (2015) “2015 CF Crowdfunding  
Industry Report”  
<http://crowdexpert.com/crowdfunding-industry-statistics/>
- 7) BMW Group: DriveNow  
<https://www.bmwgroup.com/en/brands-and-services/drive-now.html>
- 8) Lo3Energy: TransActive Grid  
<http://lo3energy.com/press/>
- 9) Can Blockchain Spark “Agricultural Reform”?:  
<http://wired.jp/2017/02/13/vol27-innolab-blockchain/>
- 10) From Bitcoin to puke-tracking: Walmart uses  
blockchains to monitor food  
<https://arstechnica.com/science/2016/11/from-bitcoin-to-puke-tracking-walmart-uses-blockchains-to-track-food/>