

## Technotalk

# Understanding the Essence of FinTech and Leveraging It for Innovation in Finance

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*As use of smartphones spreads throughout society and rapid progress is made in technologies such as big data and AI, there is rising interest in FinTech, which creates new services that combine these information technologies with financial services. Hitachi is focusing on the financial sector as one of the core areas of its Social Innovation Business. Hitachi intends to support innovation in banking and finance through collaborative creation with customers by accelerating its efforts on FinTech, including participation in an international joint development project for blockchain technology and the establishment of a FinTech-related research and development organization in Silicon Valley in the USA.*

## What is FinTech?

**Cho:** There is growing expectation and trepidation that the emergence of new financial services, collectively called FinTech, and the rise of the companies who provide them will bring about a revolution in the world of finance. As you know, the term “FinTech” comes from the combination of the words finance and technology. While the linking of finance and technology, and especially information technology (IT), is nothing new, what implications can we expect for the financial business from this new trend represented by FinTech? We are here today to discuss this subject with two people who are closely involved with the finance industry and financial services.

To begin with, the term “FinTech” has a variety of meanings. How do you think it should be defined?

**Aoki:** There is a certain degree of ambiguity in terms of the meaning and scope of how the word is used. What I personally found most interesting was the categorization adopted by José Antonio Gallego<sup>\*1</sup>, a former executive at a bank in Spain. He divided up FinTech services into five types.

The first type is Sioux, which refers to the native American tribe. Gallego used the highly independent-minded people to represent the targeting of new customers that were previously ignored by banks. This type of FinTech service covers social lending,

for example. The second type is Guerrilla. This involves services that target expensive bank services, including a foreign exchange service vis-a-vis individual customers, that charge lower fees than a bank by using the Web to match people who want to swap, for example, yen for dollars with people who want to swap dollars for yen. The third type is Samurai, referring to defeating a formidable enemy with a simple implement like a sword. One example is a service that recommends the most suitable mutual funds for a customer when the customer responds to a simple questionnaire on a smartphone. The fourth type is Double Agent, referring to business models that are based on using the infrastructure of banks to supply their services. This type includes services that provide customers with funds transfer services using the credit card infrastructure. The fifth type is Invaders from Outer Space that, if they should exist, could ruin mankind. In other words, these are services that do not look profitable but, if successful, could mean the end of the banking industry. Virtual currencies and the blockchain platforms they run on are covered under this type.

**Okina:** Is it the emergence of innovative technologies that has made these FinTech services possible?

**Cho:** Rather than technological breakthroughs, I believe it is more about creating new services through the skillful combination of existing technologies. Blockchain technology, for example, seems like a new development, but it was originally devised as the basis

<sup>\*1</sup> José Antonio Gallego, Banco Bilbao Vizcaya Argentaria, S.A. (BBVA).  
URL: <http://banknxt.com/53695/fear-fintech-startups/>, <http://banknxt.com/author/joseantoniogallego/>

for the Bitcoin<sup>\*2</sup> virtual currency. That is, you can take the view that all this attention suddenly being directed toward blockchains is because they can be used, not only as a virtual currency, but also for a wider range of businesses and applications.

In that sense, there are other factors behind the rapid growth in FinTech over recent years.

**Aoki:** According to bankers in the USA, there are two major factors at play. The first is that a portion of the bankers who lost their jobs during and after the Lehman crisis in 2008, set up finance-based IT ventures and moved to the West Coast. The second factor is that the worldwide spread of smartphones has led to a rising number of people who want everything to be handled cheaply and efficiently with a personal touch, including banking transactions.

**Okina:** In addition to those factors, another development that is believed to be driving the growth of FinTech with a strong personal touch is that progress in technologies such as big data analytics and artificial intelligence (AI) has, for example, made it easier to offer custom-made services that use transaction or event records.

The aftermath of the 2008 financial crisis saw, not only a reduction in the capital base of American financial institutions, but also a tightening of banking regulations. Moreover, another consequence was that the loss of equity due to the large drop in real estate prices dramatically increased the number of people who cannot borrow from banks. It was that gap, you could say, that led to IT companies offering financial services like crowdfunding and social lending.

## Link between Finance and IT in FinTech

**Cho:** As noted earlier, there has long been a connection between finance and IT. In what way is the connection in the case of FinTech different than in the past?

**Aoki:** Major progress was made on the adoption of IT in the financial sector during the 70's and 80's when the rapid increase in the number of financial transactions (and increased amount of paperwork) due to the liberalization and internationalization of banking services coincided with the popularization of computers. What was demanded of IT in this period was "processing"—information system technologies were used to process existing operations, which were skyrocketing.

Subsequently, financial crises that took place in a number of countries during the 90's and 2000's

highlighted the need for enhancing the safety of payment and settlement systems, as well as of financial transactions, without compromising efficiency. As a result, the link between finance and IT was strengthened to achieve "sophistication" of operational safety and efficiency.

In contrast, what we are now seeing, I believe, is a move toward "usurpation," whereby finance and IT are being brought together by new players in the financial market to take over existing operations that had been handled by traditional financial institutions or payment and settlement infrastructure.

**Okina:** Clearly, the Internet has played a major role in usurpation. In that sense, we can say that FinTech is part of the Internet of Things (IoT), can't we?

The robust systems used for payment processing in the banking industry, in which the payment system is operated by a restricted group of finance industry participants using large centralized computers, were largely put in place back in the 80's before the spread of the Internet. However, the subsequent development of the Internet has led to the decentralization of networks, opening them up to many participants, and spreading them to the edges of the banks' payment networks. These other participants have taken the initiative, and have come to provide a wide variety of services from a user's perspective.

Due to high cost-performance, a consequence of not requiring hardware and instead relying on bank deposits for final settlement, FinTech has seen the emergence of a steady stream of new business models. Companies with extensive customer bases made up of Internet users are entering the market also. These factors can be seen as bringing major changes to the competitive environment in ways that usurp the role of existing financial institutions.

**Cho:** Defining FinTech according to the five types mentioned earlier, how do you see this going?

**Okina:** It seems likely that non-banks will continue to make active use of FinTech as a tool for providing an alternative interface with banks' individual customers, or an alternative infrastructure for the transfer of capital and securities provided by a trusted third party. The former corresponds to the first four types, and the latter corresponds to blockchains used as an infrastructure for transferring goods and money.

## Vision and Strategy are Crucial

**Cho:** While I assume that banks will bear the brunt of the impact of FinTech, what impact do you foresee on the existing banking industry from the changes you

\*2 Bitcoin is a registered trademark of bitFlyer, Inc.

have spoken of, particularly the change involving non-banks taking over the interface with customers?

**Okina:** Looked at from a macro perspective, the core functions of banks have been to act as intermediaries for finance and to settle payments. In terms of acting as financial intermediaries, there has been a progressive breakdown (unbundling) of this function since the 80's due to financial innovations such as securitization and derivatives, with a variety of players entering this field. The settling of payments, meanwhile, has been an area in which banks have traditionally had a monopoly, and while it is still the case that final settlement is made by cash or bank deposit, this is another area where unbundling has progressed in recent times, and a variety of players have become involved in the portion of payment services that precede final settlement. By providing added value and better convenience than banks, I believe they will continue to encroach on that function.



**Yuri Okina, Ph.D.**

**Vice Chairman, The Japan Research Institute, Limited**

Graduated from the master's program at the Graduate School of Business Administration, Keio University in 1984. Commenced work at The Japan Research Institute, Limited in 1992 after working at the Bank of Japan. Other subsequent appointments include non-executive director and member of the industrial revitalization committee at the Industrial Revitalization Corporation of Japan (2003 to 2007), Council Member of the Science Council of Japan (SCJ) (2005 to 2014), and Guest Professor at Keio University (2014 – Present). Appointed to her current position in 2014. She has a doctorate (economics) from Kyoto University, is a Member of the SCJ, and a member of the Japan Society of Monetary Economics (JSME).

**Aoki:** It would be fair to say that FinTech has dramatically improved the efficiency of the pre-settlement stage where we make transactions and deliver payment instructions. It also improves efficiency in the post-settlement stage, such as in managing household account books. Thus traditional banks may lose customer interface, or customer bases more broadly, because new players providing efficient services come between banks and their customers, just like a wall that makes the customers invisible to banks. The impact of this is not likely to be small, particularly in the case of small- and medium-sized financial institutions that have similar customer segments to the FinTech companies. In the extreme, banks may be reduced merely to handling batches of customer funds transfers brought to them at the end of each day by the FinTech companies.

**Cho:** Is the situation different for large banks?

**Aoki:** Of course this is nothing but a stylized model of the real world, and there are big differences between banks. That said, large banks have extensive transactions with the wealthy segment (in the case of individuals) and large companies (in the case of companies), so their customers are different from those of FinTech companies which mainly target the mass market. Accordingly, large banks are not in much competition with FinTech companies. Moreover, those banks could also choose to adopt FinTech themselves in order to acquire customer segments that are new to them. However, large banks still do have customers among the mass market, and it goes without saying that they are at risk of having FinTech companies encroach on that customer base. In that case, there is an emerging trend toward infrastructure-heavy banks collaborating with FinTech companies using minimal assets of their own.

**Cho:** Whether they are small- and medium-sized or large-sized, banks are showing strong interest in FinTech. Does this mean that they will adopt FinTech for themselves in order to avoid losing customer interfaces to start-up companies, or will they make an effort to acquire new customer segments?

**Okina:** The reasons why individual banks are interested in FinTech are many and varied. These reasons might include using FinTech to go into direct competition with start-up companies in order to maintain their customer base, researching trends in FinTech without actually using it themselves in order to determine what response is needed, or working with FinTech companies with the aim of acquiring new customer segments. Whatever approach banks adopt, FinTech is one of the trends that exists at present. In a situation like this, it may be only natural that they

first seek to build knowledge and then try some new initiatives of their own.

**Cho:** If traditional banks take steps that involve the use of FinTech, what sort of things should they be watching out for do you think?

**Aoki:** Obviously, FinTech is just a tool. It seems to me that an approach like, “let’s give FinTech a try,” is getting one’s priorities backwards in the sense of choosing what to do based on the tools available. What is important is to start from “what” by identifying what kind of services they should provide that will enable them to differentiate themselves and maintain and enhance their competitive position in relation to FinTech companies and other financial institutions. Having made that decision, there are a variety of “hows,” in other words tools, available. The key is to choose the optimal tool that can be what you call FinTech, or can be a traditional one. Starting with the tool first may carry a heavy risk of wasted effort.

**Okina:** I agree. In the future, banks will need to compete or to collaborate with the new FinTech companies entering their markets. Whichever option banks choose, open innovation will be vital if they are to overcome the limitations of their principles of self-sufficiency. However, without a vision and strategy for how they intend to use IT, such initiatives will end in failure. Particularly crucial is the idea of continuing to change their business models by using IT on the basis of a clear strategy.

**Cho:** What is needed to change their business models?

**Okina:** The banking industry in the developed countries, particularly in Japan, is experiencing an era of low growth and surplus funds, with fewer financing opportunities. In addition, the impact of a declining population will become more pronounced, with difficult times ahead during which the deposits that make up the banks’ customer bases are forecasted to decrease. I believe the banking industry needs to work out strategies for the future from a rigorous user perspective. Also crucial, I believe, is to consider what makes banks different from IT companies, and what capabilities they have that come with being a financial institution.

## Potential of Blockchain and Virtual Currencies

**Cho:** Dr. Okina noted earlier that another consequence of FinTech, in addition to its serving as an alternative interface, is the potential use of blockchains to create new infrastructure. Will this result in Bitcoin superseding existing currencies? If it does so, I think this would usher in a major new

epoch with respect to the social infrastructure we know as money.

**Aoki:** While there are cases where blockchains can be used as infrastructure for enabling the transfer of money and assets between an unspecified number of participants, there are also cases where they are used for transfers between specific participants. Although the mechanism for verifying the validity of a transfer differs depending on which of these is involved, in either case, the same basic concept applies of progressively building up a chain of records of transfers of money and assets between people. It is an electronic endorsement, so to speak. While blockchain technology is often treated as if it were a subset of FinTech, the mechanism itself is actually not directly related to finance, and it can be used much more widely for non-financial transactions, such as vehicles, real estate, and diamonds.

**Cho:** Do you mean that virtual currencies will not enter widespread use?



**Shuhei Aoki**

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Joined the Bank of Japan in 1981 and served as the General Manager for the Americas, Director-General of the Financial Markets Department, Director-General of the Payment and Settlement Systems Department, and other positions prior to joining Hitachi, Ltd. in 2014.

**Aoki:** As with existing electronic monies, I expect they will gain a certain degree of popularity. However, for a virtual currency to be used like bank notes or bank accounts, it would require the establishment of a level of trust similar to existing currencies, by letting the virtual currencies be armed with mechanisms similar to banking regulations, deposit insurance, monetary policy operations, and other relevant things by which traditional monies are protected. Without that, a virtual currency will not be used as a form of money that everyone is willing to accept. The initial use of blockchains will be in the world of goods and services; their use in the world of money will still be considerably far into the future.

**Cho:** If the role of existing currencies will not change significantly in the near future, what then is the significance of virtual currencies for existing currencies and central banks?

**Okina:** Certainly, I do not think that virtual currencies are likely to replace existing currencies any time soon.



## Toshiya Cho

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Joined Hitachi, Ltd. in 1985. After serving in roles including systems engineer for the securities industry, CRM solution development for financial institutions, and business consulting, he was appointed to his current position in 2016. Mr. Cho is a member of the Governing Board of the Hyperledger Project of The Linux Foundation, and is a part-time lecturer in the graduate school at Kyushu University.

However, the fact that virtual currencies are now able to be traded means that they can be thought of as representing the antithesis of existing currencies. The increase in Bitcoin trading that occurred during the financial crisis in Cyprus reminded me of how important it is that central banks retain people's confidence. It may well be that use of virtual currencies will continue to grow and play that role.

**Cho:** What about the use of blockchains in asset transactions?

**Okina:** I believe that blockchains have many potential applications. As you noted, the new technology for electronic endorsements in decentralized networks may well replace the transfer control mechanisms that have existed up to now that involve a central administrator. There is interest in many sectors, including securities trading and real estate registers, and I hear that there are initiatives in this direction being undertaken by the government in places like Estonia. In that sense, the blockchain can be thought of as a technology that has the potential to bring about an efficient transformation in various trading systems used by society, both in the private and public sectors.

## Services being Transformed by Big Data and AI

**Aoki:** I would now like to look at FinTech in its role as a technology. We discussed earlier that the core of FinTech, from the perspective of the financial business, would be customer interface and transfer infrastructure. What then will be the essence of FinTech in terms of technology?

**Cho:** Seen in terms of technology, FinTech can be split into two layers. The first is the interface and infrastructure layer, which is close to business, and the second is the layer composed of big data, AI, and security that underpins the first layer.

First, with respect to interfaces, open application program interfaces (APIs) are one notable example. APIs provide a simple means for making some of the functions of applications and other software available for use by other systems, and those APIs that are made available to third parties are called open APIs. If end users are to be able to freely choose services that suit their lifestyles, then it is necessary to coordinate services across industries, and it is also necessary for financial institutions to deliver new services quickly. APIs will likely play a vital role in the interoperation between existing systems and new services. If the operations of financial institutions are provided through APIs, the standardization of interconnections with external services will make



it possible to offer advanced financial services that involve open innovation in the IT sector.

**Okina:** While blockchain will be a key technology for infrastructure, what possibilities and challenges do you see for blockchains from a technical aspect?

**Cho:** With respect to blockchains, there were numerous studies and trials that were undertaken overseas in 2015, and there were moves to call 2015 the first year of the blockchain era. The fact is, however, that blockchain remains a work in progress, and there are outstanding technical issues including confidentiality and processing speed that remain. First of all, based on the recognition that blockchain is a technology with potential for enabling innovation across the entire social infrastructure, Hitachi is promoting its wider adoption and has become a premium member of the Hyperledger<sup>\*3</sup> Project, a joint international program set up to standardize blockchain technology by The Linux Foundation<sup>\*3</sup>, a non-profit organization in the USA. In parallel with this, Hitachi is also working to overcome technical challenges, especially by improving the functions required for financial trading.

**Aoki:** What is your technical outlook for big data and AI, two topics that were mentioned earlier? And what changes do you think they will bring to financial services?

**Cho:** The age of big data has increased the amount of data available to financial institutions by an order of magnitude, and it is becoming difficult to make use of this data on the basis of past analysis techniques, rules of thumb, and intuition. Accordingly, we are working on applying AI to big data analytics for identifying correlations in the data.

While rules of thumb and intuition can be useful, the application of AI can uncover correlations that were not previously suspected, and this can lead to business improvements and efficiency gains. We are also utilizing question-answering AI that analyzes and interprets large amounts of text data on topics with arguments for and against to provide the basis and reasons for those arguments, and are working on using it with big data.

We also expect big data and AI to be combined and to provide more sophisticated financial services, such as the calculation of insurance premiums automatically from data on vehicle use obtained using IoT technology.

### Considering the Future of Financial Infrastructure for Society as a Whole

**Okina:** Interfaces and transfer infrastructure are dogged by concerns over security. Given that improvements in convenience and efficiency will fail if they do not also improve security, what advances in security are being made in terms of technology?

**Cho:** A wide variety of security measures are being used in financial systems already, a typical example is the use of biometric authentication in automated teller machines (ATMs). The fact is that issues of convenience remain with regard to the current method of storing biometric data on an integrated circuit (IC) chip. A new security technique developed by Hitachi to overcome problems like this is called public biometric infrastructure (PBI). This works by putting the biometric data through a one-way transform at the time of registration to generate a public key and storing this key in the cloud, so once a user has provided their biometric data, it can be made available for use by a

\*3 Hyperledger is a trademark of The Linux Foundation. Linux Foundation is a registered trademark of The Linux Foundation. Linux is a registered trademark of Linus Torvalds.

wide variety of applications. Instead of relying on a credit card or debit card, this enables “empty-handed” authentication in which the biometric means of identification provides both security and convenience.

**Okina:** What is Hitachi doing in the field of FinTech? And, what value do you see it having for use by existing financial institutions?

**Aoki:** The research and development group at Hitachi is actively deploying both human and capital resources on a wide range of technologies, including FinTech. In addition to the blockchain research mentioned earlier, we have also established our Financial Innovation Laboratory in Silicon Valley in the USA and have set about building relationships with local FinTech companies and exchanging information about the latest innovations. While it is through initiatives like these that we are able to establish the capabilities for providing customers with the newest and best tools and solutions, we also naturally work with customers to consider first the “what” questions, namely, what type of services should they be providing and what type of services are feasible. Hitachi is using FinTech as an opportunity to propose new business models to financial institutions and to engage in collaborative creation, not only supplying technology, but also offering solutions that take account of the nature of the services financial institutions provide. We intend to boost these activities further in the future.

**Cho:** Hitachi’s involvement in FinTech places an emphasis on the four fields we discussed earlier, namely, interfaces (including APIs), big data and AI, new financial infrastructure (including blockchains), and security (including PBI). These technologies can function independently or in tandem, and our aim is to use them as a basis for providing new value. Moreover, in addition to Hitachi’s own technologies, we also hope to engage in collaborative creation with financial institutions, while also using mergers and acquisitions (M&A) or collaborating with FinTech companies as necessary.

**Aoki:** Banking and finance is an information industry, and it has been the use of technological innovation, either in the front or the back office, that has made the industry’s growth and prosperity provide. Meanwhile, the recent rise to prominence of FinTech has a different character than past combinations of finance and technology. It is emerging powers promoting a tendency toward the usurpation of bank customer interfaces and existing payment infrastructure. It is anticipated that FinTech will continue to develop as a technology, so a major issue for existing financial institutions will be how they can protect or change their customer bases or interfaces. We seem to have

reached the stage where society as a whole is thinking about what form the financial infrastructure, including payment media, should take in the future.

With population growth slowing in developed countries, innovation-driven improvement in productivity is becoming increasingly important. In such an environment, we cannot ignore the trend toward the use of FinTech in finance as well as in other sectors. In particular, we can look at this as a critical moment for traditional financial institutions in terms of how they respond to this trend. Drawing on knowledge from a wide variety of industrial domains, not limited to finance, Hitachi is on the lookout for ways that it can apply its knowledge as future social infrastructure with a view toward “FinTech & Beyond.” Thank you both for your time today.