Masaru Hayami: The impact of innovation in information and communications technology on financial systems

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It is an honor to be invited and given this opportunity to speak at Kisaragi-kai. Today, I would like to share with you our thoughts on changes in Japan's financial system against the backdrop of the rapid pace of innovation in information and communications technology, and how, under such circumstances, we should continue improving both the stability and efficiency of the financial system.

The recent rapid evolution of information and communications technology, which is generally called the "IT revolution", has been exerting a profound impact on economies and finance as a whole. In the United States where such technological innovation has been one of the driving forces behind the longest period of economic expansion in its history, there are views that a new economy that is totally different from the old economy has been born. Some even claim it is comparable to the Industrial Revolution of the 19th century. Though it will be a long time before economic historians can make an objective assessment of innovation in information and communications technology, which is still under way, there is no doubt that it has had a profound impact on economies and finance as a whole.

Indeed, I don't think I need tell you that technological innovation has brought about the speedy processing and transmission of information enabling a substantial reduction in costs, wider networking, and globalization on an unprecedented scale and scope. Moreover, it has affected a wide range of industries, having a particularly dramatic impact on the financial services industry.

Man created an instrument called "money", which is a unit of account, a means of exchange and a store of value, for the smooth execution of economic activity. The financial services industry is closely related to this instrument we call money, and its core business is based on information processing and networking. Therefore, the financial services industry has been a major user of information and communications technology, and, significantly, it is an industry that can easily take advantage of technological innovation. As we all know, computers and exclusive communications networks have greatly contributed to improving the efficiency and safety of business, for example, in retail deposit taking where an enormous amount of information must be processed and recorded as well as in fund transfers and domestic and foreign exchange where extensive networks are required. Furthermore, the recent rapid growth of derivatives and securitization has been made possible through downsizing and the spread of computers.

Changes in the financial system stemming from the recent advance of information and communications technology are not limited to improving the efficiency of traditional businesses and enabling the development of new instruments in specific fields. Here, a good example is the development of a new supply channel for financial services, namely the internet, which has made it possible to establish extensive and low-cost financial networking. Traditionally, the provision of financial services was very much dependent on the branch networks of financial institutions. But now, information and communications technology has enabled the more diversified and convenient provision of financial services, including via the internet and unmanned ATM networks.

The creation of a new supply channel for financial services has substantially reduced the cost of financial transactions. For example, internet banking has greatly lowered the processing cost of banking. According to research conducted in the United States, in some cases processing by the internet is estimated to cost less than one hundredth what it does at a bank branch window.

Furthermore, the emergence of a new supply channel for financial services and the substantial reduction in processing costs have brought forth changes in the composition of financial service providers. One example is entry into financial services by non-financial business firms. While the

provision of financial services was traditionally via the branch networks of financial institutions featuring vaults and lobbies, the emergence of new supply channels such as internet banking and unmanned ATM networks has made it possible to convert without much difficulty networks used for non-financial activities into ones that can provide financial services.

The reduction in processing costs of financial transactions and the easy conversion of non-financial networks to financial ones have created a profitable opportunity for non-financial business firms to enter the financial services industry by selecting such specialized areas as payment and settlement without needing the synergies obtained from accepting deposits and extending loans. Because entry into selected financial services has become possible, it appears that the initial entry cost has been further reduced and the incentive for non-financial business firms to enter the sector further strengthened.

Following revision of the Securities and Exchange Law in 1998 that permitted entry into the securities field through simple registration instead of licensing, quite a few non-financial business firms began to engage in securities activities. And recently, some non-financial business firms have announced plans to start banking operations. Such active entry into banking has not been seen since 1993 when the Financial System Reform Law was enacted and securities houses began entering the banking area through subsidiaries. The reduction in entry costs, thanks to technological innovation in information and communications, has enabled not only mutual entry into each other's field between banks and securities houses within the financial services industry, but also new entry into the financial services industry by non-financial business firms.

The advance of information and communications technology has not only strengthened the incentive of non-financial business firms to engage in banking but also urged existing financial institutions to review their management. Recently we have observed various forms of alliances and reorganization among financial institutions, and particularly conspicuous is the movement of major financial institutions toward M&A and consolidation among themselves. The main aim of the movement toward mega-banks is for financial institutions with different niches to strengthen competitiveness by complementing each other. Under the current situation where information and communications systems might strongly affect competitiveness, it is indispensable that financial institutions effect huge IT-related investments to strengthen their competitive position. Thus, it cannot be denied that the incentive to rationalize IT-related investments in overlapping fields, thereby alleviating the financial burden and making it possible to increase IT-related investments in strategic areas, has been a big driving force behind financial consolidation.

While innovation in information and communications technology will bring about advances, diversification and improved efficiency, thus eventually leading to better services for users, it is also true that more information-oriented financial services and networking will give rise to greater and more complex risks, the quicker transmission of such risks, and possibly new types of risks. For example, the diversification and greater use of derivatives has resulted in more complex and bigger risks. Moreover, financial globalization has further deepened the linkage of financial markets both at home and abroad, thus significantly increasing risk of financial turbulence in one market being transmitted to other markets overseas. The spread of financial networks has further exacerbated the possibility of illegal entry into computer systems by hackers, leading to the diversification and proliferation of operational risks.

What should be our basic attitude toward changes in the financial system generated by innovation in information and communications technology? Given that innovation will further proceed in terms of both transmission speed and scope, and since it is a major driving force promoting structural reform, one of the most important agendas for the current Japanese economy, we have no alternative but to embrace innovation and try to reap the maximum benefits.

Before I elucidate on this, let me summarize the main points of what follows. First, technological innovation proceeds very rapidly, and it is not easy to foresee its impact on the financial system. Under such circumstances, we should be positive and flexible in responding to changes in the financial system. Second, it is not appropriate to maintain financial system stability through traditional *ex ante* regulations since they would nip the seed of private sector innovation in the bud and weaken the

dynamism of financial markets. To realize both an active and stable financial system, we rather need to emphasize risk management and market discipline.

There is a possibility that innovation will ultimately make the existing financial system obsolete, threaten the status of financial institutions that have traditionally provided financial services, change the nature of deposits at banks, and eventually the currency created by the central bank. In view of accelerating technological innovation, those who are involved in the financial system, including the central bank, should bear such possibilities in mind. But before that eventuality occurs, existing financial institutions will most likely strive to improve the financial services they offer by taking advantage of technological innovation. Thus, it can be anticipated that competition between existing financial institutions and the new entrants will continue for a long time.

So far, changes in the financial system generated by innovation in information and communications technology have been gradual with the existing framework being improved step by step. For example, non-financial business firms, which intend to enter the payment area, will establish subsidiaries to acquire banking licenses and accept deposits, which are the traditional medium of payment, rather than establish firms that will introduce a new medium of payment. This suggests that, in such areas as payment where the existing infrastructure can be utilized, at least for the time being traditional institutions and transaction channels, like banks and deposits, will be more useful than otherwise. In other words, technological innovation has progressed to the point where barriers to non-financial business firms entering financial services have been lowered, but not to the extent where the existing framework has been made completely obsolete.

It appears that rapid technological innovation and subsequent changes in the financial system have thus far had little effect on the fundamental functions of finance, including the transfer of funds from fund surplus to fund shortage sectors, the reallocation of risks, and payment and settlement.

To summarize so far, while it is true that technological innovation may significantly change the financial system, there exists great uncertainty regarding the extent and speed of change. Therefore, when responding to change, we should be positive and flexible while paying close attention to uncertainty.

Then, what should we do to reconstruct an efficient and stable financial system under the rapid advance of information and communications technology? In Japan we have traditionally emphasized detailed *ex ante* regulations and specific guidelines for individual financial institutions as ways to maintain financial system stability. It cannot be denied that such measures have, to some extent, contributed to the stability of Japan's financial system characterized by the strict segmentation and specialization of business areas. However, over-dependence on *ex ante* regulations and specific guidelines will undermine the incentive for management to pursue differentiation because the development of new instruments is not linked to initial rewards attaching to innovators, thereby leading to the spread of a "keep up with the Joneses" mentality among financial institutions. Furthermore, we might have to pay a huge price in terms of the weakened vitality of the financial system as innovation and competition are hindered. Currently, the "Big Bang", which is based on the basic principle of free, fair and global, is being promoted in Japan, and we have effected a wide range of reforms, such as the diversification of financial instruments and services, the promotion of competition in the financial services industry and the improvement of financial markets. These reforms are much needed to invigorate financial markets and should be further effected as expeditiously and steadily as possible.

The truth of the matter is that with the rapid advance of innovation in financial technology we can no longer maintain financial system stability solely through traditional *ex ante* regulations. It has become impossible for the authorities to foresee changes and the direction of financial markets and transactions and to implement detailed regulations in advance.

When changes are dramatic and entail a lot of uncertainty, it is important to further emphasize risk management and market discipline in order to maintain financial system stability without impairing its efficiency. Though we cannot exclude uncertainty regarding the impact of the advance of information and communications technology on the financial system, what is crystal clear is that financial institutions will need a risk management ability corresponding to the advances in information and

communications technology. It is thus a prerequisite for financial institutions to improve risk measurement methods so as to accurately grasp more complex risks and establish an appropriate capital base in order to win amid intense competition. In the process of innovation, risk management is also the object of innovation, and only those who succeed in risk management will be able lead the world. Technological innovation has made traditional thinking that believes risk management is a cost completely outmoded. Financial institution management must realize that risk management is a way to maximize profits. While risk management has hitherto been primarily concerned with the management of credit risk, in the future financial institutions will have to construct advanced risk management systems covering operational risk and interest rate risk in banking accounts, and also establish a high quality capital base consistent with the level of risks they carry.

To establish a more efficient and stable financial system, market discipline is important. It is necessary that financial institutions constantly strive for sound management and higher profitability fully realizing that their every move is being closely monitored by the market. From this viewpoint, it becomes important for them to actively disclose their financial conditions according to appropriate accounting methods. In this regard, we have received criticism from abroad that accounting methods and disclosure standards in Japan need to be improved in a number of areas. In response, I have to say that based on the lessons we learned from the bursting of the bubble we have been rapidly improving the infrastructure related to disclosure, including improvement of the standards for write-off and the provisioning of non-performing assets. Also, consolidated balance sheets have been refined and mark-to-market accounting expanded from the viewpoint of international compatibility. In the area of corporate information disclosure, markets have begun to positively evaluate those firms that see legally required disclosure standards as minimum standards and which at their own initiative disclose management strategy and financial conditions beyond such minimum standards. I hope these movements will further prevail and take firm root in Japan.

How should the Bank of Japan respond to changes in the financial system as innovation in information and communications technology progresses? Before examining this issue, let me begin by briefly reviewing the role of the Bank of Japan in the context of the financial system and the payment system.

In general, banknotes issued by the central bank finalize the payment of transactions when handed over to transaction counterparties. Similarly, current accounts with the central bank can also finalize payment, a function which is supported by public confidence in the central bank. As such, settlements through the liabilities of the central bank, namely banknotes and current accounts, possess "finality" in the sense that they completely settle payment. Furthermore, various private sector clearing systems eventually complete fund settlement as well as securities settlement by directly or indirectly making use of the medium of settlement with finality conferred by the central bank. Thus, each payment system is operated in a responsible manner by a respective steering body, and the central bank is responsible for maintaining the smooth and safe operation of the nation's overall payment systems.

Article 1 of the Bank of Japan Law clearly stipulates that the Bank's mission is to maintain the smooth and stable operation of Japan's payment and settlement systems: "The objective of the Bank of Japan, ... , is to issue banknotes and to carry out currency and monetary control. In addition ..., the Bank's objective is to ensure the smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of an orderly financial system."

To fulfill this mission, the Bank of Japan performs a variety of functions. First, it provides the medium of settlement in the form of Bank of Japan notes and current account services, and constantly strives to improve efficiency and safety. Its function to examine the authenticity of banknotes and prevent counterfeiting while securing the efficient circulation of banknotes lays the foundation for public confidence in banknotes. Furthermore, the Bank has been making various efforts to improve the efficiency and safety of the settlement system for funds and government securities by providing online services for current accounts through the BOJ-NET system.

In addition to such efforts, the Bank of Japan conducts on-site examinations and off-site monitoring of financial institutions that hold current accounts with it, and obtains information regarding their financial strength and risk management. If a financial institution faces a liquidity shortage that might

seriously impair the smooth operation of payment systems, the Bank of Japan will provide liquidity as the lender of last resort, thereby preventing systemic risk from emerging.

With this preamble, let me turn to the role of the Bank of Japan in securing efficient and safe payment systems, thereby maintaining financial system stability under innovation in information and communications technology. Payment systems in Japan consist of those operated by the Bank of Japan and private sector ones. In view of the fact that payment systems are a fundamental infrastructure for economic activity, it is always important to maintain the safety of payment systems as a whole regardless of whether technological innovation creates a new provider, a new channel or a new means of payment. In this regard, all related parties, that is, financial institutions, the steering bodies of private payment systems and the central bank, need to be in close contact and make efforts to discharge their respective responsibilities.

The Bank of Japan provides a settlement service called BOJ-NET. BOJ-NET is the core settlement system for yen funds and government securities and is participated in by major financial institutions and private payment systems. We continue to make efforts to accurately grasp new waves of innovation in information and communications technology and to make our settlement systems support the advances of financial institutions and private payment systems.

The Bank of Japan is currently making preparations so that current account transactions and the settlement of government securities will be executed by real-time gross settlement, RTGS, from the beginning of next year. There are two current account settlement methods: fixed-time net settlement is where settlement is finalized by paying net debit or credit balances among financial institutions at a pre-designated time, and real-time gross settlement is where each settlement is finalized on a real-time basis without calculating net debit or credit balances. Most settlements are presently fixed-time net settlement though it has the serious drawback that if one of the participating financial institutions fails to make a payment, then all settlements of all financial institutions will be disrupted. To overcome this we will abolish, in principle, fixed-time net settlement and introduce real-time gross settlement from January next year. It is recognized globally that real-time gross settlement is appropriate for large fund settlements like interbank transactions since it reduces systemic risk, in which a chain reaction of defaults arises.

There have recently been discussions in the securities industry that the settlement period between contract and delivery should be shortened for transactions in equities and government securities. The current practice is to settle such transactions within three days after the contract. Many argue that settlement should be one day after the contract, which is basically the right direction from the viewpoint of reducing the outstanding amount of unsettled transactions so as to enhance safety of the settlement system. Such discussions have indeed been promoted by the rapid improvement of information processing capabilities and communication speed under the advance of technological innovation. We will constantly strive to improve the services we offer so that we will be able to appropriately support future changes in settlement practices.

Moreover, in order for BOJ-NET to contribute to greater efficiency and enhanced safety of Japan's payment systems as a whole, we must cooperate with the steering bodies of private payment systems. For example, it is possible to conceive a situation in which we cannot easily enhance the safety of payment systems when one system among various systems is deficient in terms of risk management and settlements become concentrated on this one system. In particular, although technological innovation enhances profitability and transaction convenience, it also creates new kinds of risks and increases the degree of risk involved, thus making coordination with private payment systems all the more important. In collaboration with other central banks, we have been working to establish internationally agreed core principles that major private payment systems must comply with. In this regard, Lamfalussy standards, which were established 10 years ago, are well known worldwide, and, based on these standards, the drafting of new core principles is in progress. With these principles as a guideline, we will continue to closely monitor private payment systems and ensure that they continuously pursue greater efficiency and safety, which is often called "oversight" abroad.

Innovation in information and communications technology has raised a new issue about our relationship with individual financial institutions. Since their financial strength and risk management

might have a big adverse impact on the efficiency and stability of the financial system as a whole, it is an important issue for the central bank to evaluate its business relationship with individual financial institutions. As I mentioned, we have recently begun to observe a new provider of payment services such as institutions that specialize in internet banking. If a banking subsidiary of a non-financial business firm requests to open an account with us, we will decide whether to enter into a business relationship with it in light of the already published standards for account opening and by examining such factors as its capital base in comparison with the intrinsic risks faced, the relationship with its parent, and its contingency plans. The Bank of Japan has been paying close attention to how such subsidiaries might develop payment operations because their activity might exert not a small influence on the efficiency and safety of payment and settlement systems. If we establish a business relationship with such subsidiaries, we will monitor them through on-site examination and off-sight monitoring.

Views are now divided as to how the move toward mega-banks will change risks in the financial system. Some are concerned that the financial system might become more vulnerable to contagion than before because such moves will bring about the concentration of risks. Others are more optimistic and believe that the financial system as a whole will become more robust in terms of risk taking because individual financial institutions will become stronger due to higher profitability and an improved BIS capital ratio as financial consolidation progresses.

At the moment, non-financial business firms are expected to enter banking by first establishing a subsidiary which will acquire a banking license. Amid the move toward mega-banks, many financial groups will establish banking subsidiaries under their respective holding companies. The Bank of Japan will naturally examine those banking subsidiaries that are direct current account holders. However, if parent companies and holding companies have the power to make important management decisions, such as business operation and risk management strategy, for subsidiaries that hold current accounts with the Bank of Japan, then examination of subsidiaries alone might not be sufficient to truly grasp their condition. In such a case, we will need to conduct a review of parent companies, including on-site examinations, to the extent necessary.

Japan's financial system has been changing against the background of rapid innovation in information and communications technology. And, as always, it is an important task for the Bank of Japan to contribute to improving the functioning of the financial system by increasing the efficiency and safety of payment and settlement systems. By responding to this task, we hope that the financial system will function to appropriately reallocate the financial assets of the household sector, which amount to more than 1,380 trillion yen. If such a reallocation mechanism works properly according to market discipline, it will provide strong support, from the financial side, for the promotion of structural reform, which is one of the major challenges Japan's economy faces.