

Electronic Money Projects in Japan

Nobuyoshi Yamori

Visiting Scholar

Columbia Business School, Columbia University

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and

Associate Professor,

Graduate School of Economics, Nagoya University

Nagoya, 464-8601 Japan

And

Narunto Nishigaki

Associate Professor

School of Economics, Okayama University

Okayama 700-8530 Japan

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Abstract

Most of the discussions and analyses of Japanese banks focus on the lingering effects of the collapse of the bubble economy during the 1990's. There is limited foreign coverage of the forward-looking projects of Japanese banks. This paper attempts to fill this void by providing an overview of the recent development of electronic money in Japan. While these projects are not unusually remarkable, the experiences of Japanese banks during the 1990's will provide them with ample growth opportunities in the next century.

1. Introduction

The first electronic money (E-money) project in Japan started in the latter part of 1995. By that time, some enterprises in other developed countries had already developed E-money that could be used in real economic transactions. For example, in the United States, *First Virtual* had begun their electronic settlement services through the Internet, and *Security First Network Bank* (SFNB) had already opened a virtual mall on its web site. In the United Kingdom, *Mondex* had started an experiment with IC card type E-money to determine its usability, and in Finland and Denmark, IC card type E-money was deemed practical.

The first project in Japan was led by the Ministry of Finance (MOF). The MOF recognized that the underdevelopment of E-money technology in Japan was a potential shortcoming of Japanese financial institutions. At the initiative of the MOF, the Bank of Japan (BOJ), Fuji Bank (one of the largest private banks in Japan), Nippon Telegraph and Telephone (NTT), and the Fujitsu Corporation organized a council for the introduction of E-money in October 1995. The council discussed whether there would be strong demand for E-money, how forgeries and robberies could be avoided, and how money laundering could be prevented. Also in October 1995, Daiichi-Kangyo Bank and NTT Data Communications Systems had jointly developed an Automated Teller Machine (ATM) that could handle E-money. And at the end of 1995, Juroku Bank, one of the old regional banks, began to develop its own PC banking services because it regarded electronic settlement systems, including E-money, as strategically important.

2. The First Half of 1996

(1) Banks' efforts

In the first half of 1996, many Japanese banks launched E-money projects. In the latter part of March, Sakura Bank established a special section devoted to the development of E-money technology. In April, Daiichi-Kangyo Bank started its Ninth Management Plan, and one of its main goals was the development of an electronic network system. Almost at the same time, Daiichi-Kangyo Bank and other Japanese city banks, such as Fuji Bank, Sakura Bank and Asahi Bank, started an experiment with the IC card type E-money in the Waterfront Area of Tokyo.

Many regional banks and Shinkin banks (small mutual banks) also recognized the necessity to keep up with the innovations in electronics and telecommunications technology. Their first step was to establish their home pages on the Internet. For example, Kyoto Chuo Shinkin Bank opened its home page in March, and Kansai Bank, Shiga Bank, Biwako Bank and Midori Bank opened theirs in June.

(2) Other private and public sector projects

The Hitachi group produced IC-chips and other electronic parts that were used in *Mondex* in the United Kingdom. Using their experiences gained in the U.K., in February, the Hitachi group began to focus on developing E-money technology in Japan. In competition with Hitachi, Matsushita Electric Industrial and its group companies decided to invest in the subsidiary of *Mondex* in Japan, which was going to be established in June 1996 by the Industrial Bank of Japan, Sakura Bank, Asahi Bank, NTT and Hitachi.

At the same time, universities and local governments participated in E-money projects such as “Soft-pier Japan,” a multimedia center that assists academic institutions, venture businesses, local traditional industries and local communities with the development of software technology. At the center, Ogaki Kyoritsu Bank started an IC card experiment and carried out research on security issues regarding E-money.

(3) Legal matters

It is important to note that a remarkable legal case related with electronic money and payment systems took place. In February 1996, Fuji Bank, Sakura Bank, Daiichi-Kangyo Bank and Mitsubishi Bank together raised an objection with the Patent Agency of Japan against *Citibank*'s application for patent protection for its electronic currency system. If the application was validated, these banks would have had to pay substantial patent fees to *Citibank* for using its electronic payment system even though these banks had developed their own systems¹.

Policymakers recognized that laws and regulations should be reformed to correspond with the new technologies. In May 1996, the MOF organized the Committee for Activating Financial Functions in order to review the Prepaid Card Regulations, which prohibited sending back cash-information from cards to deposit accounts. Furthermore, the Committee reviewed the Foreign Exchange and Foreign Trade Control Act, which allowed only authorized foreign exchange banks to deal with foreign exchange transactions. Then the MOF began to prepare for the revision of these laws and regulations.

Moreover, in May, the Center for Financial Industry Information Systems, which was an affiliated organization of the MOF, concluded in its research report on electronic settlement that E-money should be made available to the general public as soon as possible. Then, in June, the Center launched a new study group to investigate the security of E-money and its users' protections².

3. The Second Half of 1996

Efforts to make E-money feasible in Japan were accelerated in and after the second half of 1996. These activities, to a certain extent, seemed to be stimulated by a large-scale experimental project during the Atlanta Olympic Games. Participants in this project were able to

use IC card type E-money offered by *VISA International* to pay for food and beverage around the Olympic stadiums and at local restaurants.

(1) Financial institutions

In August, Michinoku Bank stated their intention to participate in the experimental enterprise of *Mondex International* in Japan. In October, Ogaki Kyoritsu Bank, which had already started the E-money project at the Soft-pier Japan, opened a new multimedia division for the purpose of promoting the study of electronic finance. And in November, three regional banks in Shizuoka Prefecture, (i.e., Shizuoka Bank, Suruga Bank, and Shimizu Bank) simultaneously began multimedia-banking projects, including E-money projects, in order to offer new financial services to their customers and to improve efficiency inside these banks.

It is remarkable that during this period many financial institutions established their affiliations for E-business. In August, Nippon Life Insurance and Tokio Marine and Fire Insurance suggested that they would invest in *Mondex International*, which was established in July to accelerate the international activities of *Mondex*. On the other hand, large city banks had suspended their investments in *Mondex International* because Japanese city and regional banks were in conflict with *National Westminster Bank*, which was the parent company of *Mondex*³.

(2) Remarkable progress

Non-financial companies were also active in the development of E-money. In August, Japan Information Printing, whose main business was printing prepaid cards, collaborated with Switzerland's *Kaldak* to produce IC cards. In December, Hitachi took an order for an in-bank settlement system from *Westpac Trust*, the largest bank in New Zealand. These facts suggest that Japanese industrial firms already had the innovative technologies that were necessary for electronic finance.

Concerns over the lack of privacy prevented the widespread use of E-money in Japan as consumers worried that their purchases could be tracked by the institutions that issued E-money. However, in September, NTT announced that it had developed an improved version of E-money with the Bank of Japan's Research Institute for Monetary and Economic Studies. This new version could avoid this privacy problem by establishing a special issuer separated from banks. Users would be able to get E-money from the issuer in exchange for the electronic certification to allow the issuer to draw cash values from his bank account. This was an example of an innovation developed by Japanese institutions, and it seemed to indicate that Japan was capable of developing front-line e-commerce technology.

In October, Oki Electric Industry, which had a technical tie-up with NTT as well as Hitachi, provided an IC card type E-money system to Komagane Stamp Cooperative Society (in

Komagane City, Nagano Prefecture) and Akaho Shinkin Bank. Under this E-money project, people were able to use the “Tsuretette Card” (which means “Please leave home with the card”) to pay for purchases at local participating shops and at the municipal hospital. Following Komagane City’s project, Ina City Community-card Cooperative Society developed another IC card system named “Iina-chan Card.”⁴

(3) Government activity

In September, the Ministry of Posts and Telecommunications asked Japanese private financial institutions to participate in its new E-money experiment. The Ministry intended to catch up with Western countries in the E-money field. The Ministry set up a council in the latter part of September. The council consisted of various companies. For example, large retailers, such as Daiei, Saison group and Ion group, and major credit card companies, such as *VISA* and *Master Card*, took part in the council. Moreover, six city banks (Daiichi-Kangyo Bank, Sakura Bank, Sumitomo Bank, Bank of Tokyo-Mitsubishi, Fuji Bank and Sanwa Bank) decided to take part in the experimental enterprise. The MOF and the BOJ also participated as observers.

In October 1996, the six city banks decided to participate in a project led by the Ministry of Transport. The goal of the project was the development of an IC card commuter ticket that would allow passengers to pay for an override charge along with purchases of food and other consumer goods in businesses around train stations⁵.

(4) General public attitude

As mentioned above, in the second half of 1996, many Japanese financial institutions, industrial corporations, local governments and universities in Japan, both individually and cooperatively, started E-money projects. However, consumers in Japan seemed hesitant to use E-money.

According to a survey on the opinions of financial institutions’ customers conducted in August 1996 by the Institute for Posts and Telecommunications Policy, one third of respondents answered that they were worried about innovations in finance such as E-money and home-banking. Only 2% of respondents used home-banking services. 41% of respondents did not anticipate using home-banking services in the future, while 13% of respondents showed interest in using home-banking services. Also, an astonishing 69% of respondents believed that *home-banking* services were not necessary, and 54% of respondents also said that they were not interested in using *electronic money*.

Moreover, according to a questionnaire conducted by Nihon Keizai Shinbun in October 1996, 74% of respondents in the United States anticipated a significantly greater use of E-money during the next ten years, while only 36% of Japanese respondents anticipated so.

(5) Legislative activity

These above results suggested that Japanese consumers did not value the convenience offered by electronic settlement systems and E-money, and that they were concerned with the security of information and payments transmitted through the new electronic systems. To gain the general acceptance of E-money, legislative activity was needed.

In July, the Financial System Research Council and the Committee on Foreign Exchange and Other Transactions, which were advisory bodies of the MOF, established the Joint Conference on Electronic Money and Electronic Settlement to study how to diffuse E-money. At the first meeting in July, it started to revise the Prepaid Card Regulations and the Act Concerning Acceptance of Contribution, Deposit and Interest⁶. Following the first meeting, the conference was held every month. At the third meeting in September, one witness maintained that it was necessary to establish a new legal infrastructure and to secure the users' privacy in order to diffuse E-money. What was mainly discussed at the fifth meeting in November was the prevention of forgery and the improvement of users' security. In December, the Ministry of Justice established two small committees for studying electronic commerce. The committees started to discuss E-money systems and to consider how to revise the related civil and commercial law.

In November, the Bank for International Settlement (BIS) released a report on the influence of the diffusion of E-money on the monetary policies of central banks and required every central bank to prepare effective countermeasures. In the same month, the Japanese Version of the Financial Big Bang was proclaimed under the second Hashimoto Cabinet. The Big Bang indeed included the revision of the Foreign Exchange and Foreign Trade Control Act, which hindered the diffusion of network-type E-money.

In sum, we may say that it was in the latter of 1996 that the institutional endeavors to develop E-money actually started in Japan.

4. The First Half of 1997

(1) Government activity

During the first half of 1997, there was little progress in the legislative or political field. The Joint Conference on Electronic Money and Electronic Settlement, which started in July 1996, continuously discussed security issues with regards to electronic settlement. For example, it discussed who should be an attestation institution that proved the counter party's identity in January, and in March it focused on the legal rights and duties in electronic payment. However, at the 11th meeting in May, the focus departed from legislation issues. While some members still asserted that new laws that regulated which firms could participate in E-money transactions were

needed in order to prevent illegal transactions, others claimed that such legislation would make it difficult for new firms to enter the E-money business⁷.

Particularly, the MOF and the BOJ thought that they did not have to hasten new legislation, because they believed that E-money would not be widely used soon in Japanese society where cash was widely and firmly used. Of course, some argued that it was the lack of the legislation that had prevented the diffusion of E-money in Japan.

(2) Banks' efforts

Some banks made the technological efforts to overcome the security problems in this period. For instance, Bank of Tokyo-Mitsubishi was preparing for the practical application of new-type E-money that had both IC card type and computer network type functions. This twofold E-money enabled a user to check the balance at his bank account and to transfer his funds through the Internet only after his identity was confirmed by the IC card.

In April, Fukui Bank established a special company for electronic banking, 'Fukugin Network.' Fukui Bank believed that this E-money project was necessary for the bank to survive after the Financial Big Bang. In June 1997, Asahi Bank announced that it planned to replace about one thousand ATMs with newer versions that could handle the IC card by June 1998.

(3) Non-Japanese firms

The most remarkable development in this period was that many Japanese firms collaborated with foreign firms to start E-money projects. As mentioned above, the early practical application of E-money in Japan, such as the project in Komagane City and Ina City, used only IC card type E-money. A new international collaboration aiming at promoting network type E-money started in this period. As the Japanese version of the Big Bang included the revision of the Foreign Exchange and Foreign Trade Control Act, network-type E-money was expected to be widely demanded. Therefore, many banks and non-financial institutions wanted to overtake their rivals in the E-money market in Japan.

Sumitomo Credit Service collaborated with *Microsoft*, *Veriphon* and *GTE* in order to develop a new electronic settlement service system on the Internet, and this consortium of companies strove to be the first to commercialize such a system in Japan. This system consisted of two parts. The first part involved electronic attestation (i.e., inputting one's credit card number when ordering goods or services online). The second part involved credit card settlement (i.e., sending electronic information, such as the credit card number, to the credit card company). The method of settlement used was the "SET" system on which *VISA International* and *Master Card* had previously agreed.

GTE also established a new company with Nomura Research Institute, NTT Mobile

Communications, and B.U.G. (a maker of the PC-related commodities in Sapporo City), and they issued electronic certificates for Sumitomo Credit and JCB in April. *Microsoft*, on the other hand, competing with *GTE*, suddenly announced its participation in the project with Sumitomo Credit, and it collaborated with JCB to develop a new settlement system. *Microsoft* intended to overcome its rival company, *Netscape Communications*, which had collaborated with *VISA International* and Toshiba Corporation on E-money experiments.

(4) Continual experiments

In this period, experiments on E-money that lead to practical applications were as vigorous as in the previous period.

In February 1997, Chiba Prefectural Public Enterprise Agency, NTT, Hitachi, Sharp Corporation, Toshiba, Cable-Network Chiba, Chiba Institute of Technology and three regional banks in Chiba Prefecture together established the “Makuhari Media Surfing Management Council” to conduct E-money experiments. It was one of largest collaborations in Japan among the government, industry and academia.

In April, Asahi Bank and Matsushita Electric Industrial began experiments on IC card type E-money in Waseda University. Collaborating with the Waseda University Cooperative, they issued fifty thousands IC cards to Waseda students. The card could function as an ATM card, as a prepaid card, and as an identification card in the University.

In May, JCB and Mitaka City in Tokyo collaborated on an experiment to add an E-money function to citizen cards⁸. Mitaka City aimed to improve its administrative services with such a card. In June, members of the Electronic Marketplace Propulsion Conference, such as IBM Japan and JCB, collaborating with Mitaka City, started a new experiment on IC card type E-money at the shopping areas in front of the JR Mitaka Station. Fifty stores took part in this experiment, ranging from a convenience store to a restaurant.

Moreover, in June, Nomura Research Institute, in cooperation with Sakura Bank, began an experiment on a network type E-money, ‘e-cash.’ The Japanese experiment with ‘e-cash’ was the third earliest in the world, only behind the United States and Germany.

5. The Second Half of 1997

The noteworthy feature of this period was the nation-wide expansion of E-money experiments. E-money had come to be known throughout the country by the latter half of 1997.

(1) Experiments in this period

In August, Japan Arcadia Network, which is the third sector company of the Yamagata

Prefecture Government, started an Internet service provider business along with experiments in electronic commerce using E-money⁹. Several companies in the prefecture, including two regional banks (i.e., Yamagata Bank and Syonai Bank), took part in these experiments.

In September, Fujitsu, in cooperation with Daiichi-Kangyo Bank, Nishinippon Bank and Fukuoka City Bank, began an experiment with IC card type E-money at restaurants, bookstores and convenience stores around Fukuoka Soft Research Park (SRP) in Fukuoka City and at the Fujitsu Kyushu R&D Center. Participation in this experiment was restricted to the staffs of Fujitsu Kyushu and related companies in the R&D Center. Fujitsu intended to accumulate knowledge of system development and applied technologies regarding E-money in Fukuoka, whereas credit card companies and retail sale companies had conducted experiments in the Tokyo metropolitan area.

In November, Fujitsu led a new E-money experiment in Kyushu which involved three regional banks (i.e., Fukuoka, Nishinippon, and Fukuoka City). As Fujitsu had established a new section for promoting IC card sales and had launched the mass production of IC cards since the beginning of 1997, it intended to determine the usefulness and the efficiency of the electronic payment system for consumer purchases. Also, Fujitsu wanted to use its experience to build new electronic commerce systems.

In this period, the practical application of E-money beyond the experimental level started out on a large scale. From November, cooperatives of fifty-nine universities in the Kanto-Koshinetsu District collaborated with NTT Data Telecommunications and city banks, such as Tokyo-Mitsubishi, Daiichi-Kangyo and Fuji, in order to establish a new settlement system¹⁰. Students at these universities could use IC card type E-money for payments at shops of the University Coops. In this system, a student electronically transferred funds from his bank account to his IC card through a terminal equipped on the campus, and he could use it as a prepaid card when buying writing materials, food, etc. This card also could be used as a student's identification card. However, it did not function outside the campus.

(2) Ambitious experiments

In October, the government and the private sector independently started two new E-money experiments. The Ministry of Posts and Telecommunications began its five-year experiment on new type E-money developed by the BOJ and NTT. It intended to use E-money in both real and virtual malls. City banks (e.g., Asahi, Daiwa and Tokai Bank), Zenshinren Bank, Shinchosya (a large publisher), and several telecommunications companies (e.g., NTT and KDD) were cooperatively taking part in this project. Private companies also started an E-money experiment for practical application. Daiei, *VISA International* and Toshiba distributed multifunctional IC cards to 30,000 participants in Kobe City. The card functioned as both a

prepaid card and as a credit card. The participants could use the card at 1,000 locations, including 40 shops owned by the Daiei Group and several universities in Kobe City. The experiment on such a multi-functional IC card for general consumers was the first attempt of its kind in the world.

In the same month, led by venture companies in Tokushima Prefecture, a society for the study of fingerprint-attestation-type E-money was organized. Members of the society were Log-farm (electronic-apparatus development), Tomoyuki (trade of jewels), Apex (application software development and sale), Heaven Systems (bulletin board systems), Contem (PC soft development), Awa Bank, and Daiwa Securities. In this system, a user registered his fingerprint portrayal in a server, which confirmed his identity at a terminal in a retail store over the Internet. This system intended to apply cipher technology that used the Morse code in order to exchange data through floppy discs.

In December, *VISA International* and Toshiba jointly started an experiment on multi-functional IC cards that simultaneously functioned as a credit card and as E-money on the Internet. Although the multi-functional IC card had been used by *VISA* and Daiei in Kobe since last October, its usage on the Internet was the first such attempt in the world¹¹.

(3) Legislative actions

In September, the MOF debated the creation of a new banking license, the Type II banking license, which would permit E-money issuers to engage primarily in the settlement business, thus leaving traditional banks to engage in other businesses such as deposit taking and loan offering. The MOF intended to promote the new entry of manufacturers and distributors into the E-money business by introducing the new license, but some argued that the license might become a barrier to entry into the E-money business.

In the same month, the Government established a research section on electronic commerce in the Advanced Information and Telecommunication Society Promotion Headquarters and held the first advisory meeting. At the meeting, the following subjects were discussed:

- i) Substantive laws and electronic confirmation.
- ii) Cipher technologies.
- iii) Means of electronic settlement such as E-money.

Moreover, the Committee for Financial System Research, at its general meeting in late September, decided to set up a conference to consider new legislation that would become necessary due to the diffusion of E-money and electronic settlement in the future. The conference discussed the standards required of an E-money issuer and an attestation institute along with issues involving the regulatory system and user protection. However, the focus of the

discussion was not on the legislation itself but rather on the preparation for the legislation.

In sum, the endeavors to develop E-money in Japan seemed to be led mainly by the government at the beginning. However, the private sector led the development of E-money projects in the latter half of 1997. Although we found a strong influence of foreign companies during this period, some Japanese experiments were the earliest such attempts in the world.

6. The First Half of 1998

(1) Experiments in this period

The special feature of Japanese E-money projects in the first half of 1998 was its expansion into regions left behind in earlier projects.

In January 1998, Fujitsu started to expand its one-year-old E-money experiment, previously conducted only in Fukuoka City, to the entire country. Fujitsu also used a debit-card system to facilitate the immediate payment of consumer purchases on its web sites through the use of between-account transfers. Twenty-six regional banks, including Aomori Bank, Oita Bank, Kumamoto Family Bank and Nagoya Bank, took part in this project.

In February, the Ministry of Posts and Telecommunications started a large-scale experiment on IC-card type E-money in Omiya City, Saitama Prefecture. Initially, fifty-five stores around the Japan Railroad (JR) Omiya Station participated in this experiment¹². In this project, customers were able to use the IC-card as both an ATM card of Postal Savings and as a prepaid card at department stores, convenience stores, large chain stores, ticket slot machines at the JR Omiya Station, and at public telephone booths.

In April, Tochigi Bank, Fuji Bank and Daiichi-Kangyo Bank, collaborating with Utsunomiya University Coop, began to operate an IC-card system in that University. Students could continue to use the IC-cards as ATM cards at Tochigi Bank after their graduation. In June, Hachijuni Bank in Nagano Prefecture decided to participate in the Propulsion Conference for the Investigation of the Debit-card System, which was affiliated by several city banks and the Ministry of Posts and Telecommunications.

Although many organizations collaborated on E-money projects during this period, Ogaki Kyoritsu Bank independently started to manage an electronic commerce business using the Internet. Within its virtual mall, registered customers could apply for various lectures and seminars that were held in-and-around Ogaki City, and they could obtain information about the products of local industries. Also, these products were exhibited for non-member customers on its web site. Two methods of payment were used. The first was the debit-card system, and the second was credit card settlement managed by the UC Card.

(2) Two large-scale experiments

While a number of E-money projects in Japan expanded into many local areas, two large-scale experiments on IC-card type E-money (we call it a “smart card” to distinguish it from a debit card) were being prepared in Tokyo. The first experiment in the Shibuya area was scheduled to start in July 1998. Another experiment in the Shinjuku area was planned to start in April 1999.

In June, Tokai Bank began to invite their corporate customers to the Shinjuku experiment. Participating firms received technological assistance from Nagoya Multi Online Service, which had been managing a virtual mall in Nagoya City (the business base of Tokai Bank). The bank wanted to give its customers not located in the Shinjuku area the opportunity to participate in the experiment through the Internet. In the same month, the Tokyo Metropolitan Transportation Bureau began an experiment with non-touching type IC-card tickets for both city buses and the Twelfth Line subway. Passengers could pass through the gate only by holding up the card over the special card-readers equipped at the automatic ticket examiners or at the fare boxes.

7. The Second Half of 1998

(1) Shibuya Smart Card Society

The most remarkable event in the second half of 1998 was that the Shibuya Smart Card Society started on July 16 (and would end it on the end of October 1999)¹³. This project was important for the following reasons. First, it was the largest E-money project in Japan. Second, its experimental field was the center of the Tokyo metropolitan area.

Customers were able to use “Visa Cash,” a smart card issued by *VISA International*, at eight hundreds institutions (e.g., department stores and restaurants) within a radius of 1 kilometer from the Shibuya Station. Forty-six institutions, including city banks, regional banks, Shinkin banks, manufacturers and *VISA International*, took part in this project. More than 100,000 cards had been issued by the end of October¹⁴. The size and location of this experiment might overcome the common obstacles (i.e., high-cost and low-convenience) preventing the widespread use of E-money both in Japan and abroad.

(2) Other middle-scale projects led by the private sector

Concurrently with the large-scale experiment in Tokyo, numerous middle-scale E-money projects have started in various parts of the country.

In July 1998, the Chitose Institute of Science and Technology, collaborating with Sakura Bank, began an experiment on smart cards with prepaid-card functions. This was the first

experiment in Hokkaido. In September, ten shopping avenues in Kyoto City began to accept ATM cards issued by private financial institutions and the Postal Savings (Yubin Chokin), and payments were finalized through the automatic electronic transfer of funds.

Many other projects began in October. First, in cooperation with Toshiba and a local PC network, “New Koala,” the Oita Prefecture government issued IC card type E-money (namely, a smart card) during the National Cultural Festival held in Oita Prefecture. Second, an exhibit titled “Multimedia & VR (Virtual Reality) Messe Gifu” opened at the Memorial Center in Gifu City, where seventy-four multimedia companies and other organizations participated and exhibited modern virtual reality and E-money technology. At almost the same time, in Ogaki City (next to Gifu City in Gifu Prefecture), “the Meeting for the Preparation of the World Software & Technologies Conference” was held under the auspices of the Soft-pier Japan and the VR Techno Center.

Moreover, ASA Systems, a computer software company, announced that their collaboration with the Kyushu Institute of Technology and Kita Kyushu City had resulted in the development of a new card-system that was not plagued by crime and forgery. Lastly, three city banks (Tokyo-Mitsubishi, Daiichi-Kangyo and Fuji), Chiba Bank and Keiyo Bank started an experiment on a debit card system at restaurants and shops managed by the Coop at Chiba University.

(3) Projects led by the government

In September, the Chugoku Bureau of the Ministry of International Trade and Industry (MITI) instituted a project whose purpose was the introduction of new E-money technologies into the Chugoku District, a region which had previously been unaffected by the recent innovations in E-money. While the general public in the Chugoku District thought that E-money was necessary in the District, the private sector was unable to quickly introduce the new technologies without the support of the government.

Therefore, the Bureau judged that it was necessary for it to help to initiate the E-money into this District. For instance, in November 1998, the Kumano Town Chamber of Commerce and Industry (in Hiroshima Prefecture) made a plan to introduce a smart card system in 1999 in response to the decision of the Bureau to subsidize Kumano Town through the Central Town Area Activating Policy of the MITI.

(4) Suspended experiments

As observed above, E-money projects in Japan had spread throughout the country by the second half of 1998. These projects were led mainly by the private sector and partially by the public sector. The public sector was important in the less developed regions.

However, this period saw a new situation. Namely, some experiments were suspended, although they seemed prosperous at their inceptions. For example, in November, Nomura Research Institute (NRI) decided to stop the experiment on a network type E-money, 'e-cash,' by the end of 1998, although NRI initially planned to continue the e-cash experiment until next March. This retrenchment was the result of the bankruptcy of *Digi-Cash* in the United States in early November. *Digi-Cash* had developed and managed e-cash, and its failure influenced NRI to suspend its own experiment with e-cash.

In November, *VISA International*, which was one of the sponsors of the Shibuya Smart Card project, stopped the smart card experiment in the United States. *VISA* concluded that there was not a large market for smart cards in the United States due to the popularity of debit cards.

8. Concluding Remarks

This paper reviewed the recent development of E-money projects in Japan. While Japanese manufacturers, such as Hitachi, were leading the world in the production of electronic devices and parts that were necessary for the advancement of E-money, Japanese banks and financial institutions were far behind their counterparts in other developed countries in the implementation of E-money in mid-1990's. One of the reasons for their disadvantage was that all Japanese banks suffered from the huge loan losses due to the burst of the bubble economy and could not afford to invest substantial money in information technology.

At first, the Japanese government directly or indirectly took the initiative in E-money projects in Japan. Government initiatives seemed to encourage private institutions to start their own projects. However, the government hesitated to enact new laws that were consistent with the advanced technologies. For example, the survey study mentioned in the text shows that the general public in Japan still hesitates to use E-money due to serious concern for the Internet security and privacy issue. Apparently, the development of electronic technology is not enough to attain the high-level security and desired privacy protection in the Internet world. For example, although advanced cipher technology may make counterfeit difficult, the general public is still afraid that the E-money issuers, who can accumulate customers' information on what and when they bought, might use such information without customers' permissions. Similarly, without clear legal structures, E-money providers face unpredictable legal risks. Thus, Japan needs to do more in the legislative area in the near future in order to make E-money usable.

Even after the legal structure is well organized, it is still uncertain whether the Japanese general public will use E-money instead of cash and credit cards¹⁵. As shown by the suspension of *Visa's* E-money experiment in the United States, other payment instruments (e.g., debit cards)

have become convenient enough that people might not demand E-money. Actually, the Ministry of Posts and Telecommunications and many private banks cooperatively started the large-scale debit-cards system in 1999. Unfortunately, there are many people who seriously concern about the security issue of this debit-cards system, where old-fashioned magnetic-stripe ATM card is used as a debit card¹⁶. Truly, considering Japanese household's portfolio structure, debit-cards that are vulnerable to counterfeit makes users highly risky¹⁷. However, the experiences that Japanese banks accumulated during the late 1990's regarding E-money projects will not only provide them the know-how to operate the debit-cards system, but also help them to deal with security issues of this new debit-cards system. We expect that the success of debit-cards system will not crowd out the possibility of E-money in Japan, but rather stimulate the acceptance of E-money's diffusion, because the general public learns the convenience, efficiency, and, more importantly, security of new payment methods through their experiences.

In sum, although there are still a number of issues that need to be resolved before E-money is used widely in both actual and virtual malls, the endeavors of E-money projects of Japanese banks in the 1990's are meaningful for their and the Japanese economy's future.

<Appendix>
Major E-Money Projects in Japan

Name of Project	Number of Issued IC Cards	Amount of Utilization (yen)
IC Card System “Iina-chan Card” in Ina City	17,000 (96.11~98.12)	more than 80 million (98.1~98.12)
“Smart Commerce Japan” in Kobe City	24,468 (97.10~98.4)	about 56 million (97.10~98.4)
IC Card Experiment led by the Ministry of Posts and Telecommunications in Omiya City	64,000 (98.2~99.5)	about 103 million (98.2~99.5)
“Shibuya Smart Card Society” in Tokyo Metropolitan	120,626 (98.7~99.6)	about 100 million (98.7~99.6)

(Source: <http://www.edit.ne.jp/~arita/jec/smartjapan.html>)

<Notes>

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¹ In January 1998, these Japanese banks’ objections finally made the Patent Agency revise its initial decision and reject *Citibank*’s application.

² Incidentally, at the G7 meeting in June 1996 (i.e., Lyon Summit), Robert E. Rubin, the Secretary of the Treasury of the United States, claimed that every country that tried to use any kind of E-money should consider the benefits and problems attendant on its use.

³ When these banks and other companies invested in *Mondex*’s local subsidiary in Japan, they

believed that all the payments were for its capital. However, in June, it turned out that a large part of the payment was a fee paid to *National Westminster Bank*. Consequently, Japanese banks lost their reliance on *Mondex* and *National Westminster Bank* and stopped their participation in the project.

⁴ Ina City is in Nagano Prefecture, near Komagane City.

⁵ The project started in the Waterfront Area of Tokyo in 1997.

⁶ The regulation, abbreviated to “Syussi-hou,” prohibits anyone from accepting deposits without a license. Therefore, if a non-bank institution issues E-money in exchange of traditional money, the issue of E-money might be regarded as deposit taking and therefore illegal for non-bank institutions.

⁷ The Conference made a report in the same month. In that report, the Conference recognized the necessity for regulations on the entrance to the E-money business.

⁸ The Mitaka Citizen Card is used to obtain the various official certifications from the Mitaka City Government (e.g., the certification of citizenship).

⁹ A company that local governments and private firms cooperatively invest in and manage is commonly called “the third sector” company in Japan.

¹⁰ Yokohama City University, Hosei University, and Chiba University among others participated in the project.

¹¹ The IC card in the Kobe project had a prepaid card function and a credit card function, but it did not have an Internet settlement function.

¹² After two years had passed (i.e., in December 1999), 286 stores around the station participated in the experiment.

¹³ Actually, from November 1999, the project continued as the second stage experiment.

¹⁴ There were four types of smart cards; exhaustible type, repeatable type, IC prepaid and credit card combined type, and IC prepaid and bank ATM card combined type.

¹⁵ According to Visa Cash’s experiment in Shibuya, average payment per transaction by Visa Cash was 366 yen in January 2000. Therefore, this type of E-money is used as a substitute for cash.

¹⁶ More than 360 million existing ATM cards can be used in this debit-cards system.

¹⁷ Note that more than 60% of household financial wealth is deposited at bank or post saving accounts. Therefore, the loss caused by counterfeited debit cards could be very large.
