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Strategy of Information System for Japanese Banking Industry

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Abstract

The author would like to take a bird's-eye view of the information system in Japanese city bank (nation wide bank) and write the current situation of modern information strategy and main subjects in future. Especially, I dealt with the diversification of delivery channels in detail. The improvement of information technology continued to be developing more and more. For the result, it is deeply connected with the information strategy of the bank. Though there are various subjects in the technical side, the author writes about IC card and the broadband especially. Because these two subjects are notable in the world now.

Keywords

Information strategy, online system, delivery channel, system management

1. INTRODUCTION

In 1965, former Mitsui Bank (now a part of Sumitomo Mitsui Bank) started an online system of ordinary deposit for the first time in Japanese banks. After then, every city bank started an online system one after another. Generally speaking, online systems in Japanese banks evolved through three waves of information technology innovation, which happened every decade since 1965. They called three waves such as the first, second and third generation of online system respectively. Especially, it is said that the third generation of online system is an integrated accounting system by the host computer. Then the present system is called post the third generation of online system. This is not only an information system which was reformed completely, but also one established for the improvement of maintenances and the high utilization of functions. This system is connected with several sub-systems and acts to the best its ability. By the way, refer to appendix about the progress of online system in the banking industry. The purpose, features, networks, and the range of control, the investment and the organization of each online system are shown in the appendix Table A.1.
The other side, network systems of banking industry were also established in order. Each system has an important mission. Main systems are "Zengin System[1)]", SWIFT[2)], MICS[3)], "Nichigin Net[4)]" and so on. These networks linking financial institutions contributed to the improvement of settlement systems in Japan. Though there are several other network systems, the rest are omitted.
In these situations, information systems of banking industry become complicate increasingly. Subjects of current information strategy are stated as follows. Besides this paper has modified and revised Nagaoka (2003).

2. SUBJECTS OF CURRENT INFORMATION STRATEGY

There are a number of problems to be solved in current banks. They are diversified, complex and advanced in all kinds of departments inner banks. Managerial subjects and items are classified into eight categories in the following table. The categories are measure to environmental changes, plans for

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competitive advantage, measures to new technology, strategic support system, improvement of customer services, risk management, thoroughness of business rationalization and information system management. They are shown in Table 1.

The subjects are very important themes for banks to survive in these days. The priority to develop systems of such themes is connected with the investment plan and the profit plan closely. The development power of system is an essential factor also. Recently outsourcing is conjugated to supplement the system development power and the system operation. In this meaning, we can understand that outsourcing is notable in the system department now.

There are also various themes concerning the computer system risk. Computer system risks are shown in appendix Figure A.1. Especially troubles of computer system occurred in Japan when mega-banks went on with plan for the merger and synthesis. The process of these merger and synthesis is shown appendix Figure A.2. Further more file deception, secret leakage and unfair invasion and so on happened everywhere in these days. It is essential to protect against such computer system risks.

Table 1. A list of main management problems, main themes and items facing information systems

Management problems	Main themes and items
Measure to environmental changes	Re-regulation of monetary system, Interaction business (among securities, trust and insurance), Internationalization (global network、international cash management system, international card etc.), Entry from other industries, Upgrade of clearing system
Plans for competitive advantage	Development of high technical monetary products (derivative products etc.), Improvement of development power to new products, Enlargement of delivery channels, Enlargement of electronic banking, Strategy of Automatic tellers machines (ATM), Business model patent
Measures to new technology	Internet, Cellular phone, Electronic money, Broadband, Several types of new media etc.
Strategic support system	Strategic support to branches (one to one marketing), Support system of head office (branch analysis, product analysis, profit management etc.), Cost management, Asset management
Improvement of customer services	7days/24hours services, Consulting to asset management, In-stored branch, ATM in the convenience store, Debit card, Integrated circuit (IC) card and digital certification
Risk management	Assets and liabilities management, New BIS regulation[5], Catching of several types of risks (exchange, rate of interest, liquidity risk etc.), Safety measures, Criminal measures, Information security, Asset evaluation
Thoroughness of business rationalization	Centralization of business transaction, Low cost operation, Image processing (seal checking),Digital filing, Multi-media (multi-function terminal, new eye-queue etc.)
Information system management	Functional change of system department, On and off the job training of system development staffs, Priority of system development and investment, Outsourcing, Utilization of the associated company, Cooperation of makers and soft-houses, System auditing, Integration of system by merge and synthesis

Source: Revised Nagaoka (2003) p.33

3. REVOLUTION OF DELIVERY CHANNELS

Delivery channels are amazingly changing in current banks. The author writes details of this theme in the information strategy. If classified roughly, it can be divided into two groups. One is the revolution of business model, the other is the improvement of net-banking. The contents are shown as follows:

3.1. CHANGES OF BUSINESS MODEL

The revolution of business model consists of a change of traditional branch office and ATM strategy. These are written as follows.

3.1.1. CURRENT SITUATION OF BRANCH OFFICE

The bank had to ask permission of former the Ministry of Finance (MOF) to open new branch office up to this time. But now, the system is changed and a new branch office can be established only by giving notice of the report to Financial Services Agency (FSA). Generally speaking, the current bank promotes restructuring and the rationalization actively, then ordinary branch offices become slim now. From the view of functions and business strategies, the branch office based on new contents comes out in these days. Examples are shown below:
1) In-store branch, 2) In-branch store, 3) Robot-retailing branch, 4) Mini-branch, 5) Multi-media branch, 6) Mobile branch, 7) One-stop service branch, 8) Cooperative branch (such as in-branch branch) and 9) Network of hub-&-spoke type branch offices.
If they are classified from the character of branch, No. 1) and 2) represent the relation between the owner of branch office and the tenant. No. 3), 4), 5), 6) and 7) represent a special feature about the function of branch office. No. 8) and 9) express the contents of the combination by plural branch offices. Like these, the background of improving the diversification as to branch offices is affected by the support of information systems such as ATM, multi-media terminal and net-banking.
In the general trend of the office work in the current bank, the simple business is absorbed in ATM and network banking. And the business of back office in the branch has been reduced by the centralization in the direction of the business center and electronic banking (EB). In this movement, branch offices of the slim and special functioned type are increasing rapidly now.

3.1.2. ATM STRATEGY

It can be mentioned that ATM network is showing the notable movement concerning the positioning strategy of banking business. Up to this time, each bank is filling up ATM network by robot-retailing branch offices in according with own judgments. But, it is seen examples of ATM improvement by various co-operations now. For example, banks utilize ATMs in 24,000 post offices all over Japan in co-operation with Japan Post. Further, they are establishing ATMs at numbers of convenience stores in co-operation with their management companies and at every station of the railway company. Like these, there are various notable cases of strategic alliances in these days.
Especially, it is said that convenience stores are very handy to ATM users, because users can utilize ATMs even at night, convenience stores are located on good conditions and they have parking places. It is notable that Itoyokado[6] founded IY Bank and entered from other industry to banking one. Furthermore, it makes profits from promoting ATM network now[7].
The traditional bank struggled to secure the proper place and to pay a large amount of cost for facilities and safety control when it enlarged ATM network until now. On the other hand, the management company of convenience stores is going to increase stores established ATMs rapidly. Because it has already the place and facilities called the store and these stores are in favorable conditions to be able to enlarge rapidly. There is no person at robot-retailing branch office with ATM in the bank. But it is said that there are staffs in the convenience stores and then it is desirable for the safety control.
After all, ATM network will make rapid progress by advancing in co-operation with convenience stores and banks. ATMs in convenience stores are shown in appendix Table A.2. In this movement, the original promotion plan of each bank will be forced to be changed.

3.2. NETWORK BANKING STRATEGY

Net-banking is composed of telephone banking, internet banking and mobile banking and so on in these days. New delivery channels came out one by one instead of the traditional branch channel. Well reputed and remarkable things in these channels are shown as follows.

3.2.1. TELEPHONE BANKING AND TELE-MARKETING

It is called telephone banking that banks provide various services to customers by telephones. The

contents of services are inquiry accounts, remittance, money transfer, opening accounts, cancel of contracts and various consultations. It became to be able to use by the result of technical combination with the telephone and the computer.
Generally speaking, there are reasons why customers use telephone banking. They are as follows:

1. It is not necessary for customers to go to branch offices. Then, they can save much time.
2. They are accustomed to use telephones and irresistible to do them. They can use telephones easier than they do personal computers, because they can certify the contents of transaction by the personal voice.
3. It is convenience to use telephone banking for the transaction required timing by comparison with the exchange rate such as foreign currency deposit.
4. They can use it after the closing time of business, though it depends on the contents of services.
5. They can use it, if there are telephones only when they are out, working in the company and making business trips.

On the contrary, telemarketing is one of business at the call center to sale strategic and promotional products to customers. It deals with promoting new products, sales of bringing up main customer, fixing money from liquid deposit and the information of due date and so on. In these cases, it is an essential condition that a data base of customer's information is established and a system which can easily inquire the information of sales is already developed.

3.2.2. INTERNET BANKING

Generally speaking, it is clear that the cost which an office worker requires to deal with at the window is the highest and one by internet is the lowest. Internet banking does not inquire branch facilities and personnel assistances. Then costs can be held down low, but they should not forget the thing of indirect cost. Sometimes they forget it. Nevertheless, banks are now promoting the utilization of internet banking in the retail field as the delivery channel of low cost.
At first stage of cutting over internet banking, there were opinions of various misgivings as follows:

1. Middle and advanced aged persons build up the property but know little of internet. Therefore it is meaningless to promote the systematic strategy without wealthy persons.
2. On the contrary, users of internet are young men mainly. Then it is required much time to become effective customers to the bank and internet banking does not get suit profit by the end of today.
3. Internet banking is meaningless, because there are not products which change from hour to hour in banking.
4. Can they protect the security of internet transaction?

But, in these days internet users increase gradually, therefore it is going to enter upon the stage of getting certain profits. It is mainly thinkable that internet banking must be installed for the competition among the banks now.
By the way, 7days/24 hours banking has come into wide-use and it will be used by many persons on the holiday and at night through the special character of internet. Banks must offer new services to users of this channel. But the social custom of cash basis in Japan is left over strongly yet. Then it is thinkable that time and tide will be required, till users of internet banking attain the level of using ATM and credit card.
There are two kinds of services by banks that make specialties of internet banking and establish the virtual branch office. One aims at getting new customers, the other thinks of deepening transactions of usual customers as one of business channels. Mutual movements are notable after this. Anyway in the internet banking, it is an important subject in future to develop new strategy utilized the bidirectional specialty.

3.2.3. MOBILE BANKING

Mobile banking is utilized for inquiry accounts, transfer deposits, foreign currency deposits by cellular phone with web-blouser. It is a new channel, and the contents of business and service are renewed progressively. Cellular phones utilized as the terminal machine are i-mode (NTT DoCoMo), Ez-web (KDDI) and J-Sky (J-Phone, now Vodafone) and so on. It becomes a subject of discussion that communication protocols used by each phone are different from each other and are not compatible[8]. Therefore it is necessary for the bank to meet the requirement to all kinds of terminal machines.
The cellular phone service of the third generation (IMT-2000[9]) began to operate already. If this new

service spreads widely, it can deal with the mass data such as moving pictures at the beginning and will increase examples of practical use as multi-media terminal. It makes up the infrastructure which is used in foreign countries by the adoption of the international standard. After this, new banking services will be taken up along with the technical improvement.

4. SUBJECTS IN FUTURE

The improvement of information technology continued to be developing more and more. For the result, it is deeply connected with the information strategy of the bank. The technical side and the management one are shown only about urgent subjects as follows:

4.1. TECHNICAL SIDE

Though there are various subjects in the technical side, the author writes about IC card and the broadband especially. Because these two subjects are notable in the world now.

4.1.1. SPREAD OF IC CARD

IC card was invented at France in 1974 and is not new technology in these days. It is pointed out as advantages that the secure of security is easy, the card itself is able to record numerous information, the physical injury is a few by the capability of contact-less smart card and it can be a medium of electronic money and so on. But in comparison with Europe and U.S.A., it was scarcely utilized in Japanese banks up to this time. It is a main cause that banks had already issued numerous cash cards (about three hundred million sheets, at the end of 1999) and cards have taken root in the society[10].

At renewing from cash card to IC card, the bank could not help hesitating from a view of cost-effectiveness analysis in regard to issuing IC card, the reconstruction of terminal machine, the maintenance of software and the necessity of much management times. The other side, the credit industry continued to research into testing of IC card type electronic money still. Further it became lively to move from plastic card to IC card, because damages by unfair use of the forged card increased recently.

In banking industry also, it becomes an inevitable subject to research the methods of making multi-functions by IC card (all purpose IC card). Because there are several causes as follows:

1. It was necessary to manage severely a personal identification number along with the increase of unfair card use.
2. In the test of electronic money, the way of using IC card succeeds in various districts.
3. It was begun to use IC card in various industries, therefore the relation with a settlement system came out.
4. It was becoming necessary more and more to solve the inconvenience in which they must have several cards to use.

Then a standard specification of cash card is different from one of credit card. The former is composed of Japanese Industrial standards (JIS Ⅱ type) and the latter is composed of International Organization for Standardization (ISO) (JIS Ⅰ type)[11]. Therefore it is essential to settle a united standard used as the infrastructure of card society. Japan Bankers Association contributed to the establishment concerning the standard specification of IC cash card up to this time. In advanced countries among Europe and America at head of France, IC card has already spread in the society. It is thinkable that financial transactions by IC card in Japan are improved rapidly in such movements. After this, it will be continued to reform and to examine along with the technical improvement and the enlargement of business. This establishment of the standardized specification will be meaningful to spread IC card.

By the way, a bank is promoting to test IC card used the biometrics technology. It is notable in the world that this new technology is effective to secure against card crimes and incidents, though there are problems to solve after this.

4.1.2. WAY TO THE BROADBAND

Level up concerning access line called "Last one mile" is essential for the broadband. Till the situation called "Fiber To The Home (FTTH)" is realized, cable television (CATV), asymmetric digital subscriber line (ADSL), wireless and satellite and so on are utilized as the access of broadband. Now ADSL

increases the number of customer more than CATV does. ADSL uses the former telephone line, but CATV must be required cable works. Then CATV is felt to be expensive to need the initial cost. Moreover CATV has been restricted within limits of business area located the company. On the other hand, ADSL companies struggled to reduce the charge of getting new customers and the internal competition in the ADSL industry became severe increasingly. The charge of regular service became the lowest level in the world as of summer 2002 for this result. Besides the broadband communication service with the cheep charge was begun by the wireless also. Then, till the age of FTTH comes out finally, the competition of getting new customers becomes violently among the alternatives of broadband infrastructures.
By the way, in this broadband generation, the terminal machine can send and receive high-speed and numerous information. Then, it is thinkable that banks promote to increase kinds of products and the diversification of functions concerning network banking dynamically. It is notable that the wireless phone (IMT 2000) as the next generation of mobile communication system and the digital television already come out in the terminal machines. By the spread of internet, wireless phone and digital television, home banking service will be encouraged more and more. If the restriction of time and space will be abolished by the diversification of delivery channels and level up of functions, the age called "Ubiquitous banking", which can be received financial services every time and everywhere, will come out soon. Therefore, it is desirable to catch the technical movement properly and to improve the information strategy actively.

4.2. SYSTEM MANAGEMENT SIDE

In severe monetary environment today, the system management becomes complicate more and more. Four important subjects are shown as follows, though there are a number of subjects in Japanese banks.

4.2.1. COPE WITH OPERATIONAL RISK

The bank receives various effects of the operational risk by the spread of network banking. Up to this time, system engineers could deal with the examination of result by the fixed procedure when troubles occurred in the age of usual main-frame computer system and leased line network system. But, when the trouble occurs in the open network system, it is difficult to pursue the responsibility whether it is caused by anyone or not, such as the bank, the communication company, the provider and the system vender and so on. If the bank needs much time to restore the troubled system to the usual condition, it looses its good reputation.
New regulation of BIS proposes that the bank must synthetically grasp "Operational Risk". At the installment of new technology, the bank must consider measures fully to cope with the system risk management for instance the system capability, archives of data, the guarantee of security, back up systems and so on.
By the way, there are subjects to be unable to solve easily in the actual system management. For example, there are a number of themes in regard to the file deception, the secret leakage, the virus, unfair invasion, wiretapping and the protection against the denial of service (DOS). Then the bank generally establishes the protective committee of information security as a whole and manages to protect against the attack. Recently, crimes by unfair utilization of the information machine and facility continue to occur constantly, though they are not technologies of high level. For example, after reading the sub-seal of banknote by the scanner, and then crimes by using the seal forgery occurred at branch offices in Japanese banks again and again. In these days, the bank developed the system to register and administrate the seal by the electronic data for these countermeasures. As the result of this, the bank planned to abolish the sub-seal on the bankbook. But, this system requires a number of costs to develop and convert, though it contributes to not only the crime protection, but also the rationalization of office works at the window. Those mischief and unfair crimes are a kind of shadow to the information society. Then, it must plan to deal with quickly and properly whenever the problem occurs.

4.2.2. IMPROVE THE DEVELOPMENT POWER

There are a number of subjects in the system department of the bank such as the opening of carrying on new business, the development of new product, the improvement of system management and the adoption of new technology and so on. It is natural to invest the high order of priority one after another. But it is necessary to speed up the development time also. Time is closely connected with cost whether it increases

or decreases. Furthermore, it has the essential role for the business strategy. Because it is related with the predominant position of competition in business to develop the system quickly.
Outsourcing is noteworthy as means of improving the development power. In the system department, it was as usual to entrust the soft-house and the computer maker with the system development. Recently outsourcing of the system department becomes strategic. Because it reforms the organization itself, improves the development power and aims at reducing the cost.
It is thinkable that there is a limit for the bank itself to strengthen the power of system development. Therefore, it will be the most important subject to bring up and to educate a man of ability in the system management. But the bank can not follow the progressive technical innovation by the education of member only. It is not easy to adopt the skillful engineer from other companies. Then it is essential to ask the computer maker and the soft-house for skillful persons in their companies. It is said that such an alliance is an essential condition of strategic outsourcing from the view of the system department. It can be drawn a clear line between simple outsourcing, which entrusts an outside company or a subsidiary one merely, and strategic outsourcing (strategic alliance).
Through this outsourcing, it is thinkable that banks can improve the development power of information system and promote to rationalize the operation of computer system and the administrative business.
By the way, various incidents originated from outsourcing risks occurred recently in Japan. Outsourcing does not always serve the purpose of the bank. Therefore it will be an essential theme how to administrate outsourcing risks in the bank after this.

4.2.3. MATCH TO BUSINESS MODEL PATENT

Since the business model patent was admitted to become the object of the patent, the movement of making an application was active in Japan also. But it is said that it starts in the right direction. Naturally, if a bank can get the business model patent faster than other can do, it is clear to get predominance over other banks. On the contrary, it will be a case that the bank is behind other banks and receives disadvantage, therefore it is meaningful to protect the company of getting the business model patent previous to the others. Besides, the bank in this day has many subjects to develop and holds a great number of software assets. Then, it is an important theme of management strategy to raise the value of these assets by the patent acquisition. It is greatly interested in this meaning. But it is doubtful if a development organization gives a command only and leaves in fixed department entirely. The bank should organize to give shape to a plan in the management strategy concerning the active promotion of patent acquisition. It is desirable that not only the system department but also planning section of the financial product and the judicial affairs department are connected with each other closely. There are a lot of successful cases in U.S.A. such as "One-Click Method" by Amazon.Com. and "Inverse Auction" by Priceline. But it is to be regretted that the business model which occupied a market share in Japanese industry does not come out yet. Therefore the bank should establish its systematic organization early in the long-term view and must take back the delay in such a field. This is an important and essential subject in the management strategy. Then it is said that it is required to give rise to the mind of grappling with the patent activity.

4.2.4. SUBJECTS OF SYSTEM AUDIT

In 2002, system troubles of mega-banks occurred in United Financial of Japan (UFJ) Bank and Mizuho Financial Group successively. Now it is an important managerial subject how to nip such accidents in the bud. Moreover, it is a focal point how to restrict the effect of trouble on a small scale. By the way, what kind of such serious risks are there to be considered? They are shown as follows:
The first is the case originated from the information system. It is shown in such as new development of information system, a large scale of system modification, the renewal of system machine and terminal machine, the renovation of network, the move of computer center and so on.
The second is the case originated from the organization. It is shown in such as the rapid enlargement of business, the opening transaction of new products, the opening of new business, the synthesis and the abolishment of branch office, personnel changes, new movement to outsourcing and so on. It will be necessary to organize the whole and the severest risk management system in the case of broad renewal and reformation concerning the information system and the organization.
The third is shown in the case of real personnel accident. Generally there are two cases about the

personnel risk. One is an intentional crime and the other is a careless affair. It is essential to maintain the usual personnel administration and the rigid discipline in the company for the crime protection. In the latter case, there are examples as follow: the loss or the burglary of note type personnel computer, carelessness of the copy work concerning confidential documents, careless control of important papers and so on. In addition to these, it is necessary to manage carefully concerning the movement of capable men and the increase of retired employees because of restructuring.

The occurrence of risk owing to the computer system effects the banking management heavily. Then the bank must plan to strengthen the establishment of corporate governance. The role of system audit is just to improve the control of internal organization. By the way, in July 1999, Financial Supervisory Agency (current Financial Services Agency) made up FSA (1999) and FISC also issued FISC (2000-b) in 2000. Banks and financial institutions use them to establish the sound and proper business.

The role of system audit also was pressed to manage along with the current movement. Following five points are necessary to function the system audit. The first is an auditor who can instruct exactly. The second is able to communicate with the board concerning reformative matters exactly. The board must grapple with the reformation actively. At the third point, the auditor must have a high technical power and an ability which can adapt oneself to the change of the age. At the fourth point, the auditor must plan to utilize outside auditors concerning the subject that can not supplement in the company. At last, it is inclined passive auditing as usual. But, it is required after this to open active opinions at the planning stage even in regard to an important management subject[12].

Notes

1) Zengin Data Telecommunications System is called "Zengin System". Since it was cut over in April 1973, it was leveled up four times. This is an online network system to deal with messages of domestic exchange and the calculation of exchange settlement.
2) The letters "SWIFT" stand for The Society for Worldwide Inter-bank Financial Telecommunication. It had been utilized from March 1981. This is an online network system to deal with messages of the settlement and the remittance of customers concerning the international banking business.
3) The letters "MICS" stand for Multi-Integrated Cash Service. It began to operate in February 1990. this is CD/ATM online network system of connecting with the system of each banking organization. MICS can relay the payment request of cashing and the message of payment permission. It can sum up all debts and credits.
4) Bank of Japan Financial Network System is called "Nichigin Net". It began to operate a current account system in October 1988. This is an online network system that combines Bank of Japan with associated banking industry. It is a very important system for final settlements among banks.
5) The letters "BIS" stand for Bank for International Settlements. Refer ULR http://www.kyoto-np.co.jp/article.php?mid=P2004051200137&genre=B2&area=Z10, Accessed 12 May 2004.
6) Itoyokado is the biggest retail trade in Japan now and it is famous in the world that a company in its group entered from other industry to banking one.
7) IY Bank made a net profit of 5 billion yen in a fiscal year, March 31, 2004. (Nihon Keizai Shimbun, May 8, 2004.)
8) It is shown in FISC (2000-a) p.192.
9) The letters "IMT-2000" stand for International Mobile Telecommunications 2000.
10) It is shown in FISC (2000-a) p.9.
11) It is shown in FISC (2000-a) p.9.
12) It is shown in FISC (2000-a) pp.355-358, Kimura (2001) pp.181-216.

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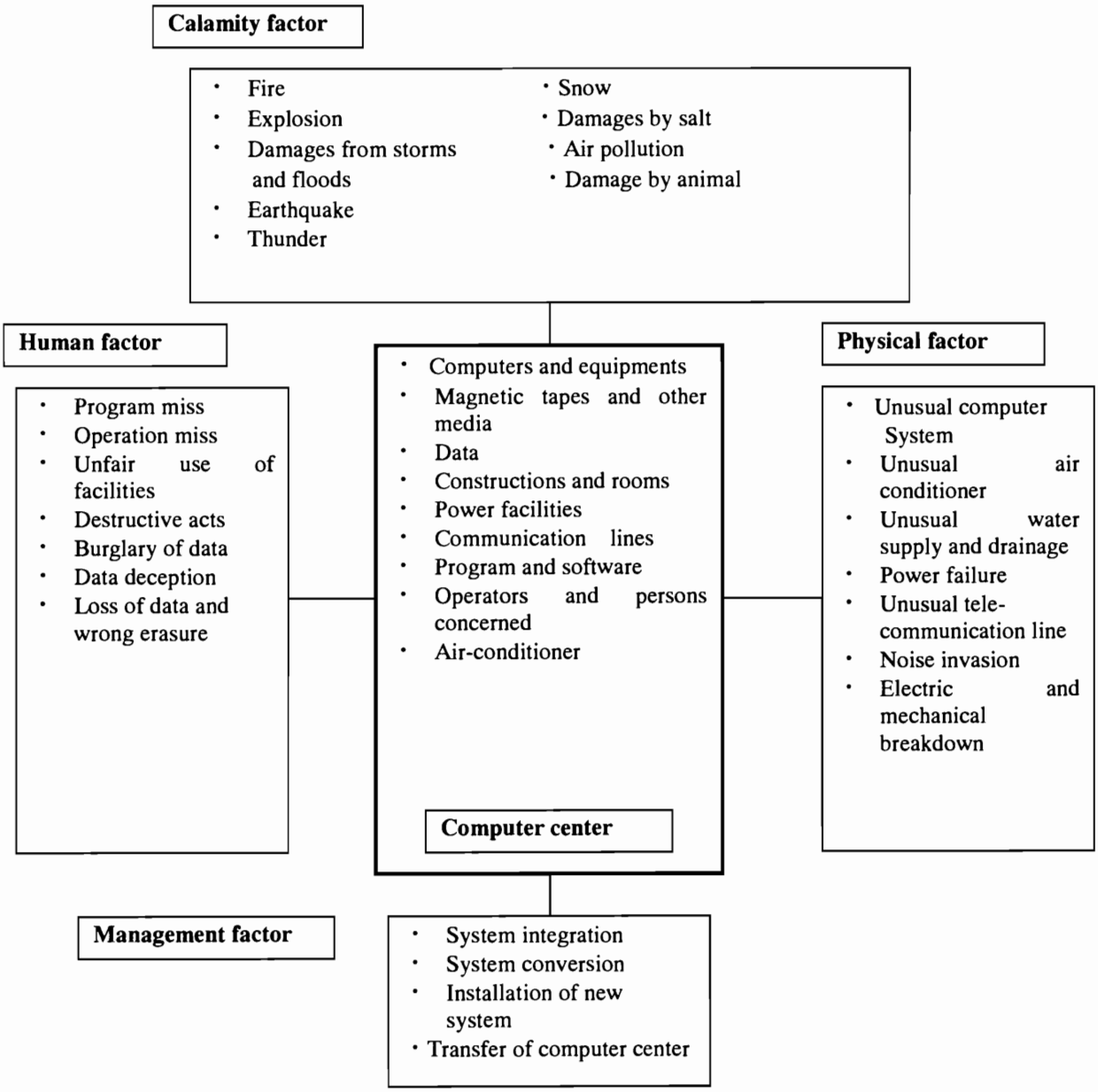
APPENDIX

Table A.1 The progress of online system in the Japanese banking industry

	The first generation of online system	The second generation of online system	The third generation of online system	Post the third generation of online system
Purposes	・ Reduction of labor force ・ Rationalization of office works	・ Rationalization ・ Improvement of customer's service	・ Re-regulation of monetary system ・ Improvement of administrative information ・ Fulfillment of customers network	・ Improvement of new product and delivery channel ・ Total risk management ・ Synthesis of system ・ Improvement of IT strategy ・ Upgrade of clearing system
Features	・ Dealing with single subject ・ (systemizing ledger in online system) ・ (centralization of automatic transfer center)	・ Connective processing of main subjects ・ Fulfillment of consolidated account ・ Inter bank cooperation of online CD	・ Re-establishment of higher account system ・ Establishment of several sub systems and organic combination	・ Many independent sub systems ・ Spread of broadband and ubiquitous banking ・ Spread of open system and improvement of security measures ・ Promotion of IC card
Networks	・ From inner bank network to inter bank one	・ From inter bank network to inter industry one	・ From inter industry network to PC network	・ From PC network to internet
Range of control	・ Inner bank (domestic) ・ Start of EB ・ Inter bank		・ Inner bank (international) ・ Enlargement of EB ・ Variety of inter bank	・ Open network
Investment amount per bank *	15-20 billion dollar	25-35 billion dollar	50-80 billion dollar	
Form of organization	Reduction of 1,000-2,000 employees by making flatter organization	Reduction of 2,000-3,000 employees by slim organization	Reduction of 1,000-2,500 persons by progress of slimmed organization	
	Developing age of system department		Expansion and subdivision of system department	Rationalization of system department and outsourcing

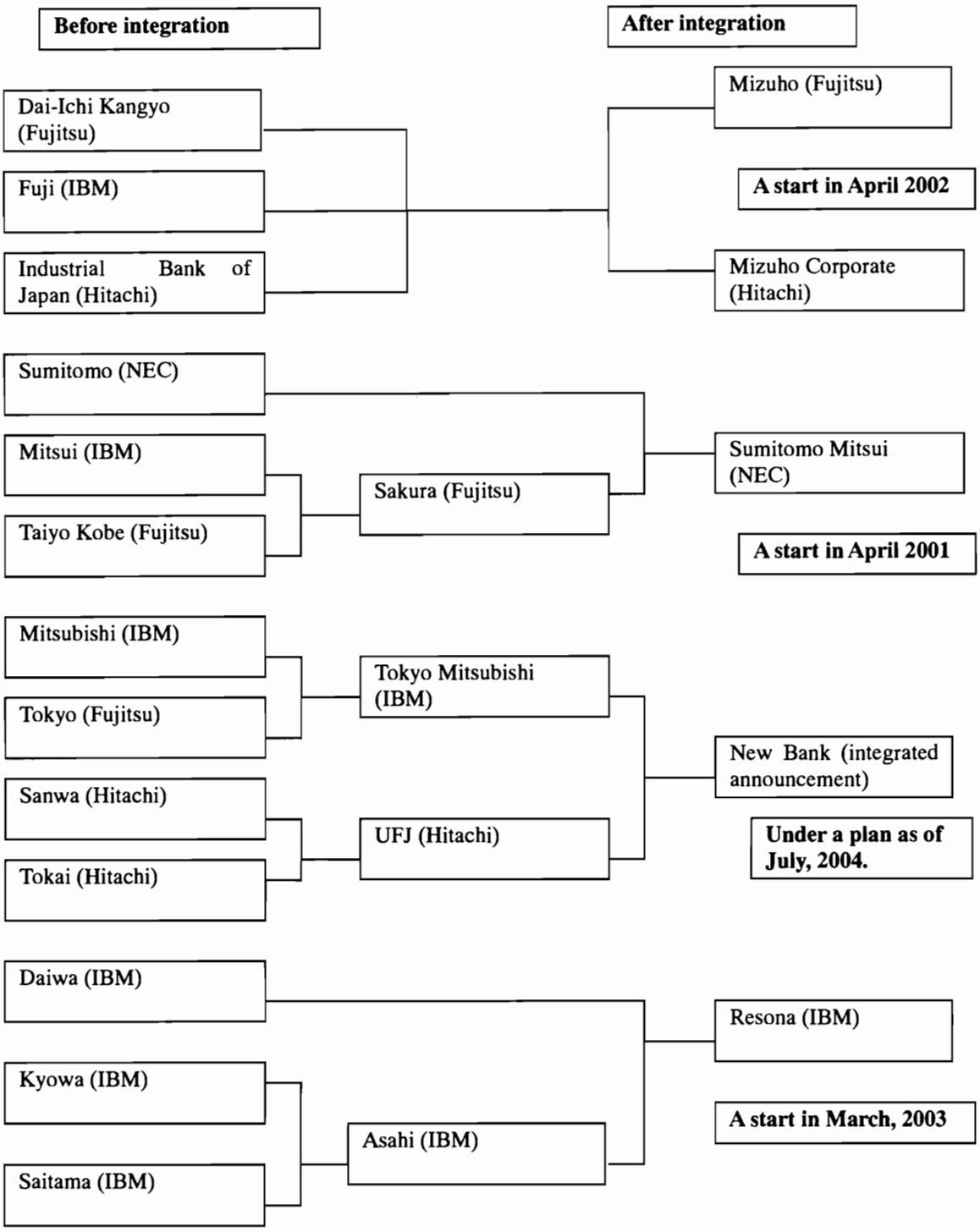
*Conversion of one hundred yen into one dollar.
Source: Revised Nagaoka (2003) p.6

Figure A.1 Examples of risk which surround the computer system



Source: Modification of Mitsui Marine (1993).

Figure A.2 Process of the accounting system integration in Japanese main banks



Source: Modification of Nihon Keizai Shimbun on July 21, 2004.
* The inside of a parenthesis is an used main computer.

Table A.2 ATMs in main convenience stores

Convenience store	Management company	Equipment plan	The number of establishment**	Main cooperative banks
Seven－Eleven Japan	IY Bank co., ltd.	3,650 stores till 2002 spring 7,150* stores till 2005	About 2,420 (9,213 as of August 2, 2004***)	UFJ, Resona(Asahi until 2003), Sumitomo Mitsui, Shinsei, Tokyo-Mitsubishi, Yokohama etc.
Lawson, inc.	LANS	3,000 stores till 2002 4,000 stores till 2003	About 1,700 (3,312 as of July 30, 2004****)	Tokyo-Mitsubishi、Sumitomo Mitsui, UFJ, Resona (Daiwa until 2003) etc.
Family Mart Co., ltd.	*e* net	5,000 stores till 2002 spring	About 3,640 (5107 as of July 30, 2004*****)	Tokyo-Mitsubishi, Sumitomo Mitsui, Mitsubishi Trust & Banking, Sumitomo Trust & Banking etc.
am/pm Japan co., ltd.	@ bank	All 1,274 stores by the improving plan	About 1,140	Sumitomo Mitsui, Japan Net etc.

* Include Ito Yoka Do.
** The number of establishment is as of January 31, 2002.
(Modification of Miyao (2001) p.85)
*** http://www.iy-bank.co.jp/atm/atmnet.html (accessed August 3, 2004)
**** http://www.lawson-atm.com/atm.area/ (accessed July 31, 2004)
***** http://gis.e-map.co.jp/standard/12130010/index.htm (accessed July 31, 2004)