THE ALIGNMENT OF BUSINESS STRATEGY AND INFORMATION TECHNOLOGY IN THE JAPANESE BANKING INDUSTRY

by

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Submitted to the
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ABSTRACT

Gradual financial deregulation in Japan has given Japanese banks many new business opportunities, but it has also thrown them into stiffer competition than they ever had before. Financial services are more diversified and require much more flexibility. Customers are more sophisticated and more sensitive to the quality of services.

Information Technology (IT) evolved along with the growth of the banking business in which objectives have moved from data-processing to information-utilization. Banks are now expecting IT to bring new sources of competitive advantages to them.

This thesis starts from the Strategic Alignment Model and proceeds to explain what is needed to lead to the successful application of IT. After touching on the situations of the Japanese banking business environment and the antecedents of IT in Japanese banks, this thesis highlights two perspectives, competitive potential alignment and service level alignment.

IT has to be utilized both in the external domain that confronts the market directly and in the internal domain that ensures a successful business performance in the external domain. This thesis will explain how the latest IT is applied to both domains.

For the external domain, topics include ATMs, electronic banking, EDI, home banking, and smart card technology. For the internal domain, topics include parallel processing mainframes and Groupware. Both chapters also discuss how to attain effective implementation, and how to manage incentives.

The successful implementation of IT in various business environments will reinforce the electronic linkages among firms and within the firm, and will erode the boundaries among them. Finally the business world may become a collection of virtual entities, and the most powerful banks will remain as financial mediators and/or huge stock holding companies.

Thesis Supervisor: Michael S. Scott Morton
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Yoshiyuki Kosuge
Brookline, MA.
May, 1995

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Chapter 1

Introduction

A. Overview of banking industry in Japan

Traditionally, the banking business in Japan has been protected by the government to stabilize economic conditions. Under this protection, banks were able to make profits easily, and banking services were similar throughout the industry. Scale economies determined the ranking of banks. The quantity of deposits and loans or the number of branches determined the competitive advantage of a bank.

However, the situation has changed. The regulation power of the Japanese government is still very tight, but the government seems to be turning toward deregulation. Gradual financial deregulation in Japan has given Japanese banks many new business opportunities, but it has also thrown them into stiffer competition than they ever had before. Similar banking services no longer meet customers' needs. A bank must offer unique services to be outstanding.

Moreover, the guidelines of the Bank of International Settlement (BIS) force banks to manage strictly many kinds of risks and maintain an adequate capital/asset ratio.

These environmental changes have great influences on banking strategies. The banking business is now in difficult straits. Banks have to explore new sources of competitive advantages.

B. Strategic impacts of Information Technology

The banking business is no longer a simple money distributor; it is an information-intensive industry. Information about customers' accounts and their attributes are stored electronically in huge databases. When transactions involving accounts occur, real money rarely moves. The electronic data are merely updated. From this point of view, Information Technology (IT) is the bank's lifeline, and it can be a powerful weapon in differentiating one particular bank from another.

IT has evolved in many ways in the last decade. The price/performance of computing has been improved remarkably. In 1980, a typical 32-bit multi-user minicomputer costs roughly $300,000 and delivered about 1 MIPS, or $300K/MIPS. By 1994, workstations from DEC, HP, and IBM brought the MIPS per dollar ratio down to $40 to $75 per MIP.[1] In addition to the power of chips, the techniques of computer networking have improved the total efficiency of the integrated systems. Efficient computer networks are about to change the dynamics of the business environment.

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[1] J. J. Donovan, Business Re-engineering with Information Technology, (Englewood Cliffs, N.J.: Prentice Hall, 1994), p.23.

IT has evolved from its traditional orientation of administrative support toward a more strategic role with the potential of not only supporting chosen business strategies, but also of shaping new business strategies.

The theoretical exploration of the strategic impacts of information systems on business management started in the early 1980s when computers began to proliferate in the business sector.

E. Warren McFarlan applied the analytical framework of Porter to examine the strategic impacts of IT in business competition. In his view, IT has moved from a strictly supporting role in the back office to one that offers new competitive opportunities.[2] Delineating how some companies have seized opportunities while others ended up playing the difficult game of catch-up, he recommends that executives make a competitive analysis in assessing where IT fits in its company to create competitive advantage. Specifically, McFarlan stated that IT can offer five strategic advantages.

(1) Building entry barriers

Entry barriers can be formed by installing on-line networks for key customers so that they can directly enter orders into their computers. Not only can this move be highly successful for the distributor in providing a superior service to customers but other companies will find it hard to replicate because customers may not want terminals from different distributors installed on their premises.

(2) Building switching costs for customers

Electronic home banking is one example of building switching costs for customers. When customers have learned to use such a system and have coded all monthly creditors for the system, they are more reluctant to change banks than before.

(3) Changing the basis of competition

IT offers opportunities to drastically reduce costs and to expedite the handling of rush orders. Offering such services alters the ground rules of competition in the industry.

(4) Changing the balance of power in supplier relationships

The development of an interorganizational system can be a powerful asset. The Just In Time (JIT) delivery system, for example, can reduce inventory levels drastically, thus permitting significant cost savings. Similarly, computer-aided design (CAD) links one organization to another to permit faster response, smaller inventory, and better service to the final customer.

(5) Generating new products

The emergence of the database information service is the most illustrative example of new product generation. Data Resources, Inc. (DRI), the econometrics subsidiary of McGraw-Hill, has a product called VISILINK which permits owners

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[2] E. W. McFarlan, "Information Technology Changes the Way You Compete," Harvard Business Review, (May-June, 1984).

of personal computers to use DRI's economics database and to extract desired information.

C. Productivity Paradox

However, there is increasing concern that the anticipated value of the investment in IT is not being attained. This topic has been debated for a number of years as the "Productivity Paradox." In fact, delivered computing power in the U.S. economy has increased by more than two orders of magnitude since 1970, but productivity, especially in the service sector, seems to have stagnated.

Eric Brynjolfsson discussed the issue and explained some factors that might cause the paradox.[3] He addressed *mismanagement of information and technology* as one of these factors. Managers in the firm may have difficulty in bringing the benefits of IT to the bottom line if output targets, work organization, and incentives are not appropriately adjusted. The result is that IT might increase organizational slack instead of output or profits. The rapid speedup enabled by IT can create unanticipated bottlenecks at each human link in the information processing chain.

He also discussed the same issue later with L. Hitt. In this paper,[4] they observed that computers have led to higher productivity and created substantial value for customers, but these benefits have not resulted in measurable improvements in business performance. As Porter has pointed out,[5] in a competitive market with free entry, firms cannot earn supernormal profits because that would encourage other firms to enter and thus drive down prices. That is to say, an input such as computers, which may be very productive, will not confer supernormal profits to any firms in an industry if it is freely available to all participants in that industry. In equilibrium, all firms will use such an input, but none will gain competitive advantage from it. Clemons said that IT has become a competitive necessity, but not a source of competitive advantage.[6]

These arguments don't lead to the conclusion that IT is not worth investing in. IT may have a strong impact on business strategy and business performance, but there are still some impediments that prevent a firm from making supernormal profits by using IT. IT must be implemented under the appropriate management system, and must be applied in effective ways in order to make it difficult for competitors to imitate the application. The source of competitive advantage lies not merely in IT itself, but in the information that firms own in IT, or in the way of using information. To make the way of using information more efficient, IT definitely plays an important role.

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[3] E. Brynjolfsson, "The Productivity Paradox of Information Technology," Communications of the ACM, (December 1993, vol.36, No.12).

[4] L. Hitt, and E. Brynjolfsson, "The Three Faces of IT Value: Theory and Evidence," a draft version for the Fifteenth International Conference on Information Systems, 1994

[5] M. Porter, Competitive Strategy, (New York: Free Press, 1980).

[6] E. K. Clemons, "Evaluation of Strategic Investments in Information Technology," Communications of the ACM, (34(1): 1991): pp.22-36.

D. Information Technology from the "Value Chain" perspective

In 1985, Porter and Miller incorporated the concept of the value chain into an analysis of the strategic significance of IT.[7] (Figure 1.1)

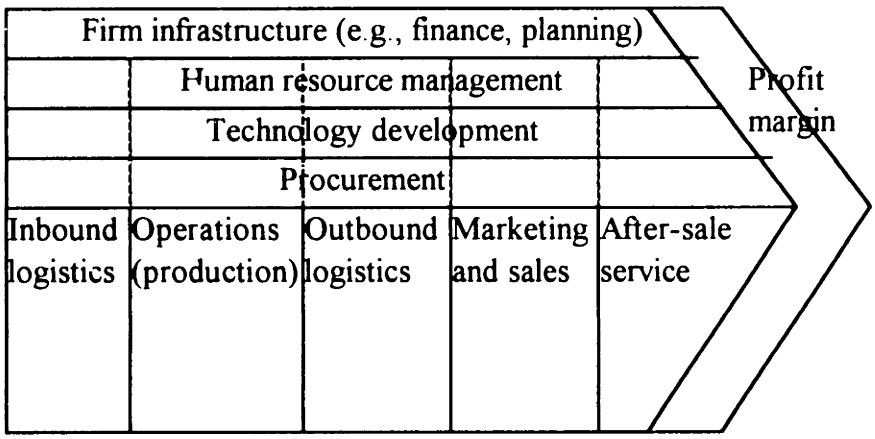

Figure 1.1: The Value Chain

According to Porter and Miller, IT influences three areas of strategic significance examined from the perspective of the value chain theory. First, the expanding capabilities of IT have offered opportunities for enhancing the efficiency and performance of each of the nine generic operations in the value chain and transforming the way their operations are performed.

Second, IT enhances a company's ability to exploit the linkages among various operations. According to Porter and Miller, although each of nine generic operations is the building block of competitive advantage, the value chain is not a collection of independent operations but a system of interdependent activities that are connected by linkages. The tasks of overseeing the linkages between and among adjacent operations in the value chain are the responsibility of corporate managers. Today, this task of integration can be increasingly performed by using IT through such mechanisms as networking and corporate databases.

Third, IT expands and enhances the "competitive scope" in which a company can physically operate. Competitive scope refers to the extent a firm can perform or coordinate activities subject to the constraints of product segment scope (product varieties produced and buyers a company can serve), vertical scope (the extent to which the activities can be performed in-house), geographical scope (the range of regions and countries in which a firm can compete with a coordinated strategy), and industry scope (the range of related industries in which a firm can compete). IT allows companies to coordinate value activities in far-flung geographical areas, and expand the scope in which a company can compete.

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[7] M. Porter, and Victor Miller, "How Information Gives You Competitive Advantages," Harvard Business Review, (July-August, 1985).

The strategic significance of IT in enhancing a company's capability to exploit the interlinkages among various generic business operations was further explored by John F. Rockart and James E. Short. In their paper, they asserted that IT today provides new approaches to one of management's oldest organizational problems, i.e., effectively managing interdependence.[8] A firm's ability to improve continuously the effectiveness of managing interdependent operations, in their view, is the critical element in responding to new competitive forces.

Malone et al. argued that IT will lead to an overall shift toward more use of market coordination mechanisms rather than hierarchies to coordinate various activities.[9] Markets coordinate the flow through supply and demand forces. The demander can compare its many possible sources and can make a choice based on the best combination of these attributes.

E. Necessity of the alignment of business strategy and Information Technology

Henderson and Venkatraman emphasized the necessity of the alignment of business strategy and IT in their paper[10] as follows:

> "a critical factor in attaining superb capabilities is not a specific set of sophisticated technological functions but the organizational capability to leverage technology to differentiate its operations from those of competitors. In other words, no single IT application can deliver a sustained competitive advantage. Rather, advantage is obtained through the capability of an organization to exploit IT functionality on a continuous basis. This requires a fundamental change in managerial thinking about the role of IT in organizational transformation, as well as an understanding of the critical components of IT strategy and its role in supporting and shaping business strategy decisions."

This thesis will focus on the alignment of business strategy and IT in the context of the Japanese banking industry. The environment of the Japanese banking industry has become increasingly turbulent as financial deregulation has increased. Some major banks have established leading positions through a huge computer networking system. However, the changing environment will force them to rethink the way they use IT. As customers become more sophisticated, and sensitive to the quality of the service, and because mere efficient data-processing doesn't differentiate one bank's services from another's, banks will have to change from the traditional data-processing use to the strategic information-creating use.

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[8] J. F. Rockart, and James E. Short, "IT in the 1990s: Managing Organizational Interdependence," Sloan Management Review, (Winter, 1989).

[9] T. W. Malone, J. Yates, and R. I. Benjamin, "Electronic Markets and Electronic Hierarchies," Communications of the ACM (June 1987, Volume 30, Number 6): pp.484-497.

[10] J. C. Henderson, and N. Venkatraman, "Strategic Alignment: Leveraging Information Technology for Transforming Organizations," IBM Systems Journal, (Vol.32, No.1, 1993).

Most banks don't have powerful internal research functions for IT. They have only limited divisions that deal with technological aspects. A rigid bureaucratic system is embedded deeply in the organizational structure. This structure was efficient under static market conditions, but it is now inefficient under dynamic market conditions. The lack of both a technological background and an innovative atmosphere makes it difficult to utilize fully the power of IT in a strategic way.

Under such conditions, the alignment of business strategy and IT is needed by most Japanese banks. Although there may be some consensus on the changing role of IT within organizations, managers are confronted with basic questions such as:

- What are the implications of IT in banking business operations both now and in the future?
- Is the locus of IT competence "inside" or "outside" the operation?
- How should the IT function be organized?

This thesis attempts to answer these and related questions by introducing the Strategic Alignment Model and related issues.

Chapter 2

Strategic Alignment Model

A. Strategic Fit and Functional Integration

The Strategic Alignment Model[11] was developed by J. C. Henderson and N. Venkatraman. Their concept of strategic alignment is based on two building blocks: *strategic fit* and *functional integration*. (See Figure 2.1)

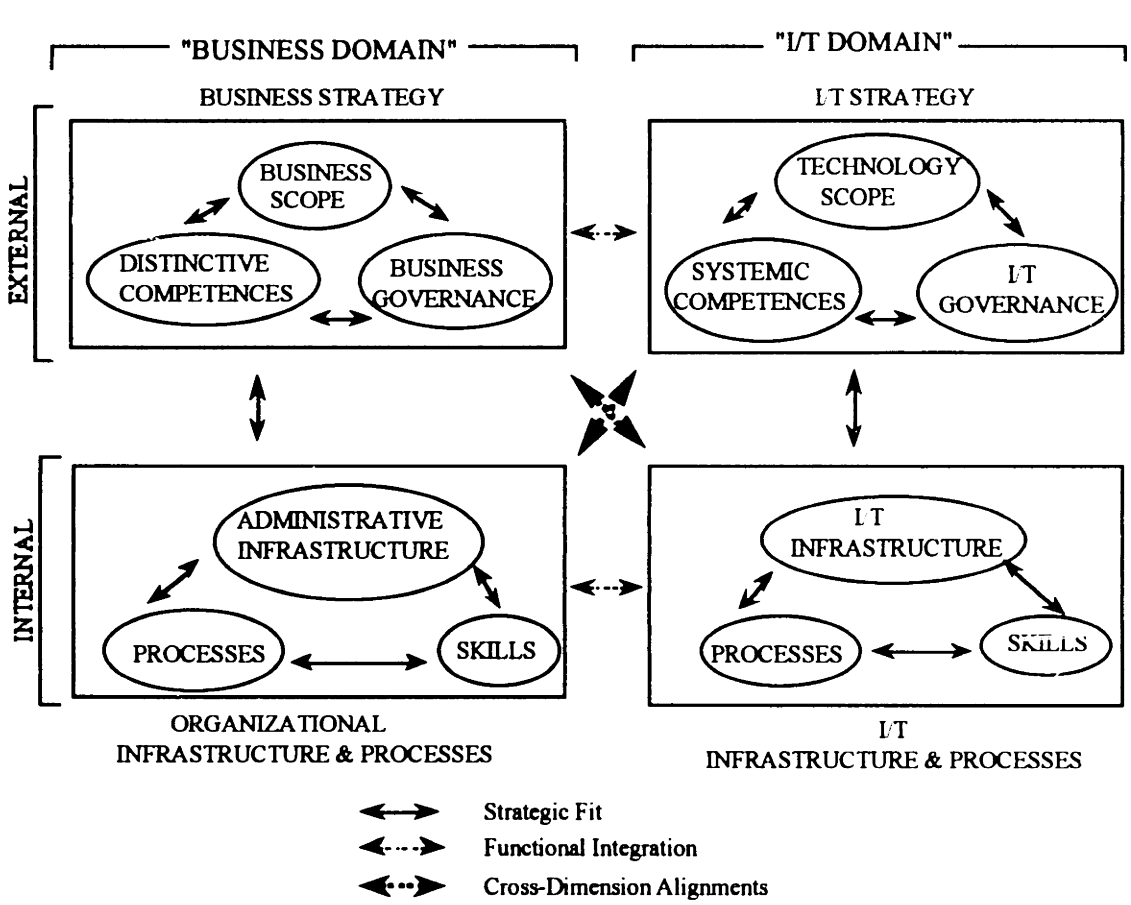

Figure 2.1: Strategic Alignment Model

Strategic fit recognizes the need for any strategy to address both external and internal domains. The *external domain* is the business arena in which the firm competes and is concerned with decisions such as product-market offering and the distinctive strategy attributes that differentiate the firm from its competitors. The *internal domain* is concerned with choices pertaining to the logic of the administrative structure and the

[11] J. C. Henderson, and N. Venkatraman, "Strategic Alignment: Leveraging Information Technology for Transforming Organizations," IBM Systems Journal (Vol.32, No.1, 1993): pp.4-16

specific rationale for the design and redesign of critical business processes, as well as the acquisition and development of the human resource skills necessary for achieving the required organizational competencies. The fit between external positioning and internal arrangement is equally relevant within both the business domain and the IT domain.

Functional integration considers how choices made in the IT domain impact (enhance or threaten) those made in the business domain and vice versa. There are two types of integration between business and the IT domain. The first, termed *strategic integration*, is the link between business strategy and IT strategy and it reflects the external components. It deals with the capability of IT functionality to both shape and support business strategy. The second, termed *operational integration*, is the link between organizational infrastructure and processes and IT infrastructure and processes. This type highlights the criticality of ensuring internal coherence between the organizational requirements and expectations and the delivery capability within the IT function.

Effective management of IT requires a balance among the choices made across all four domains. To achieve this type of cross-dimension alignment, a bivariate-fit perspective, considering all combinations of any two domains, is not enough. Henderson and Venkatraman argued that four types of cross-domain relationships should be recognized.

B. Four dominant alignment perspectives

(1) ***Strategy execution***

This perspective (illustrated in figure 2.2) is anchored on the notion that a business strategy has been articulated and is the driver of both organizational design choices and the design of IT infrastructure. This alignment perspective is the most common and widely understood perspective as it corresponds to the classic, hierarchical view of strategic management.

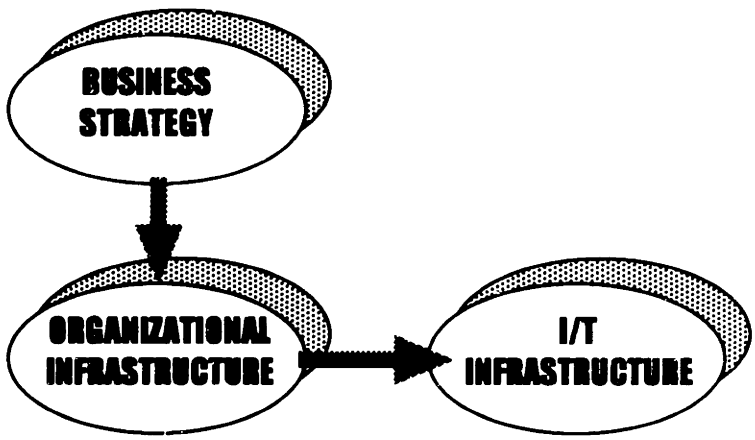

Figure 2.2: Strategic execution alignment perspective

(2) ***Technology transformation***

This perspective (illustrated in figure 2.3) involves the assessment of implementing the chosen business strategy through appropriate IT strategy and the articulation of the required IT infrastructure and processes. In contrast to the strategy execution logic, this perspective is not constrained by the current organizational design, but instead seeks to identify the best possible IT competencies through appropriate positioning in the IT marketplace, and in the corresponding internal IT infrastructure.

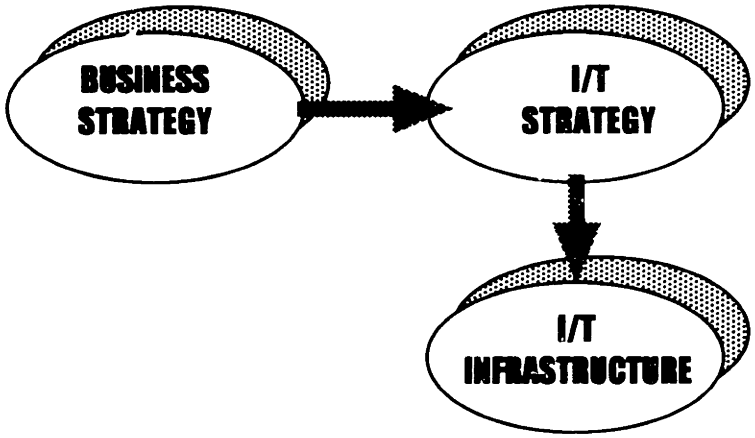

Figure 2.3: Technology transformation alignment perspective

(3) ***Competitive potential***

This perspective (illustrated in figure 2.4) is concerned with the exploitation of emerging IT capabilities (IT strategy), how they impact on new products and services (business strategy), and how they help to develop new forms of internal relationships (organizational infrastructure).

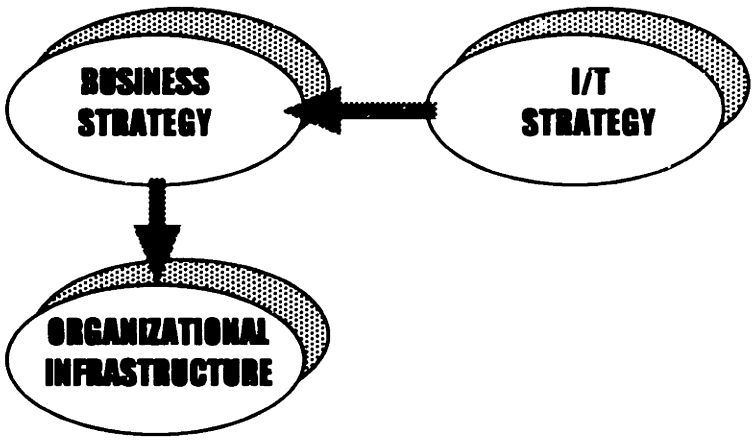

Figure 2.4: Competitive potential alignment perspective

(4) *Service level*

This perspective (illustrated in figure 2.5) focuses on the ability to deliver information technology products and services to the organization. Henderson and Venkatraman didn't develop how this perspective may include organizational transformation by the utilization of IT. In my view, however, a company's decisions can be supported and enhanced by fostering teamwork, cooperation, and communication within and among teams using collaborative computing that is known as "Groupware." Intellectual capital systems leverage valuable insights and knowledge that can be reused and shared to improve the capacity of the organization to learn, train, and solve problems. Finally, this IT application might support change of the hierarchical organization into a more efficient structure.

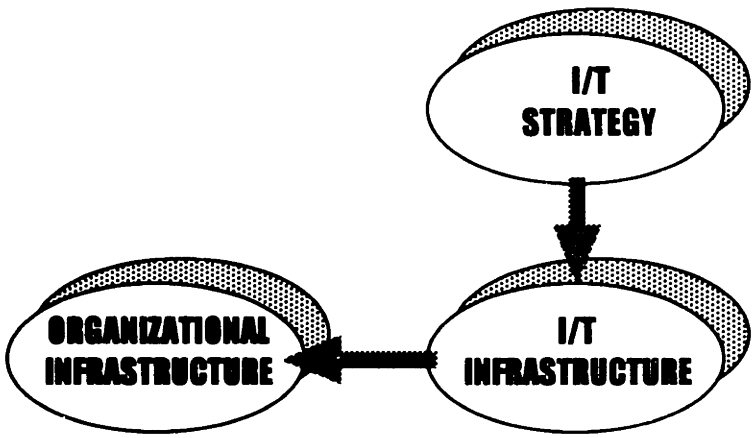

Figure 2.5: Service level alignment perspective

C. Perspectives needed for Japanese banks

Traditionally, business strategy has been the driving force in utilizing the power of IT in the Japanese banking industry. IT strategy has been subordinated to business strategy. Along this line, several examples of strategy execution and technology transformation can be observed.

Along with the expansion of the business field, banks often expand their multi-divisional organizational structure. By subdividing and merging, banks seek the best organizational infrastructure and processes. This process is driven by business strategy. As each modification is made on the organizational infrastructure, the demand for the computer system that supports the divisional work is generated. The systems development division also transforms its substructure in accordance with the changing demand pattern. At this point, there exists a weak notion of IT strategy as a driver of business strategy. This shows a typical pattern of strategy execution alignment perspective.

In recent years, emerging IT has gradually permeated various business domains. However, the way of applying IT is still conventional. One typical example of the conventional banking IT strategy is dubbed as "No-down operation," which guarantees the constant usability of computer systems for customers, especially of the

bookkeeping system that is the backbone of the banking system. Recent IT advances, such as hot-standby dual computer architecture, redundant communication networks, and dual site data-processing centers, have been applied under a "No-down operation" strategy backed by huge corporate budgets. "No-down operation" has priority over any other IT strategies. Business strategy aimed at security of the constant usability formed the IT strategy of "No-down operation," and configured the IT infrastructure and processes. This shows a typical pattern of technology transformation alignment perspective.

Most Japanese banks have established stable computer networking systems. Constant usability has become a competitive necessity, not just a competitive advantage. Along with financial deregulation, the business scope needs broader insights. IT could be used to widen the business scope. IT strategy has to be formed at the same level as the business strategy, and sometimes it should be put at a higher level.

In other words, alignment perspectives of competitive potential and service level, which are driven by IT strategy, are still weak among Japanese banks. Small signs of the influence of IT on business performances already exist, but the power of IT should be focused more at the strategy level.

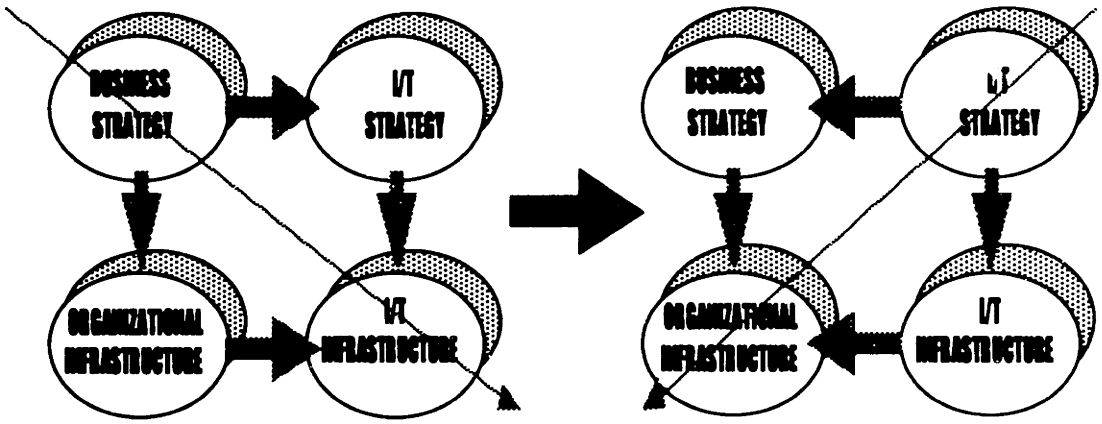

Figure 2.6: Paradigm shift from "business strategy driven" to "IT strategy driven"

Continuous expansion of Automated Teller Machines (ATMs) not only gave greater accessibility to customers, but also changed branch operations through dramatic reduction in workforce. Now, ATMs are being given much more intelligence so that they can deal with customers on loan acceptance or investment decisions. This trend may cause a human resource re-allocation within the firm. While most routine jobs will be taken over by IT, humans will, by necessity, be involved in more creative work.

Other than shifting the existing work from humans to computers, IT may open up new business opportunities. The development of Electronic Data Interchange (EDI) may urge vertical integration among different firms. By offering the medium for

electronic payment among value chains of different firms, banks may be able to enter the new field of fee business.

The present hierarchical organizational structure based on a multi-divisional system may be too inefficient to diversify business functions and coordinate these functions. This kind of cross-functional work now relies on informal personal relationships. Such informal relationships have been a critical factor in coordinating functions within the firm. However, official mechanisms to promote cross-functional human relationships will be needed from now on. IT will play an important role in this. This kind of IT might work as a catalyst to transform organizational structure.

In this thesis, two types of emerging IT applications will be investigated. The first type (based on the competitive potential alignment perspective) will focus primarily on how IT strategy influences the business strategy, and the second type (based on the service level alignment perspective) will focus on how IT infrastructure may shape organizational infrastructure.

Before these applications are investigated, the business environment and the IT antecedents in the Japanese banking industry will be discussed.

Chapter 3

Drastic change in Japanese banking environment

A. Less competitive environment in the past

Before the 1980s, there was less competition within tne banking business. This period of time can be characterized by four major factors.

(1) Governmental protection

The tight administrative control of banks by the Ministry of Finance is called the "convoy escort system." This guarantees that no bank will fail, and no bank has failed in the postwar period.

In 1980, Michael Porter set forth three basic generic business strategies for firms to follow in order to achieve success in relation to their competitors. The first, cost leadership, refers to the ability of a firm to provide products or services efficiently with the lowest outlays of capital, time, and labor. The second, market or product differentiation, refers to the ability of a firm to make its products distinctive so that customers perceive them as unique and superior. The third, focus, refers to the selection of a target segment in the industry and to the adaptation of two strategies, cost leadership and market or product differentiation, to the selected target.

In the past, all three strategies were regulated to some extent. Except for the indirect cost, a major portion of the cost in the banking business is the interest rate. This rate used to be regulated. The interest rate for the deposit was fixed regardless of the type of the deposit. The market for getting money was limited. Consequently, every commercial bank had the same cost structure.

The product concept was also regulated. Every deposit and loan had only a typical cash flow schedule. If one bank wanted to introduce a new kind of financial service, that required the approval of the Ministry of Finance in advance. The Ministry of Finance emphasized equal opportunities for every bank. The more creative the idea, the longer it took to get the approval and often the approval was withheld. As a result, all financial services were similar, and it was very difficult to differentiate one service from another.

The customer segment was also regulated. There are several types of banks, such as city banks, trust banks, long-term credit banks, regional banks, credit associations, and so on. For each type of bank, the type of service that it could offer was strictly regulated. In other words, the customer segment was assigned to each type of bank. Banks competed within given customer segments, and within given types of competitors.

The strategy didn't work well in the highly regulated environment, or it was not needed to have strategies work. It didn't seem to be a competition. It seemed to be just work for "quota."

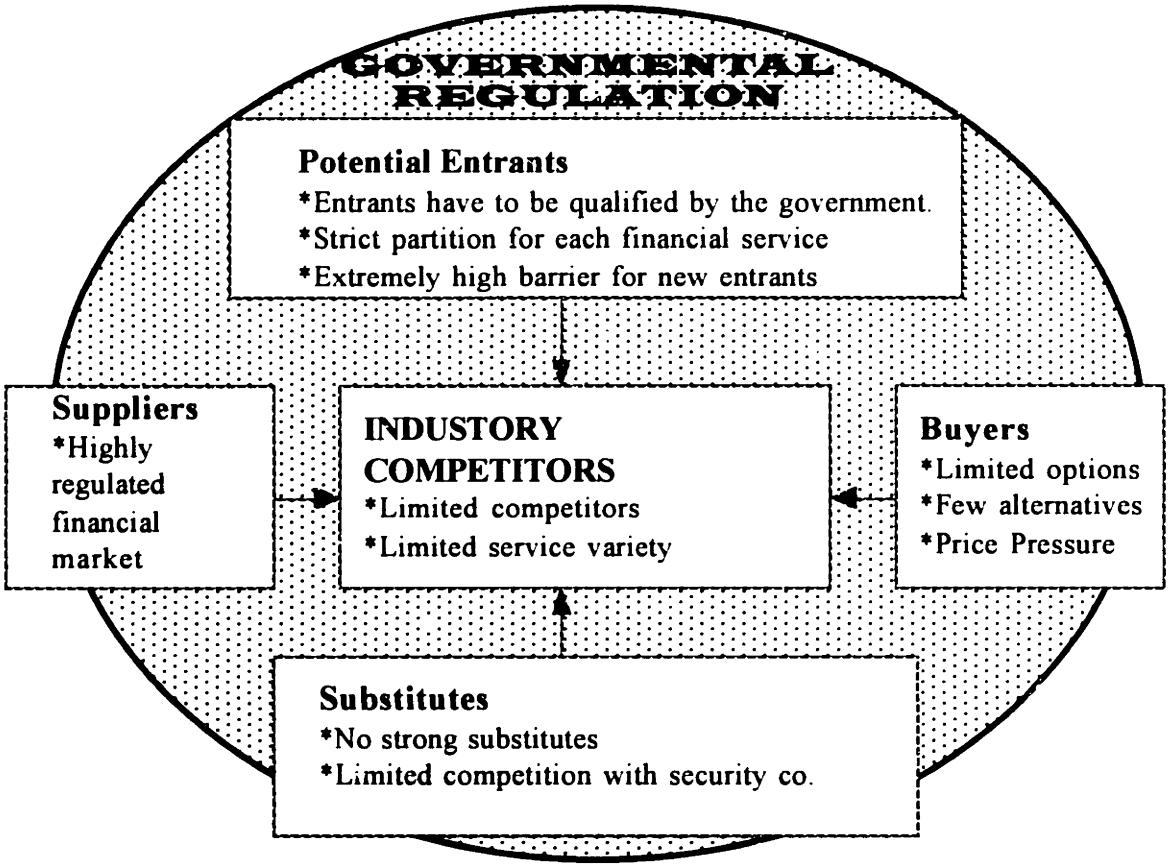

Figure 3.1: Five forces model for the banking business in the past

These analyses were also reflected in the five forces model (See figure 3.1). The banking business has been protected by strong governmental regulation. While the bank couldn't make the strategy work, other stakeholders couldn't put pressure on banks, either. Regulation worked as actual or potential barriers to entry into the industry and as barriers to mobility within the industry.[12] All five forces were very weak. How these five forces in figure 3.1 are changing will be shown in figure 3.2.

(2) Standardization philosophy

Since they were under the administrative wing of the powerful Ministry of Finance, they were not able to make themselves distinguishable from each other. Rather, it was not necessary for them to distinguish themselves. This environment created a strong philosophy in favor of standardization in every bank managers' mind. Even after some regulations were relaxed, most banks didn't dare to distinguish themselves from others by offering different services. As every manager knew that the effort to differentiate one bank from another might erode the total benefit to the banking industry, no one dared to push the button for the battle. When one bank tried to

[12] S. M. Oster, Modern Competitive Analysis, (New York, N.Y.: Oxford University Press, 1994), Chapter 17, p. 323

introduce a competitive service to the market, other major banks exerted their influence on the Ministry of Finance to stop the new service and prevent the lead of the bank.

(3) Mortgage supremacy policy

The necessary process in offering a loan is to check the customer's ability to repay the loan. However, as land prices were stable during this period, when land was put up for mortgage, lending officers tended to go easy on the credit check.

(4) Reliance on latent profits

Banks often held large amounts of stock in the companies that the banks did business with, and they became major stockholders of the companies. Initially, holding stock for the customer aimed at establishing a close relationship with the customer. Since the stock price kept rising during this period, owned stock became a hidden profit and an asset that didn't appear on the balance sheet. Banks could use this hidden profit as a stabilizer for their constant net profit. Banks could sell these stocks to increase the profit during the period when their earnings were low.

B. Present competitive environment

Since the bursting of the "bubble economy"[13] in 1990, the economy of Japan has been suffering from a recession of unprecedented magnitude. Other than the recession, the previously mentioned factors have changed completely. The competition has just started.

(1) Liberalization of interest rate

Tight regulation by the Japanese government controlled the financial environment in the past. However, a wave of financial deregulation swept across the banking business, and the financial environment is now changing radically.

The interest rate was liberalized in 1994. Markets for getting money were opened to every bank. Now every bank can use the foreign currency market to get money that will be used for domestic industry. All banks can use highly technical schemes of financial engineering to offer funds, such as swaps, options, and futures. The cost structure of banking services is no longer the same among banks. The liberalization of deposit rates caused a gradual rise in the cost of capital procurement for banks. Competent banks can offer favorable rates for customers, and increase market shares.

(2) Diversified banking service

Banking service has become also diversified. Johnan Shinkin, a credit association in Japan, started a savings account service with a lottery in October 1994.[14] In this service, the bank draws lots, and the winner gets a higher return on his/her deposits than

[13] The term "Bubble Economy" indicates a situation where the value of assets, for example stock and real estate, soars above fundamentals such as interest, yield, profitability and productivity.

[14] "A Clever Gamble," The Economist, December 10th - 16th 1994, p.78

others do. In the past, there had been a similar idea of a lottery, but the Ministry of Finance wouldn't allow the offer because it might stir up people's gambling spirit. Once it was allowed, many people bought the service.

Financial engineering techniques are also used to generate complex cash flow patterns. In the past, these techniques were allowed only within the inter-bank market, but gradually they have become incorporated in direct markets for customers.

These are a few typical examples. From now on, the more sophisticated, and sensitive to the quality of the service customers get, the more kinds of services will emerge to meet customers' needs. The creativity of each bank will determine its power.

(3) Lowering firewalls

Different types of banks are now about to be merged. Major commercial banks are now allowed to do other kinds of business, such as stockbrokerage for the underwriting business, and trust banking. In addition, they can now own subsidiaries. In other words, each bank can find different customer segments under the ministry's deregulation plans. However, at the same time, non-bank companies start businesses similar to that of banks. Some supermarket franchises are offering credit lines for their customers. Some security companies are planning to start banking businesses through their subsidiaries. Mutual entrance in other financial service domains will be the trend for the next decade.

In the 1970s, major companies began to shift their way of corporate financing from indirect financing to direct financing. Since then, they have been able to procure an abundance of cheap capital directly from the capital market by issuing stocks, bonds, convertible bonds, warrants, and so on. This trend to direct financing has eroded profits from the wholesale banking business. After having lost these preferred loan customers, banks had to begin to target individuals and small and medium-sized businesses.

In addition, since 1987, banks are forbidden by anti-trust laws to own more than five percent of a specific company's stock. Gradually, banks are losing their linkage to companies.

(4) Making "standardization philosophy" illegal

Financial deregulation opened up new opportunities for competing among banks. However, most banks seemed to persist in "standard philosophy." Public opinion strongly opposed this philosophy, and finally the Fair Trade Commission began to investigate to see if there was a cartel among banks.

It is clear that there was no cartel, but now major banks are trying to be different from others. Now there is a fierce battle among banks (similar to the one among American telecommunication companies) for the commission on money transfer between different accounts.

(5) Ending myth of land price and latent profits

After the bubble economy, stock prices and land prices fell. Since most banks heavily relied on land as security for loans, drastic erosion of land prices turned most land-related loans into bad debts. All banks were able to avoid bankruptcy, but they were still left with large bad debts and liabilities, which remain today.

During the one-year period after the bubble economy, stock prices fell by approximately 40%.[15] This market crash got rid of banks' latent profits in their holding stocks.

(6) Liberalization in telecommunications

The revision in the Public Telecommunication Law in 1982 allowed private companies to lease telephone lines to third parties. The leasing business had previously been monopolized by Nippon Telegraph and Telephone Public Corp. However, connecting leased telephone circuits to public circuits was still not allowed at that time.

Beginning in April 1995, the linkage between public circuits and cheaper leased telephone circuits was allowed. Such a move will enable corporations and banks to link up their computers by direct, exclusive circuits. As phone rates for leased circuits are charged at fixed amounts regardless of the number of calls made, companies (as well as banks) that already have a wide range of leased circuits for their own use can offer various kinds of information service throughout the country at relatively low prices by connecting to public circuits.

A portable terminal machine can be hooked to a bank's central computer from a customer's home. A customer service clerk from the bank visits the customer's home to pick up money and passbook and take them back to the banking office for depositing and registering the transaction in the passbook. The bank clerk then returns to the customer's home with the passbook. The portable terminal machine can register the deposit when the money is handed to the bank clerk at the customer's home. This greatly saves time for the bank clerk who no longer needs to travel to and from the banking office.

Such liberalization in telecommunication is certain to cause tremendous changes in the banking business. It will lead to linkups among banks, securities companies, credit card firms and consumer financing firms. It inevitably will open the way for financial commodities hitherto unknown to take advantage of computers.

C. Accelerated consolidation

The competition has just started. Now all banks have to think about strategies realistically. Five competitive forces are getting stronger as shown in figure 3.2.

Consolidation within the banking industry is gathering speed. Figure 3.3 shows bank failures and the number of banks in the US. Bank failures are now starting to taper off, but consolidations continue. The situation in the banking industry in the US may be slightly different from that in Japan, but a similar phenomenon can be observed now in

[15] Tokyo Stock Exchange, "Monthly Report," June 1992

Japan. The restructuring of the banking industry will continue through consolidations rather than through failures. The Ministry of Finance itself seems to recommend that major banks merge with banks that are struggling with bad assets.

Whatever form new financial business may take, only highly profitable institutions that can afford to develop sophisticated computer systems will survive. Implications of this are that managerial gaps will widen within respective areas of financial services. Under such circumstances, mergers will abound and a number of weaker financial institutions will come under the control of stronger ones.

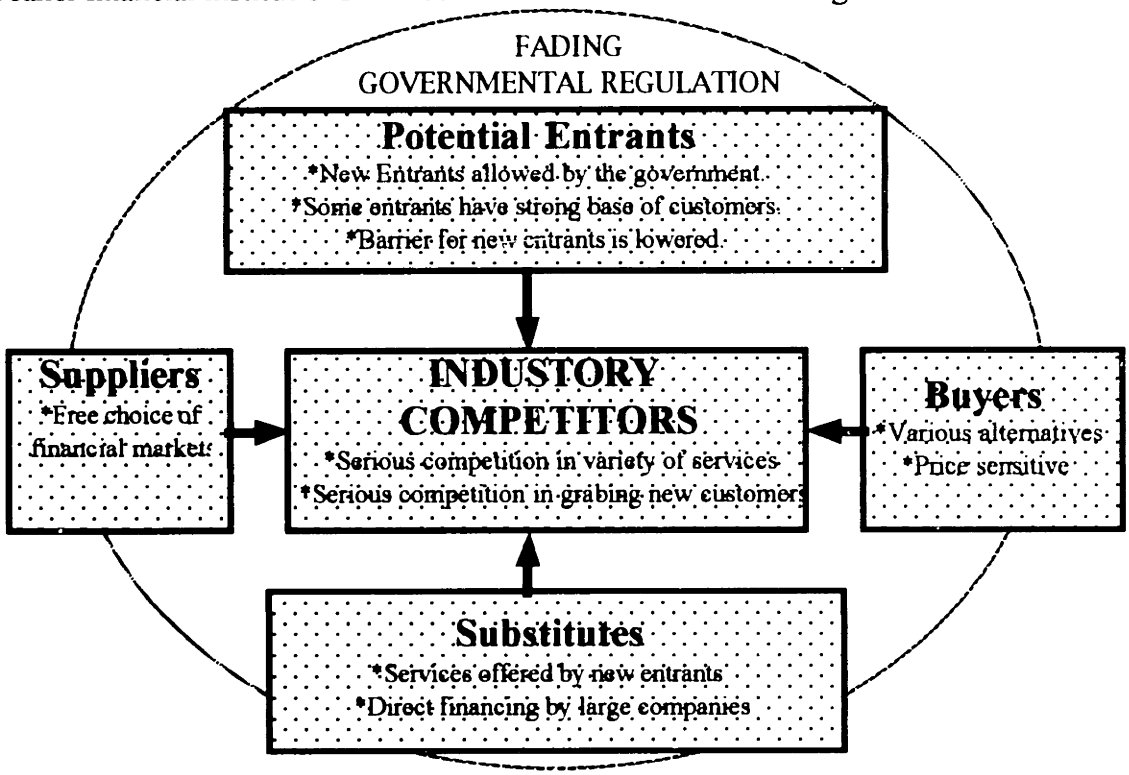

Figure 3.2: Five forces model for the banking business in the near future

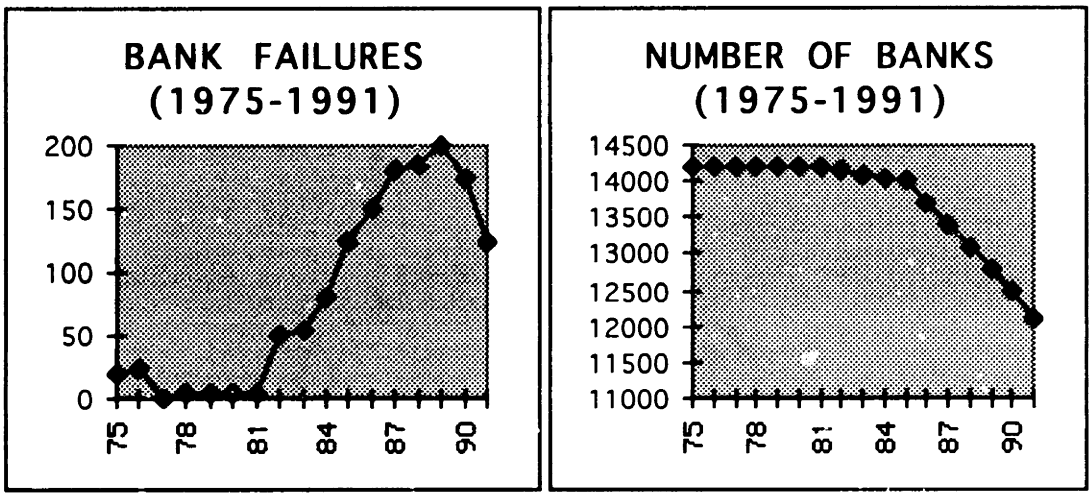

Figure 3.3: Bank Failures and Number of Banks in the US (Source: FDIC)

Gradual financial deregulation in Japan has given Japanese banks many new business opportunities, but it has also thrown them into stiffer competition than they ever had before. Financial services are more diversified and require much more flexibility. Customers are more sophisticated and more sensitive to the quality of services.

To survive the stiff competition, banks have to change the way they use IT. They must make the transition from the traditional data-processing mode to the strategic information-creating mode.

Chapter 4

Antecedents of Information Technology in Japanese Banks[16]

A. Three generations of on-line system projects

In 1965, Japanese Banks initiated computerization, and competed to complete three major on-line system projects in ten-year intervals thereafter, each of which required a huge burdensome investment on the part of management.

(1) First generation (1965 - 1975)

The objective at this stage was to rationalize the overwhelming amount of clerical work done by hand at the branch offices, because of the rapid increase in the number of customers' saving accounts. Central emphasis was on deposit and domestic exchange functions.

The effects were the reduction of personnel (approximately 10% of about 20,000 employees at the average large Japanese bank), their overtime costs, and time it took to process transactions at branches. The total investment amount for this project was estimated to be US$150-200 million per major bank in Japan.[17]

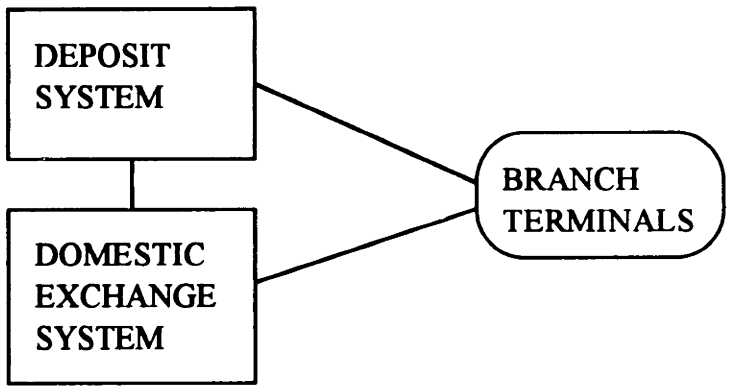

Figure 4.1: Concept of First generation on-line system

(2) Second generation (1975 - 1985)

A bank can close daily operations only after balancing all accounts. It was an annoying problem for all branches to have many people stay late frequently only to find a single error of operation. These errors were caused by increasing complexity and volume of transactions.

To solve that, the automated system was invented to save the operation times generated by complex transactions. For example, in the case of executing loans, the

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[16] Except as otherwise indicated, the ideas in this chapter come mainly from my experience in the Mitsubishi Bank. However, the content describes the general situations of the Japanese banking industry.

[17] Yoshihiko Shoyama, "The Impact of BIS Regulation and Information Technology on Japanese Banking Industry in 1990s," MOT thesis, MIT, Cambridge, MA (1992): pp.12-14.

transaction of executing the loan and that of depositing it in the customer's account had previously been handled separately. In this second generation on-line system, these two transactions were done in one operation. By reducing the operation times, the new system not only improved productivity but also remarkably reduced the operation errors.

The new system required more power for the huge amount of data-processing. A mainframe computer and its sophisticated operating-system (OS) enabled this new system to work. On the basis of the new infrastructure, the old software was completely replaced by a new one. To maintain huge computer systems, most banks separated the systems development division from the operation planning division.

Cash Dispenser (CD) and Automated Teller Machines (ATMs) were introduced at that time. These new technologies enabled a bank to reduce personnel and to expand its territory relatively cheaply compared to opening a new branch.

For the customers' convenience, some large banks connected their own ATM-networks to those of other large banks. The advent of gigantic banking system alliances, such as TOCS and BANCS, became a large threat to small financial institutions, and a strong barrier to new entrants.

This second generation on-line system broadened the territories it covered to include loan and foreign exchange functions. As the financial environment changed in the 1980s, the system took on new functions such as international banking and investment banking. Electronic banking also started around this period.

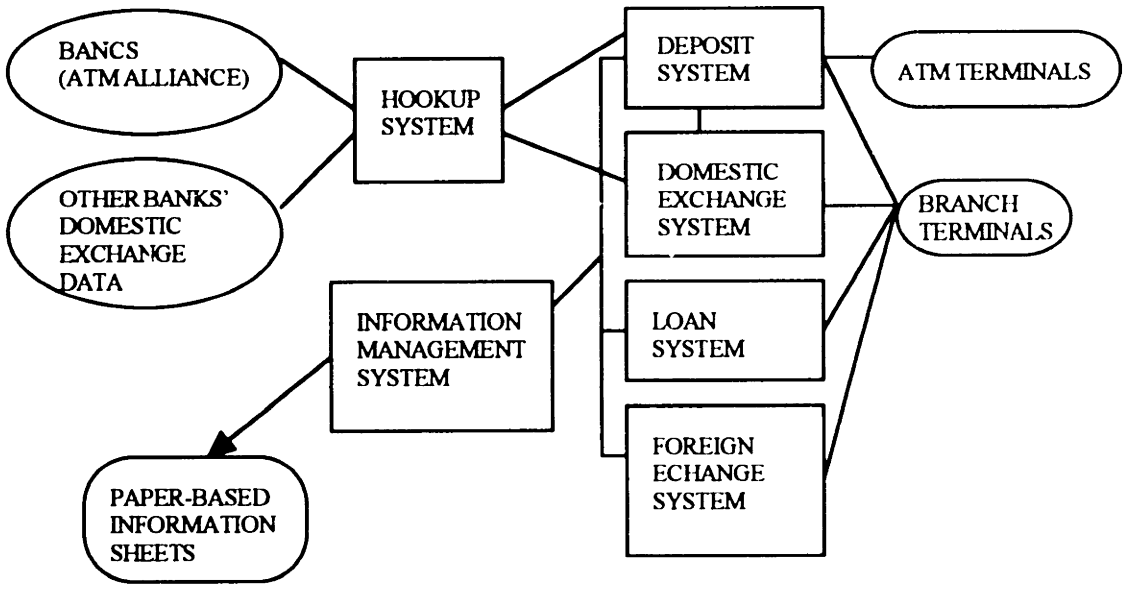

Figure 4.2: Main concept of second generation on-line system

Many functions were added onto the main body of a huge banking system. Some sub-systems were built based on a different system architecture. In order to get maximum benefit from advanced computer technologies, these sub-systems had to be built outside the main body. That was why the second generation on-line system

became too complicated to change flexibly and so it could not keep up with financial environmental changes.

(3) Third generation (1985 - present)

As the system took on more functions, its complexity came nearer to the break-even point where the cost of establishing a completely new system was equivalent to that of maintaining the old system.

Aiming at securing the system expansion for new financial products and productive system maintenance, most Japanese large banks launched big projects for the third generation on-line system around this period.

As the banking system got larger and had a larger influence on everyone's daily life, fault-tolerance became another important factor. To enable more stable computer networks, complex architecture such as duplicated (tandem) computer architecture[18] was introduced. Whenever the banking system failed, the mass-media publicized the problem widely. This sometimes had a great influence on the overall credibility of the bank that caused the system trouble.

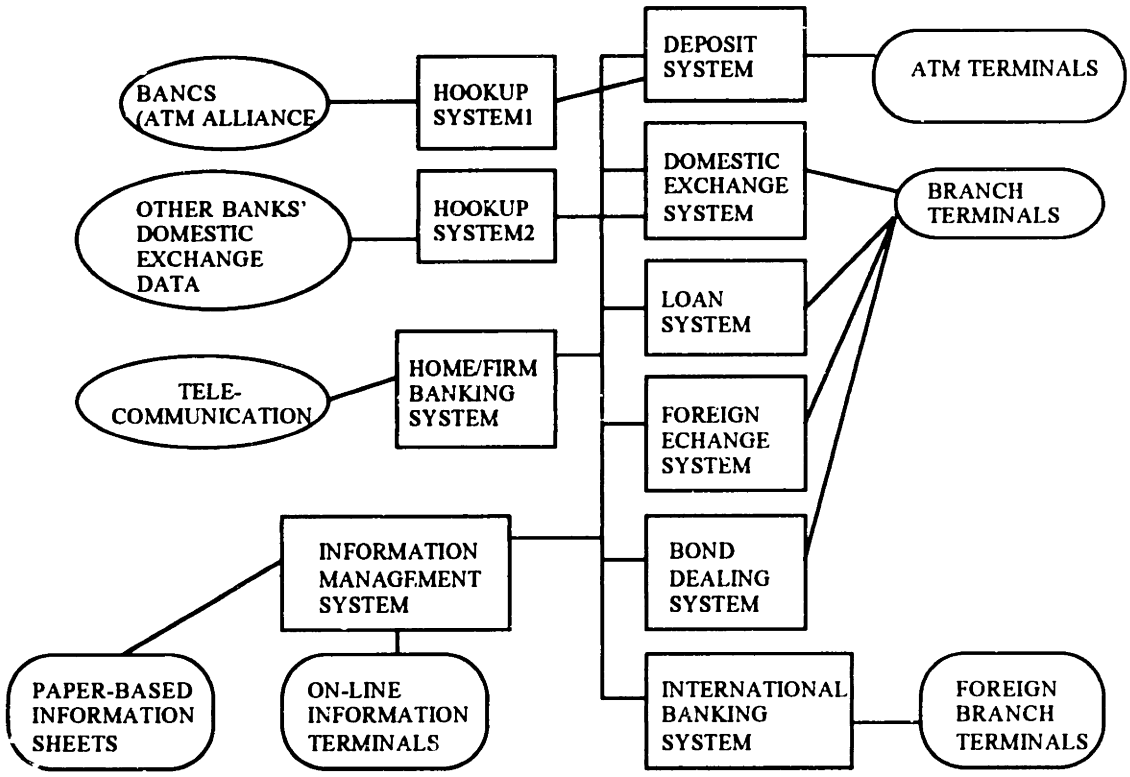

Figure 4.3: Main concept of third generation on-line system

[18]Even if one mainframe computer gets failed, the other takes over the roles of failed one.

B. Post third generation on-line system projects (1990 - present)

(1) Tragedy of the third generation on-line system project

In terms of the business environment, the designing stage of the third on-line system project (approximately 1982-84) coincided with the starting period of the "drastic change in the banking business environment" that was described in chapter 3. At that time, new business domains, especially in the investment banking domain, were considered to be subordinate and it was expected that time would be required for them to become main businesses. But within a couple of years, as the project moved into the software development phase, public bond and foreign bond assets became significant in banks' balance sheets, and leading financial techniques such as swap, options, and futures became competitive tools to cultivate customers.

The tragedy of this project was that its design phase had to be wrapped up before banks had a clear picture of the shape of future business. At the later development phase, there were conflicts with internal bank users who began to recognize the specifications for the future information system. However, it was very difficult to introduce new specifications into the computer application after the initial specifications had been fixed. Finally, the new system was not received by bank users very enthusiastically at its release. Even after releasing the system, the systems development division had to concentrate on maintenance of the huge "crying baby." Some users in headquarters felt frustration in the slow response of the systems development division. Maintenance of mainframe computer system is still a large burden for the systems development division of most Japanese banks.

(2) Decentralized information systems

On the other hand, in the late 1980s, the new type of system architecture that is called "client-server architecture" drew much attention. This architecture is often based on UNIX machines, which are much cheaper than mainframe computers, and have much more flexibility and better performance, especially in calculation processes. While mainframe computers are good at processing lots of transactions (input/output instruction) with high fault-tolerance, UNIX workstation has the advantage in calculation speed.

There was no chance for end-users to overlook this attractive alternative. At headquarters of most Japanese banks, there emerged many sub-systems based on "client-server architecture" at each division, especially in the investment banking area. Investment banking divisions really needed high performance computers for their quick and complex pattern of dealing. In a few seconds, a dealer might lose millions of dollars. In addition, dealers needed a good Graphical User Interface (GUI) for easy operation and easy recognition of processed results. Dealers bought hundreds of workstations and asked the external vendors to build up new systems.

Consequently, the current banking system tends to have two aspects. One aspect is the mainframe computer that processes a large number of electronic transactions, and then stores the data. The other aspect is the client-server system that

works on the front line of business where primarily flexibility and quick response are needed.

(3) A typical decentralized Management Information System example

Figure 4.4 shows a typical example of Management Information System in Japanese banks. This kind of system is commonly used at headquarters.

Huge numbers of transactions are put into mainframe computer systems, such as the deposit system and the loan system. These data are stored in various types of databases. Each database has a different layout of data location. Data in each database are arranged by their indexed values. This type of data allocation is suitable for transaction processing, but not suitable for data searching by non-indexed attributes.

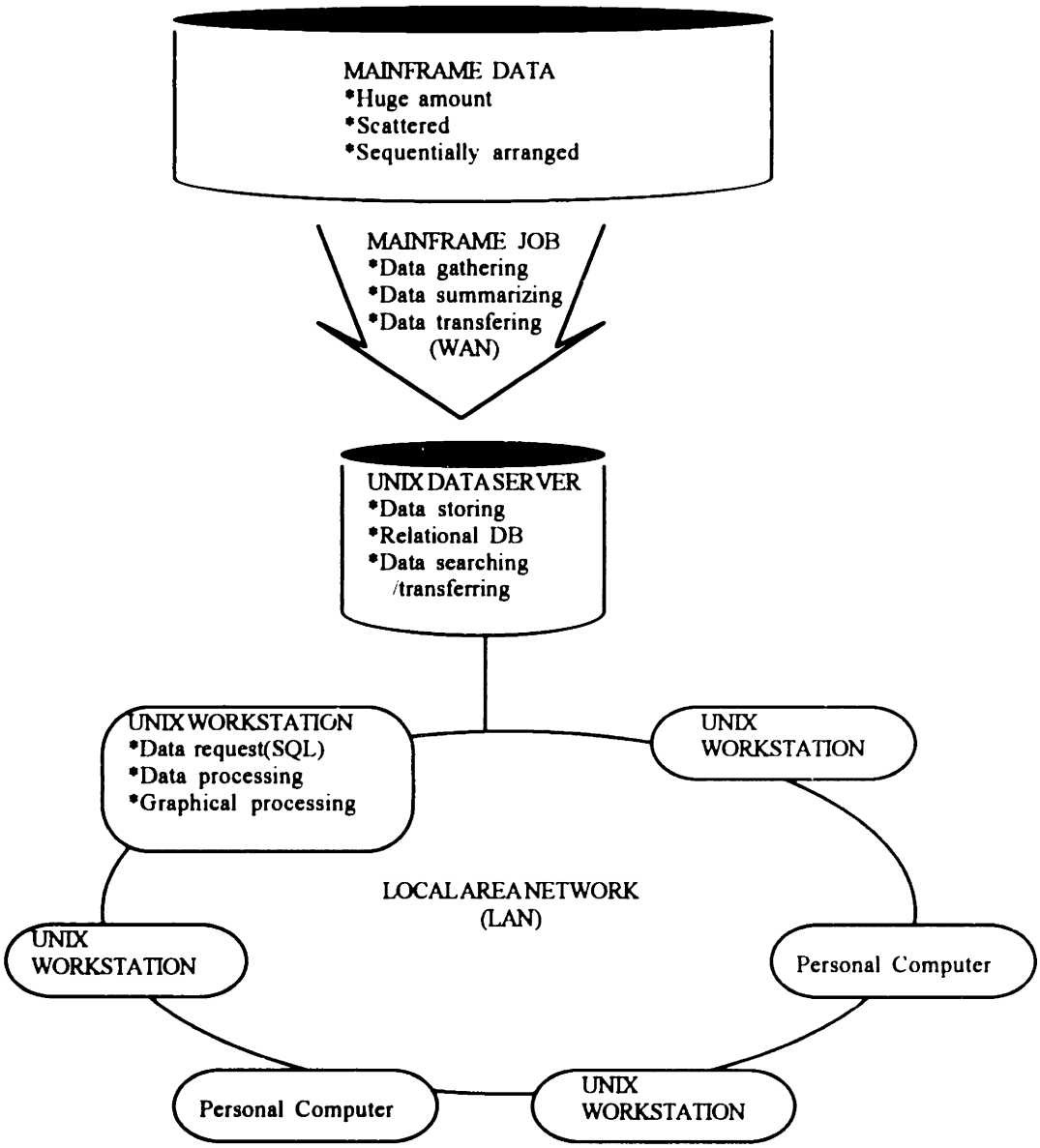

Figure 4.4 Typical MIS in Japanese Bank

To download required data into a UNIX data server, scattered data are gathered, summarized, and transferred. Downloaded data are stored into the relational database (RDB) of the UNIX data server. RDBs have a flexible data structure, and enable a virtually infinite number of data searching methods within a relatively short response time.

Data server and UNIX workstations are linked on a Local Area Network (LAN). Workstations work as clients that request the data server to search and send back the data. Received data are processed in the workstation again to be revealed in tables or charts. Once data are saved within the workstation, they can be reused to change the way of viewing the data in accordance with the operator's request. This function of an intelligent workstation is the big advantage over a mainframe system. In a mainframe system, a dumb terminal works only as a monitor, and most processes are done in a mainframe computer. It takes longer response time, and there is less flexibility.

(4) Emerging problems

So far so good. However, some people gradually began to understand the problems.

a. Sub-systems can not be linked together

There was no common guideline for establishing these kinds of sub-systems. Each division built a sub-system for its own convenience. This precluded sub-systems being connected to each other.

There are two aspects of this problem. One aspect is the technical problem. Each data server or workstation is assigned one address on the LAN. These addresses must be managed under a common rule. However, many divisions defined these addresses in their own ways. That caused the technical problems in linking them.

The other aspect is the data definition. As a matter of course, each division defined the data in its own way. For example, even if one manager wanted to sum up the total "profit" of the entire firm, the difference in the definition for the term "profit" would make it difficult. Some divisions calculate the profit by current price, and others do so by the lowest price during a certain period.

b. Too much complexity

In distributed system architecture, data and application processes exist in both data servers and clients. It requires a complex system to keep data both in server and in clients aligned. It also requires a high degree of skill for system engineers to design well coordinated process assignment between clients and server. Because of the complexity, once troubles happen in a system, it tends to take a longer time to solve them.

Moreover, in most cases, original data exist in the mainframe computer. Each division demands the same data in mainframe computer. As a result, the same data

exist among those sub-systems, and the power resources of the mainframe computer become scarce.

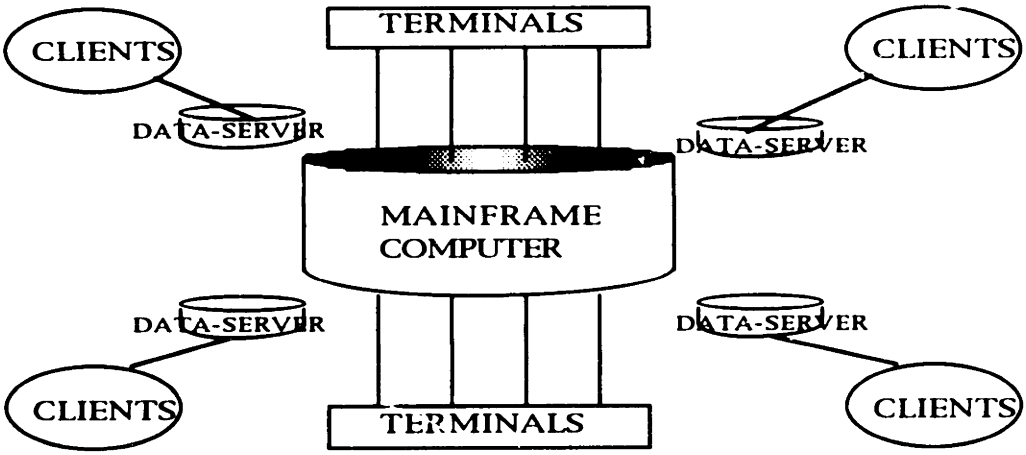

Figure 4.5: No relation between mainframe and client-server

The technology of distributed computing seems to go far beyond the management ability to control the computing system. Especially in the banking industry, the huge amount of the data makes the problem more serious.

In a later chapter, I will discuss how these problems should be resolved and what banking information systems should be like.

C. Paradigm shift in banking system

As mentioned before, most major banks in Japan have gone through three gigantic projects for establishing on-line data-processing system to catch up with the growing number of on-line transactions.

Initially the target of these projects within individual banks was to construct differentiated system architecture to give a competitive edge. However, the results were not so favorable. Because of various regulations and other factors, the business processes of the banking industry tended to be similar. Consequently, the transaction processing systems of major banks tended to be similar also. Of course there was a certain period when the efficiency of data processing led to competitive advantage, but gradually these advantages faded away. Now these data processing systems are a competitive necessity.

To establish competitive advantage, the strategic use of IT is being stressed. The strategic use of IT doesn't mean supporting existing business processes only, but also adding new ways of using information, which turn into competitive advantages. Distributed system architecture will play one of the important roles for the strategic use of information. IT evolves day by day, and many other star players are emerging.

Times have changed from the data processing era to the information utilization era. To survive the information utilization era, bank managers have to be more aware of emerging IT.

Chapter 5

Competitive potential alignment: Impact of Information Technology on banking business strategy

A paradigm shift in the banking system has just begun. However, most bank managers still cling to old notions of data processing uses of IT. The Japanese banking industry has been in an inefficient competitive environment (See Chapter 3). Business strategy in banking business rarely goes beyond governmental regulations and customers' anticipation. With the help of advanced IT, business strategies should be able to see far beyond the immediate future, and give innovative surprises to competitors and customers. IT itself has already gone far beyond the managers' ability to draw up future business strategy. Bank managers have to keep pace with the IT evolution, and bring out the full latent capabilities of IT.

The key concept is the competitive potential alignment perspective described in Chapter 2. This perspective is concerned with the exploitation of emerging IT capabilities (IT strategy), how they impact on new products and services (business strategy), and how they help to develop new forms of internal relationships (organizational infrastructure).

In this chapter, several implications for application of IT will be introduced. Some have already been applied, and some have not yet.

A. Automated Teller Machines (ATMs)

(1) The advent of ATMs

In the US today, a bank's traditional organization model, based on full-service branches, absorbs up to 65% of its operating expenditures.[19] And in Japan only a few years ago, major banks competed in the number of branches each had. The accessibility of branches has a great influence on a customer's decision of which bank to choose. However, full-service branches turned out to be very expensive, while they failed to deliver satisfactory convenience, simplicity, and value to customers.

Automated Teller Machines (ATMs) were introduced in Japanese banking environment in the late 1970s. At first, some people refused to use them because they gave a cold impression, and were difficult to use. After the human-to-machine interface of ATMs was improved, customers began to feel more comfortable using them. Nowadays, most simple deposits and withdrawals are done by ATMs. ATMs permeate people's daily lives.

ATMs have changed the rules of competition. The large number of ATMs has a greater impact on customer accessibility than expensive full-service branches. Thus most

[19] William M. Randle, "Delivering The Future; Redefining The Role of Banks in a New Competitive Environment," The Magazine of Bank Management (January-February 1995): p.45.

banks have changed their strategies from opening up new branches to increasing the number of ATMs.

(2) Case of Sanwa Bank[20]

Sanwa Bank, one of the biggest Japanese commercial banks, heavily invests in ATMs, and follows an "unstaffed branch" strategy. An "unstaffed branch" is a branch that has only ATMs and where there is no clerk other than a temporary cash delivery person for ATMs. Sanwa Bank, whose headquarters are located in Osaka, didn't have enough branches in the Tokyo area, and so tried to open branches there. These unstaffed branches have been taken as complementary functions by other banks. However, Sanwa's CEO was convinced that most customer needs would be met by ATMs, whose functions were increasingly innovative. Sanwa took unstaffed branches not as complementary functions but as new strategic devices.

Sanwa has opened 320 new unstaffed branches in three years. (See figure 5.1 for the total number of staffed branches and unstaffed ones.) While the number of staffed branches are almost same among major banks, Sanwa surpasses other banks by the number of unstaffed branches. The price of land is extremely high in Tokyo. While an average "staffed branch" needs 7000 - 9000 square feet, an "unstaffed branch" needs only 360 square feet. The total cost for opening unstaffed branches is said to be one-twentieth of that of ordinary branches. Sanwa could establish the wider ATM network with much less cost, and the wide ATM network seizes many new customers.

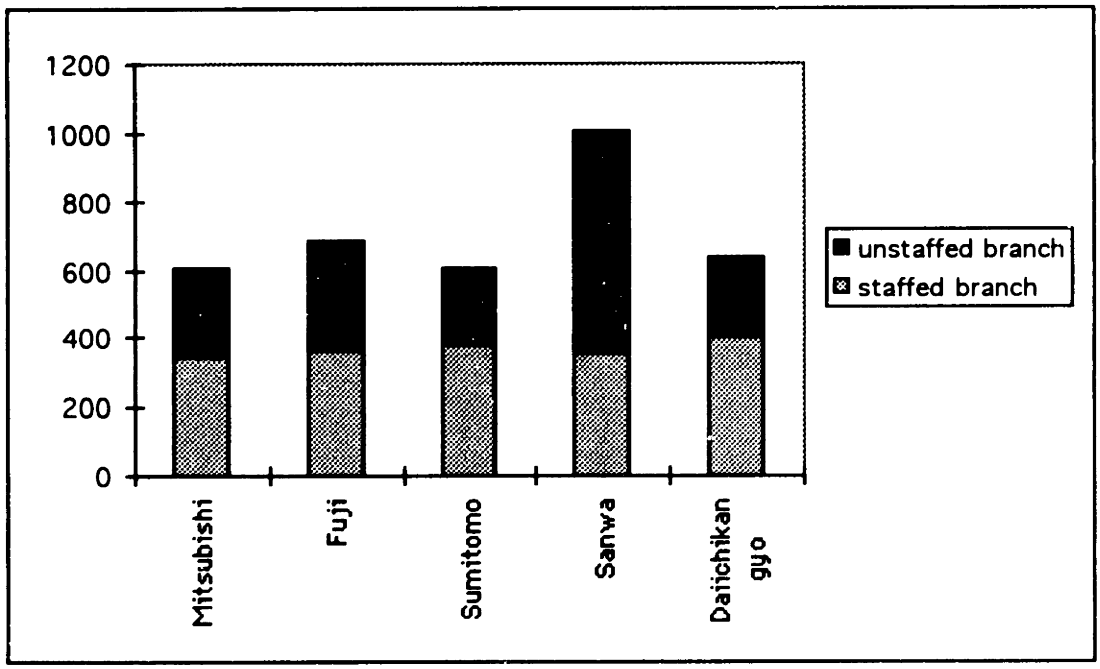

Figure 5.1 Total number of branches among major Japanese banks as of 1993

[20] "Sanwa's Slogan: Capture the Large Share by Electronic Banking," Kinyu Business (October 1994): pp.50-53.

"Mail-order service" enhanced this strategy even more. This service allows customers to open several accounts by mail-order. The service is a very simple one, but by the synergy effects with unstaffed branch strategy, 100 thousand accounts are opened every year.

(3) New competition in function of ATMs

The number of ATMs seems to have reached the limit. Nowadays, it is not difficult to find the nearest ATM in the metropolitan area. After providing enough accessibility to customers, banks are now competing in the function of ATMs.

a. Speed

Most people use ATMs for withdrawals. During the peak period, such as just before a long weekend, people tend to line up in front of ATMs.[21] The slowness of some ATMs sometimes irritated customers. Some customers compared their speed at several banks, and chose the bank that had the fastest ATM. A poll conducted in 1993 by the privately funded Institute for Financial Affairs Inc. found that 35% of the 954 families surveyed said the length of lines at ATM outlets is an important criterion in choosing a bank.[22]

For this reason, most banks began to compete in the speed of ATM transactions. Each bank developed its own ATM with the help of machine vendors, such as NCR,[23] Fujitsu, and Hitachi. Currently, banks are in close competition with ATMs for speed.

Sanwa Bank introduced an ATM in July 1992 with a then-record processing speed of 16 seconds for a withdrawal. Dai-Ichi Kangyo Bank broke the record by 2 seconds with a new ATM in March 1993. But Mitsubishi Bank further shortened the time to 12-13 seconds in July 1993 and has since replaced about 20% of its ATMs with a new model. For a typical withdrawal, most bank ATMs take only 12-14 seconds now.

b. Various functions

In addition to deposits and withdrawals, ATMs began to include other functions.

Electronic money remittance is a popular service in Japan. Most ATMs can be used for this purpose. Some ATMs can issue a kind of passbook that is used exclusively for money remittance. In this passbook, a customer can register several destinations in advance for money remittance. A customer registers and the next time the customer just inserts the passbook, picks the destination, specifies the amount of money, and the remittance is completed. It takes less than a minute.

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[21] Most ATMs in Japan don't work on holidays now. However some banks extend the service hours, and some other banks are planning to open ATMs on holidays also.

[22] Yuzo Saeki, "City Banks Focus on ATMs as Way to Keep Customers," The Nikkei Weekly (February 14, 1994): p. 13.

[23] AT&T acquired NCR, and NCR changed its name to AT&T Global Information Solutions in January 1994.

The Bank of Tokyo, which specializes in foreign exchange, introduced ATMs that serve the function of foreign exchange.

In December 1993, Mitsubishi Bank introduced ATMs which can provide finance-related information on loans, the average expenses for a wedding and the cost of a child's education.

c. User-friendliness

Most Japanese ATMs have infrared sensors that detect a customer's approach and display an animated teller bowing on a video screen and offering a greeting. Most ATMs are implemented with a touch-panel screen which is easy for most customers to use. Some touch-panel screens have bilingual instructions in Japanese and English.[24]

(4) Future perspective

Recent multi-media related technology will add far more advanced functions to ATMs.

a. Video conference function

The international banking group Citibank opened its first machine-only banking facility in Sydney in May 1994.[25] It is said to be the world's first unstaffed facility to offer a full range of banking services. This facility has advanced ATMs with video links to the bank's head office. This has allowed customers to conduct banking activities that require human interviews without going to a teller. This "remote video banking" system serves the following functions: opening of accounts, loan establishment, deposit, withdrawals, and access to all normal banking services. A scanner is provided at the terminals so that the customer can present documents such as driver's license or passport for personal identification.

Ohio-based Huntington Bank opened an electronic kiosk that also has a two-way video conference function.[26] Huntington implemented another function, called "electronic check imaging system". This system allows ATMs to electronically read the courtesy and legal recognition amounts off a check. The ATM compares the amount the customer entered into the machine against the actual value of the check. The check can also be electronically lifted to appear on the ATM screen.

b. Packet-switching technologies and Video conferencing

For many years, the only way for distant computers to communicate over the public telephone system was via a voice-quality link, either a dialup line or a point-to-point leased line. As networks expanded and applications required speedier transmission rates, time-division multiplexing (TDM) technologies stepped in to

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[24] These terminals are not connected with American banking networks.

[25] "Video Banking Hits Australia," Newsbytes News Network, (May 9, 1994).

[26] "ATM Update It's More Than A Name Change For AT&T," Bank Network News, (March 12,1995).

provide cheaper and faster data transfers on large-bandwide circuits. However, TDM still cannot convey multimedia data that consist of video, sound and data.

Along with the growing demand for efficient networks, packet-switching technologies are developed.[27] Three packet-switching standards - frame relay, Switched Multimegabit Data Service (SMDS) and Asynchronous Transfer Mode (A.T.M.) - have emerged to provide high-bandwide communications. A.T.M. especially has attracted a lot of attention as an emerging technology whose primary benefit is carrying time-sensitive data, such as video or sound, without interruption. It is also said that future Broadband-ISDN (B-ISDN)[28] services will be based on A.T.M., and A.T.M. technology will tear down the walls between Local-Area-Network (LAN) and Wide-Area-Network (WAN). A.T.M. will replace all networking technology, such as Ethernet, Token-Ring, and FDDI.

Fuji Bank has already announced that it will apply A.T.M. to its backbone network.[29] Fuji will start experimental operations of the A.T.M. network on its information system between Tokyo and Osaka in April 1995. By December 1996, Fuji will complete the implementation of the A.T.M. network to all 350 branches. (See Figure 5.2)

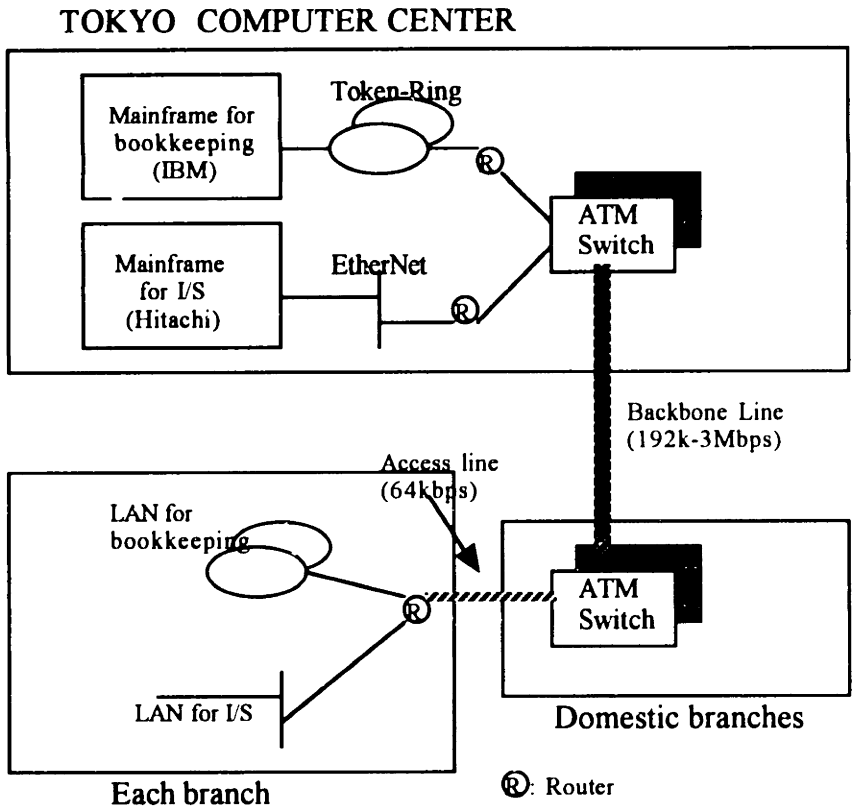

Figure 5.2: ATM network of Fuji Bank[30]

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[27] Bruce Schneier, "Everything's Coming Up Packets," MacWeek (May 17, 1993).

[28] B-ISDN is a fiber-optic public network service that will accommodate voice, data and video at once.

[29] Nikkei Computer, (October 31, 1994): p.16.

[30] Ibid.

Sanwa Bank also announced it would apply a similar network to its backbone line.[31]

c. Biometric voice recognition

While video conferencing and check verification are offered by several banks, one function that has yet to make it to the US is biometric voice recognition. Using voice processing technology developed by Bell Labs, AT&T Global Information Solutions has piloted four ATMs with voice verification in South Africa. Because many South Africans can't read, biometric voice verification allows customers to identify themselves without entering a personal identification number. When a customer opens an account, the bank asks the customer to say some randomly selected words. The customer's voice pattern is placed on a template and entered into the bank's central computer. The template is used for verification each time the customer accesses an ATM.

d. Fingerprint recognition

InterBold also offers biometric verification. Instead of using voice verification, InterBold has developed technology for ATMs to identify customers by their fingerprints.

These verification techniques by voice or fingerprints will take more time to be implemented, but they succeed, it will be a great news especially for impaired customers.

Advanced technologies, especially in the multi-media domain, are enhancing more frequent and more effective use of ATMs. The case of Sanwa Bank reveals the turning point from the conventional staffed branch strategy to the innovative unstaffed branch strategy. Staffed branches have served as bases of banking marketing activities, but the advent of new technologies begins to change these branches into low-performance assets. Some of these staffed branches will remain as brokerage facilities for more complex banking transactions. However, in the future, most of them will be handled by unstaffed branches that are equipped with intelligent ATMs. Banks are now forced to have more cost efficient financial structures. Unstaffed branch strategy will play an important role for attaining efficient banking operations. IT is a vital component to enable unstaffed branch strategy.

B. Electronic banking

Banks' efforts to enhance customers' accessibility to banking services changed from staffed branch strategy to unstaffed branch strategy by using advanced Automated Teller Machine (ATM) technology. The ultimate way to secure customers' accessibility

[31] Nikkei Computer, (January 23, 1995): pp.64-76.

to banking service is electronic banking, or remote banking which enables customers to reach the banking services from their office or home.

The fields of electronic banking may be divided into two categories. The first field is called firm banking. It is for companies that deal with many suppliers and customers, and thus must handle various flows of services and goods. Large portions of these flows are still certified by papers such as checks and invoices. Most large companies now try to make these flows simpler and more rational. The idea of Electronic Data Interchange (EDI) may solve these companies' concerns. The flow of services or goods accompanies that of money. Banks offer various kinds of service to secure the flow of money. EDI is now supporting movement towards electronic payment by connecting companies' electronic data directly to banks' systems. Banks are required to work as an efficient medium for electronic payment. This shift is more advanced in the U. S. than in Japan.

The second field is home banking. A handful of ambitious PC-based home banking tests have either failed from lack of customer support or have continued with only a small, loyal following. However, the market environment is now changing. The big difference in today's market is the consumer. One indicator of bank customers' technological readiness is the usage of ATMs. Today, according to MasterCard, 61 percent of Americans regularly use ATMs. Along with the diffusion of electronic media, such as personal computers on Internet or CATV, more consumers experience the electronic market that offers goods, services, and various kinds of information. However, there is still no standard way to secure electronic payment for this purpose. Also in this field, banks have to act quickly to secure their position as an efficient mediator for electronic payment. Some banks are experimenting with "*smart card*" technology. This may eliminate cash, and change the payment system completely. Similar trials have also begun in non-banking sectors, such as MasterCard, VISA international, and Microsoft. Banks still control the payment mechanism, but as things start moving more and more into electronic media, banks could lose control of that.

Electronic banking has a great potential to impact the traditional payment system, as ATMs impacted the usage of the branch in the past. Electronic banking will reinforce the electronic linkage among companies and consumers, and change the market environment completely. IT will work as the infrastructure for the electronic society, and banks should focus more on this area. Otherwise, banks might be excluded from the whole electronic economy.

(1) Firm banking in the U.S.

Electronic, firm-level banking has progressed further in the U. S. than in Japan, so I will first describe its progress there.

a. Evolution of electronic payment

The migration of payments from paper to electronics started in the late 1960s in the US with the usage of the Automated Clearing House (ACH), a system that provides

for the exchange and settlement of electronic payments. ACH transactions continued their double-digit growth in 1994, rising 13.3 percent to US$2.38 billion, according to the Federal Reserve Board.[32]

ACH permits payments to be made by magnetic computer tape or disk. The tape is sent, either directly or through the payer's bank, to the ACH, where the information is transferred as electronic data to the appropriate banks that make and receive the payments. (See figure 5.3)

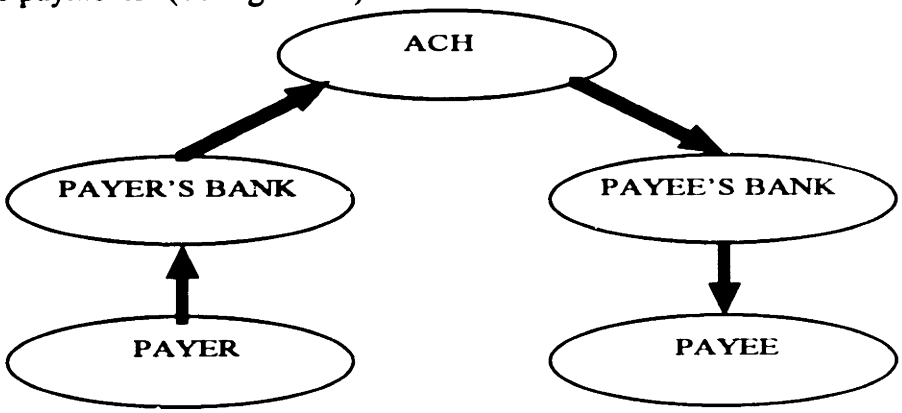

Figure 5.3: Electronic Funds Transfer through ACH[33]

ACH payment is very cheap compared to a wire transfer. Banks typically charge $5 - $25 for a wire transfer, but ACH payments usually cost less than a dollar each, depending on the amount of remittance detail.

The function of firm banking works to facilitate the flow of information between banks and payer/payee. The prototype of firm banking started as cash management services in the 1970s and early 1980s. It enabled companies to access account balance information, reconcile multiple accounts, and generate electronic payment through PC-based corporate banking systems.

b. Expansion of EDI

Along with the expansion of the electronic payment system, there emerged another movement called Electronic Data Interchange (EDI). EDI is defined as the flow of business information between organizations without human intervention by using standardized, machine-processable data formats.[34] Since the mid-1980s, EDI has been making inroads into the business world, particularly in the purchasing/procurement area and its counterpart in order entry and order processing. EDI has enabled companies to improve inventory controls and to facilitate shipping and billing processes.

A typical example is the case of Wal-Mart. Wal-Mart has EDI links with several thousand vendors, a vital development for quick response, just-in-time inventory

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[32] Corporate EFT Report, (February 22, 1995).

[33] G. W. Mitchell, and R. Hodgdon, "Federal Reserve and the Payments System," Federal Reserve Bulletin, (February 1981): p.112.

[34] Phyllis Sokol, "A Beginner's Guide: Getting Off to a Profitable Start in Financial EDI," Corporate Cashflow Magazine (April 1994): p.46.

replenishment.[35] Wal-Mart's automatic replenishment is based on point-of-sale (POS) data generated at each Wal-Mart store. These data are automatically sent to suppliers, and they supply the appropriate amount of goods at the right time. With this system, Wal-Mart has succeeded in shifting an enormous percentage of its inventory costs back onto manufacturers. For example, Wal-Mart was able to cut apparel inventory by half or two-thirds by using this system.[36] Also suppliers can analyze the POS data for their marketing activities to facilitate shipping and billing processes.

At first, some companies started EDI without accompanying payment information. In this case, when payment data and remittance detail are sent separately, the beneficiary must rejoin the two legs of the payment: the remittance detail and the advice of the payment received from the bank. To facilitate this rejoining process, the originator typically embeds matching trace numbers in both the remittance detail and the payment so that its computer can match them up. This procedure is called non-financial EDI, and the total efficiency can't be improved upon very much.

The necessity of accompanying the payment data with the shipping data encourages the use of financial EDI. In the financial EDI, payment data are combined with EDI messages to communicate remittance detail.

The EDI payment order can be communicated to the originator's bank in a number of ways, typically by NACHA format that is maintained by the National Automated Clearing House Association (NACHA). There are four kinds of NACHA formats available now.[37] These are CCD, CCD+, CTP, and CTX.

- The CCD (cash concentration or disbursement) envelope carries only funds (value, addresses, date). It can't convey any EDI messages.
- The CCD+ envelope carries funds plus an addenda record that can accommodate up to 80 characters of remittance information in ANSI (American National Standards Institute) X12 language.
- The CTP (corporate trade payment) envelope carries funds and a message that can exceed 300,000 characters, written in a NACHA language that requires special software to interpret. This extra handling requirement has led most companies to avoid it.
- The CTX (corporate trade exchange) envelope carries funds and a message of up to 800,000 characters. The message is in the form of the ANSI X12 transaction sets 820 or 835 (for health care payments), which can be interpreted by standard EDI translation software found in nearly all companies that use EDI for purchasing, shipping and invoicing.

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[35] K. Tada, and H. Tanaka, "Wal-Mart," Nikkei Business (September 5, 1994): pp.10-26.

[36] Richard Halverson, "Logistical Supremacy Secures the Base - But Will It Translate Abroad?: Wal-Mart," Discount Store News (December 5, 1994): p.107.

[37] Richard Bort, "Ax Falls on Paper As Electronic Payments Hone Sharper Edge," Corporate Cashflow Magazine (March 1993): p.24.

The CTX is favored by most companies because it is totally compatible with ANSI X12 EDI, and it can also convey enough data for identifying the payment.

c. Strategic meaning of EDI for banks

Of the more than 11,000 commercial banks in the US, only several dozen are capable enough EDI handlers to receive, process, execute and deliver all of the information contained in a CTP or CTX transaction in a fully automated way. On the originating side, that means most banks lack the capability of receiving an ANSI X12 payment order from a customer and then executing the payment order in the precise form required. On the receiving side, virtually all banks can receive ACH payments and credit the amounts to the accounts of their customers. However, only the capable banks can pass on remittance detail to their customers in EDI (machine-processable) form. Consequently, both the originator and beneficiary must select their banks carefully if payments and remittance detail are to travel together. If the beneficiary's bank is not EDI-capable, then only the payment should be sent through the banking system, and the remittance detail should be sent separately.

In accordance with the expansion of EDI, there are many chances for banks to take parts in customers' value chains as financial facilitators. However, only the bank that has enough IT infrastructure for EDI can be qualified as a facilitator. The bank has to have a wide network that customers can access easily and cheaply and a flexibility in terms of acceptable EDI data formats.

Once these capable banks are able to participate in customers' value chains, or backbone logistics system, it is relatively easy for banks to maintain close relationships with their customers and exclude other competitors.

The electronic linkage among companies is now strong, and will grow stronger in the future. The ultimate goal of EDI might be the virtual corporation.[38] To survive hyper-flexible economic conditions under virtual corporations, banks have to offer flexible electronic payment systems. Otherwise, non-bank companies could take over the banks' role. It is now time for banks to start to secure electronic payment before EDI becomes dominant yet.

(2) Difficulty of financial-EDI in Japan

Most major Japanese banks offer cash management services similar to those in the US. However, differences in the infrastructure of the electronic payment system have thus far prevented the expansion of financial-EDI by these banks. Rather, other non-bank companies are beginning to take over the banks' role in securing electronic payment.

[38] John A. Byrne, "The Virtual Corporation," Business Week (February 8, 1993): p.98.

a. Old-fashioned "Zen-gin system" as a Japanese ACH

There is an electronic payment system called the "Zen-gin system" in Japan similar to the ACH in the US. The flow of payment authorization and fund transfer is almost the same, but there is a big difference in the data format they can handle. While ACH can handle four types of NACHA formats, the "Zen-gin system" can handle only one format. "Zen-gin format" was created almost twenty years ago when there was no concept of EDI. "Zen-gin format" conveys the least data necessary to enable funds transfer. There is no space for identifying the content of payment. This factor has prevented the diffusion of financial-EDI handled by banks.

Consequently, non-financial EDI is becoming the dominant EDI style in Japan. Every company that is involved in EDI has established the non-financial EDI networks with other companies. In the network, only logistics data are transferred, while the remittance data are sent to the bank separately. In other words, there is no bank in the EDI network. Banks can not participate in the customers' value chains.

Most banks can still earn substantial fees by facilitating their electronic payment. But there is a major pitfall in this strategy.

b. Fading power of banks in electronic payment

All companies dealing with EDI have to combine the remittance data from banks with the invoice data. Since there is little data for identifying the content of payment on the remittance data, these matching processes have to rely on estimations or manual processing. These processes are intolerably inefficient.

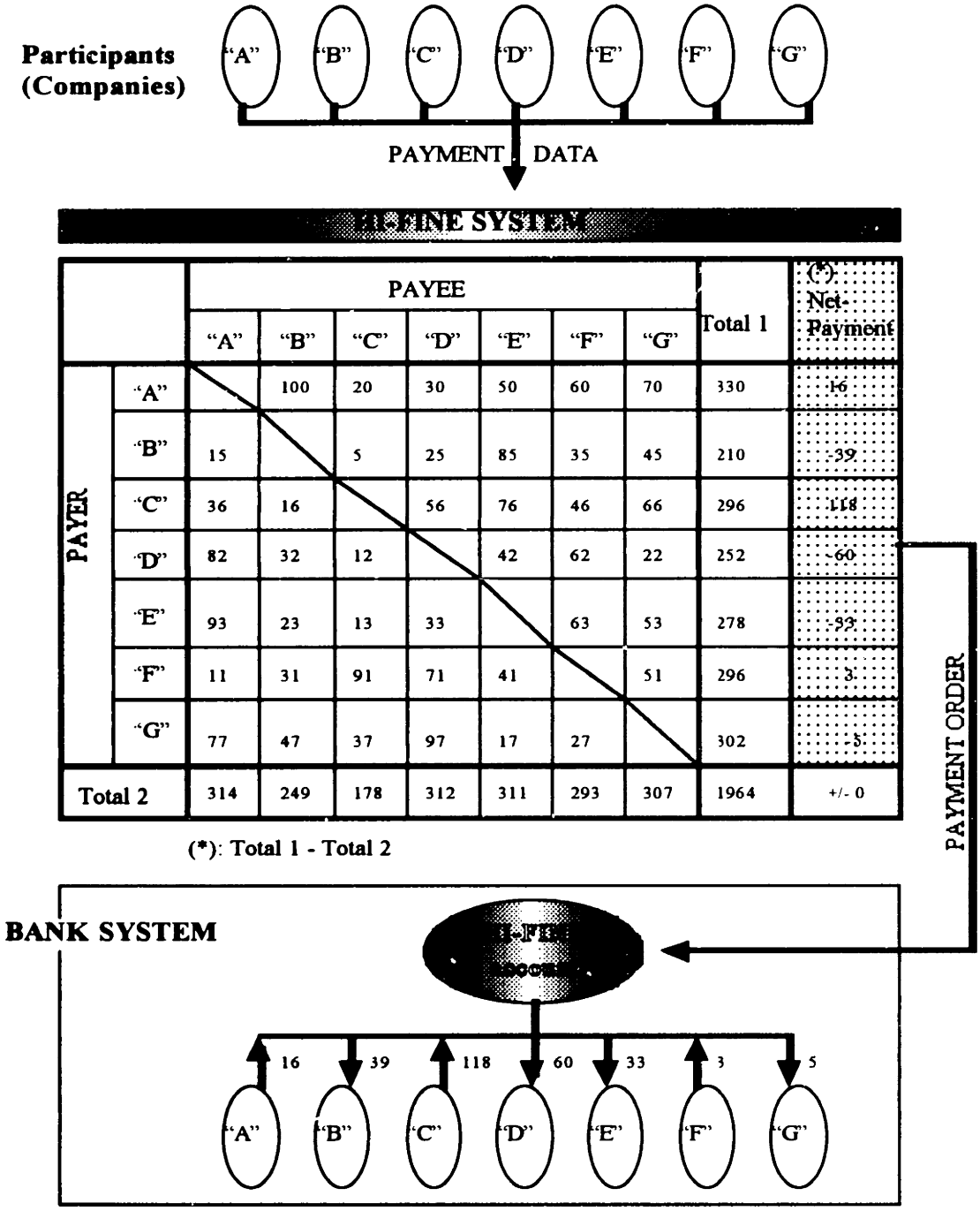
To avoid these nuisances, some groups of companies established their own electronic payment systems. The Hitachi group established the "HI-FINE system" as a self-defense against bank-proprietary expensive electronic payment system (See figure 5.4). Several companies within the Hitachi group participate in the HI-FINE system.

At first each company sends payment data to HI-FINE system. At a given time, the system calculates the net payment for each company. The HI-FINE system sends only net-payment data to the bank that holds the HI-FINE account. This system has the following advantages.

- Saves the cost of remittances. In the past, banks executed all remittances among group companies. Each company had to pay the fee for every remittance. The HI-FINE system now handles the netting process, and funds transfer occurs only once for each company at a time. This saves several millions of dollars a year in remittance fees.
- The HI-FINE system can handle the financial EDI. Although real electronic payment is still done by banks, nominal payment is processed automatically by the system.

The implication is that a nominal electronic payment system may shift from banks to other institutions. In the case of the HI-FINE system, they are group companies. However, as long as the company has the capability of systems development and efficient networking infrastructure, any company can be the electronic payment provider. The large companies, telecommunications, computer vendors, credit card companies, and all financial institutions are strong candidates.

Japanese banks should recognize the implication. Most banks still seem to enjoy earning plenty of money in remittance fees. Remittance fees hold the top share in the fee-business in banking. However, some capable foreign banks have begun to offer their own world-wide network for netting system for international credit/debt. Japanese banks are a few steps behind in international banking and also in the domestic exchange area.



PAYER \ PAYEE	"A"	"B"	"C"	"D"	"E"	"F"	"G"	Total 1	(*) Net-Payment
"A"		100	20	30	50	60	70	330	-16
"B"	15		5	25	85	35	45	210	-39
"C"	36	16		56	76	46	66	296	118
"D"	82	32	12		42	62	22	252	-60
"E"	93	23	13	33		63	53	278	-33
"F"	11	31	91	71	41		51	296	3
"G"	77	47	37	97	17	27		302	-5
Total 2	314	249	178	312	311	293	307	1964	+/- 0

Figure 5.4: Scheme of HI-FINE system[39]

[39] H. Okada, "Pitfalls in Electronic Payment Led by Banks," Kinyu Business (December 1994): pp. 46-49.

c. Bank as an information facilitator

Most major Japanese banks own a wide area of networking systems domestically and internationally. Since April 1995, the linkage between public circuits and leased telephone circuits has been allowed in Japan. This means banks are allowed to open their exclusive networking lines to their customers. In the shape of expanding firm banking to customers, banks can enter the leasing business in telecommunications. Customers can establish a wide area network at a low cost, and the telecommunication fee will be lower than the line leased directly from telecommunication companies. Banks can lower the network fee because they can earn from the banking business area.

Banks can provide a more flexible electronic payment system. It is difficult to change the Zen-gin format, but banks can offer financial-EDI services by extracting financial data from EDI data and rejoining these data before passing EDI data to the beneficiaries.

If banks own a sophisticated database system, they can store the customers' huge EDI data, and use these data for mass-marketing.

Banks can be information facilitators, and such a new domain of business would be the key for banks to survive during a turbulent business environment.

(3) Home banking

In this section, I will describe how the home banking business differs from firm banking, how home banking is progressing in the U.S., and how Japanese banks should act in this business in the future.

a. Different world from firm banking

While firm banking shows signs of proliferation, home banking still seems to have difficulties taking off. Home banking services are different from firm banking services in several ways.

- Lower frequency of use of banking service

  The main target of home banking is the household. These customers use banking service less frequently compared to customers of firm banking who are often companies or entrepreneurs. Since it usually costs a certain fixed amount of money to set up a home banking facilities including hardware or software, most typical customers are reluctant to pay these costs for reduced chances of using the service. Home banking devices must be cheap.

- Seeking convenience

  The users of firm banking seek improvement in productivity. To attain this objective, they are relatively tolerant of bad interfaces between their system and the banking system. To introduce EDI, they have to make a great effort to set up common rules such as how to handle data definition or data formatting. However they can improve the productivity of their business, and increase the profits.

On the other hand, users of home banking seek convenience only. They want time and location convenience, ease of use, protection against fraud and invasion of privacy, and access to financial information and payment transactions through a variety of consumer electronic devices. They hate nuisance. The interface of home banking has to be simple and easy to use.

- Mass market

  The life style of each customer is different. Some customers prefer to use banking services during the daytime, while others prefer to use them at night after finishing their work. Some customers watch TV programs while others spend more time on using personal computers.

  The interface of home banking should be adaptable to a variety of environments. There should be opportunities to customize the service for each customer.

b. Changing environment in the U. S.

Home banking started in the 1970s when customers were first allowed to make balance inquiries over the telephone. However, customers seem less keen on the concept of telephone banking. While they are quite comfortable about withdrawing and depositing cash through ATMs, they are reluctant to let their fingers do the walking to check account balances, transfer money between accounts and pay bills. An Ernst & Young report in 1994 found that only 4 per cent of US households use telephone banking to pay bills.[40] The report concluded that telephone banking technology was not likely to receive much more investment from the American banks.

As mentioned before, the home banking has different characteristics from firm banking. It is much more difficult to market services for home banking than for firm banking.

However, growing wealth, sophistication and consumerism is prompting the banking industry to finally realize the importance of providing better retail services. Several environmental changes have also widened the possibilities of opening up the home banking market.

- Computer literacy

  Many kinds of electronic devices permeate daily life. Most people are already familiar with ATMs. Everybody uses telephones, and many people use fax machines and CATV. Children are enjoying "edutainment software" on personal computers. Home PC sales accounted for nearly 32 percent of the 5.6 million PCs shipped in the United States during 1994 -- up more than 28 percent over 1993.[41] Similarly, PC penetration of U.S. homes increased from 27 percent in July 1994 to 31 percent in January 1995.[42]

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[40] Lucinda Schmidt, "Australia: Banks Going Branchless," The Age (Melbourne) (February 20, 1995).

[41] According to Dataquest, a market research firm in San Jose, Calif.

[42] A recent study by Odyssey Home-Front Inc.

- Proliferation of Internet

  The Internet grew out of the ARPAnet, a U.S. Defense Department network. Its application was restricted originally to research objectives. However, in 1989, the Internet was released for business objectives. The estimated number of computers on the Internet has grown rapidly from 213 computers in 1981, to 28,174 by December 1987, to 376,000 by January 1991, to 727,000 by January 1992, to 2,217,000 by January 1994.[43]

  The Internet is a place where any person can post or publish anything he/she might wish. And every participant can view any material, such as advertising, customer-support literature or even products on the Internet. Millions of people all over the world have created a system of informal computer bulletin boards called newsgroups. These bulletin boards are used to exchange views and information on subjects as diverse as biophysics and boyfriends.

  Home-oriented telephone dial-up computer services like America Online, CompuServe and Prodigy have made Internet available to their customers. The number of subscribers using America Online increased by 500,000 to almost 2 million in 1994 alone.[44]

  The development of "Internet browser," such as Mosaic or Netscape, also makes the Internet more familiar. This browser makes the proper links to the Internet, then calls up on the screen graphical representations of whatever the host computer is offering, including photographs, text files, even multimedia material such as music and movies. Prodigy offers a Web browser to its 1.5 million subscribers. In 1995, America Online will have a browser up and running for its 2.1 million customers. And CompuServe, with 2 million customers in the U.S., is also expected to make a browser part of its service soon.[45]

  More than 20 million computer users are known to be on the Internet. Growing numbers of experts speculate that having access to the Internet from a desktop computer will soon be as commonplace as having access to a telephone or to a letter carrier.

- Growing needs for electronic payment

  Along with the proliferation of business uses of Internet, a need for a secure and simple way of electronic payment on the on-line networks is growing. Customers could pay by credit card, transmitting the necessary data by modem. But intercepting messages on the Internet is ridiculously easy for a smart hacker, so sending a credit card number in an unscrambled message is inviting trouble.

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[43] Jerry V. Glowniak, and Marilyn K. Bushway, "Computer Networks as a Medical Resource: Accessing and Using the Internet," The Journal of the American Medical Association (June 22, 1994): p.1934.

[44] According to PC Magazine

[45] James Coates, "The Internet Business Come Home; A Mailbox in Cyberspace Brings World to your PC," Chicago Tribune (March 26, 1995): p.1.

As a result, dozens of firms are rushing to develop ways to send messages and conduct financial transactions safely on the Internet. Companies such as Netscape, which makes "Internet browser," have built into their programs ways to encrypt details such as credit-card numbers.[46] Apple has put a program into its latest software for its Macintosh computers. A "digital signature" can be attached to a message to confirm that it is legitimate. Microsoft is working with Visa to develop similar software for financial transactions.

However, many commercial banks show little interest in the ideas around the Internet. The Internet will have a substantial effect on money and commerce in the new economy. The banks' role as a provider of electronic payment could be important. In order to foresee the future style of home banking services, this electronic market can't be neglected. Certainly the banking industry could lose a huge share of this market if it does not take measures to secure its position in the home banking.

c. Strategic alliances in the U. S.

In the 1980s, many American banks tried to sell home banking services through their own proprietary networks and software, but most failed. The biggest difference from the early days of experimentation with home banking may be the information network that it is on. Nowadays, most banks try to provide their home banking services making alliances with other non-bank network providers and software developers.

Prodigy currently has 17 banks using its service for home banking. Bank customers who are Prodigy subscribers can access their accounts at participating banks via their personal computers (PCs).[47] Most major (top 20) American banks participate in Prodigy's "Bank Online" service. (See table 5.5)

Name of Bank	Base
Chemical Bank	New York
Banc One	Ohio
PNC Bank	Pennsylvania
Wells Fargo	California
First Interstate Bank	Colorado
NBD Bank	Michigan, Illinois
Barnett Bank	Florida
Comerica Bank	Michigan
Midatlantic National Bank	New Jersey
Meridian Bank	Pennsylvania
Chevy Chase Savings Bank	Washington D.C.

Table 5.5 Major participants in Prodigy's "Bank Online"

[46] "Don't Tell It to the Spartans (Nor, Indeed, to Anyone Else)," The Economist (February 18, 1995): p.81.

[47] Katherine Morrall, "The Race to Offer Home Banking," Bank Marketing (May 1994): p.15.

In October 1994, Microsoft acquired Intuit Inc. publisher of Quicken, which accounts for 70% of the personal financial management software market, including home banking functions. Intuit had already acquired National Payment Clearinghouse Inc., an electronic bill payments system integrator. Microsoft also plans to create its own on-line network, with a view to becoming the gateway of choice for millions of consumers to billions of dollars in goods and services, including home banking. These moves pose a strong challenge to the role of banks. U.S. Bancorp, Michigan National Corp., First Chicago Corp. and Chase Manhattan Corp. have all had marketing relationships with Microsoft.[48]

Visa International also has a relationship with Intuit, and several banks announced their support. Participating banks can offer their customers who use Quicken the following services: funds transfer, balance inquiry, checking and Visa account statements, and bill payment. Banc One Corp., First Bank Systems, First National Bank of Omaha, Wells Fargo Bank, and Meridian Bank are participating.[49]

MasterBanking is a kind of home banking service supported by MasterCard International's technology infrastructure. Participants are Chemical Bank, Signet Bank of Richmond, Wells Fargo, Commerce Bank, First Interstate Bank of Denver, Capital Bank, and Space Coast Credit Union.[50] Comerica will integrate MasterBanking into ComeriNet, its PC remote banking service, and First Interstate Bank of Denver will incorporate it into the bank's Day and Night Computer Banking Services.[51]

d. Future prospective

As mentioned before, the home banking market is a mass market. Banks have to choose carefully interface devices for each customer. Since the market itself is widely diversified, there is a risk associated with choosing one type of delivery device over another. There is great merit in dividing the responsibility into two parts, "content providers" and "application/service intermediary." Banks can concentrate on the content of services, while intermediaries absorb the risk associated with devices and software. On the other hand, customers of a specific bank can choose from a wide variety of devices from touch-tone or screen telephones, personal computers, CATV, or other means of delivering remote services.

From the customer's point of view, this kind of service has another merit. Customers can get various kinds of information other than home banking service with the same device. In the past, in addition to home banking services, banks offered financial information (other than home banking services) on their proprietary network to

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[48] Karen Epper, "Frontiers: Microsoft Looms as Potent Foe, Study Warns," The American Banker (March 14, 1995): p.17.

[49] Marck Arend, "Son of ATM Is Growing Up Fast," ABA Banking Journal (February 1994): p.74

[50] "Banks Join Remote Service," Computerworld, (March 7, 1994): p.58.

[51] Katherine Morrall, "The Race to Offer Home Banking," Bank Marketing (May 1994): p.15.

be more attractive to customers. However, no matter how much effort banks made, they couldn't attract customers so much as they had expected only with financial information.

Microsoft had already conquered the software market in the world when it announced its intention to enter the home banking market. In the future, this will draw consumers' attention to home banking services. It depends on banks' management of strategic alliance whether banks can utilize this chance to expand home banking service, or whether banks' roles are taken over by the third parties. Unlike in their strategy for firm banking, banks shouldn't count on their own power in the home banking area.

In Japan, most banks still seem to rely on their proprietary networks and terminals to offer home banking services. Japanese banks must rethink their current strategy of home banking. To offer attractive services, Japanese banks have to seek appropriate partners, such as telecommunication companies, on-line service providers, software providers, and entertainment mediators. Japanese banks have not traditionally had strategic alliances with different industries. However, to offer innovative services, Japanese banks must now consider carefully the possibilities of strategic alliances.

(4) Smart card

a. "Electronic cash"

No matter how the electronic banking technologies develop, there is one thing that cannot be conveyed through the network. This is cash. But in accordance with the expansion of electronic payment system, the demand for "electronic cash" is growing. "Smart card" will play an important role in meeting the challenges of remote cash delivery to customers.

Smart card is a wallet-sized plastic card with an embedded microprocess chip that can currently store approximately 80 times the amount of information currently contained on a magnetic stripe.[52] The chip's processing capability is expected to improve security significantly and provide additional applications placed on the same card along with the stored value function.

Developed two decades ago, smart-card technology was not generally accepted until 1990. But dramatic growth has been observed in the 1990s. Several factors have contributed to the growing interest of banks and financial-service firms in this technology:

- Declining cost -- chip cards are now available in the $1-$5 range.
- Increasing concerns about fraud associated with magnetic-strip card-based systems.
- Growing interest in transacting remotely using telephones, PCs, and screen phones, and the parallel need for enhanced security on public networks such as the Internet.

[52] "VISA Chip-based Stored Value Card Products Offer Cash Alternative to Consumers," PR Newswire (March 23, 1995).

- Intensifying search for new revenue opportunities and innovations by banks and financial-service firms -- as well as telecommunications and computer hardware and software companies -- to deliver information services and payments electronically.

"Smart-card" technology has the potential of meeting these needs.

b. Current movements of "smart card"

In the United States, smart-card applications have already begun to appear in the telecommunications, health-care, transit, product-vending, entertainment, and payments industries. Banks are implementing trial programs. Both MasterCard and Visa International have endorsed smart-card technology as a key delivery opportunity.

Three large Southeast banks, NationsBank Corp., First Union Corp., and Wachovia Corp., in cooperation with Visa, plan to launch a smart-card system in time for the Summer 1996 Olympics in Atlanta.[53] The three banks expect to sign up thousands of merchants so the cards can be used all over metropolitan Atlanta, from convenience stores and gas stations to vending machines and newspaper stands. They will then roll out the card in other major cities in the Southeast during 1997.

Mondex, the National Westminister Bank/Midland Bank venture into electronic-purse applications, will begin a trial run in the United Kingdom in 1995 and perhaps a U.S. trial run in 1996. EPS/SmartCash is also planning a trial in Delaware in 1995. In addition, the U.S. government's National EBT (Electronic Benefits Transfer) Task Force is looking at smart cards for electronic banking transfer applications.

The State of Ohio and the Western Governor's Council on EBT are looking at smart-card technology for EBT applications at the state level.

Telecommunication vendors are actively pursuing smart cards as well. U.S. West has implemented a trial in Seattle using the company's payphones for a smart-card-based telephone card.

Table 5.6 provides projected market penetration of smart-card applications world wide.[54]

Applications	1993	1995	Average annual growth
Public Telephone	350	850	56%
Health Care	1	100	900%
Banking/Finance	16	50	77%
Mobile Telephone	2	20	216%
Encrypted TV	8	50	150%
Transportation	1	10	216%
Vending	2	60	448%
Other	9	60	158%
Total	389	1200	75%

Table 5.6: Number of SMART-CARD market projections (World wide)

[53] The Wall Street Journal, March 21, 1995

[54] Catherine Allen, "Smart Cards and the Virtual Bank: Broad Implications for Banking," The Magazine of Bank Management (formerly Bank Administration Magazine) (March/April 1995): p.59

c. Key areas of smart-card applications for banks

- As payment vehicles

  Smart-card technology enables credit and debit transactions to occur in a much safer and fraud-resistant environment. Cartes Bancaires in France, a bank association for credit and debit cards, claims a 50% reduction in fraud losses since the association mandated that banks use smart-card technologies.

  Float and transaction-fee revenue can be expected as part of the new revenue stream by smart-card applications. The potential market is huge: Worldwide cash transactions numbered $8.1 trillion in 1993, with $1.8 trillion of these valued at under $10. In the United States, 99% of all transactions are cash or check and 83% of those are for less than $10.[55] Smart-card systems are targeted at this market both to create new revenue streams and to remove cash-handling costs for merchants and banks.

- As access keys

  Many of the companies seeking to deliver goods and services over the Internet and other publicly accessed networks are looking at smart-card technology for encryption and authorization of data so that financial transactions and information can be delivered in a secure environment. Citibank currently uses smart cards in its screen phone-based home-banking service to provide storage and security.

- As information managers

  Smart cards can now hold up to 16K of memory and processing power. With manufacturing costs expected to drop dramatically, experts believe that cards will contain as much as 32K of memory in the next two to three years. This will allow more storage and processing capability for multiple-application cards, which may contain payments, telecommunications, health-care and frequent-user applications all on the same card.

  In a venture with IBM, Kodak developed the technology called hypercompression of photographs, which can reproduce human faces using only 50 bytes of data. (A fully digitized photograph requires about 80 million bytes.) This technology enables the storage of such images on smart cards. The teller, for example, can pass the card through a device that will display the likeness of the customer on a small monitor.[56]

  In addition, banks will be able to "co-brand" cards and provide customers with new packaged financial and information services on the card, thus enabling linked accounts.

- As customized delivery systems

  As the memory and processing power of smart cards grow, they will be able to carry screen sets, biometric information, and personal information, thereby creating new ways of delivering customized services and products to customers.

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[55] According to PSI, Inc.

[56] Peter Nulty, "Digital Imaging Had Better Boom Before Kodak Busts," Fortune (May 1, 1995): pp.80-83.

Such possibilities will make the smart card the ultimate in personal and mobile computing.

d. Smart card as electronic cash

Current technology supports two kinds of smart cards, a reusable card and a disposable one. With reusable cards, electronic money can be pumped into the card repeatedly via an ATM or an ordinary phone with a special slot for the card. Disposable smart cards are issued at set values such as $50 or $100 and used until depleted.

Every smart-card holder will bring a keyring-style electronic "reader" which, when the card is slotted into it, will show how much money is left on the card. This money can be held in several currencies.

All companies and organizations that receive money will be given a simple black plastic box called an "electronic till" which will automatically deduct the amount of purchase from a customer's smart-card and credit the company's own card instantly. By dialing into the bank, firms can deposit the electronic cash they received into their bank accounts.

Anyone who has an electronic "wallet" can not only read off their last several purchases, but can also transfer money from one card to another. As this wallet can also lock the card, users don't need to worry about being robbed.

e. Hurdles

So far it seems that smart cards will catch on. However, there are several hurdles to be overcome to achieve real success.

- Wall of law

  Is it possible to offer the smart-card services as electronic cash under Japanese financial regulation? The Ministry of Finance has not announced its intentions about electronic cash yet. However, several experts in Japanese law think that it would be difficult to offer the service under the present Japanese financial law system.[57]

  Under one of the financial laws, banks or other commercial institutions are not allowed to issue money-equivalents if they are divided and stored after issuing. Overseas payment by electronic cash won't come under the Foreign Exchange Control Law that generally allows overseas payment, and payment by electronic cash may fall under "special payment" which requires permission from the Finance Minister.

  To introduce electronic payment by smart-card in Japan, major banks would have to take the initiative in changing the current law system.

[57] Daisuke Imaizumi, "Can E-cash Be Used in Japan?," Kinyu Business (March 1995). pp.36-39.

• Incentive control

Under the current smart-card system, the benefits are mainly on the banks' or other service-providers' side. Unless there are advantages for the customer in the new way of payment, most customers won't change their present ways. Technology must always be pursued with a social consensus.

One incentive to use would be to control electronic money under the floating exchange rate determined by each financial institution. For example, customers could get electronic money on their smart-card above the face value of the amount deducted from their bank accounts. On the other hand, firms that receive the electronic cash could deposit it only below the face value. This would encourage customers to use electronic cash, because they can get a premium above the face value. The firms would also benefit, because they can use or deposit electronic cash immediately without any floating period as compared to check payment or credit card payment. The Central bank may want to control the electronic money supply. This floating exchange rate would work also for this purpose.

This idea may sound too radical. However, a strong incentive will be required to diffuse the innovative payment system.

• Proper segmentation

The target of the smart-card system may need to be clearly distinct from that of credit card or bank-POS (Point-Of-Sale) systems. After the smart-card becomes popular, customers will be able to choose an appropriate way of payment from among many options. However, at the orientation stage, the target of the smart-card system should be clear: small cash payments under $10 or $20. For this purpose, the peripherals of smart-cards must be cheap and the infrastructure should be arranged first where small cash payments happen. Electronic payment on the Internet is also a good target. However, it will require a wide area of lobbying activities, and continuous attention must be paid to industrial standards. This will take time.

C. Management of competitive potential alignment in banking industry

Advanced technologies, especially in the multi-media domain, encourage more frequent and more effective use of ATMs. The case of Sanwa Bank reveals the turning point from the conventional staffed branch strategy to the innovative unstaffed branch strategy. Staffed branches have served as bases of banking marketing activities, but the advent of new technologies begins to change these branches into low-performance assets. Some of these staffed branches will remain as brokerage facilities for more complex banking transactions. However, in the future, most of them will be handled by unstaffed branches that are equipped with intelligent ATMs. Banks are now forced to have very cost efficient financial and organizational structures. Unstaffed branch strategy will play an important role for attaining efficient banking operations. IT is a vital component to enable unstaffed branch strategy.

EDI is expected to make various business transactions more efficient for most companies. However, Japanese banks' reactive attitudes toward EDI prevent the proliferation of financial-EDI in Japan. Some group companies have started to establish financial-EDI system without banking functions, as described in the case of HI-FINE. Thus Japanese banks must rethink their remittance fee business. This business currently holds the top share in fee earning of banks, but there is a great possibility that this fee business will shrink with the growth of non-bank financial-EDI. Banks' entrance into the EDI business may temporarily erode their remittance fee earnings. However, if they don't enter, banks may lose their stable position in the financial business. Along with improving the currently inefficient "Zengin-system," banks have to take proactive interests in the EDI business. This strategy may also open new business chances such as banks' leasing their exclusive networking lines to their customers.

The home banking business has long been expected to be a star-player in retail marketing. Along with the proliferation of Internet, electronic transactions have begun to permeate daily life, but it appears that the home banking business is still having difficulties getting off the ground. Services derived only from the banking industry are not enough to attract the mass market. To offer attractive services, banks have to seek appropriate partners, such as telecommunication companies, on-line service providers, software providers, and entertainment mediators. Japanese banks have not traditionally had strategic alliances with different industries. However, to offer innovative services, banks must now consider carefully the possibilities of strategic alliances.

Smart card technology is expected to be a strong candidate as a new mean of electronic payment. A fundamental shift from the conventional cash or check payment system toward an electronic payment system will bring a great advantages to the banking industry. With electronic payment systems, banks can make various business processes efficient, and they can also enter the new market on Internet by offering means of payment to customers. However, other industries, such as credit card companies and software providers, have already announced their intention of entering the electronic payment business. To secure the leading position in the financial service industry, banks have to take the initiative in setting standards for electronic payment. In Japan, it is necessary to change the current laws in order to introduce electronic cash. Banks should set up the special committee for electronic cash, and should keep pushing for a revision of current laws. Banks also have to think about alliances with other industries to provide convenient applications for electronic cash.

Two important implications can be observed from this evidence. Firstly, rapidly changing technology and competition from firms in other industries means that banks increasingly will be delivering their products and services through avenues outside their direct control. This will require banks to shift their strategy and corresponding organizational structure from that of proprietary control to one of cooperation and partnerships.

Secondly, evolving technologies are shifting most financial transactions from the conventional means, such as cash and checks, to electronic means, such as ATMs, EDI,

and smart cards. Bankers must keep this trend in mind. To keep their leadership position throughout the financial system and to developing an effective infrastructure for financial services, banks have to promote industry standards, interoperability, and security among a variety of market participants. Thus, IT becomes one of the key strategic tools that define banking in the next decade.

This fundamental shift from the conventional means to the electronic means will also cause a fundamental transformation of the organizational infrastructure within the bank. An "unstaffed branch" strategy could remarkably reduce the number of personnel who do simple clerical work at the staffed branch. Approximately 80% of the total number of employees of Japanese major commercial banks are involved in work at staffed branches.[58] A bank could establish a "center of excellence" in sales expertise, and share the advanced skills with all the unstaffed branches through multi-media technologies.

To create a new type of business, such as financial-EDI, home banking, or smart card, the conventional divisions may not be able to work effectively because divisions are based on a hierarchical structure and divided into conventional classification in terms of banking business functions. For example, to realize the smart card business, the corporate planning division has to work to set up a special committee that pushes the revision of current laws for electronic cash. The systems development division has to work for collaboration among the card vendors. It also has to set up the technological infrastructure for the business. The marketing division has to consider how to educate customers to use smart cards. The banking administration division has to manage the project team overall. If the smart card has the function of foreign currency exchange, the international planning division has to assure its legal validity. If electronic cash is exchanged on the floating exchange rate, the investment banking division has to set up the scheme for hedging the treasury risk. All this depends on each bank's organizational structure, but more than five divisions have to be involved in the same project. In addition, the assignment of roles for each division could be very complex and difficult.

A new type of organizational infrastructure is required to realize the new type of business (as illustrated in figure 2.4: competitive potential alignment perspective). IT will also play an important role in transforming a conventional organizational infrastructure into an innovative one. In the next chapter, IT strategy for this purpose will be investigated.

[58] Rough estimation from the data of the Mitsubishi Bank as of 1993.

Chapter 6

Service level alignment:
Impact of Information Technology on banking organizational dynamics

In the previous chapter we saw how emerging IT is exploited to develop new products for financial services. IT strategy has a strong impact on the banking business strategy. Drastic environmental changes impel banks to utilize the power of IT at maximum strength, and to develop innovative financial products. Bank managers have to keep their eyes on the evolving IT, and form a proper IT strategy.

A competitive alignment perspective in the Strategic Alignment Model affects the organizational infrastructure. Recent innovations such as interactive ATMs, EDI support, strategic alliances in the home-banking area, and the smart-card business will require a new type of business organization. It would be difficult to support these new products and services only through the conventional multi-divisional organization. Internal ventures or cross-functional teams may have to be added as alternatives in the organizational structure.

These new types of organizational structures need coordination in order to maintain their centripetal force. In the past, this power could not be obtained by human coordination based on hierarchical organization. However, emerging IT will probably make this strong coordination power possible.

Electronic connections within organizations, as well as those between firms, are becoming increasingly important to firms. The service level alignment perspective in the Strategic Alignment Model refers to the potential power of IT in supporting the coordination function. IT will lead to an overall shift toward more use of market coordination mechanisms rather than hierarchies to coordinate various activities.[59] Markets coordinate the flow through supply and demand forces. The demander can compare its many possible sources and can make a choice based on the best combination of these attributes. With a help of IT, the organization may be able to be managed by market forces, or the balance of demand and supply.

Banks were once notorious for their highly inflexible bureaucratic business processes. Some still are. To make innovative business strategies work, banks have to make their way of doing business more effective and efficient. Here, also, IT will play an important role in transforming the organizational dynamics.

In addition to the IT strategy that influences the business strategy (based on the competitive potential perspective), in the next decade, there must also be an IT strategy that facilitates an innovative IT infrastructure, and finally transforms the organizational infrastructure.

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[59] T. W. Malone, J. Yates, and R. I. Benjamin, "Electronic Markets and Electronic Hierarchies," Communications of the ACM (June 1987, Volume 30, Number 6): pp.484-497.

A. "Coordination" as the key to efficient organization

(1) Paradigm shift in organizational structure

Most companies have management problems. The business environment is always changing, and growing more complex. New technology is destined to be imitated and new substitutes for older technologies may take over. Many companies go global, and they have to think about a large number of factors that affect their business environment. To keep sustainable competence, managers have to lead the strategic change of their business process to adapt their business to a volatile environment.

Traditionally a hierarchical structure has been dominant in the corporate organization and in the type of alliance among firms. The hierarchical structure is relatively easy to control from the managerial point of view. Each manager has a few subordinates, and doesn't need to meet with employees under those subordinates. Business information has been filtered so that managers can understand it easily. Managers don't need to be in touch with confusing bottom line information.

To attain economies of scale, the company had to be large. To manage large organization, managers had to apply the hierarchical organizational structure. In fact, hierarchical structure was the best solution for the productive organization. During the mass-production era, supported by the strong consumer demand, sales could easily increase. Control functions were centralized, and employees at the bottom only had to concentrate on their predetermined roles. Productivity and low cost were the top priorities, and the hierarchical organizational structure could meet these priorities quite well. The R&D division was separated from the marketing division, and could get enough budget without being asked about its performance in terms of the outcome of the research. Each division had its own responsibilities, and they were strictly separated.

Times have been changing from the mass-production era to the mass-customization. Customers now demand something different. Incremental innovation can no longer meet customer needs, and successful products are enabled by the architectural innovation that consists of completely different combinations of existing technologies. As Pine et al. have argued, "To achieve successful mass customization, managers need first to turn their process into modules. Second, they need to create an architecture for linking them."[60]

It becomes clear that hierarchical organization has several disadvantages in decomposing business processes and reuniting them. In hierarchical organizations, decision-making paths tend to be very long, and they are vulnerable to environmental changes. It's really difficult to share information or skills among different divisions in hierarchical organization. The combination of the R&D and marketing divisions, for example, has been well debated.[61] The simple product line can no longer increase sales

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[60] B. J. Pine II, B. Victor, and A. C. Boynton, "Making Mass Customization Work," Harvard Business Review (September-October 1993): pp.108-119.

[61] Thomas J. Allen, "Organizational Structure, Information Technology, and R&D Productivity," IEEE Transactions on Engineering Management (November 1986, Vol.33, No.4): pp.212-217.

avenues, and the budget for R&D division gets tighter if R&D can't prove its effectiveness of performance. Each division has to cooperate with other divisions. Marketing people have to look at proper technology, and R&D people have to listen to the customer.

(2) Changing coordination equilibrium

Two important factors must be considered to design the proper organizational structure. These are needs for coordination and technology for coordination. The proper understanding of the relationship between coordination and technology is the key to the future corporation.

Figure 6.1 shows the demand and the supply curve for coordination. The supply curve for coordination indicates the cost of enhancing coordination. The more one tries to enhance coordination in the organization, the more it costs. The demand curve for coordination indicates the degree of customer needs for the coordinated products or services. Customer demand for sophisticated products and willingness to pay a high price requires highly coordinated work on the part of the producer.

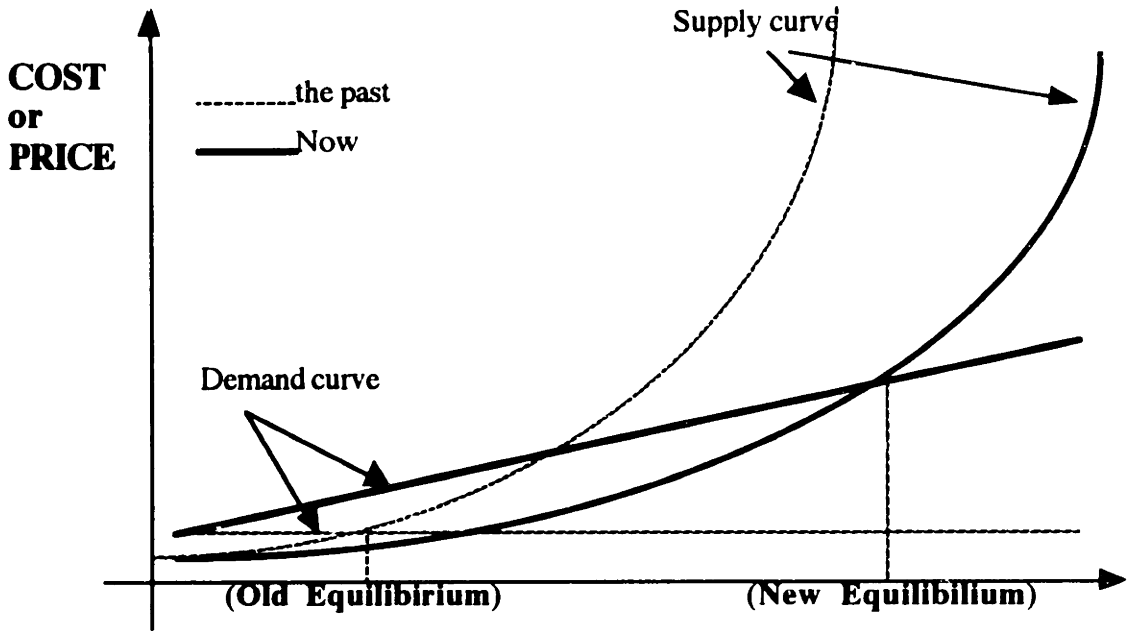

Figure 6.1: Demand and Supply curve for Coordination

In the past, the demand for coordinated products or services was relatively constant. If a customer wanted to buy a car, he had to choose it from a limited lineup. If a customer wanted to borrow money, the payment schedule had already been fixed. There were few options for customers. Customers took this as a matter of course. On the supply side, at first, they didn't recognize the need for coordination. They could increase the sales avenue with simple product or service lineup. In addition, the coordination process took more time and cost more than the closed independent

process. The coordination elasticity of cost was extremely high. Finally, the equilibrium point of degree of coordination showed the low necessity for coordination.

Now, the demand for the coordinated product or service is growing. Customers want exactly what meets their needs. There are many options for customers. In the case of buying a car, a customer has various options in choosing accessories and car color. If a customer wants to borrow money, he can also arrange the payment schedule and choose various options for the interest rate mode. If customers can get what they want, they are willing to pay more for it. To develop custom-made products or service lineups, more coordination is required for the supply sides. Now the demand curve for coordination has a positive slope. On the other hand, the price/performance of computing has been improved remarkably. Other than increased power of computer chips, the networking technology such as Local Area Network technique has developed very well. These improvements lower the cost of information technology and may dramatically improve the coordination process. If technology lowers the cost of coordination, the supply curve of coordination will be shifted to the right. Finally, the equilibrium point of degree of coordination shows the high necessity for coordination.

To respond to the volatile business environment, the company has to change its organizational structure by putting more emphasis on the coordination process. As figure 6.1 shows, the coordination process will become more and more critical to the organization, and IT is the indispensable tool for promoting coordination.

B. Antecedents of structural linking mechanism in the organization

Research in organization theory focuses on how people coordinate their activities in formal organizations. Structural linking mechanisms in the organization can be analyzed in terms of their ability to handle information flows and complex problem-solving requirements. With little support from IT for coordination processes, people have transformed structural linking mechanisms in the organization.

This section discusses their historical changes and articulates the argument that there is a certain limitation for improving the efficiency only by transforming structural linking mechanism without any help of emerging IT.

(1) Hierarchy

The simplest form of structural linking is hierarchy. In this form, each person's exposure to other persons is limited. There are two kinds of boundaries, vertical and horizontal.

The vertical boundary is the division. The function of the company is divided into several sub-functions. Each division is designed for encouraging interaction within the division, while cross-divisional interaction is limited.

The horizontal boundary is at the level of job title. The characteristics of the information that exist at each level are different from each other. There is more managerial information to serve for decision making at higher levels of the hierarchy. On the other hand, there is more bottom-line information to serve for doing the work at

lower levels. This difference in quality of information forms the horizontal boundary. Each employee only needs to report to his direct superior. It is rare to report directly to a higher level person (See figure 6.2).

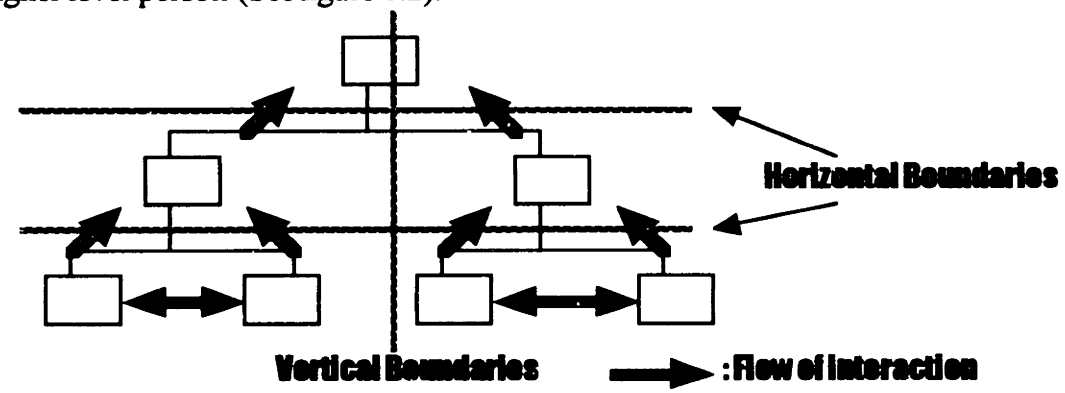

Figure 6.2: Hierarchical structure

This limited exposure to others contributes to reducing coordination costs. However, at the same time, it also reduces chances of interaction among employees. Each manager has to direct the stage for the effective coordination between organizational groups. Even modest amounts of task interdependence, exceptions, crises, or environmental uncertainty can overload the individual manager. When linking requirements begin to overload the first common supervisor, other formal mechanisms must be used to complement the manager's role as a linking mechanism.

(2) Liaison Roles[62]

When a close coordination between divisions is required, much more intense problem solving occurs between liaison individuals. They serve as sources of information and expertise for problems and as contacts and advisors on common work that affects their divisions. These liaison roles are responsible for enhanced information flows and coordination between units, although they rarely have authority to back up their positions. In addition, the liaison role is not usually a full-time responsibility but rather is done in conjunction with other activities (See figure 6.3).

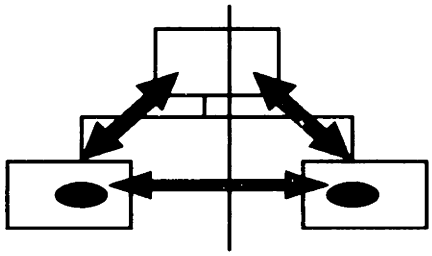

Figure 6.3: Liaison Roles

[62] Following descriptions on structural linkage mechanisms (Liaison Roles, Cross-unit Groups, Integrator, Matrix Structure) are based on the book: David Nadler and Michael L. Tushman, Strategic Organization Design, (Scott, Foresman and Company, 1987), "Strategic Linking: Designing Formal Coordination Mechanisms."

This structural linking can't be controlled. It is informal and very vulnerable; it can be defined as a transition status to more formal linkage.

(3) Cross-unit Groups

To provide a more extensive forum for information exchange, for coordination, and for the resolution of conflict between work units, group-based formal coordinating mechanisms are introduced. Groups made up of task-relevant representatives meet to focus on particular problems. These groups can be permanent, temporary, or ad hoc. Their objective is to assure that relevant expertise comes together to deal with their joint task or problem (See figure 6.4).

However, if problem-solving requirements increase and more decisions affecting multiple groups must be made at lower levels of the organization, cross-unit groups might not be sufficient.

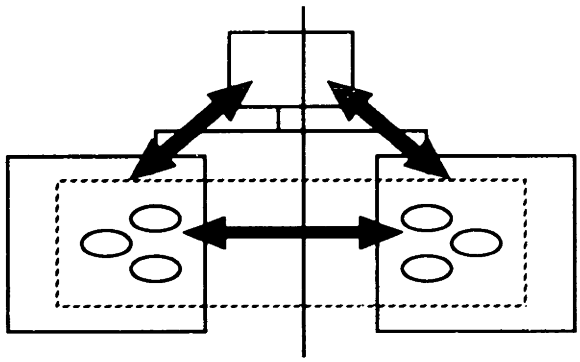

Figure 6.4: Cross-Unit Groups

(4) Integrator

Cross-unit groups may result in no one person feeling accountable for the total performance of the group. Conflicts sometimes arise within cross-unit groups or between liaison individuals, yet the first-in-command might not have the expertise and time to adjudicate these differences.

A solution to the need for real-time problem solving and for bringing management's point of view to lower levels in the organization is to appoint an individual as *integrator*. This integrator role is to help multiple work groups accomplish a joint task. The big difference between liaison individuals and integrators is that integrators have the formal responsibility of achieving coordination across the organization. Through a responsible integrator, the presence of the group is reinforced (See figure 6.5).

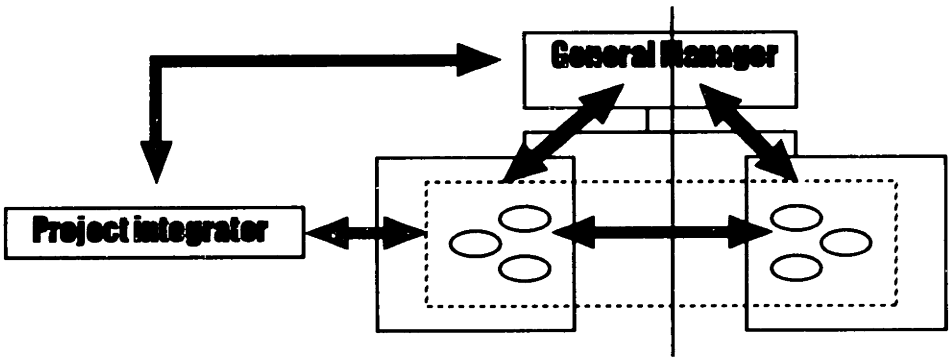

Figure 6.5: Integrator

(5) Matrix Structure

Integrators require various resources to accomplish their work. When there are several projects, each of them must compete with one another for resources. To increase the power of cross-unit groups and to help coordinate resources among groups, a different kind of linking system should be added.

The integration manager is appointed to coordinate resources among groups. Finally, structural linkage is formed as matrix structures (See figure 6.6). A matrix organization structurally improves coordination between multiple perspectives by balancing the power between dimensions of the organization and by installing systems and roles to achieve multiple objectives at the same time. For example, an R&D facility that wants to maximize disciplinary competence and product focus might invest in a matrix structure.

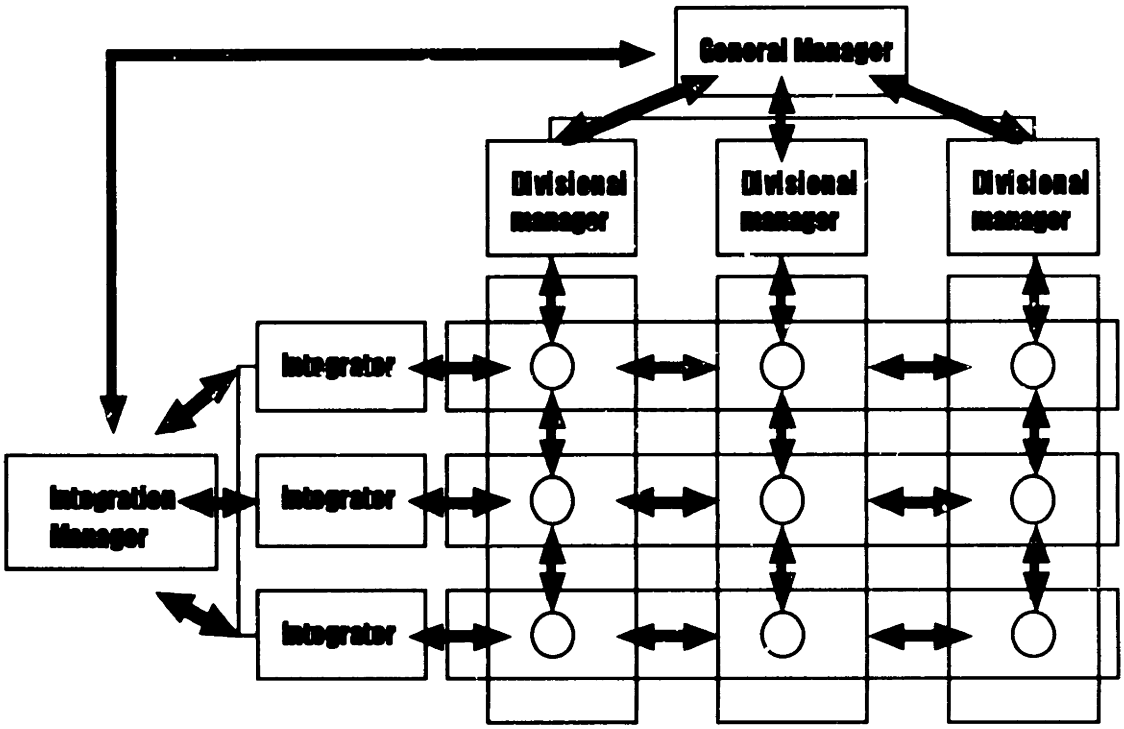

Figure 6.6: Matrix Organization

However, a matrix organization is very complex. These more complex linking mechanisms might actually cause organization conflict.

(6) Basic coordination dynamics

Reviewing changes in structural linking from hierarchy to matrix organization, some might notice that the basic coordination dynamic hasn't changed at all. It is still hierarchical. A matrix organization consists of two hierarchical systems. One is the vertical hierarchy where the general manager is at the top, and the other is horizontal hierarchy where the integration manager is at the top. To embed two different scopes, the organizational structure is compulsorily transformed into two hierarchical systems. It is a matter of course that there are many conflicts within this system.

Without any help from technology, a hierarchy may be the only way to organize people. Technology is the lifeline for the efficient, multi-scope organization.

C. Emerging IT for effective management

The evolution of IT will bring about much more effectiveness in business management, and finally change the organizational structure and human interaction.

(1) Reinstatement of mainframe -- Parallel processing architecture

a. Growing concerns with distributed systems

The proliferation of distributed systems in the Japanese banking industry was discussed in chapter 4. These systems gave sufficient data-processing power to each division. Mainframe computer systems had become too huge and complex to correspond to each division's flexibility demand. Each division established its proprietary sub-system with distributed system architecture.

Finally these systems strengthened each division's autonomy, and divisional organizational structure. The systems development division was located in the best position to coordinate the specifications for these systems, but the managerial right over powerful distributed systems was gradually transferred from systems development division, a centralized management style, to each division, a decentralized management style. Rigid divisional structure prevents divisions from communicating with each other. Lack of a linking mechanism became a big impediment in launching new business plans based on multi-divisional supports. Nowadays, there are few business projects that can be treated by a single division, as typically discussed in chapter 5.

Another problem is the cost of maintaining a distributed system. The Gartner group calculates that a traditional, centralized mainframe hooked up to dumb terminals is 40% cheaper than a "client-server" environment (See figure 6.7). While functionally more diverse, distributed systems incur high costs, especially for the labor needed to manage and support them.

It is certain that client-server systems have a great advantage over mainframe computer in flexible analyzing capability. This greater effectiveness of client-server

systems may be able to offset the disadvantage in cost. However, it has to be recognized that to extract the maximum power from the client-server system more systems integration is required. It is very dangerous to say that simply "down-sizing" mainframes into client-server systems will produce cost reduction.

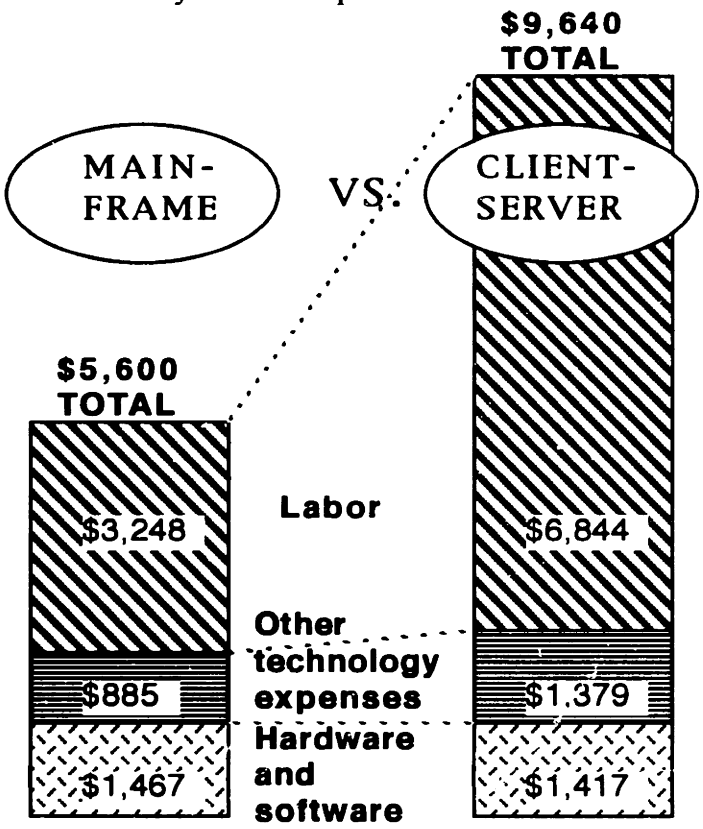

Figure 6.7: Estimated yearly cost per user (1995-2000; by Gartner Group)

More important, distributed systems are hard to match to the major need for reliability and security of huge amounts of transactional data, both of which are extremely important in the banking industry.

b. Advent of parallel-processing mainframes

On April 5, 1994, thirty years after IBM announced the last previous architectural change in its mainframe computers, IBM announced its new line of mainframe computers, called "Parallel Sysplex."

Many techniques are used in this new architecture. The largest difference is that new system has multi-CPUs rather than a single CPU. The latest coupling technology enables multi-CPU architecture. New machines are based on CMOS (Complementary metal oxide semiconductor) technology. CMOSs cost far less than water-cooled, bipolar emitted coupler logic (ECL) chips used in conventional high-end mainframes. Air-cooled CMOS processors are denser, making the overall system units smaller than most standard mainframes. CMOSs are generally slower than bipolar ECL chips in processing speed, but CMOSs have a simple structure which enables easy coupling

boosts total performance. The new parallel mainframe will have 2 billion instructions per second (BIPS) of processing power through hundreds of CMOS processors, while the largest bipolar processor-based mainframe has 440 million instructions per second (MIPS).[63]

One of the great advantages of new parallel mainframes is that users can keep their existing applications and run them without modification on new parallel mainframes. The Gartner Group estimates that close to 200 billion lines of software code, nearly 80% of all software code, are written in the COBOL mainframe language. Moreover, the market to maintain and enhance COBOL applications and roll out new COBOL programs will total $3 billion in 1996. This huge asset is difficult to dispose of.

Another advantage is that users can add the processors afterwards. This guarantees the scalability that helps users match the size of the processing job with the size of the system.

Some US banks such as First Bank have already applied parallel processing mainframes to the backbone system. The Gartner Group predicts that the Parallel processing commercial market will balloon tenfold by 1998, from about $500 million to $5 billion.

c. Impacts of parallel-processing mainframes

As an enterprise data-server, powerful mainframes will absorb a large portion of roles of distributed data-server at each division. This will eliminate many batch jobs that select and summarize mainframe data for downloading to the divisional data-servers. Moreover, powerful mainframes will allow each division to access a broader range of mainframe data without developing any divisional distributed systems (See figure 6.8).

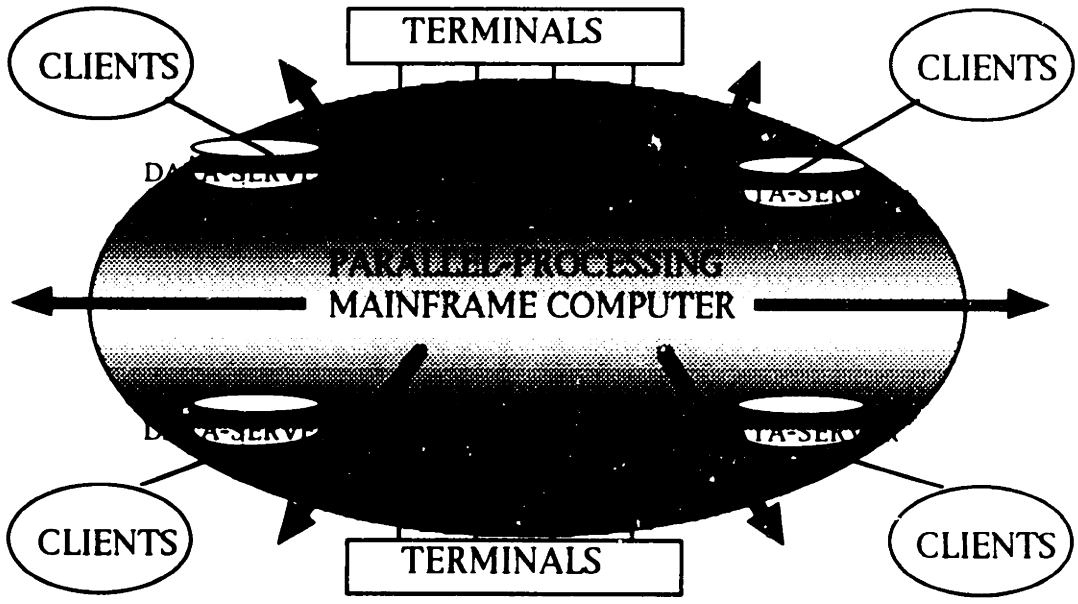

Figure 6.8: Expanding role of mainframe computers

[63] Mike Ricciuti, "How the Parallel Mainframe Works," DATAMATION (June 1, 1994): p.71.

Powerful mainframes that can deal with mass data will enable a totally new way of marketing analysis, such as data-mining. Data-mining is a kind of decision support system that allows corporations with the help of artificial intelligence to glean strategic market information hidden within great reams of their corporate and customer databases.[64]

The next generation of backbone banking on-line systems may change its basic concept (See figure 6.9).[65] The current third generation on-line system is designed to utilize the computing resource efficiently. In terms of application programs, the common functions are extracted as common modules, and shared among different modules so as to eliminate the redundancy. Databases are also normalized by the subjects to avoid the same data scattered among the different databases.

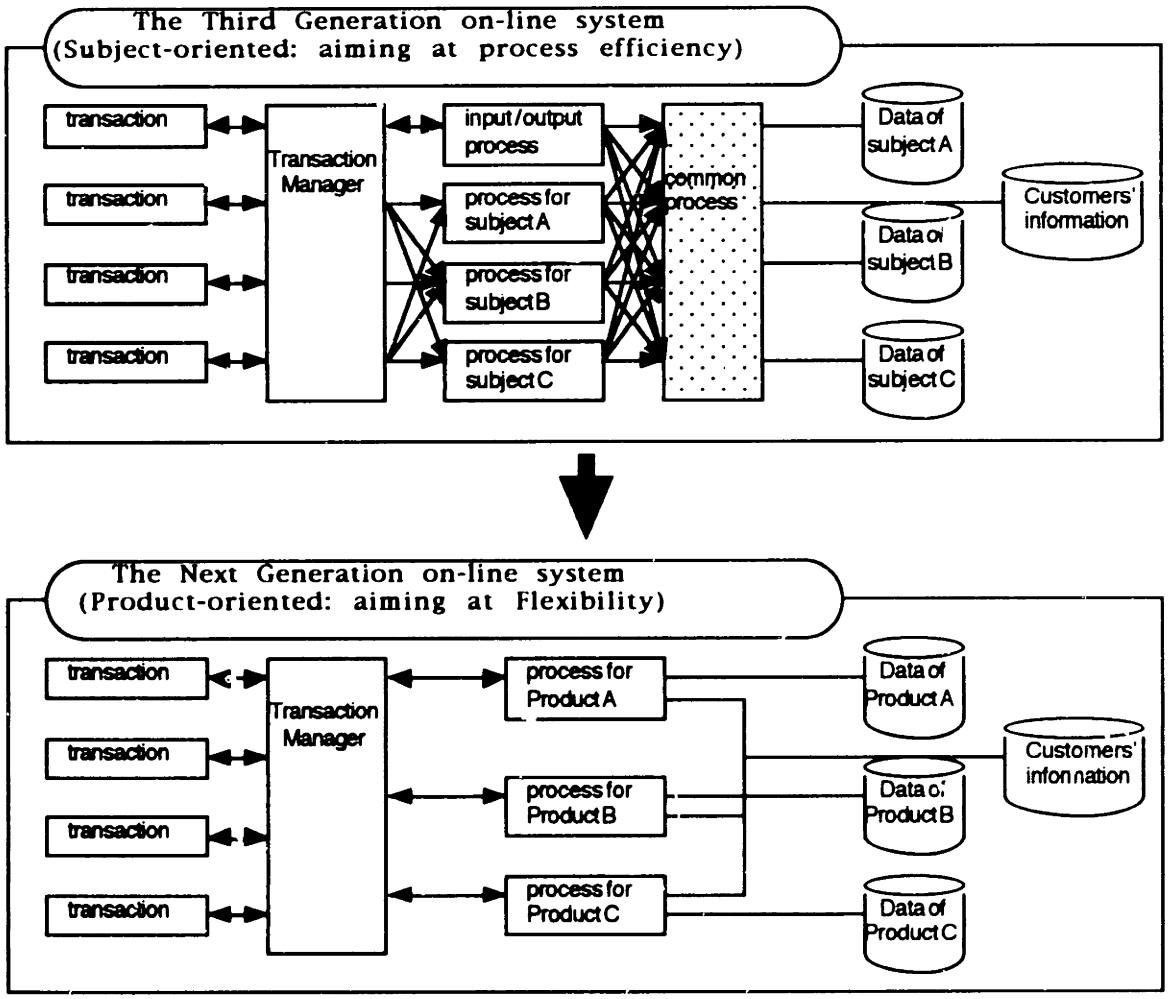

Figure 6.9: The transition of the concept for the banking on-line system

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[64] "nCUBE and Oracle Demonstrate Scalable Solution For Very Large Da abases," Business Wire, (February 27, 1995).

[65] T. Akiyama, "Next Generation of Backbone System," Nikkei Computer (June 13, 1994): pp. 75-76.

In the next generation of on-line systems, both application modules and databases will be designed for products or services. In this case, the similar processes and data entities will be scattered among different modules or databases. This may seem redundant, but this architecture can add new functions for flexibility in the new products or services. This concept becomes possible for the first time when parallel processing architecture emerges.

These impacts will finally lead to the transformation of multi-divisional organizational dynamics. Easy access to the shared data will enhance the cross-divisional way of thinking. The business plan will be created in terms of product or market orientation, rather than division orientation. The change in backbone computer system may necessitate changes in the way of doing business as well as in the organizational infrastructure.

(2) Groupware

As discussed in chapter 5, to realize the new type of banking business, such as financial-EDI, home banking, and smart card, conventional divisions based on hierarchical structure may not be able to work effectively. These divisions are divided by the conventional classification of banking business. To launch the new business project, many divisions have to be involved, and coordination of these divisional works seems to be very complex and difficult.

A new type of organizational linking mechanism is required to support this new type of banking business. Facilitating coordination for collaborative ways of doing business will be a key to transforming a conventional organizational infrastructure into an innovative one. Groupware will play an important role.

a. Effective general managers

The classical view says that the manager organizes, coordinates, plans, and controls. According to Henry Mintzberg, these four words have dominated management vocabulary since the French industrialist Henri Fayol used them in 1916.[66]

However, Mintzberg's own research shows a different set of roles of general managers (See figure 6.10). For example, Mintzberg explained the disseminator role, "In the disseminator role, the manager passes some privileged information directly to subordinates, who would otherwise have no access to it. When subordinates lack easy contact with one another, the manager may pass information from one to another."

Surprisingly, these roles are rarely supported by IT. After the Industrial Revolution, most manufacturing processes became automated. The productivity in this area has been improved remarkably. But the manager's roles, in other words, white-collar work is still done "manually," and depends on traditional media, such as papers, telephone, voice, body, OJT(On the Job Training), and so on. Of course these media sometimes work very effectively. However, they are often inefficient, time-consuming,

[66] Henry Mintzberg, "The Manager's Job: Folklore and Fact," Harvard Business Review (March-April 1990): Reprint Number 90210.

and redundant. These roles force general managers to keep contact with many colleagues, take too much time, encourage interruption, respond quickly to every stimulus, seek the tangible and avoid the abstract, make decisions in small increments, and do everything abruptly. There is little time left for general managers to do creative work.

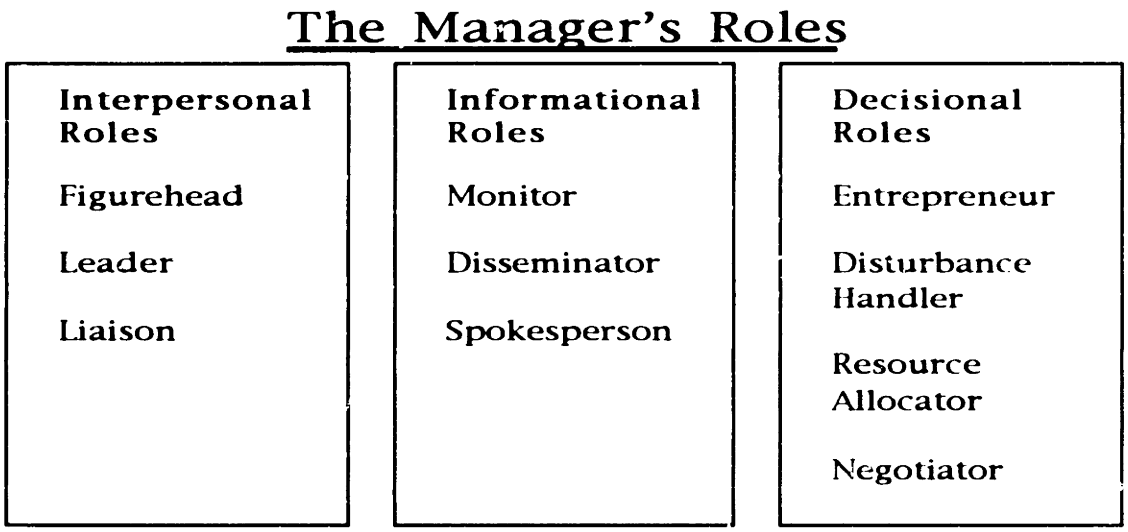

Figure 6.10: The Manager's Role

b. Groupware defined

Groupware has been defined by Coleman and Marshak as "computer-mediated collaboration that increases the productivity or functionality of person-to-person process."[67] They observe people work as follows:

- People create things (documents, ideas, questions, etc.)
- People communicate what they create.
- People share what they create and communicate.
- People track the information they have created, communicated, and shared.
- People act on this information.

To support these activities, Groupware consists of several ITs:

- Electronic Mail/Messaging
- Group Document Handling
- Calendaring/Scheduling
- Workgroup Utilities and Development Tools
- Group Decision Systems and Meeting Support
- Information Sharing/Conferencing Products
- Workflow Management and Business Process Design

[67] David Coleman and Ronni T. Marshak, "Changing Your Organization with Groupware," Fortune (September 19, 1994): Special advertising section.

Each component of Groupware is not necessarily new technology. Some of them may be relatively old technologies, but the way of using and combining these technologies is new, and is expected to change completely the present way of working.

The characteristic of these technologies is that they transform the conventional types of data in traditional media into electronic forms, which can be stored and reused electronically. This function allows human interaction at different places and different times, as shown in Figure 6.11. Some of these technologies will be explained next.

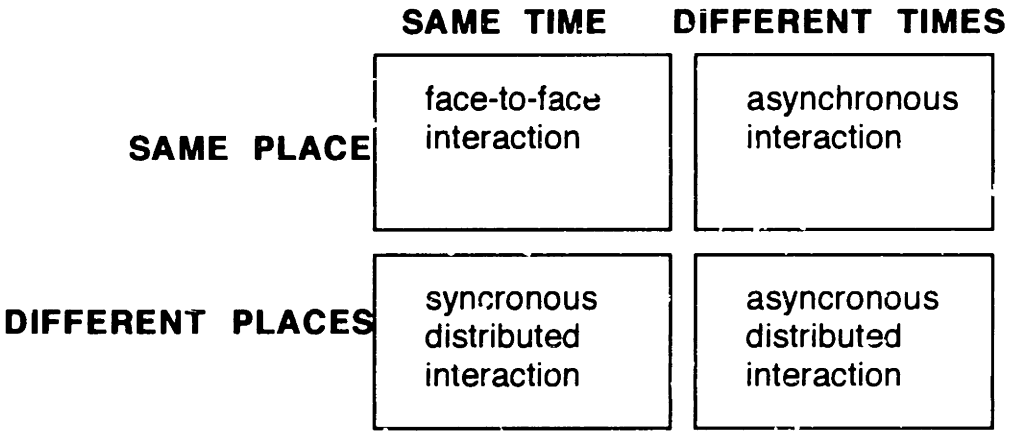

Figure 6.11: Groupware time space matrix[68]

c. Electronic Mail/Messaging

E-mail will soon become a common communication device like the telephone or facsimile, rather than a special IT. E-mail is not a new technology. But it will play an important role as an infrastructure of Groupware. An E-mail system has several basic functions.

- Asynchronous message exchange:
  The sender can send messages regardless of what the recipient is doing.
- Carbon copies:
  Messages can be sent to various recipients at the same time.
- Forwarding:
  The recipient can send received messages after modifying them.
- Repository:
  Messages can be stored and reused electronically.
- Attaching files:
  Messages can be sent with any electronic files including multi-media data.
- Remote access:
  Messages can be sent or received anywhere with modems.

[68] C. A. Ellis, S. J. Gibbs, and G. L. Rein, "Groupware: Some Issues and Experiences," Communications of the ACM (January 1991, Vol.34, No.1): p.38.

E-mail system has several advantages over conventional means of communication.

- Reducing interruption:

  Telephones interrupt the recipient's work regardless of his/her condition. This decreases the white-collar worker's productivity. It has often been claimed that it takes fifteen minutes for a person to return to his/her original working condition after a telephone interruption.
- Reducing meetings:

  As meetings require many people to get together at the same time and place, total consumption of man-hour becomes huge. E-mail will eliminate most meetings that are mainly for communicating administrative matters.

  Microsoft makes it a rule to attach the forwarded message to the reply message. This function creates what is called "mail thread." Mail threads enable readers to remember discussions, thus serving as a partial substitute for meetings.
- Reducing circulation:

  The quantity of circulating materials can't be neglected. Things are often lost. Important memos are buried. Paper occupies most of the physical space on the desk. Electronic bulletin boards eliminate these problems.
- Repository:

  There are many standard forms within the firm. They are based on the local rules, and it often takes time to remember these rules and forms. These forms can be stored electronically and can be picked up easily. Past memos on the same form can be referred to when creating new memos and, thus, save the memo writer time.

  If these messages are stored systematically, they will become useful databases full of know-how within the firm. This will enable organizational learning, and the firm could get the merit of the learning curve effect.
- Reducing the cycle time:

  The present process for general approval takes a long time. This will be rationalized with an E-mail system.

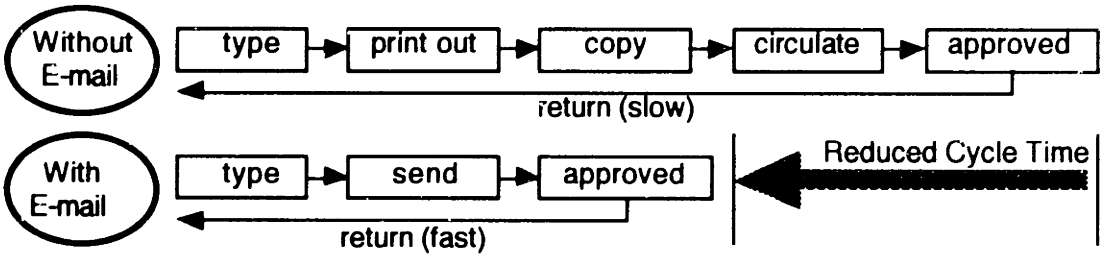

Figure 6.12: E-mail reduces the cycle time

E-mail is also used in inter-firm communications. As the network of E-mail expands wider, the firm that doesn't have the E-mail gateway may be excluded from the electronic trading society.

E-mail makes communication across the organizational borders more efficient. Managers can not survive in the firm only as mediators. They have to add some value when they forward the E-mail received from their subordinates to their superiors. These factors may change the organizational dynamics.

In Japan, major manufacturing companies, such as IBM Japan and Toshiba, have already implemented E-mail systems as corporate-wide communication infrastructures. In the summer of 1994, some other major manufacturing companies, such as Hitachi, NEC, and Mitsubishi Electronics, announced their plans of implementing corporate-wide E-mail systems.[69] Under the current recession, however, most banks seem to be reluctant to make a large investment in corporate-wide E-mail systems. As of 1994, only Sumitomo Bank had announced its plan to introduce a corporate-wide E-mail system. Sumitomo plans to give PCs to all its employees, and aims at quick decision making and breaking up bureaucratic business processes.[70] Japanese banks, which are much more bureaucratic than manufacturing companies, must surely need effective communication infrastructures. In the near future, major Japanese banks will probably follow Sumitomo's IT strategy, in which the E-mail system plays a central role as a communication infrastructure.

d. Electronic Meeting System (EMS)[71]

The research done by Japan Office Automation Association shows that 26.4% of managers' work hours are spent just in meetings. If the time for preparation or transportation is included, the total percentage will go up further. Improving the efficiency and the productivity of meeting activity will have a great impact on a white-collar worker's total efficiency.

Meetings are often not as effective as they could be. They may lack a clear focus. Member preparation may be inadequate to activate discussion, and meetings often last too long. Meetings may end without a clear understanding or record of what was discussed. Yet in spite of these problems, little computer support is available for meetings.

EMS, an electronic system for supporting meetings, was first developed by the University of Arizona in 1984. Several updates have been added on the initial system, and now the system covers various functions including Collaborative Meeting Room (CMR) facilities and GroupSystems software tools. CMR is based on a series of networked workstations arranged in a U-shape, around a table, or in tiered legislative style (See figure 6.13).

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[69] J. Taguchi, and Y. Kobayashi, "E-mail," Nikkei Joho (Information) Strategy (October, 1994): pp50-66.

[70] Yomiuri Shinbun (November 5, 1994).

[71] J. F. Nunamaker, A. R. Dennis, J. S. Valacich, D. R. Vogel, and J. F. George, "Electronic Meeting Systems to Support Group Work," Communications of the ACM (July 1991, Vol.34, No.7): p.43.

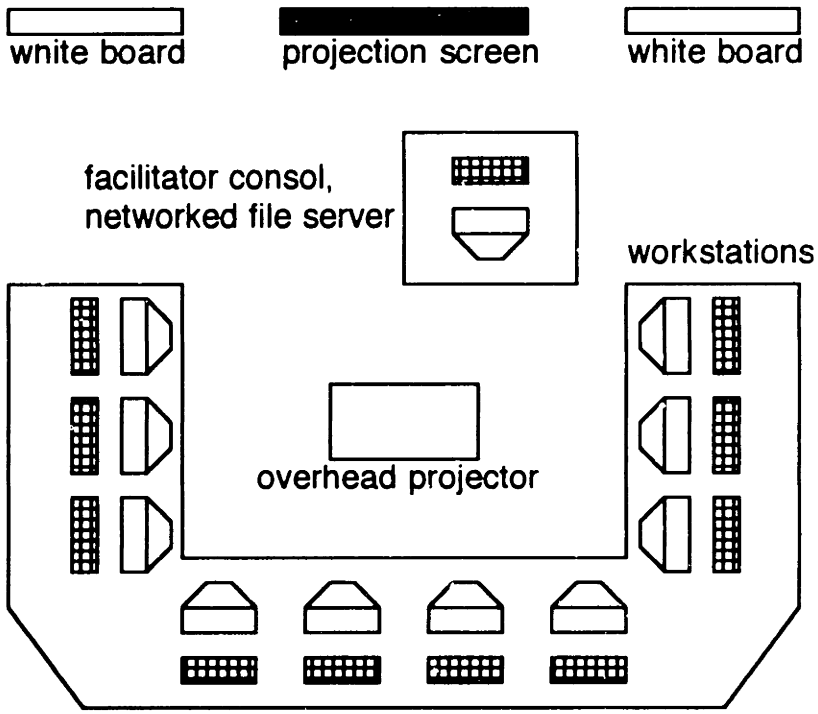

Figure 6.13: EMS minimum facilities

The GroupSystems toolkit provides tools for improving group performance in three areas as shown in figure 6.14.

Tools for session planning have several functions. They provide an electronic questionnaire to ensure that important planning information is not overlooked, and they assist in developing an agenda. During a meeting, they record the content of discussions, and they output it as part of the organizational memory. Various components can be indexed and stored, task assignment reports generated and distributed, and paper printouts copied and distributed to better integrate information between the session and subsequent ones.

Tools for group interaction fall into four categories. The first, exploration and idea generation, involves the development and exploration of issues relevant to the task. The second category, idea organization, involves the synthesizing, structuring, and organizing of ideas into specific alternatives which may follow the generation of ideas. The third category, prioritizing, supports the individual members in evaluating alternatives. The final category, policy development, implements formal methodologies to support policy development and evaluation.

Tools for organizational memory capture the additions to organizational memory and provide access to them in subsequent meetings.

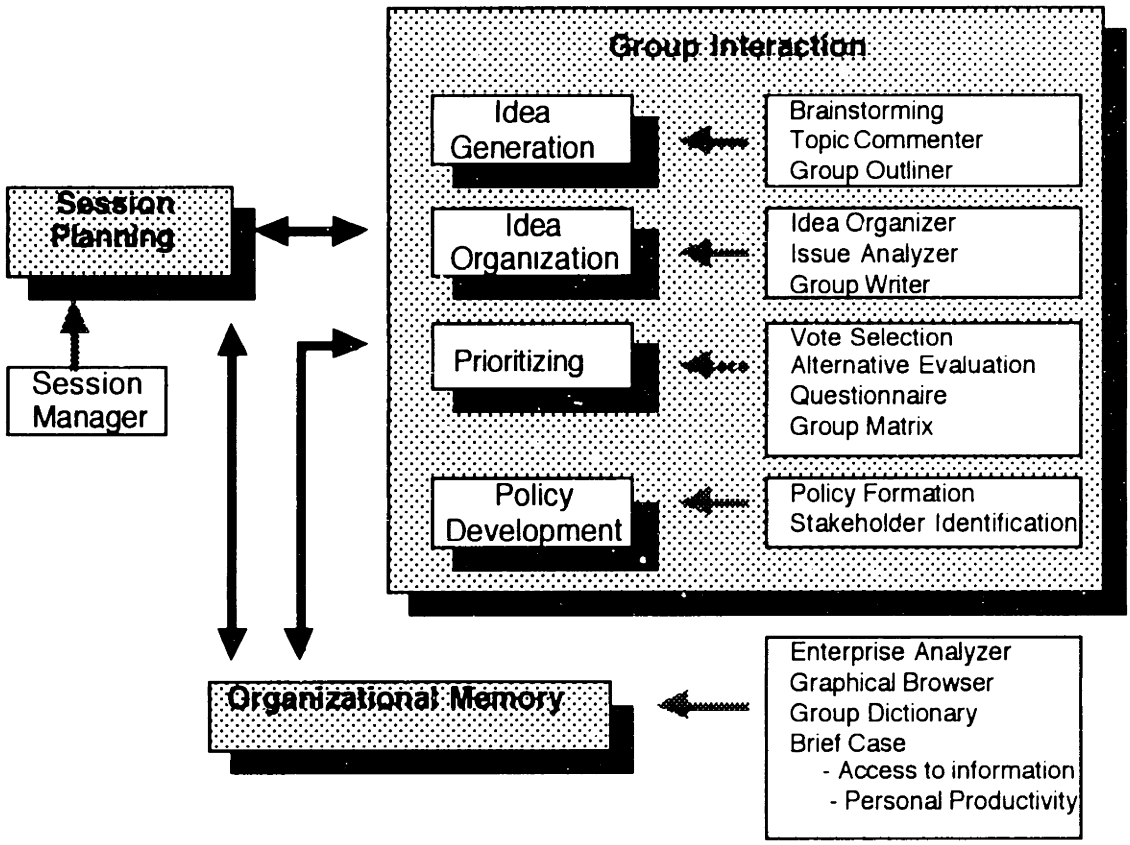

Figure 6.14: GroupSystems Tools

IBM Corp. introduced EMS in 93 cites, and reported a 56% reduction in the time consumption per meeting. IBM also reported a reduction in administrative costs and the number of meetings needed to complete a project. Boeing, introducing EMS, also reported that they were able to reduce the flowtime from the planning phase to the completion of a certain project by 90%. They said the ROI (Return on Investment) of EMS reached 170% when the reduction in the flowtime was included in returns.[72]

On the other hand, the initial investment tends to be large, and it requires special skills to utilize the system because electronic texts (not voice) are mainly used. However, some parts of the system can be introduced into Japanese banks, and these will save work hours substantially and enable the organization to have efficient meetings.

e. Desktop Conference System (DCS)

E-mail enhances asynchronous distributed communication. But to firm things up, messages have to go back and forth several times. This takes time. Video conferencing could solve this kind of problem; however, this system sometimes requires an excess amount of physical space in relation to the number of participants.

[72] A. Ishikawa, "Electronic Meeting System," Nikkei Joho (Information) Strategy (August 1994): pp.121-128.

DCS aims at creating a virtual meeting room that combines colleagues in different cites with minimum facilities. The system makes it possible to show in separate windows of personal computers video images of users who are currently talking with each other. By bringing two-way video to desktop computers, the system can capture some of the flexibility and human warmth that electronic communication has lacked.

Recent DCSs convey not only facial expressions, hand gestures, and body language, but also various types of data or even applications. These functions are called white board function and application sharing functions.

The white board function shows the same document data or spreadsheet data on both the originator's and the receiver's screens. They can share the telepointer[73]. But in this function, only the originator of the data can make corrections.

The application sharing function is similar to the white board function. In this function, anyone who is participating in the session can correct the data shown on the screen. The application software that is shared is required only on the originator's computer. Other users can use the application and correct the data without the application software.

The Rapport system developed by AT&T Bell Laboratories has a "store-and forward" function that can allow meetings to be saved and passed on to other people.

The TeamWorkStation system developed by Japan's NTT has two miniature video cameras -- one for faces and one, mounted on a flexible desk lamp, to capture the desktop and the user's hand gestures. In this system, participants can share books and papers by pointing a camera at the desktop, in addition to electronic-formed data. The metaphor behind the system is the "open shared workspace": members of a work group ought to be able to bring a wide variety of tools, both old and new, to a cooperative work session and use them simultaneously.

These desktop conference systems still have minor problems in transferring video data smoothly, but the price is going down to the equivalent level of personal computers. Many banks are now interested in the system for their remote-ATM system as described in chapter 5. In addition to external use, internal use will facilitate efficient communication within the firm.

D. Management of service level alignment for future organizations

The organizational structure has evolved through human interactions based on hierarchical linkages. The growing power of IT has started to support the coordination function, and can initiate a fundamental change in the organizational linking mechanisms within Japanese banks.

Parallel-processing mainframes allow each business unit to have efficient access to a broader range of enterprise data. Also, on the client-server system side new parallel-processing technology, called symmetric multiprocessing (SMP), is emerging. SMP allows complex queries to be distributed across more than 100 CMOS-based processors

[73] Telepointer is a cursor that appears on more than one display and that can be moved by different users. When it is moved on one display, it moves on all displays.

in a system consisting of multiple SMP nodes clustered together.[74] By bringing together advantages of both parallel-processing mainframes and SMP client-server systems, banks will be able to establish effective information systems, which will enhance easy access to the shared data and lead to the cross-divisional cooperation.

A broad set of Groupware applications will enable bank employees to choose an appropriate way of communication among more options, such as face-to-face interaction (including EMS), asynchronous interaction (E-mail), synchronous distributed interaction (DCS), and so on. These alternatives will make people feel physical distance less, and prompt more frequent interaction with colleagues. Although it has become technically easy to communicate effectively with colleagues across the division, there are still barriers that prevent workers from using Groupware.

IT will transform the organizational structure, but other factors will also be needed to accelerate the transformation.

(1) Incentive management

People need incentives to change their style of working. The present hierarchical system is deeply ingrained in every employee in a Japanese bank. No matter how much less the new IT costs or how much more efficient it becomes, most workers will still be reluctant to change their style of working unless there are obligation and promises of security for risking a change in working style.

The concept of Computer Supported Cooperative Work (CSCW) is expected to make human interaction more efficient and effective, but CSCW still needs careful implementation to attain the expected results.

In my view, there are two general ways of encouraging successful CSCW implementation: direct support and indirect incentive.

Okamura et al. argued that the influence and action of mediators who actively guide and manipulate the technology and its use may play a critical role in helping CSCW applications succeed in organizational contexts.[75] Staying in touch with user concerns and use issues, mediators facilitate CSCW directly. This is direct support.

The other way is to give an indirect incentive. The corporate personnel management strategy may be able to facilitate CSCW indirectly. Gradual introduction of project-team-based management may erode the functional barriers, and finally may facilitate CSCW indirectly.

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[74] "Sequent Announces Breakthrough Technology For Decision-Support Applications; New Capability Speeds Large-Scale Queries by Using All Processors in Four-Node Cluster," Business Wire (April 17, 1995).

[75] K. Okamura, M. Fujimoto, W. J. Orlikowski, and J. Yates, "Helping CSCW Applications Succeed: The Role of Mediators in the Context of Use," Proceedings of the Conference on Computer Supported Cooperative Work (October, Chapel Hill, NC), ACM SGCHI & SIGOIS, NY, 1994, pp.55-65.

(2) Project-team-based management

The introduction of project teams has already become popular in the matrix organization. But what is meant here is totally different from the matrix organization (See figure 6.15).

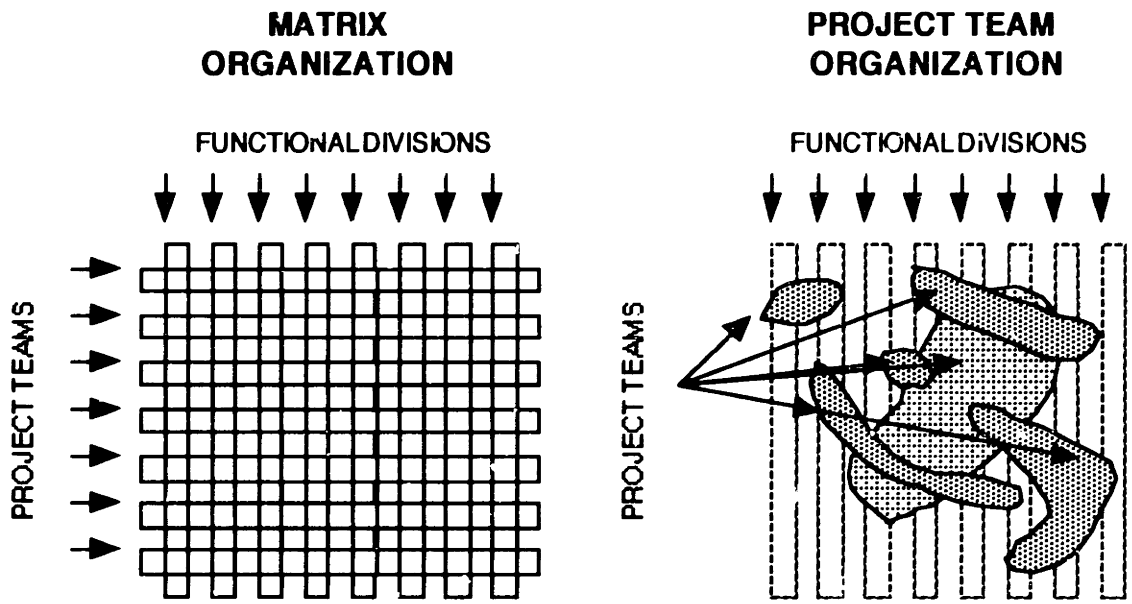

Figure 6.15: Conceptual differences between matrix organization and project-team-based organization

In the matrix organization, functional roles and project-team-based roles intersect vertically. Mechanically, each employee has two roles at the same time. This system inevitably causes managerial conflicts. The reason is that most managers have the presumption that they have the right to "own" their team or division members exclusively.

In the new project-team-based management, functional roles and project-team-based roles don't intersect vertically. Some employees may have only functional roles, and some may have only project-team-based roles. Some may have both roles and some may have several project-team-based roles.

It will be virtually impossible to estimate what kinds of roles a specific employee has by looking at only one of his/her roles. This will weaken both the managers' presumption about their "ownership" of employees and the team members' presumption about the durability of membership. The managers may have to make efforts to keep their team working together. The team members will also have to remain loyal to their superiors. Otherwise, the managers may lose their team members to other managers, and team members may lose their roles to other more capable employees.

By introducing project-team-based management, the border of the organization gradually becomes less important.

Another reason for conflicts in the matrix organization is the evaluation and reward system. The Japanese banking organization has strong functional divisions. No

matter how frequently project teams are introduced, team members are still often evaluated only by the functional manager, not by the project leaders.

Cross evaluating by both functional managers and project team leaders is needed. If one employee is involved in several projects, each project leader will evaluate that employee's work. The total evaluation is the weighted average of these evaluations.

(3) Personnel management system

To facilitate project-team-based management, a flexible personnel management system has to be considered.

Employee records are usually kept on paper. These records are arranged according to the functional division that the employee belongs to. Whenever an employee belongs to one specific functional division, and is evaluated by only a few functional managers, this paper-based personnel management system may work.

However, this system will not work well for the complex project-team-based cross evaluation process. Each employee does not necessarily belong to one specific functional division. The employee records can not be arranged by the division. The more current project teams there are, the more difficult it becomes to keep track of activities of each project team.

The current Relational Database Management System (RDBMS) may simplify complex personnel management. RDBMS allows flexible access to stored data. Managers can have access to an employee's record according to types of attributes, such as experience on projects, specialized skills, and performance evaluations. It is no longer necessary to arrange employee records by each functional division.

This detailed database stores a complete graphical historical analysis of each employee. This system can also analyze and show inconsistencies in a manager's evaluation of subordinates. This function will lead to a fairer evaluation process. Finally this database will be a collection of the abilities or skills of the employees.

With this database, managers can easily find capable and suitable people for a new project. Managers can also advertise on the electronic bulletin board in the E-mail system for staff for a new project. In addition, staff members can get information about a new project and its leader. In this way, staff members can apply to a new project voluntarily, or even initiate new projects on their own.

(4) Market organization

In the current organization, most employees' jobs are assigned by the company. There are few options for employees in terms of choosing the content of the job. The "voluntary" system will give employees the right to choose the content of the job, and thus increase employee motivation. To be employed on a desired project, an employee is motivated to learn new skills in order to be accepted by the project leader. This system may create a culture of self-discipline among employees. Since each employee's evaluation is determined by his/her contribution to projects, the employee who doesn't work on any projects will get no reward.

This two-way interaction between managers and staff members is a kind of internal labor market. As the electronic system in the firm develops both in personnel management and communications, the organizational structure may be transformed into a market-type organization shaped like networks. This type of organization depends on many rapidly shifting project teams and much lateral communication among these autonomous, entrepreneurial groups (See figure 6.16).

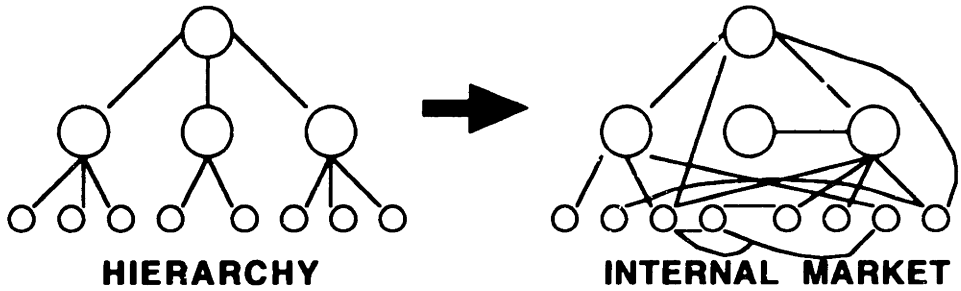

Figure 6.16: Organizational transformation

Electronic connections within organizations as well as those between firms are becoming increasingly important. The service level alignment perspective in the Strategic Alignment Model refers to the potential power of IT in supporting the coordination function. IT will lead to an overall shift toward more use of market coordination mechanisms rather than hierarchies to coordinate various activities.[76] Markets coordinate the flow through supply and demand forces. The demander can compare its many possible sources and can make the choice based on the best combination of these attributes. With help of IT, market forces, the balance of demand and supply, could manage the organization, and bring new linking mechanism.

[76] T. W. Malone, J. Yates, and R. I. Benjamin, "Electronic Markets and Electronic Hierarchies," Communications of the ACM (June 1987, Volume 30, Number 6): pp.484-497.

Chapter 7

Conclusion

Gradual financial deregulation in Japan has given Japanese banks many new business opportunities, but it has also thrown them into stiffer competition than they ever had before. Financial services are more diversified and require much more flexibility. Customers are more sophisticated and more sensitive to the quality of services.

The growth of the banking business in which objectives have moved from data-processing to information-utilization occurred as IT evolved. Banks are now expecting IT to bring new sources of competitive advantages to them.

In order to get maximum benefit from advanced IT, the alignment of business strategy and information technology is necessary. There are four fundamental alignment perspectives in the Strategic Alignment Model. Among the four perspectives, competitive potential alignment and service level alignment were investigated. These two perspectives are driven by IT strategy rather than business strategy.

In the competitive potential alignment perspective, several key IT applications that influence the banking business strategy were discussed.

- Advanced ATMs equipped with multi-media functions may shift the locus of marketing strategy from the staffed branch to the unstaffed branch. This will enhance efficient banking operations.
- EDI is expected to make various business transactions more efficient for most companies. As financial mediators, banks have to maintain close contact with these EDI networks.
- Home banking business has long been expected to become a star-player in retail marketing, but there are still many problems to be overcome. To attract the mass market and make home banking successful, banks have to seek the appropriate alliances with other companies, such as telecommunication companies, on-line service providers, software providers, and entertainment mediators.
- Smart card technology is expected to be a strong candidate for new means of electronic payment. To secure the leading position as financial service providers, banks have to take the initiative in setting standards for electronic payment. Banks also have to think about alliances with other industries to make electronic payment convenient.

To effectuate these new types of business, a completely new type of organizational structure that facilitates more effective cross-functional linking mechanisms is required.

In the service level alignment perspective, several key IT infrastructures that support effective data-sharing and human interactions were discussed.

- Parallel-processing mainframes allow each business unit to have efficient access to a broader range of enterprise data. The advent of parallel-processing mainframes will enable banks to establish a centralized corporate database, while the utilization of the data will be done through distributed systems. By bringing the advantages of both parallel-processing mainframes and client-server systems together, banks will be able to establish effective information systems, which will enhance the easy access to the shared data and lead to the cross-divisional cooperation.
- A broad set of Groupware applications will enable workers to choose an appropriate way of communication among more options, such as face-to-face interaction (including EMS), asynchronous interaction (E-mail), synchronous distributed interaction (DCS), and so on. These alternatives will make people feel physical distance less, and prompt more frequent interaction with colleagues.

The alignment of business strategy and information technology in the Japanese banking industry occurs when conventional means for banking transactions or human interactions change to electronic means for leveraging emerging IT. In the competitive potential alignment perspective, conventional banking involving cash, checks, paper contracts, and branch buildings, are about to be replaced by electronic means such as electronic cash, smart cards, financial-EDI, intelligent ATMs, and home banking terminals. In the service level alignment perspective, the way people communicate within the firm is also changing to electronic communication. Face-to-face interaction will remain important, but much interaction will be replaced by the EMS or the DCS.

These transitions may cause temporary friction in terms of the human to machine interface. The proper incentive management for the successful implementation of new IT applications is vital to making a smooth transition from conventional means to electronic means.

- The improved human-to-machine interface of ATMs has made most customers feel more comfortable using ATMs. In addition, most banks have set the remittance fee lower if the operations are done at ATMs rather than by tellers at counters. These incentives have encouraged customers to use ATMs more frequently.
- The advanced multi-media technologies will also improve the human to machine interface in the home banking area. By forming alliances with other information service mediators, banks can make information provided through the home banking service diverse and attractive. The home banking service will be a part of the other interactive services. This enrichment of information is part of the incentives.
- The introduction of the smart card as electronic cash may cause more friction. The floating exchange rate for electronic cash could be the effective incentive. Customers could get electronic money on their smart-card above the face value of the amount

deducted from their bank accounts. On the other hand, firms that received the electronic cash could deposit it only below the face value. This would encourage customers to use electronic cash, because they would get a premium above the face value. The firms would also benefit, because they could use or deposit electronic cash immediately without any floating period as compared to check payment or credit card payment.

- On the CSCW side, mediators will play an important role in facilitating the use of CSCW directly. The corporate personnel management strategy may also facilitate the use of CSCW indirectly.

The proper incentive management may reduce any friction, and enable firms to move to the electronic linking society both externally and internally. This transition will lead to an overall shift toward more use of market coordination mechanisms internally and externally rather than hierarchies to coordinate economic activity.[77] Market coordination has a disadvantage over hierarchies in terms of coordination costs. However, IT reduces the coordination costs, and promotes market coordination. Markets coordinate the flow through supply and demand forces. The demander can compare its many possible sources and can make the choice based on the best combination of these attributes. With help of IT, market forces could manage the organization, and bring new linking mechanism. Incentive control will also work as an important catalyst in the market organization.

These electronic linkages inside and outside the firm may blur the boundaries of the firms as well as the boundaries of the functional divisions. The development of EDI will encourage strategic alliances among firms. In a market-type organization, the functional divisions gradually lose their presence, and interpersonal competition may become harder. The extent of this competition will easily expand outside the firm. Each project leader may have to decide if he/she should hire staff from inside or outside the firm.

The ultimate effect of the IT strategy will be realized in the organizational transformation both inside and outside the firm. Finally, the future business world may become a collection of venture companies. With the development of electronic communication, the individual with the help of virtual employees in a virtual corporation will be able to do business in the same way the corporate world does.

Banks have to adapt to these new transitions. Along with seeking the appropriate partners to keep abreast of new markets, banks must diversify their own products and services.

With repeated mergers, alliances, and spin offs, the main body of the bank may have difficulty remaining a simple financial mediator. Banks may be transformed into huge stock-holding companies, whose main function is to control other firms through shareholdings. Under the current Japanese anti-trust law, setting up a pure stock-holding

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[77] T. W. Malone, J. Yates, and R. I. Benjamin, "Electronic Markets and Electronic Hierarchies," Communications of the ACM (June 1987, Volume 30, Number 6): pp.484-497.

company is prohibited. However, the Ministry of International Trade and Industry and the Federation of Economic Organizations (Keidanren) are pushing hard to allow holding companies, and the Japanese government plans to review the holding company ban in its five-year deregulation plan, and set up a panel to study how the ban could be lifted.[78]

To sustain the present competitive advantages of the bank, bank managers should understand the correct function of the alignment of business strategy and IT. The transition to the electronic society may be slow in Japan. But banks must be in the vanguard in this transition so that when the electronic society is realized, banks will be on the cutting edge of the determining factor in providing an electronic market in their marketplace.

[78] "Japan to Review Ban on Holding Companies over 5 Years," Japan Economic Newswire (Kyodo News Service) (March 25,1995).

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