Survey and Analysis of the Economic Impact **of EC on the Japanese Economy**

March 1999

Electronic Commerce Promotiom Council of Japan (ECOM)

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Published by:
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Ⅰ NTRODUCTION

The Electronic Commerce Promotion Council of Japan (ECOM) is conducting a number of programs to promote the growth of full-scale electronic commerce (EC) in Japan and to ensure that it develops smoothly.

ECOM has conducted surveys and analysis on the economic and social impact of EC and commissioned McKinsey and Company, Inc., to undertake the analysis in this last fiscal year. We looked at the future impact of EC transitioning on Japan's domestic economy and what impact it will have on investment. We also compared the scale of the EC markets in Japan, the US, and Europe.

This material sets out the results of our analysis and is organized as follows:

Chapter 1 describes the definition of the electronic commerce.

Chapter 2 describes our approach to the comparative analysis. Our approach is unique in that first, it does not consider EC transitioning to be merely an extension of the computerization of current business activities, but predicts the direction in which the institutional structures of industry will evolve. It then depicts how an enterprise should best make the transition to EC in order to become competitive within the new structure, and sets about verifying this through surveys and analytical approaches. Second, instead of basing forecasts for the future on user predictions as reported in surveys (as did the existing US/European EC transition studies), we anticipate the new industry structure, then postulate and substantiate the impact of EC transitioning within that structure.

We used two main approaches to analyze the impact of EC transitioning. One, which we employed to capture the scale of Japan's EC transactions and compare it with that in the US and Europe, uses total amounts of money in all Internet business transactions. It is called *Narrowly Defined EC Transitioning* and is employed by the US Department of Commerce in its *The Emerging Digital Economy*. It is based on the definition laid down by the US survey company, Forrester Research, Inc. These definitions are valued in that they enable comparative analysis with the US and Europe.

In the other approach, we conducted impact analysis using the EVA (Economic Value Added) of all activities to improve industry by means of digital technology in electronic media. This is known as *Broadly Defined EC*, and its purpose is to capture a wide spectrum of the economic effects of EC transitioning.

Chapter 3 summarizes the analysis results based on the above approaches.

March 1999

The Electronic Commerce Promotion Council of Japan

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Analysis Summary

Objectives

As we move into a highly computerized milieu, we can foresee the dramatic development of full-scale digitalization of commercial and other transactions. This will have an enormous economic and social impact. We therefore analyzed the impact of EC transitioning on Japan's future domestic economy and on investment effects, compared the EC market scales in Japan, the US, and Europe and employed the results of our analysis to promote the smooth development and expansion of full-scale electronic commerce in Japan. We adopted two approaches: "A broadly defined EC transitioning," to obtain a complete understanding of the economic impact, and Narrowly Defined EC Transitioning to comprehend the scale of EC transactions in Japan and compare them with that of Europe and the US.

Results of Survey Analysis

(1) Results of Survey Analysis of Narrowly Defined EC Transitioning
--Comparison [of Japan's] EC Transitioning Progress with that of Western Countries--

It is estimated that EC transactions on the Internet in Japan will amount to Å\15.4 trillion (about US $130 billion) in three years, and Å\55.5 trillion (about US $370 billion) in five to ten years (Figure 1). In three years they will represent 35% of total US commercial transactions, and 72% of total European commercial transactions. The EC percentage of total commercial transactions (or growth rate) in Japan, however, will grow to one percent in three years, and four percent in five to ten years (Figure 2). When comparing Japan's growth rate in five to ten years with that of the US in three to five years, Japan's will be much higher in the non-manufacturing sector but about equal for inter-industry transactions and individual transactions in the manufacturing sector. In other words, Japan's growth rate in five to ten years will be similar to that of the US in three to five years. Drastic structural reforms in all industries are a premise of this survey and, as a grim result, Japan's EC growth rate will finally reach an EC growth rate a few years behind that of the US. Furthermore, absolute value for EC growth, and comparative values with the US manifested about the same numerical values across all comparisons such as business-to-business and business-to-consumer transactions, and manufacturing and non-manufacturing sectors. It may be said, therefore, that the above phenomenon is spreading throughout Japan's economy.

(2) Results of Survey Analysis of Broadly Defined EC
--Transitioning to EC as Management Improvement and Economic Stimulation Strategy--

It is estimated that the economic stimulation (in GDP increase) expected to result from the realization of EC transitioning, in its broader definition "all activities to improve industry by means of digital technology in electronic media," will surpass Å\60 trillion in five to ten years (Figure 3). No more than \10 trillion need be invested to realize these transitions for about six times that amount in expected cost-effectiveness (Figure 3).

Looking at EC transitioning by industry, cost effectiveness is particularly high - 10 to 40 times higher - in infrastructure industries such as process manufacturing industries (foods and processed foods, publishing and printing, and facility operation type service industries such as financial, distribution, and retail). This shows the importance of EC as a method for improving industrial infrastructure.

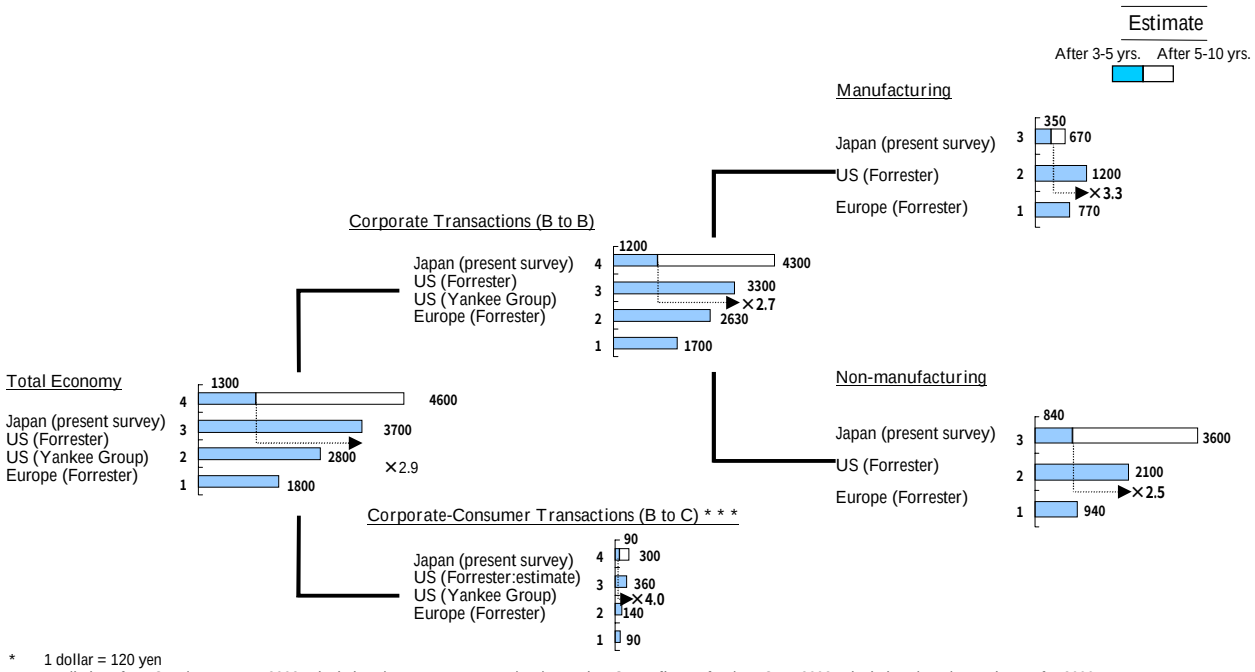
A look at EC transitioning by type,[1] meanwhile, reveals its particularly high cost-effectiveness for supply chain management (SCM) and integrated customer management (ICM).

The magnitude of EC impact in SCM shows that there is presently large-scale waste among companies in the way they divide a broad range of resources including the procurement and utilization of operating resources, to include goods and services distribution, manufacturing facility capacity, and human resources. It also indicates that information technology in customer interface, currently costly and non-productive, could bring about a great improvement in ICM.

Implementation of the top third of the most cost-effective measures for EC transitioning could be expected to increase industry profits to a little underÅ\40 trillion for an investment of a little less than Å\3 trillion invested (Figure 4). This means that only 25% of the investment necessary to uniformly accomplish all of the EC transition measures could realize more than 60% of all of the anticipated results. This strongly suggests the importance of selective investment in management and policy planning.

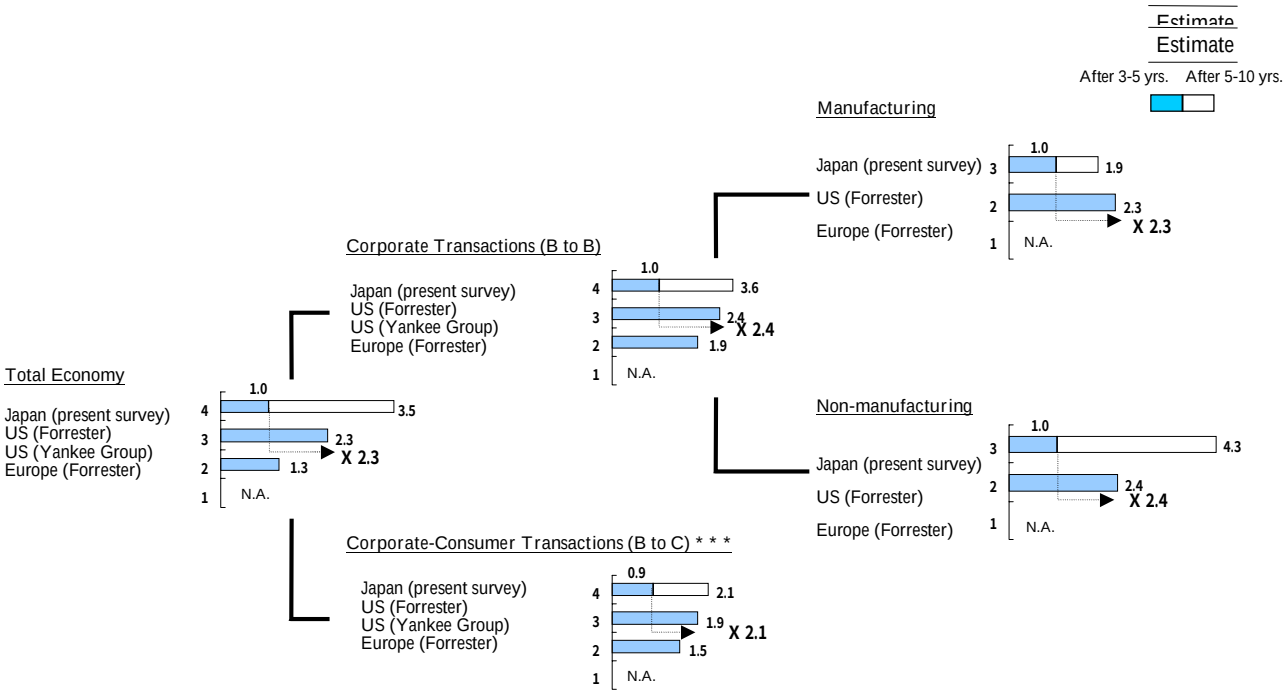
[FOOTNOTE]

[1]Refer to paragraph 2.1.3 for details.



* 1 dollar = 120 yen
* * Predictions for US and Europe are 2002 calculations by Forrester Research. The Yankee Group figures for the US are 2002 calculations based on estimates for 2000.
* * * To allow comparison, retail BCM was calculated to match the definitions by Forrester Research. Total BCM narrowly defined EC transactions involving private individuals are estimated at $48 billion after 3-5 years and $136.8 billion after 5-10 years. (BCM : Business-to-Consumer Marketplace)
Source: McKinsey Analysis, Forrester Research (Copyright 1998, Forrester TM Research, Inc.), Yankee Consulting Group, Economic Statistics Yearbook

Figure 1: Comparison of EC Transaction Value in Japan, the US, and Europe — Absolute Value Base ($ million)



* Predictions for US and Europe are 2002 calculations by Forrester Research. The Yankee Group figures for the US are 2002 calculations based on estimates for 2000.
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Source: McKinsey Analysis, Forrester Research (Copyright 1998, Forrester TM Research, Inc.), Yankee Consulting Group, Economic Statistics Yearbook

Figure 2 : Comparison of EC Transaction Value in Japan, the US, and Europe — Percentage of Total Transactions

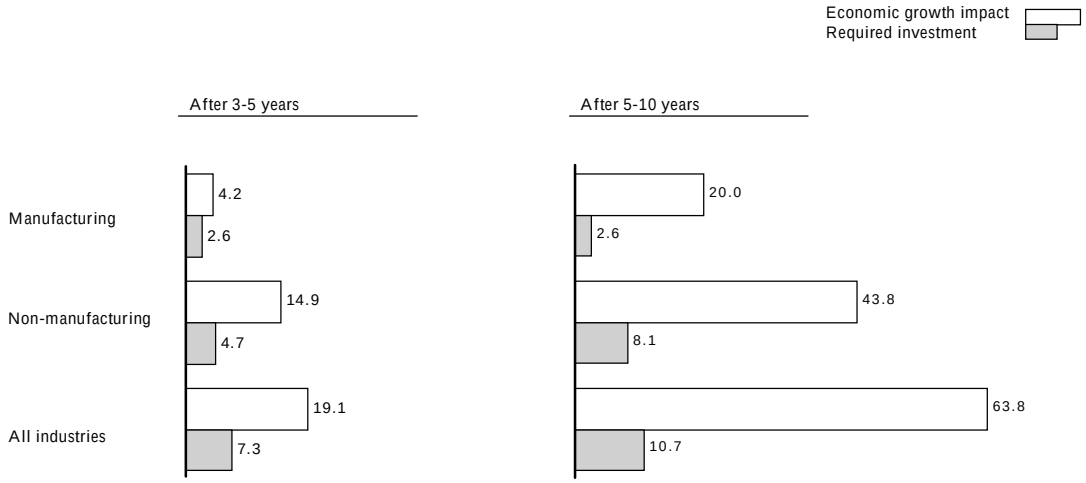
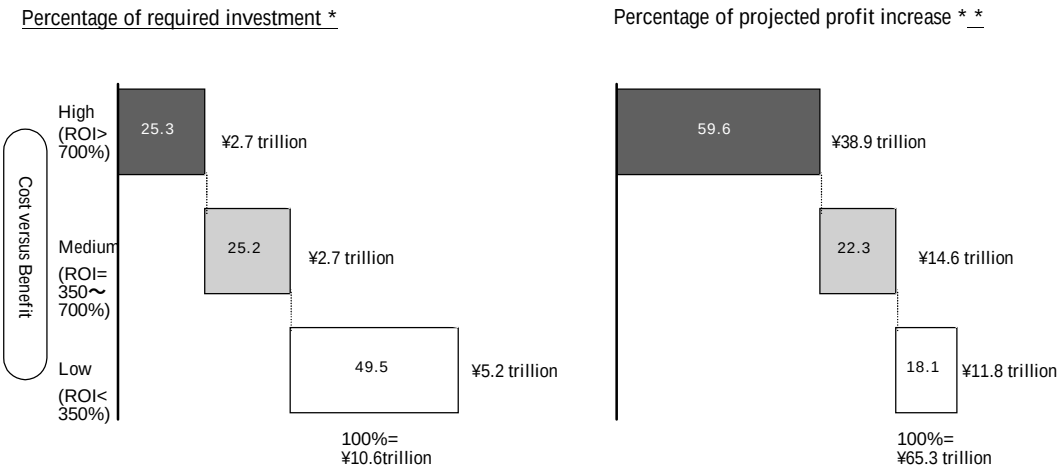


Figure 3 : Economic Growth Impact due to Broadly Defined EC and Required Investment



* Based on one-year depreciation, includes IT introduction, operating, and capital cost
* * Based on operating profit (EVA), includes cross-sale and impact
Source: McKinsey Analysis

Figure 4 : Cost-Benefit Structure of Broadly Defined EC - After 5-10 years

1. Interpretations of Electronic Commerce

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1.1 Definitions

Electronic commerce is still an extremely vague concept and has many definitions. We defined it both narrowly and broadly for the purposes of this survey. Narrowly, EC is "all uses of the Internet for business transactions (both contracting and settling accounts), and broadly, "all enterprise improvement activities by means of digital technology in electronic media" (Figure 1.1-1).

The narrow definition is what the US Department of Commerce used in its *The Emerging Digital Economy*, and is based on the definition given by the US survey company, Forrester Research, Inc. It uses the percentage (growth rate) of both general and commercial Internet transactions as indicators of impact. The value of this definition is that it enables comparative analysis with transaction values in Western countries. The reason for this is the existence of a survey based on the same definition conducted by Forrester Research in Europe in addition to the US survey mentioned above. The fact that these surveys focused only on transactions (contracting and settlement) as industrial activities, and did not cover the whole range of research and development, procurement, manufacturing, and operational improvement activities behind the transactions, however, could be considered a shortcoming. Improving only transaction activities does not necessarily reform the substance of company operations and limits the study of EC impact on the Japanese economy. In fact, looking at EC impact as transaction amounts[2] only, the European/US surveys made no mention of the economic expansion effect that should be the true impact of EC.

The Forrester surveys provided one of the important objectives of this survey; enterprise operation and material upon which to form conclusions about EC-connected measures for policy planning. Determination of cost-effectiveness is essential, however, for that objective. No inquiry into this important point can be made with only transaction totals (Figure 1.1-2).

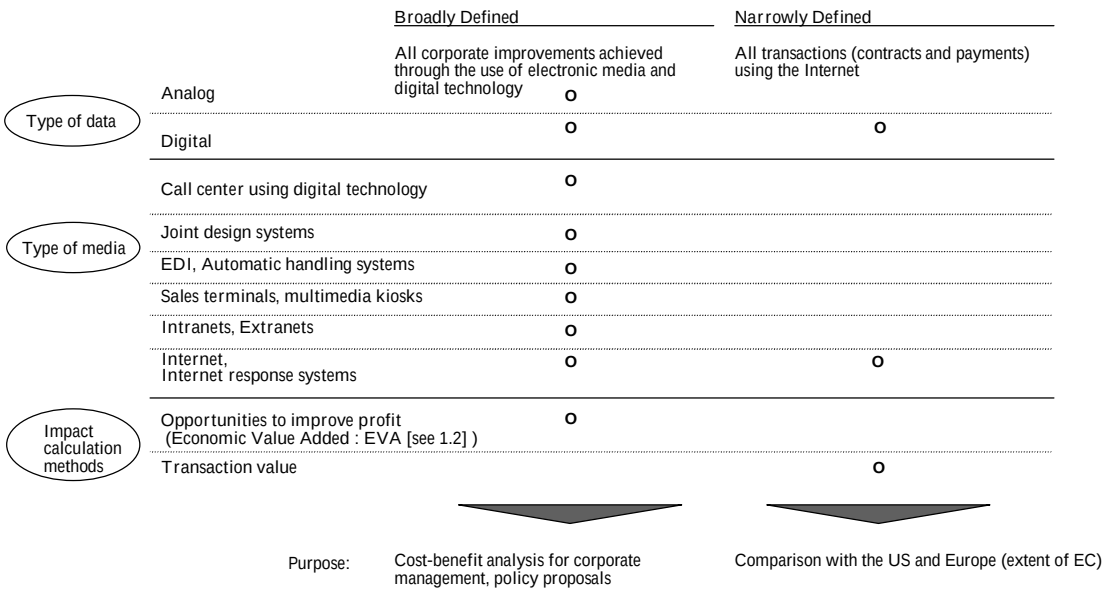
For EC in the broad sense, we can make no international comparative analysis because a similar survey of Europe and the US has not been conducted. Totals for industry operation improvement activities by means of information technology are covered, however, and it is therefore possible to quantify EC impact on operational management and on the economy. This survey uses EVA[3] indicators to quantify the economic impact on the whole economy stemming from various operational activities by means of information technology (EC in the broad sense) in [six] industries.

Considering the above, this survey uses the narrowly defined EC for its comparative analysis with Europe and the US, and the broadly defined EC in cost-effectiveness analysis to aid in enterprise operation and policy planning, its original objective.

[FOOTNOTES]

[2]Forrester Research, Inc. and the US Department of Commerce based their survey only on retail sales through the Internet, and the survey does not therefore reflect a complete picture of EC transitioning (see paragraph 2.4).

[3]Refer to paragraph 1.2 for details.



* Economic Value Added (See 1.2)

Figure 1.1-1 : EC Definitions

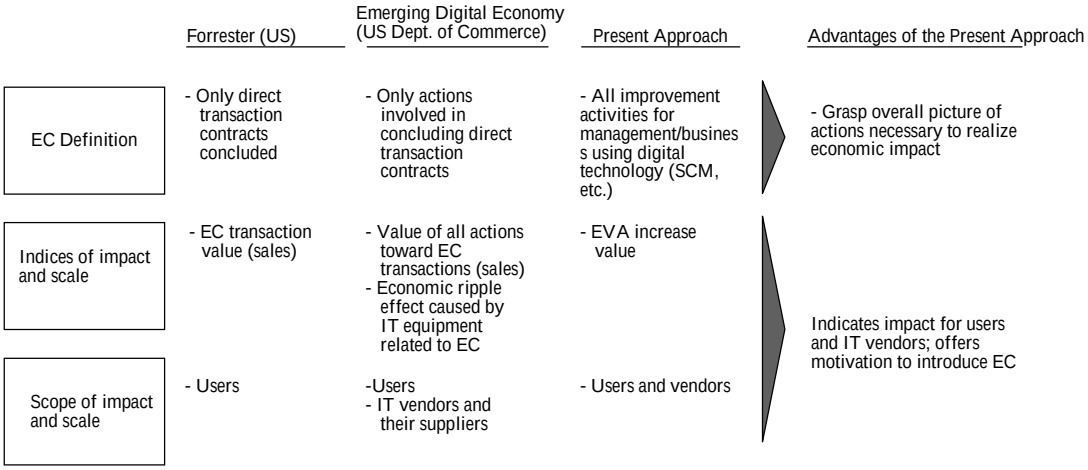


Figure 1.1-2 : Comparison of Scale Calculation Methods and EC Economic Impact

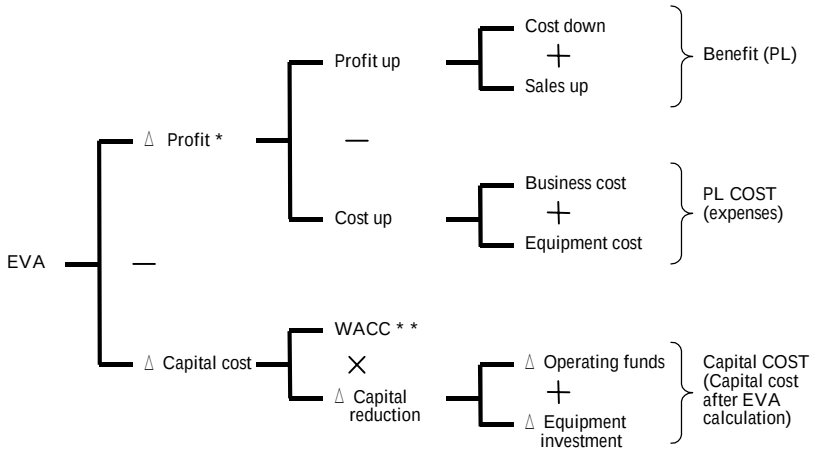
1.2 Impact Quantifier Indicators

As outlined, EC impact is quantified using total EC transactions (total sales) as indicators for the narrowly defined EC, and EVA is used for each industry and for the whole economy for the broadly defined EC. EVA is the value that results from subtracting the cost of a business activity from the profit gained by it, "activity profit," and from further subtracting the "capital cost" (the capital invested in it) from the activity profit.

The point to which I wish to call attention here is that not only the information technology provider industries, but also the user industries, create economic impact. There is a tendency to think primarily of profits to the provider industry when discussing this kind of economic impact. It is natural, however, that the profit to the user industries is much greater. Analysis in the US Department of Commerce survey emphasizes impact on the provider industries. Our survey differs greatly to theirs on this point.

1.3 Discussion of Survey Analysis Methodology

We adopted two methodologies in this survey. First, we do not take up EC transitioning as merely an extension of the computerization of current business activities, but predict the direction in which the institutional structure of industry will evolve in the future. We then depict how an enterprise should best transition to EC to become competitive within that new structure, and set about verifying this through surveys and analytical approaches. Second, instead of basing forecasts of the future on user predictions as reported in surveys (as did the existing US/European EC transition studies), this survey, having anticipated the new industry structure, postulates, then substantiates the impact of electronic commerce transitioning within that structure. We took a balance of six model industries to represent all industries, postulated real EC transitioning steps, and thoroughly analyzed operational management. We also applied the result to other industries.



☞ - The relationship between profit and capital cost (can capital cost be made up by profit?) is key in determining an increase or a decrease in EVA

* Strictly, based on profit after taxes
* * Weighted Average Cost of Capital

Figure 1.2-1 : Method for Calculating EVA (Economic Value Added)

2. Analytical Approach

2. Analytical Approach

2.1 Analysis of EC Transitioning in Model Industries

2.1.1 Concept of Industrial Structure

Industrial structure may be viewed as an aggregation of industry value chains (hereafter, value chains). A value chain is "the flow of value creation activities to provide goods or services to the end user." It extends over multiple industries because value creation flows through upstream industries (raw materials, parts manufacture, etc.), midstream industries (assembly, processing, etc.), and downstream industries (wholesale, retail, and service industries). The goods and services we speak of here are not only those provided to the customer on a one-time basis, but also include business from the purchase to the end of the goods' and services' life span. In other words, all the goods and services that could be provided over the lifetime of the product. The value chain of an automobile, for example, does not end with manufacturing and sale; it includes the industry's provisions for all of the after-purchase services that the customer will require. In concrete terms, this includes all related industries such as raw materials and parts, assembly, the dealer, automobile-related products, maintenance and repair, and used car sales (Figure 2.1.1). From this vantage point, which transcends the former concept of isolated companies and industries, it will be possible to identify more opportunities to improve competitiveness.

2.1.2 Selection of Model Industries

We selected the model industries in a two-step process of elimination (Figure 2.1-2). First, we halved the number of industries likely to feel substantial impact from EC transitioning – there are 28 types in the "Comparative Analysis of US and Japanese Productivity" (conducted by the Japanese Ministry of International Trade and Industry in May 1998) - according to two standards: industry size, and the degree to which EC would improve value added. Then we chose a good balance of model industries according to three characteristics: manufacturing vs. non-manufacturing, consumer vs. infrastructure, and exposure to international competition vs. mainly competing domestically. Our chosen six industries were automobile, electrical/electronic (electrical consumer appliances and personal computers), health care, distribution, finance, and retail (convenience stores).

2.1.3 Predictable Structural Changes in the Model industries and Five Models for Transitioning to EC

Value chains are evolving through three different kinds of change: break-up and expansion; modification; and reformation into more competitive value chains. These changes are occurring across all industries and have become a main driving force. They will continue to drive structural change in the future (Figure 2.1-3).

Until now, there have been powerful leaders (value chain owners) which have controlled the entire value chain in most industries. In the financial sector, for example, some financial institutions carried out all of the functions in their value chain. In the automotive industry too,

original equipment manufacturers for Toyota, Nissan, etc., in reality controlled the other players in that value chain.

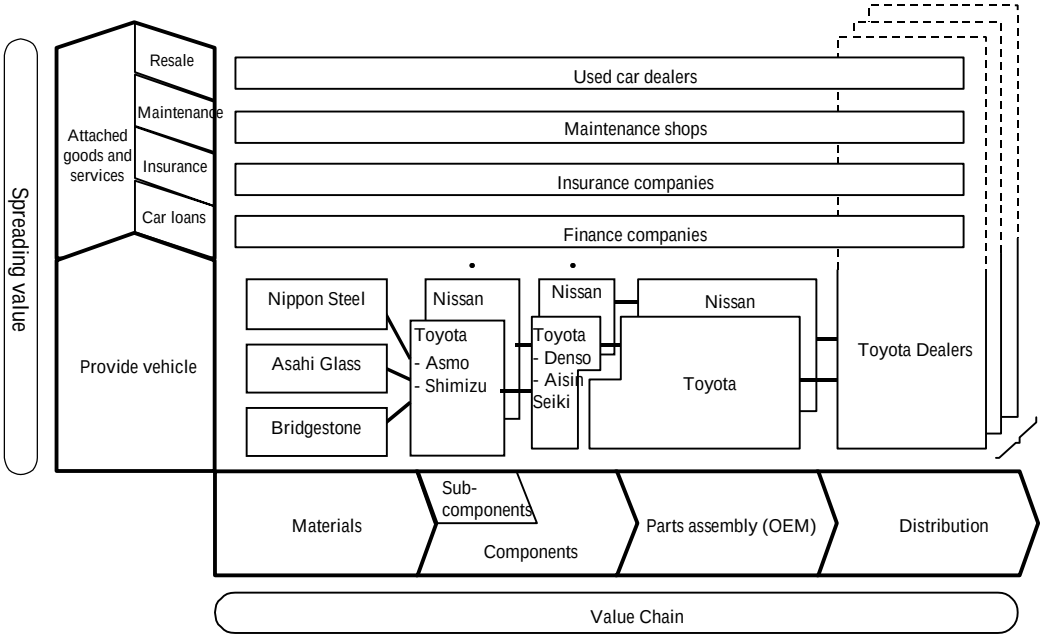
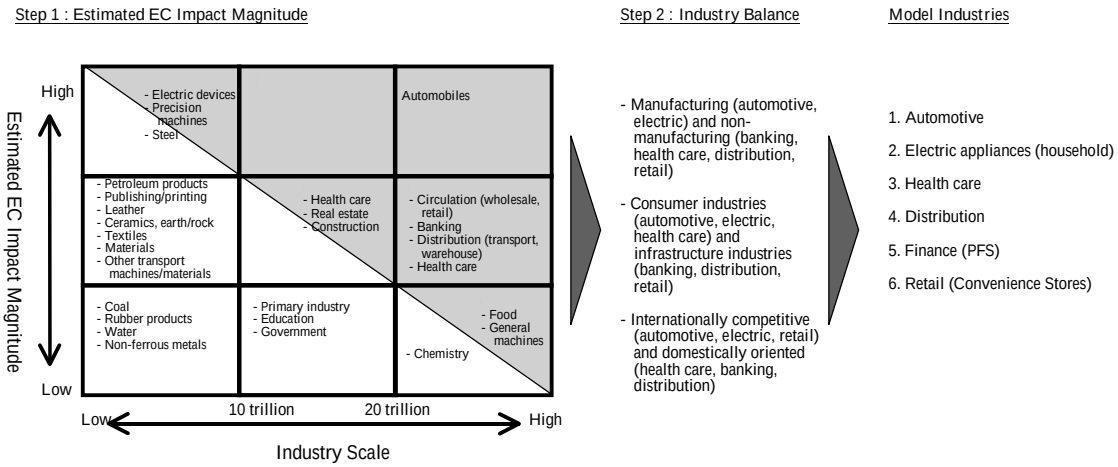


Figure 2.1-1 : Value Chain : Automotive Industry Case



* Final shipment base. However, circulation industry is gross profit base.

Note) Industry categories are taken from Japan-US Industrial Comparison Analysis (Ministry of International Trade and Industry, May 1998). However, “agriculture, forestry, marine industry”, “coal mining”, “other mining industry” are “primary industries” and “rail transport” “highway transport” “water transport” and “air transport” are handled as “distribution.”

Figure 2.1-2 : Process for Selecting the Model Industries

This kind of overall value chain control structure is fast breaking down, however, due to rapidly intensifying global cost competition and evolving global information/communication technologies that, in turn, are being driven by rapid improvements in quality and cost reduction in information interaction. Functions that required close coordination previously had to be placed in the same organizational or geographical location, and it was therefore beneficial to adopt industrial organizational structures across the whole value chain.

Today's technological developments in information communications, however, transcend the boundaries of organization and geography, and enable the same close coordination that geographical neighbors enjoy. Value chains, which are linked networks of enterprises specializing in and pursuing economy of scale in some function therefore have a competitive advantage. It is this trend that is driving the break-up and expansion of the value chains.

The second step, modification, is more important, however. Two new industries have emerged as a result. One is the "proponent (backer, supporter) type," the "value packager," that has superior planning and organizational skills, and bundles individual goods and services to form "meta-goods." The other is the "customer agent" that offers services like an agent on the customer's behalf.

In the third step, reformation, multiple players, i.e., people who call on customers to supply components, people who package the components into meta-goods, and people who work as customer agents, all vie in their various capacities for value chain leadership. The value chain is a linear upstream and downstream structure, and therefore evolves into a meta-structure encompassing loose alliances around the nuclei of value packagers and customer agents.

Driven by intense competition, supported by information and network technology evolutions, the value chains are continuously evolving, breaking apart and expanding, modifying, and reforming in this way. These changes in the value chain bring about changes in industry structure as well. Figure 2.1-4 shows the future structure of the automotive industry after passing passed through this process.

Within this changing industry structure, five operational improvement models utilizing EC might be considered from the perspective of value chain redesign to accord with the process by which value reaches the customer (value choice, value creation, value transmission, and value management, which drives and integrates the others) (Figure 2.1-5):

(1) OCM (Open Collaboration Management)
(2) SCM (Supply Chain Management)
(3) ICM (Integrated Customer Management)
(4) BCM (Business-to-Customer Marketplace)
(5) VBM (Value-Based Management)

Below, I shall look at the roles played by each of these models.

(1) Open Collaboration Management (OCM)

Most of what is known as collaboration has been performed only within the existing transaction relationships of the very small number of enterprises comprising a value chain. The

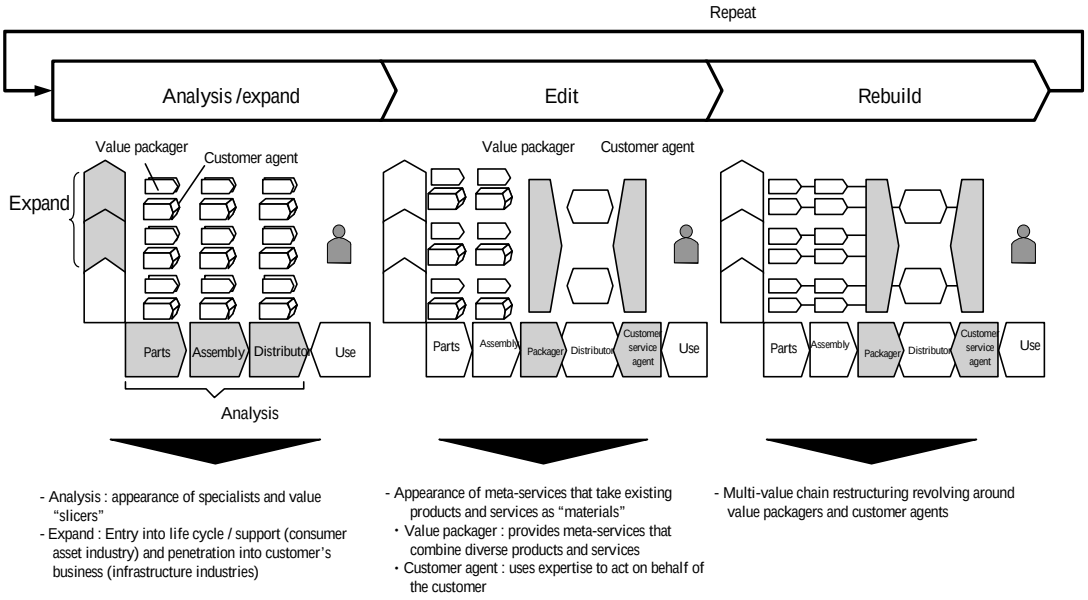


Figure 2.1-3 : Evolution of the Value Chain

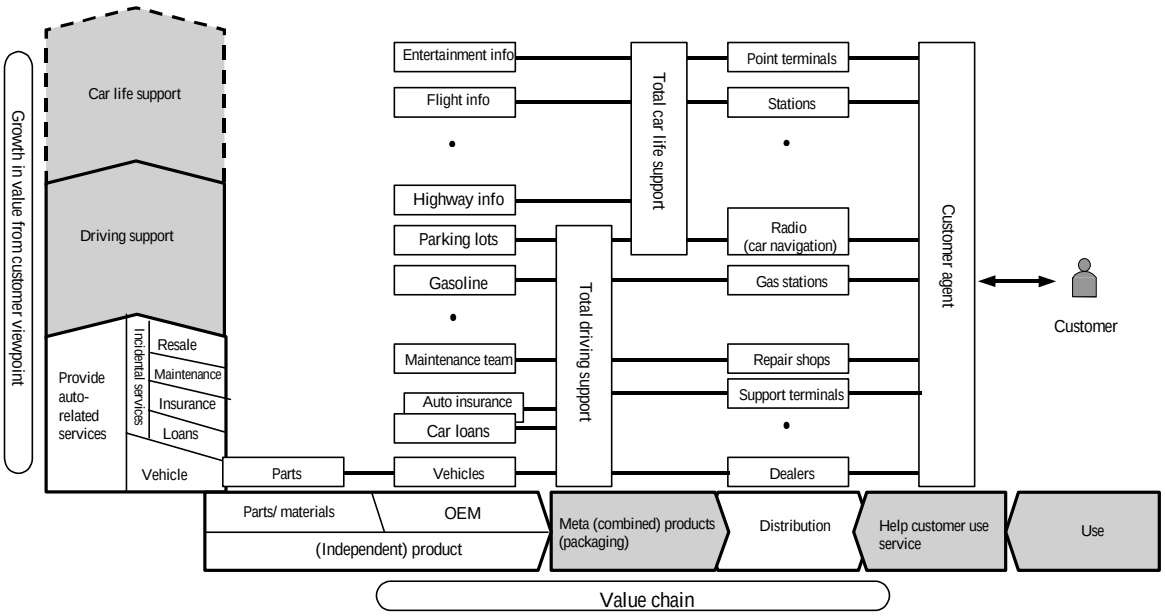


Figure 2.1-4 : Future Structure of the Automotive Industry

open collaboration management we define here, on the other hand, is the free selection of optimal suppliers through an open network of many suppliers, and the simultaneous conduct of advanced development with them.

Collaboration in the automotive industry, for example, has been limited to CAD (Computer Assisted Design) and other transactions between original equipment manufacturers and major parts manufacturers in affiliated units. Open collaboration, on the other hand, aims to create an environment that promotes concurrent development among secondary parts manufacturers, repair shops, foreign parts manufacturers, and others who exchange technical information such as CAD data as they work. Conversion software to link CAD and CAM (Computer Assisted Manufacturing) design systems with differing standards and a network capable of connecting numerous small and medium manufacturers and vendors that is highly safe, reliable and inexpensive, is needed in order to do this. Open collaboration management can be expected to provide three main advantages.

First, departing from geographical restrictions may attain better and more efficient design. It will preclude the constant need for engineers from different companies to meet to work out designs. Each engineer will be able to coordinate and make design improvements while looking at a mutually linked design system screen, right in his own office. At the same time, the freedom to choose the optimal partner from anywhere in the world for collaborative development will lead to design quality improvements.

Second, design time will be greatly reduced through promoting the re-use of blueprints and specifications. This is made possible by compiling a database of those previously used, linking them by network, and allowing authorized firms free access to them.

Third is the reduction of design system use costs. This will be made possible by placing the design systems on the network, thereby allowing multiple firms to "own" them.

(2) Supply Chain Management (SCM)

Supply chain management is the optimization of goods and service supply within the value chain by making sales and production information available to all enterprises in that chain. This does not simply mean greater efficiency by sharing information that was previously the property of only one company, but is also meant to optimize the whole value chain encompassing multiple players and to cross industry boundaries. It is therefore necessary to involve diverse industries, such as distribution companies, customs clearance firms, and financial institutions. Although the supply chain management concept has existed for some time, the information infrastructure to integrate management across the value chain has not. The widespread use of ERP[4] software in big companies in recent years, and the appearance of supply chain planning software, via which production and procurement planning may be conducted real time based on frequent demand forecasting, has made this concept feasible.

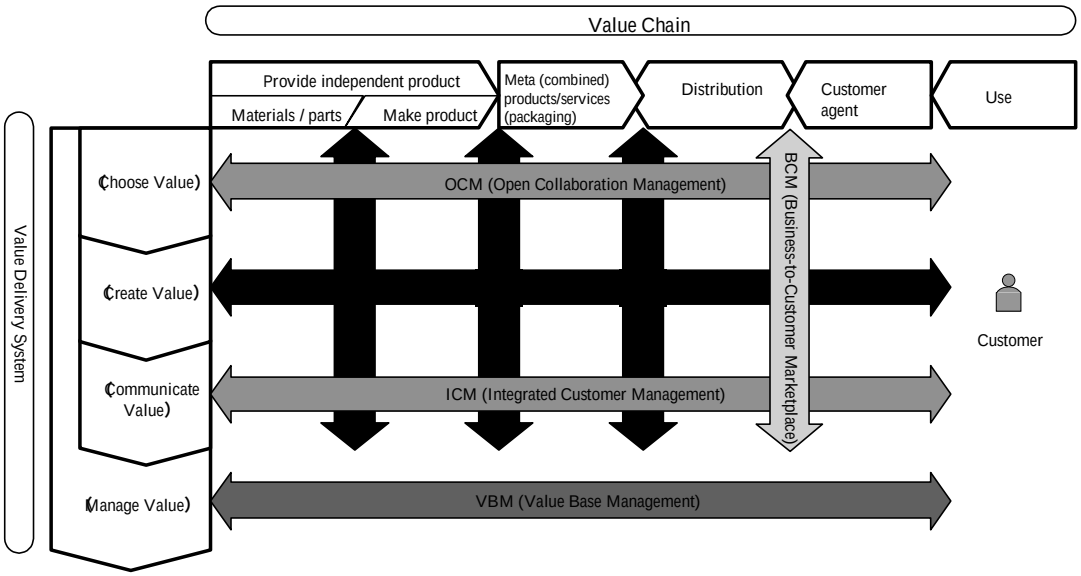


Figure 2.1-5 : Five Models of EC Transition (Computerization)

Optimal procurement, from the point of view of a single enterprise, is likely to be obtainable through supply chain management. Transcending existing transaction relationships and procuring the best materials at the lowest price from anywhere in the world can be expected to bring substantial increases in profit. It will be necessary to equip a linked environment including small, medium, and foreign suppliers to accomplish this. Most industries now employ (EDI[5]) order receiving and placing systems with only their existing transaction partners. Placing these on a "linkable," conversion-capable network will therefore probably be necessary.

In addition to increased cash flow resulting from reduced inventory (resulting from the introduction of supply chain management), cost reductions in procurement, inventory, and transport may be expected. At the same time, the time needed to receive and issue orders will be shortened, thus avoiding sales opportunity loss.

(3) Integrated Customer Management (ICM)

Integrated customer management greatly improves conventional customer management by freely utilizing the networked channel system that runs throughout the value chain, and the customer/operation database linked to it. This method has four main objectives:

1. To construct a diverse and inexpensive channel highly convenient for the customer. Customer telephone reception centers, the Internet, and other remote channels continue to increase with information and communication technology advances. These channels are overwhelmingly superior to existing channels in terms of convenience, cost, and coverage.

In banking, for instance, the cost of customer service telephone reception is no more than seven percent of the cost of the bank's office management. In situations where a voice response unit may be used, this cost is reduced to one percent. Also, bank offices will be able to consolidate and even out workloads to a formerly impossible degree when they can concentrate functions geographically through linking to a remote channel.

To build a channel network effectively, it must be assembled according to the concept of the customer's value chain, i.e., the flow of consumer value that motivates the customer.

Let us take once more the automobile as an example: a new car buyer follows a definite pattern in his car-related consumption of goods and services such as products, repair and maintenance, leisure goods, and resale of his used car. Driving classes, moving from the city to the suburbs, accidents to his present car -- all become opportunities at the time that he purchases the new car. This understanding opens up new vistas of opportunity for improvement for the manufacturer. Disseminating the information received when a new car is purchased to related enterprises in the group via the network, for example, would enable them to approach the customer. Prospective customers could probably be identified from driving school or house removal business information if they were linked into the network. In other words, cross (follow-up or repeated) sales or other additional business may be obtained by casting a channel network over the whole of a consumer's car-related activities.

2. To develop product handling and service expansion. Remote channels are not subject to physical restraints. This means that if multiple vendors and manufacturers are linked through the network, a wide range of products can be sold to the customer. It will then be important to maintain a rich assortment of goods along the value chain. In cases where meeting the customer to demonstrate the product - test-driving a car, for example - the product trial is an essential element of making the sale. In fact, it is vital to include a mechanism that brings the customer to the place where the interface can be carried out.

3. To follow up sales repeatedly leveraging the deep understanding of each customer’s purchasing and consumption behavior gained over multiple product purchases. Requisition of customer purchasing behavior through compiled databases and manifold analysis of information obtained from the channel network along the whole customer value chain will provide the means for highly accurate marketing.

Prerequisites for this are wide trawling of customer purchasing behavior from the networked channel system, a flexible database, and tools to collect, accumulate, and analyze the information obtained and transform it into individual databases. This approach is rapidly spreading in advanced financial institutions and retail industries in Europe and the US, and is bringing great profit increases (averaging 30 percent) to many enterprises.

4. To automate the entire demand flow from the customer interface to back office tasks. The information input by the operator at the customer interface has heretofore been sent to each back office, where it is again input after being reprocessed, reformatted, or re-protocoled. This process could in theory be entirely automated, however, because the standardized tasks concerning demand flow are entirely regulated by the information from the customer interface. It is possible in other words to put the information obtained at the customer interface into a standardized task processing system set up beforehand that will automatically connect distribution, production, and account settlement.

More and more industries are using the TSTP (Total Straight Through Processing) method that takes this trend even further. In this system, information entered by the customer on the Internet input screen or by touch-tone telephone is sent directly to the whole demand flow system. Not only are personnel costs reduced through this system, but faster processing and reliability improvement can be realized by eliminating human error.

(4) Business-to-Customer Marketplace (BCM)

The business-to-customer marketplace constitutes a global electronic market where both industry and consumers can buy and sell freely. Three major business opportunities exist when looking at this marketplace from a single company's perspective:

1. The opportunity to provide goods in the business-to-customer marketplace as a supplier. Connecting to the marketplace has the same effect as constructing a large channel; one can access all participating consumers.

2. The opportunity to act on behalf of the customer in procuring goods from the supplier as a customer agent[6]. The customer agent profits from volume discounts by bundling the needs of multiple customers and ordering in large lots, and by collecting user fees from his customers. A large customer base and a deep understanding of customer needs are necessary to succeed in this.

3. The opportunity to run the marketplace itself. If both customers and suppliers can be attracted by value added services, such as account settlement, certification, and agent guarantees, the operator can build a market exceeding critical mass and can expect new income, such as marketplace participation and sales total dependent service fees, in addition to the value added service user fees.

(5) Value-Based Management (VBM)

Value-based management enables appropriate monitoring of the performance of affiliated enterprises according to their current worth based on cash flow. It is the top-level manager's basis for strategy implementation and decision-making. Up to several hundred globalized and diverse enterprises can be centrally managed on multiple axes through value-based management. Based on cash, risk management becomes easy, even in a rapidly changing business environment.

Several software applications already exist for putting this method into practice. The software produced by Hyperion Company and used by more than half of the Fortune 500 companies is a good example. German companies including Deutsche Bank, Daimler Benz AG, and Siemens have recently introduced similar software applications, and progressive companies such as Sony Corporation, Nippon Telephone and Telegraph, and Dokomo are beginning to use them in Japan. Their use can be expected to spread rapidly with the introduction of holding company and accounting systems for which connectivity is important.

A system that can expand value-based management to all companies participating in the value chain and that can evaluate decision-making among participating companies from the point of view of the whole chain is also, in theory, possible.

[FOOTNOTES]

[4]Enterprise Resource Planning

[5]Electronic Data Interchange

[6]See paragraph 2.1.3 in this chapter.

2.1.4. Impact of EC Transitioning

As we have stated, we selected six industries for our survey analysis (automobile, finance, distribution, health care, electronics, and retailing), and then calculated the specific manner and extent to which the industrial world could be transformed through electronic commercialization. In these calculations, EC could mean a rise in profits for each industry from 50% to as much as 800%. (Figure 2. 1 - 6). We based our calculation of the impact on each industry on the following: we took the parameters of the sales volume and cost structure of each industry, estimated the impact of cost reduction, revenue increase, and penetration level based on the best practice internally and externally (advanced precedents), and then calculated incremental profit increases. In each case we calculated a net amount of profit increase from which we deducted the investment amount required for computerization as well as newly added costs (EVA) (see 2.2.2.1).

Automobile

With the opening up of the exclusive industry structure represented by the *keiretsu* (affiliated companies), it is now possible to consider whether or not companies should bear the cost of certain items themselves or whether there is room for more outsourcing. It will consequently become possible to obtain a full understanding of all customer motoring needs and provide products and services to meet them through more efficient techniques (Figure. 2. 1 - 7).

In the *kanban* system boasted by Japan, for example, it will be possible to strengthen the stock of secondary and tertiary manufacturers and dealers, the redistribution of management resources on a global scale, etc., by reviewing the whole supply chain. Moreover, with the

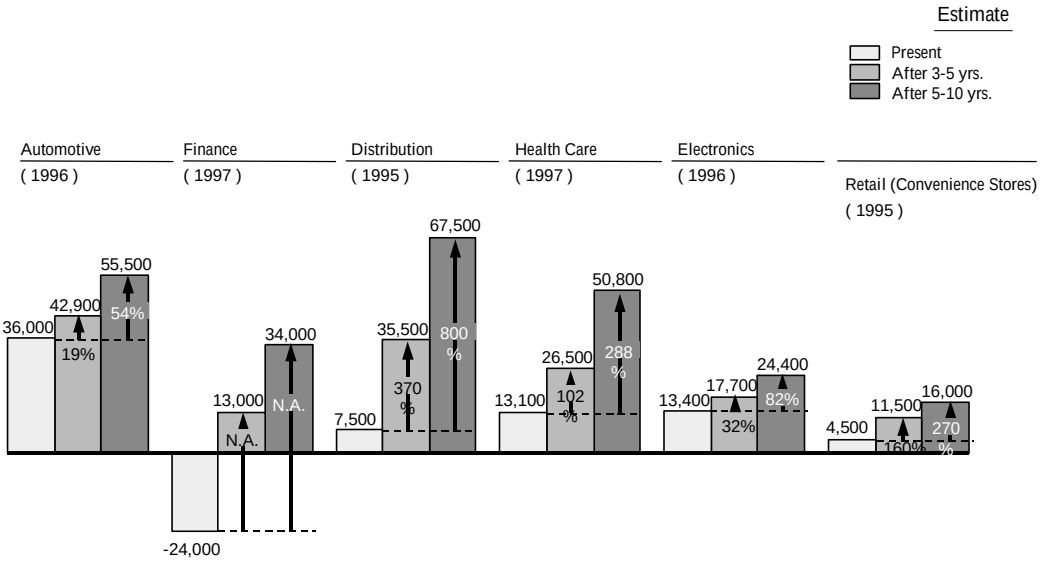
introduction of GroupWare CAD and the establishment of an open, cooperative system in product development, it will also be possible to reduce development lead-time substantially. There is also real potential for growth if new retail channels represented by the Internet are combined with existing dealer networks.

Finance

How can financial institutions survive without turning into giants like Citicorp Travelers? The introduction of "hub and spoke" system architecture and special conversion middleware that enable connections between different systems means that unlimited combinations of diverse products, channels, and customers will be made possible through connections to the hub. As a result, it will be possible to respond flexibly to customers and create a new business structure of network distribution-type financial institutions that can even out-compete economies where scale is regarded as important (Figure 2. 1 - 8).

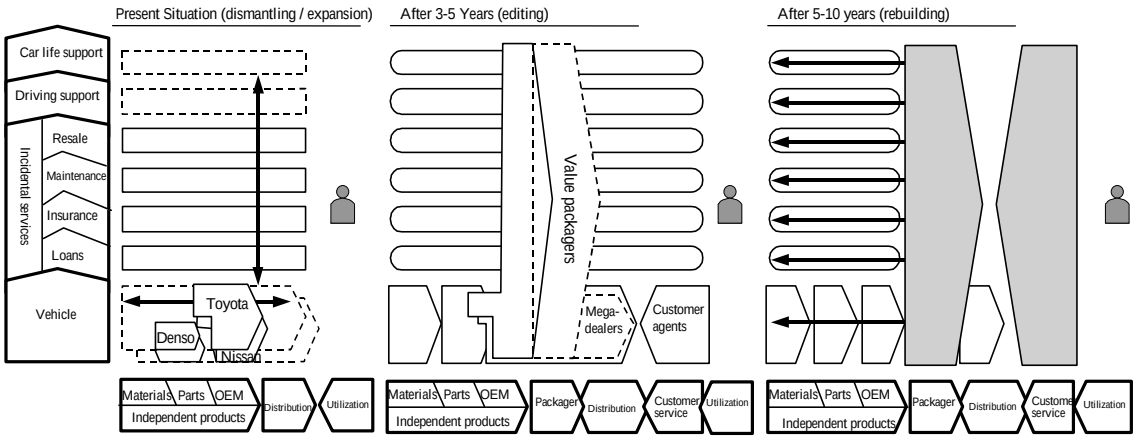
Distribution

Distribution accounts for ¥25 trillion of the ¥50 trillion costs engendered by industry throughout Japan because companies conduct one-way empty distribution. When this issue is addressed by entrusting distribution to professionals who make practical use of information technology or by creating markets that optimize the net working rate, the cost will fall dramatically. This will have an enormous impact on other industries (Figure 2. 1 - 9).



* Operating profit (however, financial institutions are ordinary profit)
Source: McKinsey Analysis, Analyst Guide, Corporate Reports of Negotiable Securities

Figure 2.1-6 : EC (Broadly Defined) Impact by Industry
(¥100m; profit base * / year)



- For autos, integration around OEMs
- Value slicer emerging in parts and services
- OEMs expanding business territory
  - ・Direct management of dealer / service bases
  - ・Entry into insurance and financing
  - ・Entry into car navigation services

- Progressive OEM expansion and dismantling by value slicers
  - ・Reorganization/abolition of parts suppliers and dealers
  - ・Appearance of value slicers at steps other than assembly (e.g., mega-dealers)
  - ・Emergence of next generation infrastructure services
- Appearance of a few advanced meta-service providers
  - ・Value packagers
  - ・Customer agents

- Intensification of competition among value packagers and customer agents aiming to become value chain owners
- Changes in the content of the value chain
  - ・From sales bases to service bases
  - ・From build-to-stock to build-to-order

Figure 2.1-7 : Structural Changes in the Automotive Industry

Health Care

If health care is divided into the three areas of prevention, treatment, and care, then a new business model will surely evolve in the areas of prevention and care as a result of future electronic commercialization. Services that package prevention and care for each disease will evolve through the practical use of individual information and information technology. Even in the area of treatment, services traditionally confined to hospitals could be disbanded and reforms, such as the outsourcing of distribution within hospitals, will be possible (Figure 2. 1 - 10).

Electronics

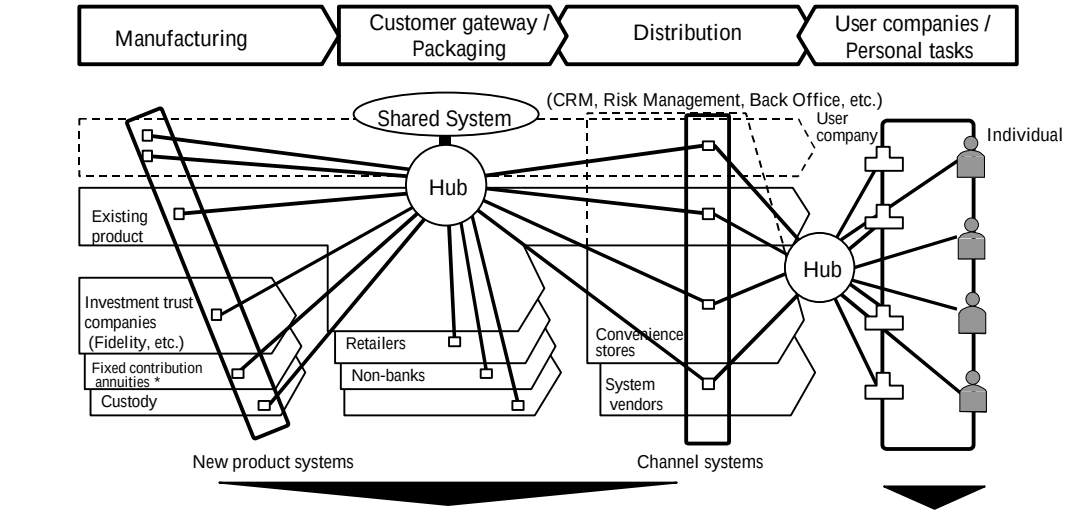
Although there are interesting developments at the individual product level, if we are indeed entering an era in which these products appear on open platforms such as Windows, then these components will all become daily necessities. Products must be made lean but the development of packages that take customer lifestyle and the living environment into account is more important (Figure 2. 1 - 11).

It is not necessarily the electronics companies that will carry this out. Construction companies or financial concerns such as GE capital may do so. Diverse businesses are loosely connected and they will be forced to consider whether or not they can present living proposals that suit their customers' lifestyles.

Retailing

Convenience stores are considered to be the most advanced form of retailing, but even they will evolve further with the advent of electronic commercialization. They represent area service delivery points and as such can provide all information and services (Figure 2. 1 - 12).

Furthermore, we should see new developments as a result of area specialization and marketing that takes regional characteristics into account. An example would be the creation of different service formats for areas where there are many elderly households and or many university students. New packagers applying the concept of community marketing are certain to appear.



* Hewitt, etc.

Figure 2.1-8 Appearance of Hub and Spoke Financial Institutions

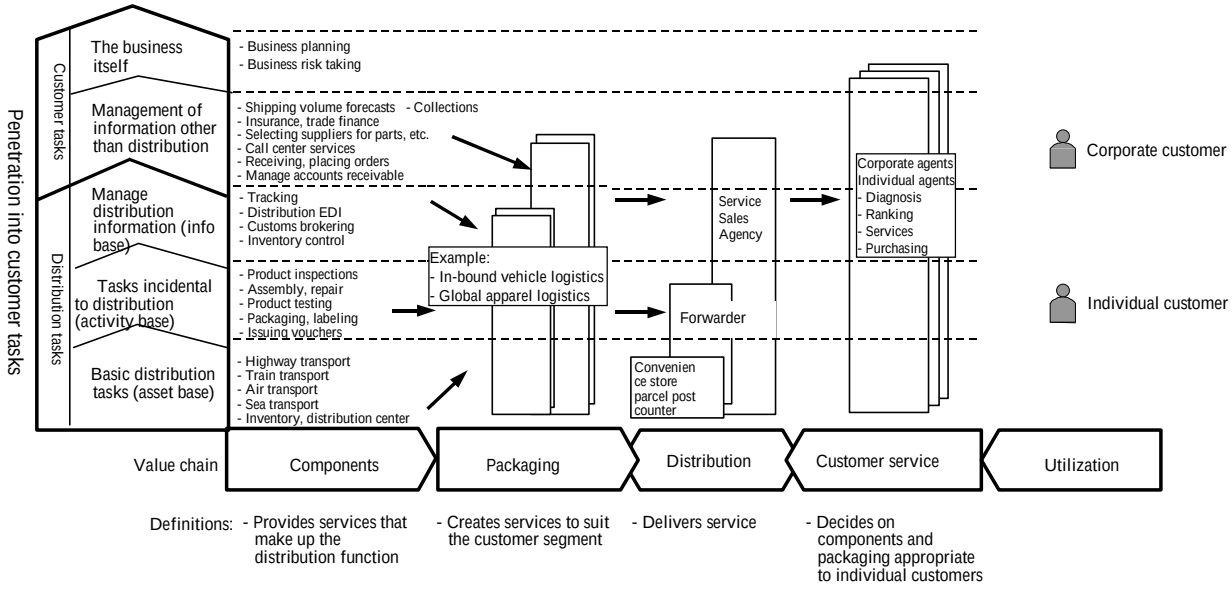


Figure 2.1-9 : Framework for Understanding Distribution (Future)

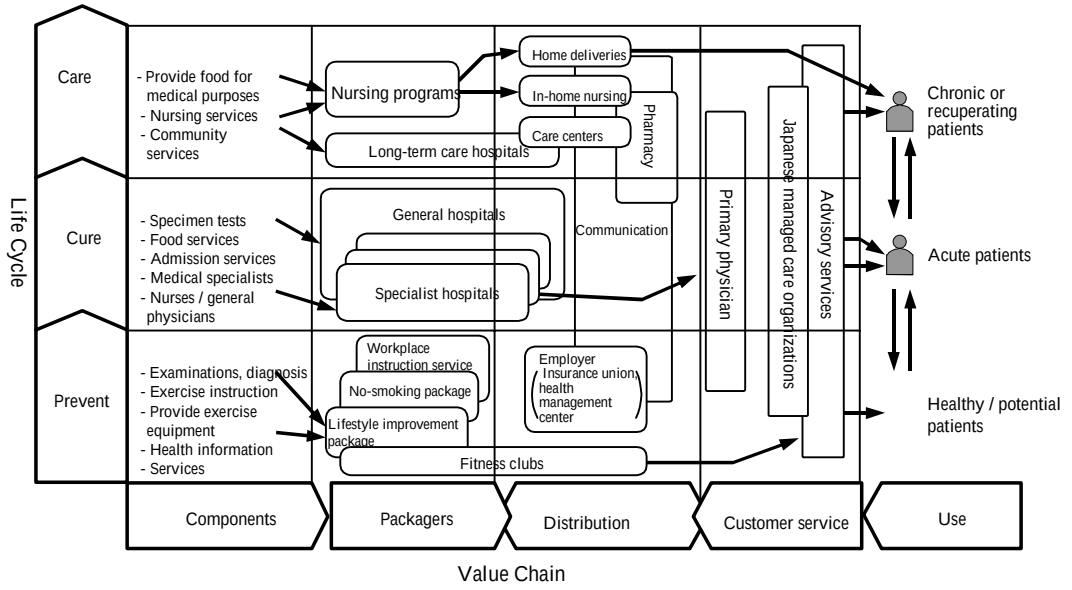


Figure 2.1-10 : Framework for Understanding Health Care (Future)

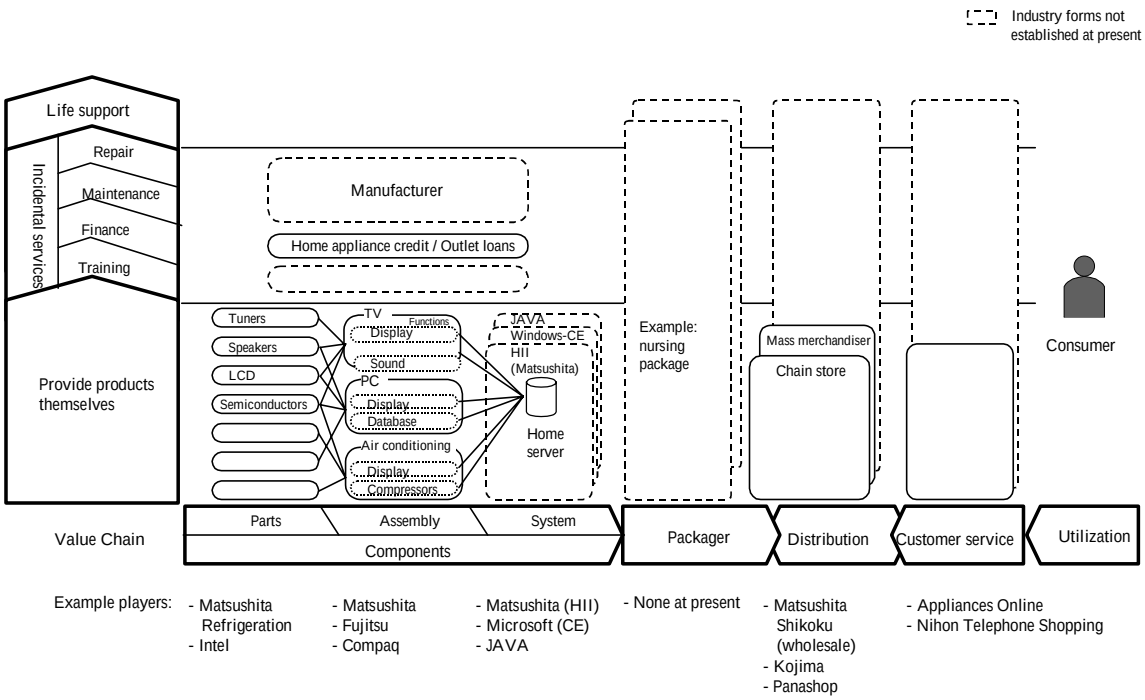


Figure 2.1-11 : Framework for Understanding Electronics (Future)

2.2 Other Industries

To extend the knowledge obtained from our analysis of model industries to other industries, we first classified them into several types (Figure 2. 2 - 1).

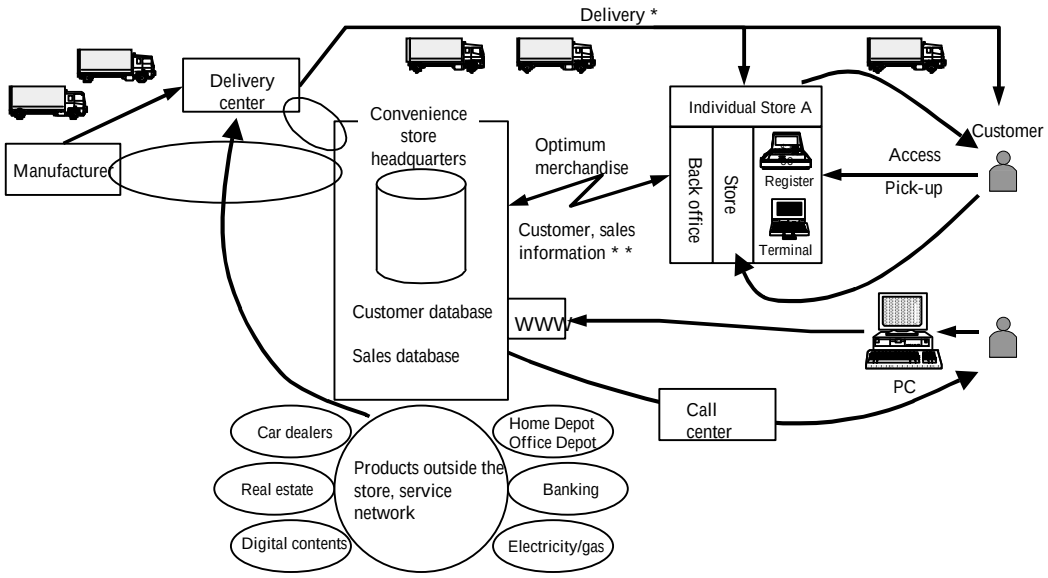
Industries belonging to the manufacturing sector are classified into seven types according to existing broad industrial classifications. Industries belonging to the non-manufacturing sector are classified into three types in line with the special characteristics of the value chain: processing distribution, specialized services, and facility operation. The processing distribution type allows products and services to circulate while adding added value through processing, and corresponds to wholesale/retail, real estate, and eating and drinking. The specialized services type provides high-grade special services using practical expert knowledge and skills, and corresponds to education, advertising, information services, etc. The plant operation type provides services through effective and efficient management infrastructures such as facilities/buildings and machinery, and corresponds to electricity/gas, communications, passenger transportation, etc.

2. 3 Methods for Estimating the Impact of Widespread Electronic Commercialization

As stated above, we adopted EVA to gauge the impact of widespread electronic commercialization. First, for each improvement method we multiplied the cost of its objective and sales by the extent of improvement, and calculated the improvement effect. We then multiplied this by the penetration level of improvement activities inside the industry and estimated the improvement effect at the industrial level (Figure 2. 3 - 1).

For each of the five types of electronic commercialization we used a detailed list of improvement measures obtained from the model businesses. We established base values for the impact and penetration level of each type with reference to developed precedents. Next, we classified each industry according to fixed standards, and established different numerical values for measures where it was estimated that impact differences would change greatly due to the type of industry, (Figure 2. 3 - 2, 3 - 3). For example, in the BCM (business-to-consumer marketplace) which is one forum for electronic commercialization, we classified four quadrants according to the costs engendered by the bargaining power of the purchasers and the transactions, and then established penetration levels that differed to these quadrants. In other words, we adjusted the penetration levels based on the assumption that the greater the purchaser's bargaining power and the greater the transaction cost, the further the BCM would spread.

We basically applied the same methodology to the cost of the IT (Information Technology) necessary to realize these improvement measures. In other words, after classifying the industries based on their level of IT and industrial concentration using the trial cost calculations from the model industries as a base, and with reference to the numerical values for the model industries, we established standard IT cost/sales ratios for each category and applied them to each industry (Figure 2. 3 - 4, 2. three to five).



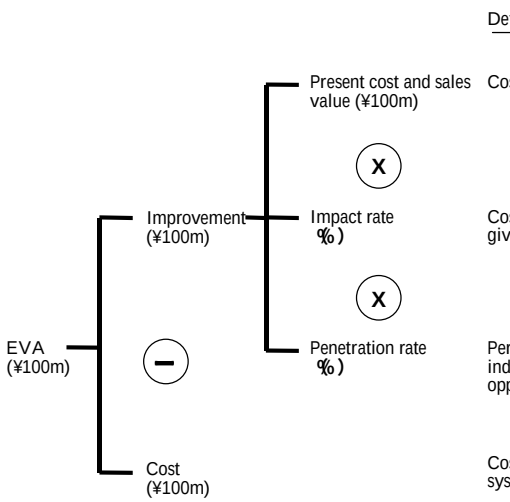
* In the case of home delivery, direct delivery from the delivery center and delivery with individual stores as hubs are both possible (based on economics).
* * Customer information will be obtained through the use of convenience store cards and electronic money.

Figure 2.1-12 : Evolution of Convenience Stores as Service Delivery Points

Manufacturing	
1. Food	Food products, beverages, tobacco, feed
2. Textiles / clothing	Cloth, clothes, leather, furs
3. Wood products	Wood products, furniture, pulp, paper, paper products
4. Publishing / printing	Publishing, printing, related products
5. Process products	Chemicals, petroleum, plastic, rubber
6. Metal products	Steel, non-ferrous metals, metal products
7. Machines	General mechanical appliances, electric appliances, transportation machines

Non-manufacturing	
1. Process/circulation	Wholesale, retail, real estate, restaurants
2. Specialized services	Education, construction, advertising, information services, specialist services
3. Facility operations	Electric/gas, communication, travel/transport, lodging, rental housing, broadcasting, leasing

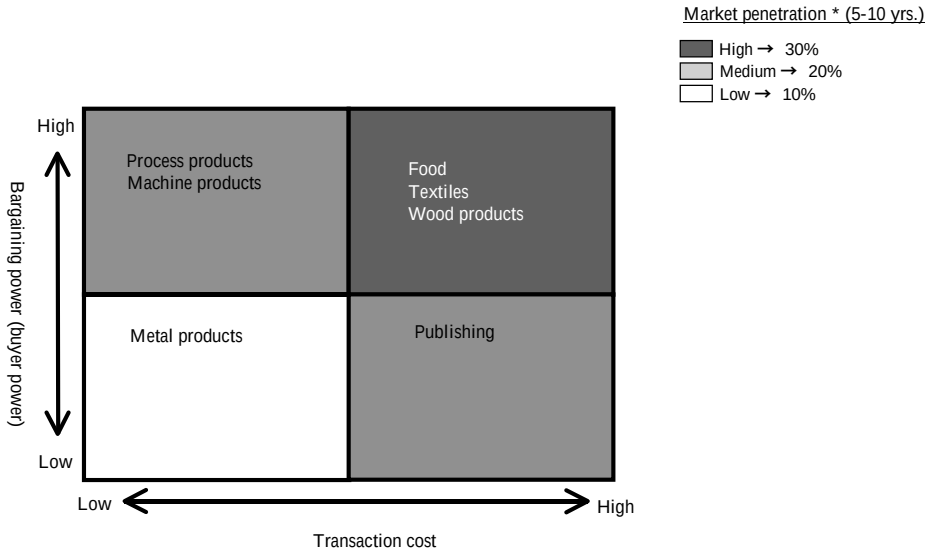
Figure 2.2-1 : Industrial Classification



	Definitions	Estimation method
Present cost and sales value (¥100m)	Cost structure in an industry group	Calculated from most recent performance information from the industry as a whole or representative companies (interviews conducted for some).
Impact rate (%)	Cost reduction or revenue improvement for a given EC opportunity	Basically, impact and penetration are estimated based on advanced examples for each EC type. If the impact is large, the characteristics of the industry are considered and individual improvement opportunity is categorized into high, medium, and low cases. * *
Penetration rate (%)	Percent of the sales or shipped value of an industry group that is involved with or has opportunity to use an EC system	
Cost (¥100m)	Cost of introducing and running an EC system *	Based on cost calculations for model industries, high, medium and low cases of IT system cost were designed for manufacturing and non-manufacturing. The industry group frameworks were based on the current degree of computerization and industrial concentration. * * *

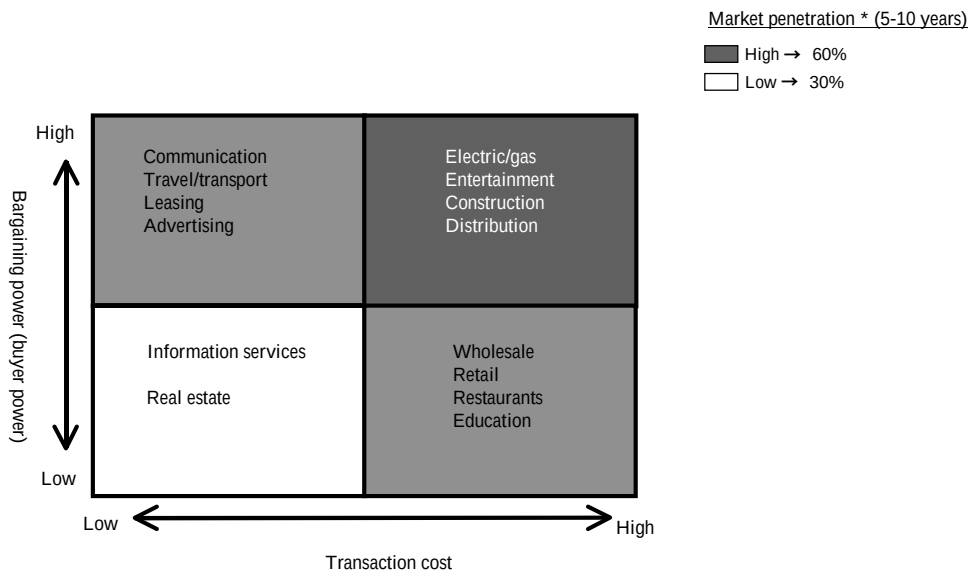
* The effect of capital cost on profit impact is comparatively small, so capital cost was separately calculated only for the model industries.
* * The detailed rationale for impact rate and penetration is presented in attached materials (p. 2, 3 for manufacturing, p. 23, 24 for non-manufacturing)
* * * The detailed rationale for the cost model is shown in attached materials (p. 11 for manufacturing, p. 28 for non-manufacturing)

Figure 2.3-1 : Methods of Estimating Impact of Broadly Defined EC



* The high case is based on a survey of 2,000 purchasing agents done by Thomas Register/VISA. It is assumed that 40% of companies use the Internet for more than half of their purchasing decisions (20 to 40% of all purchasing). The medium case is based on performance by TPN (Trading Process Network), FreeParts, and the automotive marketplace and assumes that about 20% of easy-to-deal commodities and parts will involve the Internet. The low case assumes about half of that.
* * For detailed rationale, see p. 32 of attached materials.

Figure 2.3-2 : Framework for Evaluating BCM Penetration — Manufacturing



* The high case is based on distribution industry and assumed penetration of 20% after 3-5 years and 60% after 5-10 years. The low case is half of that.
Note) For detailed rationale see p. 34 of attached materials.

Figure 2.3-3 : Framework for Evaluating BCM Penetration — Non-Manufacturing

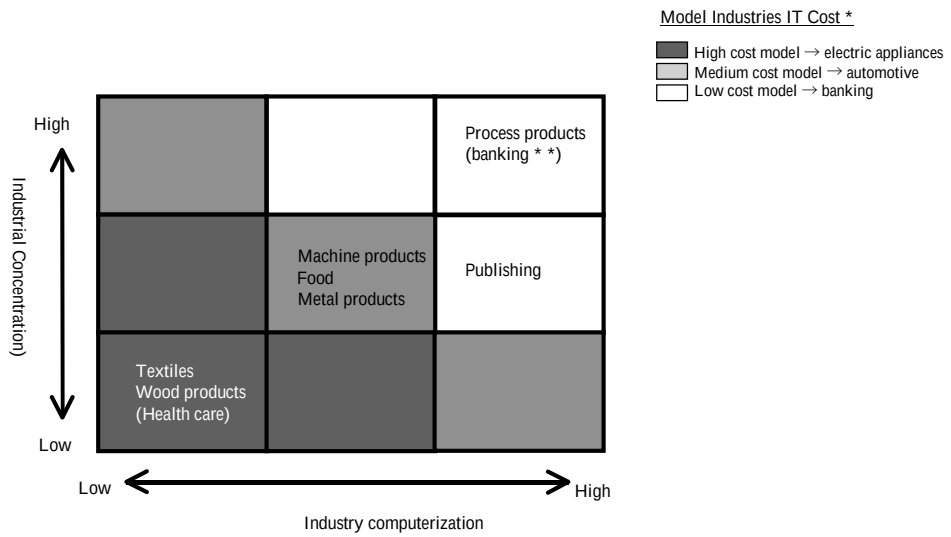
2.4 Method for Calculating the Scale of Narrowly Defined EC (Turnover)

To gauge the impact of narrowly defined electronic commercialization we used the indicator of transactions/contracts over the Internet as a guideline. Specifically, we calculated the total turnover of business-to-customer transactions (B to C), and business-to-business transactions (B to B) in each industry by estimating the penetration level of transactions through electronic media based on the scenario of electronic commercialization, and then multiplied it by the ratio of Internet contracts in these transactions (Figure 2. 4 - 1).

To carry out comparative analysis with US studies, we made two revisions. The first relates to the definition of electronic commercialization. Broadly defined, EC should include sales to individuals over multimedia terminals in convenience stores, and business-to-business transactions over every type of extranet, but because US studies only target transactions over the Internet, we restricted the definition to the level of Internet turnover. The second revision concerns transaction classification. Strictly speaking, transactions with individuals should include all those in the industry that make up the value chain (sales amount). However, since the Western studies that we are using for comparison only calculate the turnover of retail industries, we have also adopted this classification here (Figure 2. 4 - 2).

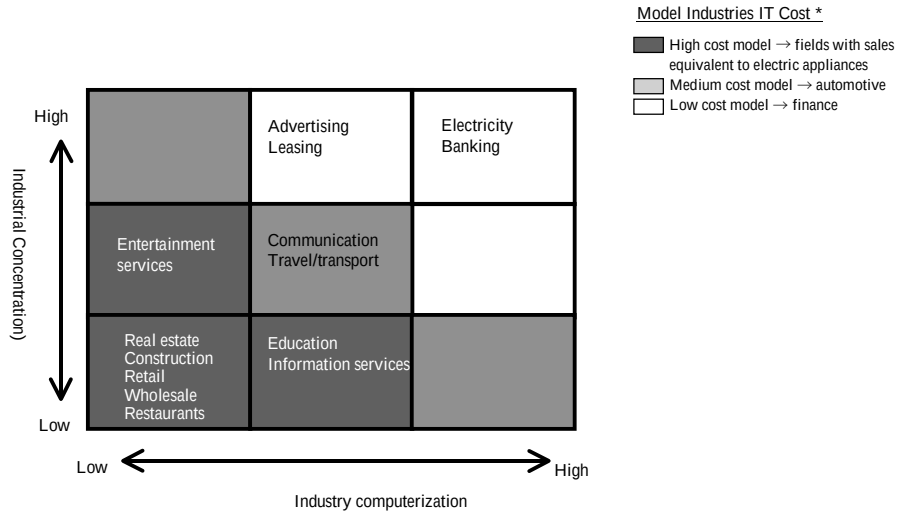
As shown in Figure 2. 4 - 2, there are no duplication problems because the value chains for each industry are defined without mutual duplication. At this point, there are no direct relationships with duplication between connected industries, but we would like to point out that the problem of double counting does arise when narrowly defined EC (turnover) is used to gauge impact.

When calculating the transaction amount using the narrowly defined EC, all the industry sales that make up the value chain are added up. As a result, the figure follows the flow of the value chain and duplicated product sales are counted twice. Taking the metal used in automobiles as an example, we see that sales are added at each stage of the process: raw material manufacturers, first and secondary component manufacturers, OEM manufacturers, and dealers. This suggests a fundamental problem when considering future structural changes in these industries. In other words, as EC develops, structures will simplify and middlemen will be eliminated. If the number of steps in the value chains is reduced, it is highly probable that the EC transaction amount will also be reduced because the number of sales duplications will decrease. A fatal flaw in this method, however, is that the value showing the level of progress could be reduced despite the advance of electronic commercialization. Consequently, when measuring the progress ratio of narrowly defined EC, it is necessary to look not just at the absolute values of turnover, but also at the penetration level (the proportion of EC transactions in the total transaction amount).



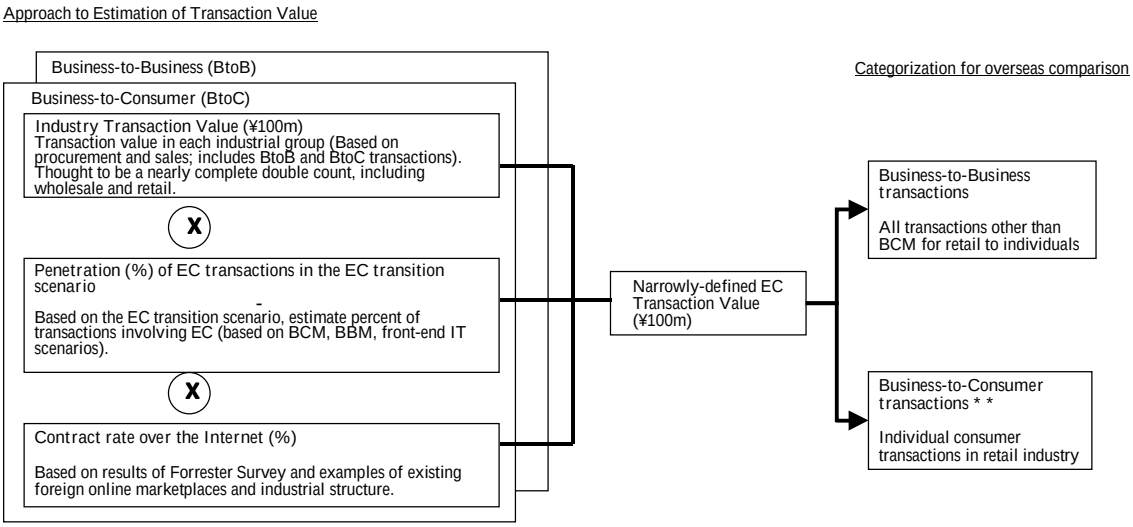
* Cost of information system, including introduction, operation, capital costs
* * As seen by player companies
* * * For detailed rationale, see p. 33 of attached materials.

Figure 2.3-4 Framework for Estimating IT Cost * for Each Industry - Manufacturing



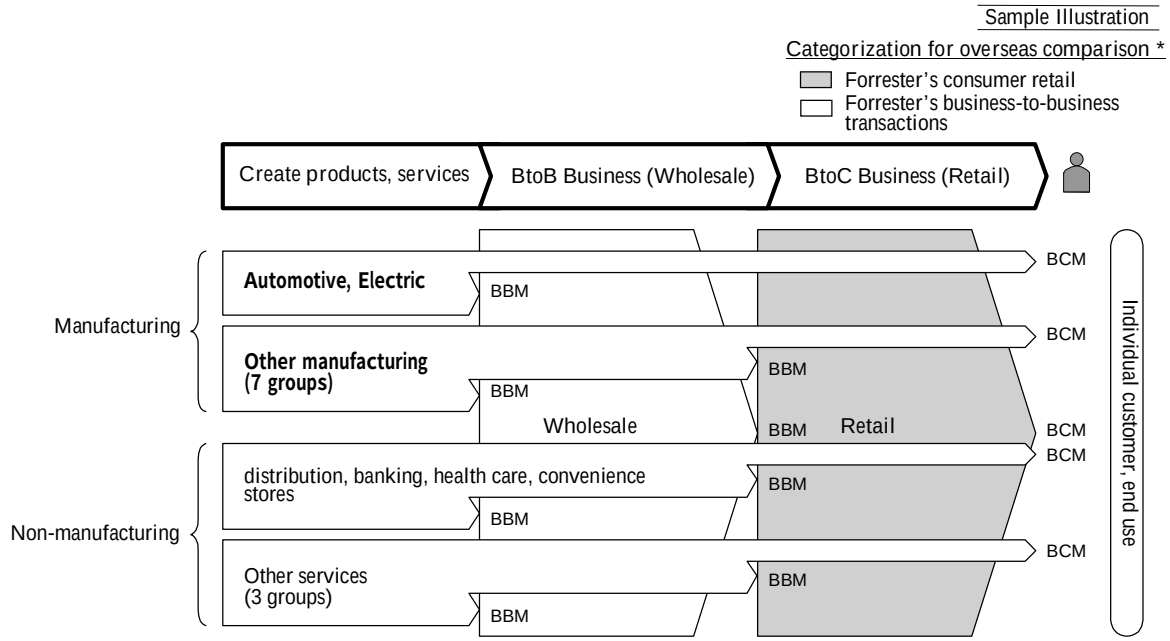
* Same as above
* * For detailed rationale, see p. 37 of attached materials.

Figure 2.3-5 : Framework for Estimating IT Cost * for Each Industry - Non-Manufacturing



* The transaction value is based primarily on representative companies and industry averages; Internet penetration is actual performance from the Forrester Survey, AutoByTel, and other marketplaces. For detailed rationale, see p. 38-55 of attached materials.
* * Used categories from Forrester Research's Consumer Retail.
Source: McKinsey Analysis, Forrester Research (Copyright 1998, Forester TM Research, Inc.)

Figure 2.4-1 : Method for Estimating the Scale of Narrowly Defined EC (Transaction Value)



* For comparison with Forrester, only retail BCM for sales to individuals is counted as consumer retail.
* * Calculating all transaction value of BCM to individuals, BCM will grow to ¥9 to ¥48 billion after 3-5 years, and to $30 to ¥130 billion after 5 to 10 years.

Figure 2.4-2 : Definition of Business-to-Business and Business-to-Consumer in Narrowly Defined EC

3. Analysis Results and Study

3. Analysis Results and Study

3.1 Analysis Results and Study of Narrowly Defined EC

3.1.1 Predictions for Japan

It is anticipated that the entire industrial total of narrowly defined EC transactions in Japan will grow to ¥15.4 trillion over the next three to five years, and to ¥55.5 trillion over the next five to ten years. If we look closely at the three to five year forecast, we can see that manufacturing industries account for ¥4.2 trillion and non-manufacturing industries for ¥11.2 trillion (72% of the total). Looking closely at the five to ten year forecast, we can see that manufacturing and non-manufacturing industries account for 8 and 47.5 trillion respectively, and that the proportion accounted for by non-manufacturing industry rises to 86% (Figure 3. 1 - 1).

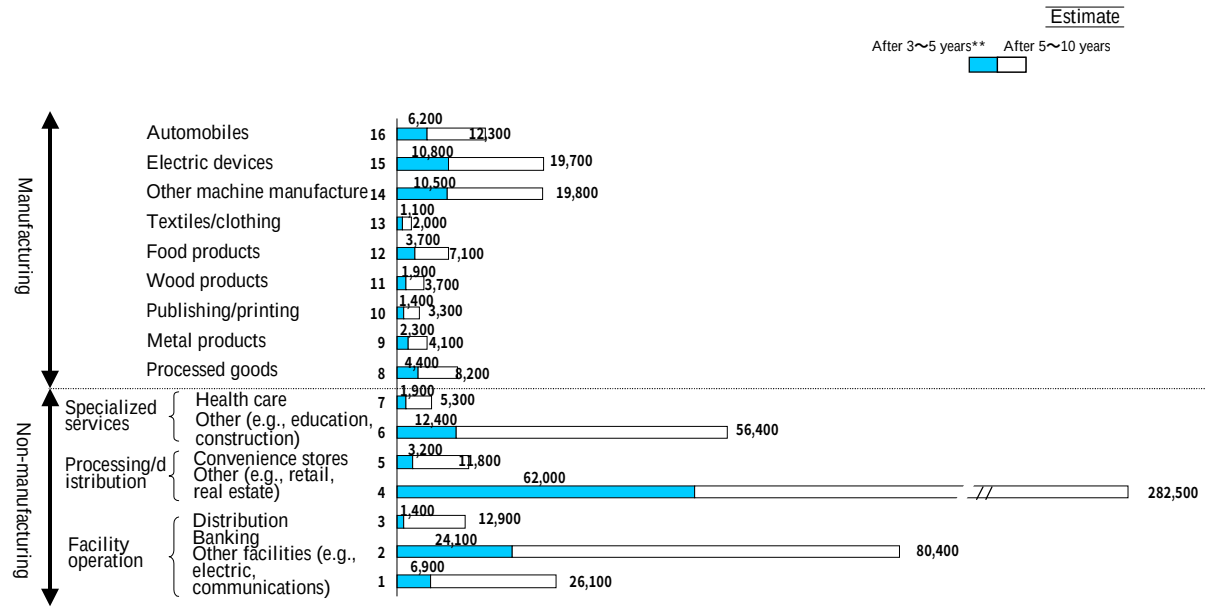
Of the manufacturing industries, the "machine product group" accounts for by far the largest percentage. If we add together the model automotive and electronic industries, then this group accounts for 69% of the entire manufacturing sector total at ¥2.7 trillion over the next three to five years and ¥5.2 trillion over the next five to ten years. It seems that the percentage of the whole of EC accounted for by the machine products group will be extremely large due to the size of the commercial transactions themselves, and the high penetration level of the EC marketplace (mid-level) in this group. A comparison between business-to-business and business-to-customer transactions in the manufacturing industry reveals that the percentage accounted for by the former outstrips the latter at 61% for any given period.

It is anticipated that business transactions involving extremely large amounts of money will become electronic in non-manufacturing industries. In particular, the processing distribution type industries, including convenience stores, will reach ¥6.5 trillion (after three to five years), and ¥29.4 trillion (after five to ten years), and will account for 58% of the entire non-manufacturing sector over the next three to five years, and 62% over the next five to ten years.

The plant operation type industries as a whole, including distribution and financial model industries, will reach ¥3.2 trillion over the next three to five years, and attain a scale second only to the processing distribution type. However, the financial industry will account for 74% of this figure at ¥2.4 trillion. This trend does not change in the five to ten year forecast with the financial industry continuing to account for 67% of the whole.

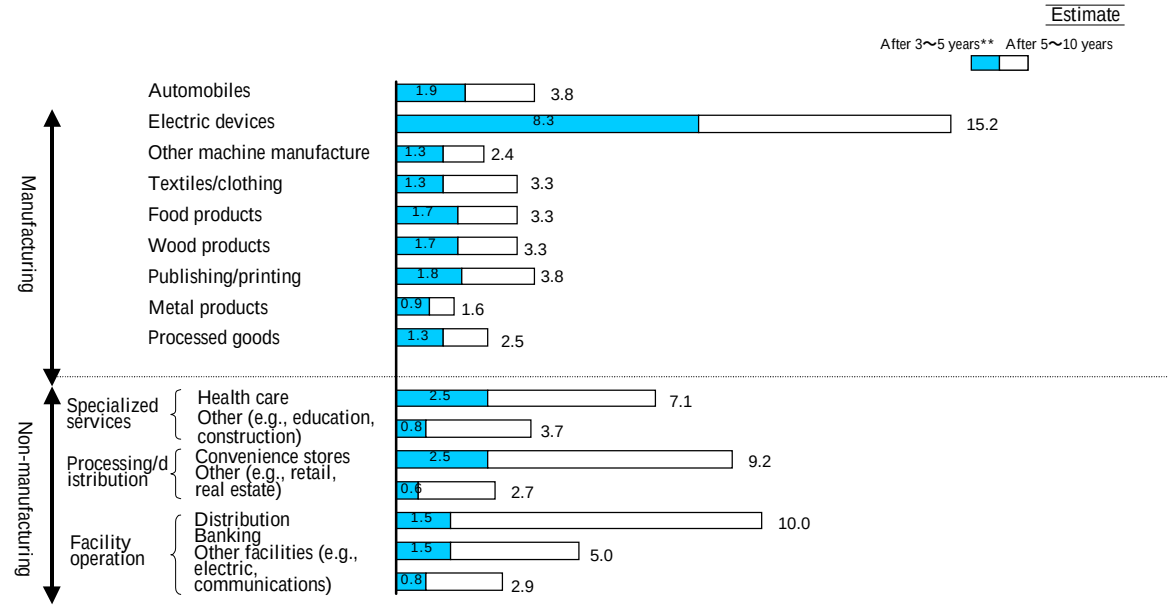
Special service type industries, including health care, are likely to total ¥1.4 trillion over the next three to five years, and grow to a scale that exceeds the ¥1.1 trillion of the electrical machinery industry. The main reason for this is that scale of the construction services will expand enormously (construction services alone account for 75% of the entire special service industry).

The percentage of narrowly defined EC transactions in the total commercial transaction amount according to the above estimations and assumptions is shown in Figure 3. 1 - 2. These are results for which we assumed the penetration level separately for patterns of electronic commercialization where relationships are strong in the narrowly defined EC such as supply chain management, general customer management, and the business-to-consumer marketplace,



* For detailed rationale, see p. 38, 48 of attached materials
Source: McKinsey Analysis

Figure 3.1-1 : Narrowly Defined EC Transaction Value by Industry
(¥100m; transaction value)



* For detailed rationale, see p. 38-55 of attached materials
Source: McKinsey Analysis

Figure 3.1-2 Penetration of Narrowly Defined EC by Industry (%)

with reference to domestic and foreign precedents. According to the above industry structure change scenario, we assumed that narrowly defined EC would also progress. The values are generally large for the model industries but this is probably because we added up the opportunities for narrowly defined EC in greater detail. This would indicate that the estimated values discounting the model industries are on the conservative side. Please refer to the attached materials for details.

3.1.2 Comparison of the EC Market in Japan and the West by Industry

We compared the scale of narrowly defined EC and the percentage of EC in the total transaction amount between Japan and Western countries. The comparison data were provided by Forrester and Yankee for the US, and Forrester for Europe. They are all predicted values for the year 2002 and correspond to the three to five year forecast of our study.

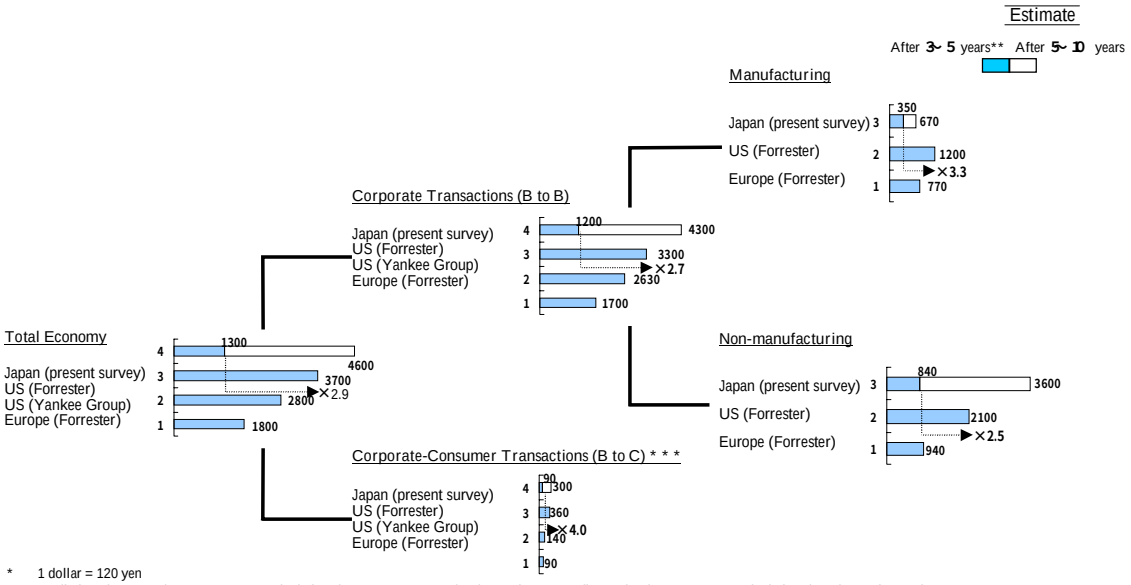
If we look at transaction amounts in the manufacturing and non-manufacturing industries that make up the entire economy, we see that individual transactions, corporate transactions, and a breakdown of both in the US are approximately three times the size of those in Japan. In Europe, individual transactions are estimated to be on approximately the same scale as in Japan, but corporate transactions are 1.4 times the scale of those in Japan (Figure 3. 1 - 3).

These absolute values are naturally influenced by the original size of the economies and to estimate the extent of electronic commercialization we compared the proportion of EC transactions in the total transaction amounts in Japan and the US (Figure 3. 1 - 4). Once more we see that the US boasts a penetration level roughly twice that of Japan in every field. When we compare the penetration levels for the Japan five to ten year forecast and the US three to five year forecast, we see that the Japanese ratio is far higher in the non-manufacturing industries, but in the manufacturing industries corporate and individual transactions are roughly the same. The situation in the US after three to five years closely resembles that in Japan after five to ten years. In this study we assume that structural reforms will forge bravely ahead in every industry, but this leads to the harsh conclusion that Japan will slowly reach a penetration level that lags several years behind that of the US.

3.1.3 Study of the Different Backgrounds in Japan and the US

The difference between EC penetration levels in Japan and the US is not due to individuals, corporations, manufacturing industries, or non-manufacturing industries in particular, as they are all consistently twice as strong in the US. It seems that structural differences between Japan and the US exist that are not determined by disparate situations in their industries.

As explained, we originally surveyed the structural changes in six model industries in our study and estimated the scale of narrowly defined EC based on the results. Despite differences due to the model industries, the industrial structure in Japan remains several years behind that in the US. A comparison of the scale of the EC market place also reveals that there is a time lag of several years. Furthermore, it appears that structural change in industry proceeds simultaneously with the development of narrowly defined EC. In other words, growth in the EC market place itself is nothing more than a phenomenon resulting from these reforms and without them we cannot expect any substantial electronic commercialization.



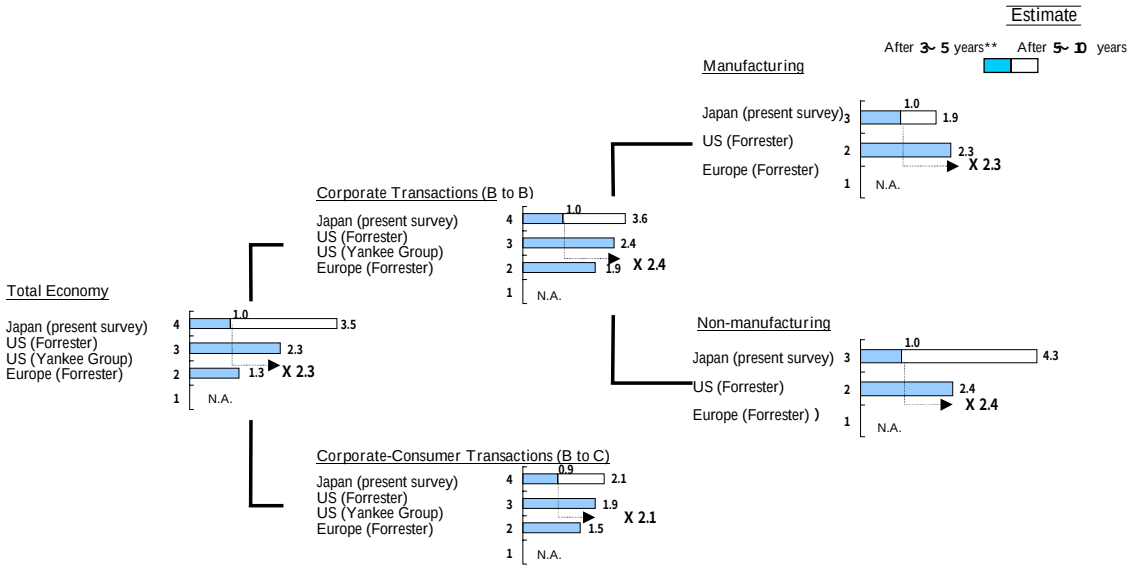
* 1 dollar = 120 yen

* * Predictions for US and Europe are 2002 calculations by Forrester Research. The Yankee Group figures for the US are 2002 calculations based on estimates for 2000.

* * * To allow comparison, retail BCM was calculated to match the definitions by Forrester Research. Total BCM narrowly defined EC transactions involving private individuals are estimated at $48 billion after 3-5 years and $136.8 billion after 5-10 years. (BCM : Business-to-Consumer Marketplace)

Source: McKinsey Analysis, Forrester Research (Copyright 1998, Forrester TM Research, Inc.), Yankee Consulting Group, Economic Statistics Yearbook

Figure 3.1-3 (same as Figure 1) : Comparison of Narrowly Defined EC Transaction Value in Japan, the US, and Europe — Absolute Value Base ($100m)



* Predictions for the US and Europe are 2002 calculations by Forrester Research. The Yankee Group figures for the US are 2002 calculations based on estimates for 2000.

* * To allow comparison, retail BCM was calculated to match the definitions by Forrester Research. Total BCM narrowly-defined EC transactions involving private individuals are estimated at $48 billion after 3-5 years and $136.8 billion after 5-10 years. (BCM : Business-to-Consumer Marketplace)

Source: McKinsey Analysis, Forrester Research (Copyright 1998, Forrester TM Research, Inc.), Yankee Consulting Group, Economic Statistics Yearbook

Figure 3.1-4 (same as Figure 2) : Comparison of Narrowly Defined EC Transaction Value in Japan, the US, and Europe — Percentage of Total Transactions (%)

3.2 Study and Analysis Results of Broadly Defined EC

3.2.1 Impact of Broadly Defined EC throughout the Japanese Economy

3.2.1.1 Impact Overview

The impact (economic expansion effect) of broadly defined EC as measured by EVA reaches a level of ¥19.1 trillion after three to five years and ¥63.8 trillion after five to ten years throughout the Japanese economy. In other words, compared to a GDP of ¥486 trillion for fiscal 1995, there are boost effects of 4% and 13% respectively. Of this, the proportion accounted for by the non-manufacturing industries reaches 78% after three to five years and remains at 69% even after five to ten years. As for narrowly defined EC, the economic effects of the non-manufacturing industries are significant (Figure 3. 2 - 1).

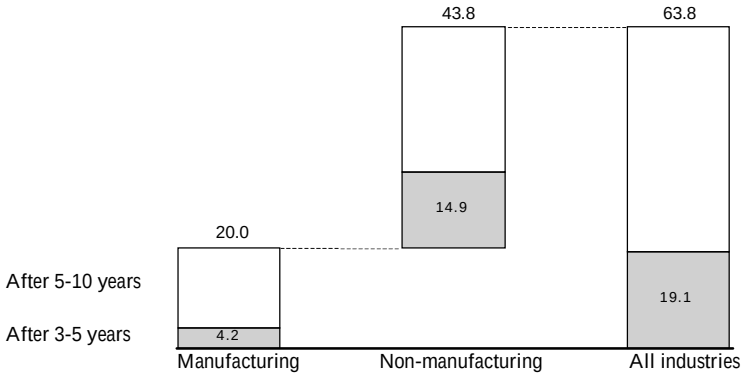
Furthermore, the timing of the effects reveals that 30% of the value added creation effects predicted after five to ten years emerge after three to five years. Although a trend can be seen where the pace of the effects accelerates over the years, a considerable proportion of the impact is realized at an early stage. This suggests that the frequently held opinion that "IT is nothing more than prior investment for long-term results," may not necessarily be correct. In particular, in the non-manufacturing industries, the added value of ¥14.9 trillion that will be realized after three to five years accounts for 34% of the ¥43.8 trillion added value that will be realized in the five to ten year period, and early effects are predicted when compared to the manufacturing industries.

3.2.1.2 Impact by Industry and Background

In the manufacturing sector the greatest impact is in the machine industry. If we total the added value that is created in the automobile, electrical equipment, and other machine industries after three to five years, it amounts to 54% of the entire manufacturing sector. Large impact is also anticipated in categories such as foodstuffs and processed goods (Figure 3. 2 - 2).

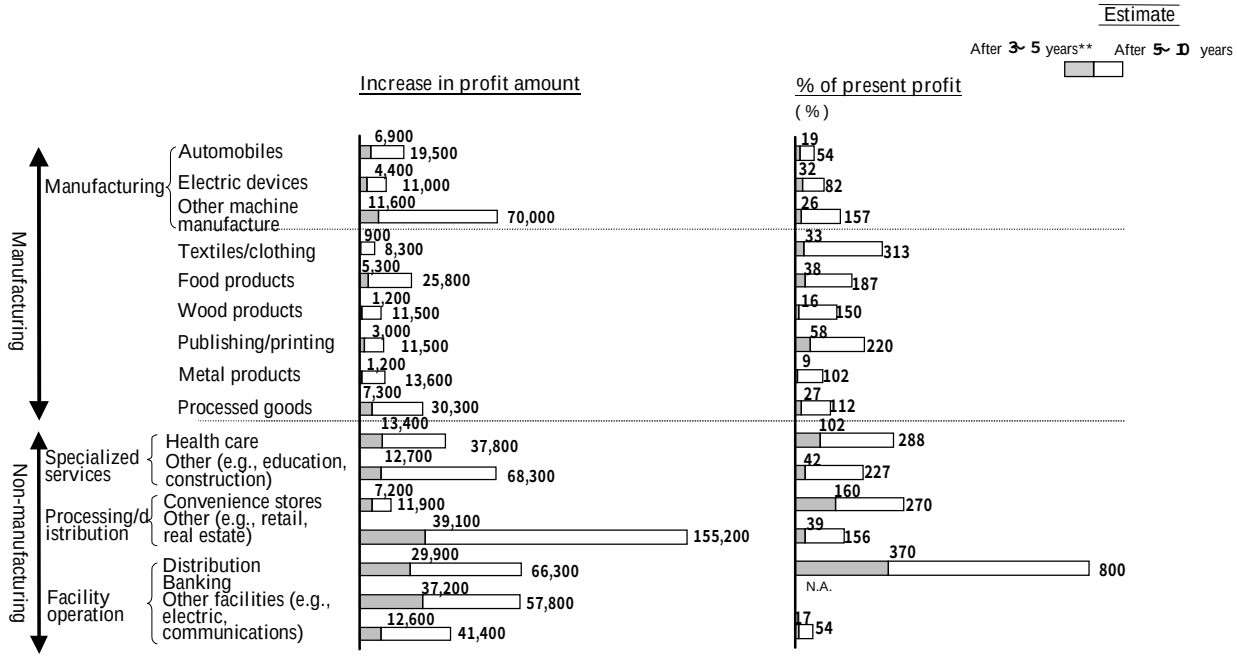
This naturally relies on industrial scale. Consequently, to discern the extent of the impact of broadly defined electronic commercialization on the improvement of profit structure in each industry, we looked at the ratio of current profit and created added value. This showed us that in the manufacturing sector, the industries with large profit increases are printing and publishing, foodstuffs, textiles/clothing, electrical equipment, etc. Looking at the five to ten year forecast, we see that there is an additional effect of over 150% (an increase of more than 2.5 times in profit amount) for machine products (excluding textiles/clothing, printing/publishing, foodstuffs, automobiles, and electrical equipment) and timber products, etc. We can surmise that computerization has an enormous latent power to change the profit structure of industries. In other words, it appears that the "waste" and "loss of opportunity profit" that ought to be revealed by structural reforms are largely concealed in these industries.

In the non-manufacturing sector, the added value creation effect after three to five years for the plant operation type industries is significant and accounts for 53% of the whole. Together with finance, and distribution, approximately ¥3 trillion of added value is created by each of these



* Operating profit; effect of cross-sales on other industries omitted.
Source: McKinsey Analysis

Figure 3.2-1 : Impact of Broadly Defined EC
(¥ trillion; profit base * / annual)



Source: McKinsey Analysis

Figure 3.2-2 : Impact of Broadly Defined EC by Industry

industries alone. This has a large impact even with regard to the current profit levels. In the distribution industry it equates to an increase of 370% (4.7 times). Looking at the five to ten year forecast, we see that the profit creation effect for the processing distribution type industries reaches ¥15.5 trillion. The effect is considerable due to the structural reform in industries where inefficiency is currently high, such as retailing and the sale and lease of real estate, and the added value of ¥9.4 trillion and ¥3.5 trillion respectively will increase. Looking at Figure 3. 2 - 2, we see that that the percentage of profit increase amount is large for processing distribution type industries excluding convenience stores, but that this value shrinks in comparison to the present profit level. This is because considerable amounts of profit are being generated even now. Meanwhile, because the finance industry is not generating profits at the moment, numerical values comparing forecasts to the present are not given.

3.2.1.3 Impact of Each EC Model and Background

Looking at each of the five EC models, we see that in the three to five year period, the impact in SCM (Supply Chain Management) is largest, and generates an economic value of ¥8.8 trillion per year (Figure 3. 2 - 3). Next is the ¥5.8 trillion of ICM (Integrated Customer Management), followed by ¥4.3 trillion for the BCM (Business-to-Consumer Marketplace). The economic effect of OCM (Open Collaboration Management) is small compared to the others at ¥0.5 trillion. This trend is the same over the five to ten year period, with ¥38.6 trillion of SCM standing out. Next is ICM with ¥14.8 trillion, followed by BCM at ¥8.4 trillion.

The impact of SCM shows that at present there is significant waste in the circulation of goods and services between companies, plant capacity, and the supply and application of management resources in the broad sense including human resources. Moreover, for ICM, the current interface with customers is expensive and unproductive and can be improved significantly through the application of information technology.

3.2.2 Analysis of Effects of Investment in EC

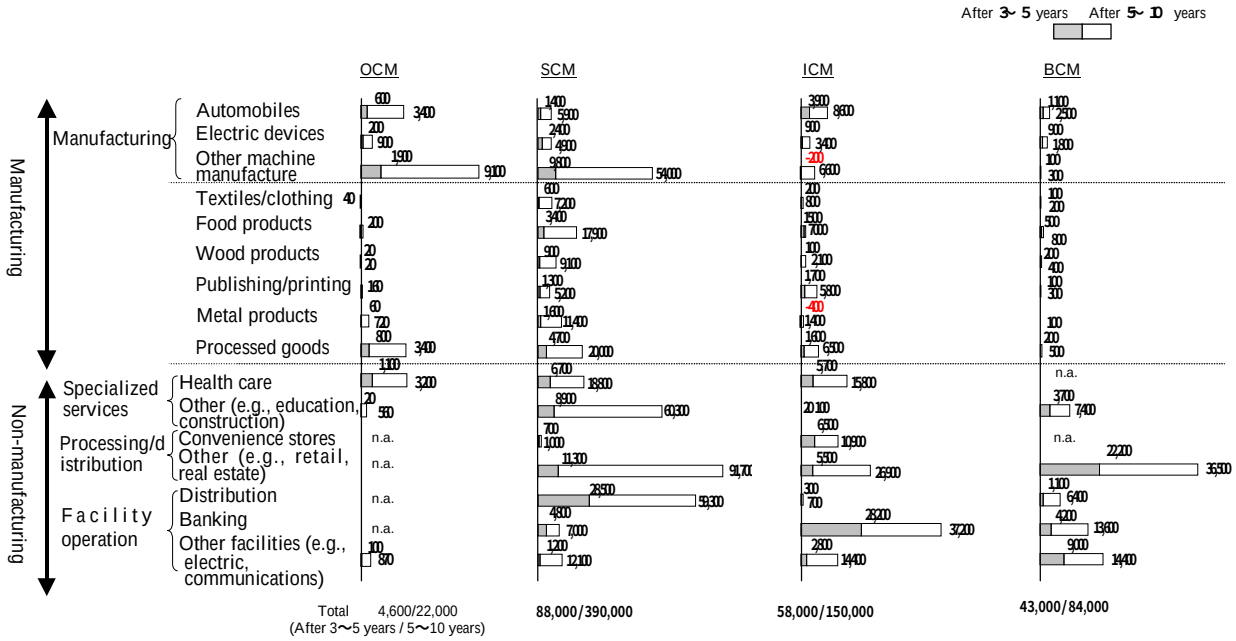
3.2.2.1 Investment Effects by EC Model and by Industry

For each industry and EC model we used appropriate indicators for the ratio of profit increase to cost, i.e., ROI (Return on Investment), and investigated areas where it is high.

(1) Three to Five Year Period

We first looked at the effects over the three to five year period (Figure 3. 2 - 4). Looking at each type of electronic commercialization, we see that ICM (Integrated Customer Management) has a comparatively high value of 420% (making four times more profit than the initial investment). OCM has the lowest at 90%, and BCM and SCM are in the middle with 270% and 240% respectively. The fact that the values are positive for all electronic commercialization means that large profits exceeding investment can be obtained.

If we examine each industry in detail, we see that ROI is generally high for non-manufacturing industries in comparison with manufacturing industries. In particular, we obtained ROI of 5800%, 1000%, and 3000% (58, 10, and 30 times the investment) for our chosen model



Source: McKinsey Analysis

Figure 3.2-3 : Impact of Broadly Defined EC by Industry by Model

ROI for investment opportunities

Low	Medium	High
ROI<350%	ROI>350%	ROI>700%

EC Type

Industory Group

		Manufacturing									Non-manufacturing							
		Assembly			Process						Skill		Infrastructure management					
		Autos	Electric devices	Other	Textiles/clothing	Food	Wood	Publishing	Metal	Processed goods	Health care	Other specialized services	Convenience	Other process/ distribution	Distribution	Banking	Other facilities	Total
OCM	Increase in Profit	548	189	1,925	-14	-59	-38	19	60	757	1,062	26	0	0	0	0	143	4,618
	Cost	1,287	426	760	65	231	110	45	256	186	1,548	243	0	0	0	0	156	5,314
	ROI	**43%**	**44%**	**253%**	**-21%**	**-26%**	**-35%**	**41%**	**23%**	**407%**	**69%**	**11%**	**0%**	**0%**	**0%**	**0%**	**92%**	**87%**
SCM	Increase in Profit	1,426	2,405	9,794	589	3,344	900	1,258	1,586	4,738	6,673	8,918	682	11,290	28,461	4,817	1,220	88,101
	Cost	772	2,301	4,252	1,063	1,295	1,793	74	1,434	309	1,823	2,312	18	16,233	2,080	506	1,065	37,330
	ROI	**185%**	**105%**	**230%**	**55%**	**258%**	**50%**	**1693%**	**111%**	**1533%**	**366%**	**386%**	**3789%**	**70%**	**1368%**	**952%**	**115%**	**236%**
ICM	Increase in Profit	3,875	874	-178	168	1,546	128	1,684	-447	1,614	5,652	18	6,520	5,521	266	28,213	2,834	58,288
	Cost	855	987	3,146	271	958	457	89	1,061	371	2,023	7	106	644	51	713	2,203	13,942
	ROI	**453%**	**89%**	**-6%**	**62%**	**161%**	**28%**	**1889%**	**-42%**	**435%**	**279%**	**257%**	**6151%**	**857%**	**522%**	**3957%**	**129%**	**418%**
BCM	Increase in Profit	1,080	895	73	127	457	213	88	25	228	0	3,717	0	22,246	1,138	4,185	8,432	42,904
	Cost	410	181	213	21	65	35	13	72	52	0	3,418	0	8,125	954	0	2,540	16,098
	ROI	**263%**	**494%**	**34%**	**603%**	**706%**	**603%**	**706%**	**34%**	**438%**	**0%**	**109%**	**0%**	**274%**	**119%**	**0%**	**332%**	**267%**
Total	Increase in Profit	6,929	4,363	11,614	870	5,288	1,204	3,048	1,223	7,337	13,387	12,679	7,202	39,057	29,865	37,215	12,629	
	Cost	3,324	3,895	8,371	1,421	2,549	2,395	221	2,823	918	5,394	5,980	124	25,002	3,085	1,219	5,964	
	ROI	**208%**	**112%**	**139%**	**61%**	**207%**	**50%**	**1381%**	**43%**	**799%**	**248%**	**212%**	**5808%**	**156%**	**968%**	**3053%**	**212%**	

* Operating profit base; includes effect of cross-sales
* * Based on one-year depreciation; includes cost of IT introduction, operations, capital cost
* * * Wholesale and retail for autos and electric devices omitted.

Figure 3.2-4 : Increase in Profit * , Required Investment * * , and ROI by Model for Broadly Defined EC after 3-5 years

industries of convenience stores, distribution, and finance respectively. The return on investment is high for ICM and SCM as EC models.

In the non-manufacturing sector, we can classify special services industries as "skill type" industries relying on human skills, and plant operation industries as "infrastructure type" industries. Processing sales industries fall between the two. When we compare skill and infrastructure types, an interesting trend can be seen whereby the ROI is higher for the latter. This appears to be because infrastructure type industries generally have strong controls and wide scope for the rationalization of facilities and sales channels, while the electronic commercialization of human resources management in skill type industries is comparatively difficult.

Even more than for manufacturing industries, in non-manufacturing industries it seems that the high EC potential of ROI is due to the following reasons. Electronic commercialization seems to greatly reduce "interaction costs," namely the costs related to the exchange of information necessary to create value. On the other hand, it seems that compared to manufacturing industries, the proportion of interaction costs is large for non-manufacturing industries. Consequently, there should be more room for cost reduction through EC for non-manufacturing industries than for manufacturing industries.

However, if we classify the industry group into "system types" and "process types" in the manufacturing sector, then ROI is generally high for process types. Large ROI of 800% and 1400% (a profit of 8 and 14 times investment) are expected from industries in the "process industry group" such as chemicals and petroleum, and for the "published goods group," such as publishing and printing respectively. Here too, EC models reveal significant impact for ICM and SCM.

Even considering the absolute values of profit increase for each of the aforementioned types of electronic commercialization, both ICM and SCM have substantial effects. It is true to say that both are effective approaches to electronic commercialization in terms of both investment amount and efficiency.

(2) Five to Ten Year Period

We conducted the same kind of analysis for the five to ten year forecast (Figure 3. 2 - 5). Looking at each of the EC models, SCM exceeds ICM and has the highest ROI. This is probably because a certain amount of prior investment is necessary for SCM requiring the involvement of a great many businesses. In the other EC models too, ROI exceeding the three to five year period are obtained by 250% for OCM and 330% for BCM. It seems that investment effects rise gradually in tandem with the rise in the penetration level.

The fact that non-manufacturing industries are more likely than manufacturing industries to follow the trend of high ROI, and that the infrastructure types among non-manufacturing industries and the process types compared to the system types in the manufacturing industry have high ROI, constitute similar results to those obtained for the three to five year period. With the exception of convenience stores and distribution, the fact that the values for ROI itself are also greater for the five to ten year period than for the three to five year period, with the rise in ROI following the rise in the penetration level, suggests that "the law of diminishing returns"

is operating. Conversely, convenience stores and distribution show in the three to five year period, that the advance of IT spreads easily in areas where results are obtained efficiently, and that areas remain in the five to ten year period where investment efficiency is comparatively low.

ROI for investment opportunities

Low	Medium	High
ROI<350%	ROI>350%	ROI>700%

EC Type / Industry Group

		Manufacturing (Assembly ◄ ► Process)									Non-manufacturing (Skill ◄ ► Infrastructure management)							
		Autos	Electric devices	Other machine products	Textiles/ clothing	Food	Wood	Publishing	Metal	Processed goods	Health care	Other specialized services	Convenience stores	Other processes/ distribution ***	Distribution	Banking	Other facilities	Total
OCM	Increase in Profit	3,111	919	9,133	44	199	14	158	722	3,380	3,220	555	0	0	0	0	871	22,326
	Cost	1,083	479	1,608	163	489	275	95	256	186	3,876	243	0	0	0	0	327	9,080
	ROI	287%	192%	568%	27%	41%	5%	167%	282%	1815%	83%	228%	0%	0%	0%	0%	266%	246%
SCM	Increase in Profit	5,561	4,913	54,074	7,226	17,853	9,086	5,238	11,443	19,949	18,744	60,339	1,041	91,729	59,275	6,956	12,108	385,534
	Cost	541	2,030	2,657	1,043	809	1,759	119	1,434	309	2,923	7,036	59	17,955	6,031	828	1,602	47,135
	ROI	1028%	242%	2035%	693%	2207%	517%	4407%	798%	6456%	641%	858%	1764%	511%	983%	840%	756%	818%
ICM	Increase in Profit	8,371	3,392	6,588	827	7,017	2,077	5,812	1,370	6,450	15,788	80	10,854	26,940	660	37,217	14,424	147,866
	Cost	825	1,735	3,146	278	958	469	104	1,061	371	5,058	20	232	1,656	1,780	880	5,929	24,502
	ROI	1015%	196%	209%	297%	733%	443%	5588%	129%	1740%	312%	400%	4678%	1627%	37%	4229%	243%	603%
BCM	Increase in Profit	2,406	1,789	252	209	773	352	318	85	482	0	7,354	0	36,547	6,361	13,591	13,978	84,496
	Cost	574	362	319	37	97	63	19	72	52	0	5,929	0	13,737	102	0	4,310	25,673
	ROI	419%	494%	79%	557%	796%	557%	1692%	119%	925%	0%	124%	0%	266%	6236%	0%	324%	329%
Total	Increase in Profit	19,449	11,013	70,047	8,305	25,842	11,528	11,526	13,619	30,261	37,752	68,328	11,895	155,216	66,296	57,764	41,381	
	Cost	3,023	4,606	7,730	1,522	2,354	2,566	336	2,823	918	11,857	13,228	291	33,348	7,913	1,708	12,168	
	ROI	643%	239%	906%	546%	1098%	449%	3427%	483%	3296%	318%	517%	4088%	465%	838%	3382%	340%	

* Operating profit base; includes effect of cross-sales
* * Based on one-year depreciation; includes cost of IT introduction, operation, capital cost
* * * Wholesale and retail for autos and electric devices omitted.

Figure 3.2-5 : Increase in Profit * , Required Investment * * , and ROI by Model for Broadly Defined EC after 5-10 years

For the OCM of textiles, foodstuffs, and timber industries, and the ICM of the metal industry, the three to five year ROI is negative, and no increase in profits which exceed investment are obtained. For OCM in particular, the systems investment burden tends to be large and it seems that the fact that results are difficult to obtain because EC is not widely spread in the industry influences results. However, in the five to ten year period, all the ROI are positive even in these categories. This means that even if results which offset investment are obtained in the long term, there are areas where losses have to be covered in the medium term, and long-term IT investment decisions are required in these specific areas. However, there are very few industries in the EC categories that cannot secure profits in the medium term, and most obtain results that offset investment in the three to five year period. As stated, IT investment is not a case where "short-term results are unclear, but become positive with a long-term perspective," and in reality results are obtained comparatively short term. We hope that industry confidence and the setting of IT policies will bring about urgently needed economic revitalization.

3.2.2.2 Degree of EC Investment Precedence

When investment targets for economic commercialization are selected, to what extent do they generate different economic results in cases where they focus on the areas where ROI is high? Or in cases where investment is carried out across the board? We used the three to five year

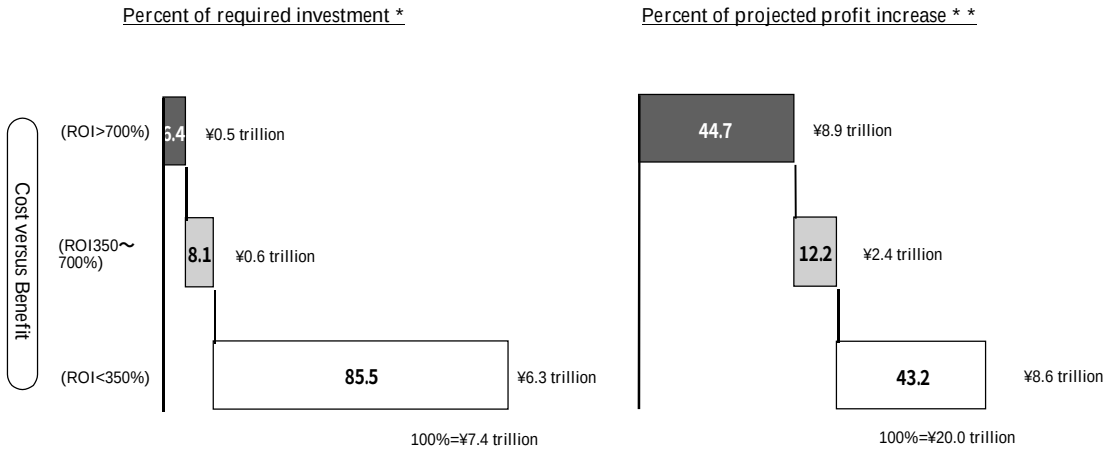
values to gain the answer (Figure 3. 2 - 6). When we set 100% of the necessary investment amount at ¥7 trillion for all industries and EC models, the necessary investment is 6% in areas with the highest ROI (over 700%).

On the other hand, the profit increase due to this investment rises to 45% if 100% is a ¥20 trillion profit where total investment is carried out. If we include areas with medium-term investment results, i.e., investment targets with ROI of 350% - 700%, then 57% of results are obtained from 15% of investments. In short, it is possible to generate the majority of results while keeping the investment amount down to 15% by focusing on investment targets in areas with high ROI.

The proportion of impact on cost over the five to ten year period is not as pronounced as in the three to five year period, but there is still a large bias (Figure 3. 2 - 7). Investments in target areas with the highest ROI (over 700%) account for no more than 25% of the total ¥10.8 trillion, but generate 60% of the ¥65.3 trillion anticipated profit increase.

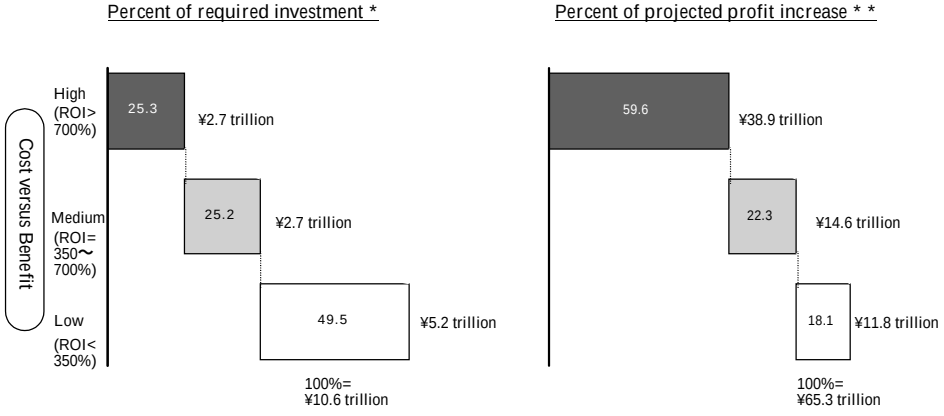
These results show that focusing a policy is vital in company management and government policy drafting. Furthermore, the fact that there are specific benefits to this over the three to five year medium term suggests that it will be particularly important to ascertain investment areas correctly over the next few years as this is when electronic commercialization will really take off.

CONCLUSION



* One-year depreciation; includes cost of IT introduction, operation, and capital cost
* * Operating profit base (EVA); includes cross-sale effect
Source: McKinsey Analysis

Figure 3.2-6 : Cost-Benefit Structure (after 3-5 years)
(%)



* One-year depreciation; includes cost of IT introduction, operation, and capital cost
* * Operating profit base (EVA); includes cross-sale effect
Source: McKinsey Analysis

Figure 3.2-7 (Same as Figure 4) : Cost-Benefit Structure (after 5-10 years)
(%)

Survey and Analysis of the Economic Impact of EC on the Japanese Economy

— Attachments —

Contents