Supporting Informatization and IT

Evaluation of IT-Related Projects in Asian Countries

Final Report

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Center for Global Communications

International University of Japan

Preface

This is the report of an evaluation study, which was consigned by the Japan Bank for International Cooperation (JBIC) to the Center for Global Communications (GLOCOM), the International University of Japan, in order to review the information systems which were developed by the governments of selected Asian countries (China, Indonesia, and South Korea).

The government of Japan started to recognize the importance of policies to assist development programs in the IT sector soon after the Kyushu/Okinawa Summit in 2000. This report aims to draw guidance and lessons to promote development assistance projects in the IT sector. Among the development assistance projects that JBIC has conducted so far, this report selects and evaluates those that are aimed at developing information system.

The research and survey for this report was conducted in China, Indonesia, and South Korea. The main subjects of this report are China and Indonesia, which received the assistance from JBIC for the development of information systems. South Korea did not receive any assistance from JBIC, and it is taken as a referential case for comparison.

The survey in China was delayed because of SARS. The mission visited China (Beijing and Changchun) for the first local survey in August 2003, and in October for the second (Beijing, Xian, Ulumuqi, Chongqing, Guangzhou, and Shanghai). In Indonesia, the mission visited Jakarta, Bandung and Palembang in June. In Korea, we visited Seoul in October.

In each local survey, the mission was honored to obtain cooperation from the executing agency: the State Information Center (SIC), the Indonesian Ministry of Industry and Trade, and the Indonesian Central Bureau of Statistics. In both countries, we conducted additional research visits by the local consultants, and also dispatched questionnaires for organizations that are related to the development of the information systems. In South Korea, the mission met with agencies of the national government and departments of Seoul City.

This report attempts to analyze and summarize all the information collected from the local surveys and other relevant sources, and to draw lessons, recommendations and conclusions. We hope that this report would help those who are engaged in development assistance related to IT.

We received cooperation from SIC, information centers at the provincial and municipal levels, the National Development and Reform Commission of China, the Indonesian Ministry of Industry and Trade and Central Bureau of Statistics, the national government of Korea and Seoul City, and JBIC. In addition, we obtained various forms of advice and cooperation from many other people. We appreciate the efforts made by the local consultants who worked with us. The surveys could not have been completed without their corporation. We are very thankful for them.

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Executive Summary

1. Background and Rationale of the Survey

After the G8 Kyushu-Okinawa Summit in July 2000, the apprehension for the digital divide is enhanced, while programs to make the best use of information technology (IT) at development assistance projects are emphasized. IT is becoming more of a policy issue in the international society.

However, the effect of development assistance programs implemented in the IT sector is not always clear, although development assistance programs are inclined to increase in number. Since the effect of the implementation of IT projects is difficult to appear clearly, it is difficult to measure and evaluate its effect. Knowledge is required to overcome the shortcomings of basic infrastructure such as telecommunications and electric power, and human resource.

In addition, it is apprehended that technological innovation in the IT sector are so fast the framework of yen loan, which is implemented over a long period of time, does not fit.

Moreover, it is also apprehended that IT does not fit the reality of developing countries, as it tends to adopt products and technologies from developed countries. On the other hand, deep-rooted claims exist that the development of IT should be entrusted with private investment since it can start up with small capital and earn returns easily.

This survey was planned with the purpose to draw objective lessons and guidance on how to plan and implement IT-related development assistance projects in years to come through evaluating selected projects which JBIC has actually conducted so far.

2. Methodology of the Survey

This survey is aimed at examining the effect of introducing IT to development assistance projects, and thus drawing lessons and guidance for the future, through evaluating three JBIC funded yen-loan projects conducted in China and Indonesia, and the self-funded projects for developing government information systems in Korea from a synthetic and third party point of view.

This survey was conducted from February to December 2003, with a four-month delay because of SARS. On-site surveys were held twice in China, and once in Indonesia and Korea respectively.

The survey targets were primarily the State Information Center (SIC) in China, and the Ministry of Industry and Trade (MOIT) and the Central Bureau of Statistics (BPS) in the two projects in Indonesia. The mission visited governmental agencies, universities, and research institutions in Beijing for the first local research visit, and information centers, governments at provincial and municipal levels, user organizations and private companies in Changchun, Xian, Ulumuqi, Chengdu, Guangzhou, and Shanghai. The mission also visited non-government users and conducted questionnaires. In Indonesia,

the mission did not only visit central government agencies in Jakarta but also local agencies in Bandung and Palembang. In Korea, the mission visited the national government and the city government of Seoul.

The mission considered that quantitative evaluation is impossible as the information systems in question are intended for nation-wide economic and statistic activities. Therefore, instead, the mission emphasized qualitative evaluation by interviews and case studies. The mission also applied the standard evaluation framework such as DAC five evaluation items as much as possible. Moreover, the mission examined the cause and effect by formulating "logic models" for each country and extracting promoting factors and obstructing factors from use cases for each country, and compared them to analyze synthetically.

3. China: State Economic Information System (SEIS) Project

Project Outline

The State Economic Information System (SEIS) Project was implemented in China, aimed at improving the ability for policy planning support concerning macro-economy management and information delivery by introducing computers and communication devices into the State Economic Information Center, other central ministries and agencies, and information centers of provincial and municipal governments, and constructing seven economic information systems and information network infrastructure. The amount of the yen loan funds invested for both the pilot and main projects totaled to 22,567 million yen and the amount of domestic funds invested totaled to 1,203 million RMB (13,141 million yen). All components of the project finished in 2001.

Relevance of the Project

The State Economic Information System (SEIS) aimed at supplying economic information not only to the internal government but also to general society. This project was found to have high relevance, because it contributed to driving forward market economy in China, which was being promoted by government policy, and to building the infrastructure of the Internet by adopting the TCP/IP protocol suite, getting ahead of the worldwide trends towards the Internet, thus making the outcomes of the project available to more users than planned.

Efficiency of the Project

As the project funds fell below the plan, equipment and systems were introduced in the information centers of other organizations of the central government, provinces, municipalities, and the autonomous regions which were not initially covered. As information network has the characteristic that the more nodes are connected, the more utility gains the whole system; it leads to an efficient and

practical use of funds. The project progressed just as scheduled except for the construction of the information center building.

Effectiveness of the Project

The State Economic Information System (SEIS) Project constructed the following seven economic information systems; (1) Macro Economic Information System, (2) Enterprises and Products Information System, (3) Price and Market Information System (Price Part), (4) Price and Market Information System (Market Part), (5) Economic Laws and Regulation System, (6) Foreign Loan Project Management Information System, (7) Governmental Investment Project Management Information System.

The Macro Economic Information System supplies information about macro economic forecasts, trends of international market, data announced officially by the International Monetary Fund (IMF) and the World Bank Group, and economic information concerning current events in forms of online data or printed reports. The Enterprises and Products Information System provides 270,000 entries of company information and 370,000 entries of product information, and it also sells some part of the information.

The Price and Market Information System (Price Part) provides market price information to a wide range of users, including the central government, provincial and municipal governments, and the general users. There are four fields of data provided; price fluctuation information, wholesale and futures market information, price cost information, and price analyses and forecast information. The Price and Market Information System (Market Part) was planned to be constructed as an integrated system with the price part in the beginning, although it is now a separate system which provides information on large-scale retail store trends.

The Economic Laws and Regulation System provides the four fields of laws and regulations as follows to the central government, provincial and municipal governments and general society; central regulations, provincial and municipal regulations, administrative regulations, and international treaties. The system was planned to be dedicated to economic laws and regulation, but it grew into a synthetic database that provides a wide spectrum of Chinese laws and regulation.

The Foreign Loan Project Management Information System is to manage domestic projects that are operated with overseas loans. It deals with highly confidential information so that it is not connected to wide area network. All the projects after 1979 are managed by this system.

The Government Investment Project Management Information System is used to plan and manage projects funded by governmental budget, large or middle-scale public projects, such as the construction of the Three Gorge Dam, and projects originally financed by the governmental bond. It also treats governmental secret information.

Besides the construction of the above-mentioned systems, the project constructed information

systems at the information centers of other agencies of the central governments, provinces, municipalities, and autonomous regions. In addition, the project built out nation-wide network infrastructure called "China Economic Information Network (CEIN)", which interconnects information centers at all levels, and it became a basis for providing wide area network connection.

The network infrastructure developed by the provincial and municipal information centers has a role as a regional backbone, and in some cases it provides Internet access not only to the agencies of provincial and municipal governments but also to public users. However, the role of the information centers as an ISP is declining in recent years.

The information centers at the provincial and municipal level constructed economic information systems with different functions to match regional needs. Not a few information centers in provinces and municipalities and autonomous regions have started to provide applications and services aimed at e-government and become the leaders of e-government. However, most of them are in the stage of a public notice system from the local administration to the citizens and have not yet reached to achieve transaction-based services. The obstacle is rather the delay of regulatory reform for electronic signature and authentication than technology. The information centers at the provincial and municipal level contribute to constructing the broadband network which directly connects between the development and reform commissions at the national, provincial and municipal levels.

Direct Impact of the Project

The main project is considered to have accomplished the initial objectives as follows; (1) improvement of governmental macro-economy management functions, (2) decision-making support for rational economic policies, (3) efficiency of administrative operation. The SEIS system may fairly be said to have contributed to the followings: establishment of macro-economic models, collection of essential data for economic models, generation and delivery of quantitative economic analysis and forecasts based on actual data and the qualitative analysis of economic trends, and decision-support for analysis-based economic policies.

Particularly, the rapid collection and delivery of economic information, which covers all over the country, has contributed to the management of overall economic policies.

In addition, the promotion of information disclosure by the government has brought the administrative efficiency and improved transparency and trustworthiness of the government. Not only the central government but also the governments of provinces, municipalities, and autonomous regions have started to deliver detailed information extensively, and hence the impact of the project can be seen.

Specialists and citizens came to take part indirectly in decision-making processes by exchanging their opinions about economic policies. Although the range is still fixed, traditional "hierarchical" policy making would change to reflect public opinion with the help of this system.

Indirect Impact of the Project

The indirect impacts that this project brought about to the whole Chinese society are described from perspectives of (1) response to globalization, (2) response to market economics, and (3) promotion of e-government. This information system is found to contribute to supporting the innovation of economic management with the accurate and rapid collection and delivery of information as China moves towards globalization at policy level.

As secondary impact, the project contributed to the promotion of informatization all across the country and led to diffusion of the Internet. At the same time, it is found to have good results in human resource development in the field of information technology, as well as regional administrative reform and the promotion of informatization.

Sustainability

The executing agency, the State Information Center (SIC), has been reorganized as a non-profit corporation fully funded by the Chinese government after the project is completed. The management of the information systems and network infrastructure is now in the charge of CEInet Data Company, which is a subsidiary of the State Information Center (SIC). This company also coordinates the sales of information services.

As of 2003, SIC has a total of 1,100 employees, including full-time and part-time. Also there are 175 employees at CEInet Data Company, which operates the information systems and network, and approximately 10 employees are now in charge of the operation of the systems and network which were developed as part of the yen loan project, and the rest of the employees are working for other commitments such as consignment development.

The equipment and facilities introduced by this project have been renewed by the budget of SIC depending on the necessity. Most of the equipment that was installed during the pilot project has been renewed and is not used any more.

4. Indonesia: Evaluation of Government Information Systems

4.1 Equipment Supply for Installation of Computer for Industrial Statistics and Planning Project

Outline of the Project

The executing agency of this project was the Ministry of Industry and Trade (then Ministry of Industry), and the project installed computers to establish a basis for industrial statistics, and to acheive the collection and internal delivery of statistic information, the rationalization of office work through office automation, and the training of computer and statistics experts. From May 1982 to May 1989, the

loan amount of 975 million yen was invested and the project installed computers into the Ministry of Industry and Trade as well as its subordinate laboratories. Training was also provided as part of the project.

Relevance of the Project

At the planning point of this project, the Central Bureau of Statistics did not have the authority to decide whether or not to publicize the result of the statistics that they conduct, and their statistics were not available even for industrial policy-making. This project was planned because of the restriction and, to this extent, the project is considered to have high relevance.

On the other hand, the project planned to install computers to the National Development Planning Agency (BAPPENAS) besides the Ministry of Industry and Trade and its subordinate laboratories, and to interconnect among these nodes through optical fiber. However, because of the bid price that exceeded the minimum price and failure in coordination with the national telecommunications carrier, this portion of project was cancelled. Networking by optical fiber was planned in order to escape the high cost of leased line, but considering the price and telecommunications regulation at the time, the plan was not realistic or appropriate.

Outcomes and Effects of the Project

Thirteen years have passed since this project had completed and the remaining results that can be directly associated with the projects are none but the five applications which were originally developed for the main frame computer. These applications are now ported to the PC platform. Because the objective of establishing cooperative relationship with external bodies for collecting statistics on their own was not achieved sufficiently, and it became possible to obtain statistics from the Central Bureau of Statistics later on, the meaning of establishing cooperative relationship for collecting statistics was lost. However, the Information Analysis Bureau of the Ministry of Industry and Trade has led a leading role of informatization inside the ministry, in areas such as e-government. It is considered to an impact that this project brought about in human resource development.

Sustainability of the Project

The sustainability of this project was not evaluated because most direct effects of this project have not existed any more. However, the executing agency has gained experience as a group of specialists in the field of information technology, and the budget distribution for IT equipment now increased. In addition, the budget for the network connection, which was not authorized before, is now authorized. The budget for the internal training has been kept since 2002 and there seems to be some talented staff specialists there.

4.2 Central Bureau of Statistics (BPS) Computer and Regional Computer Installation Project

Outline of the Project

This project introduced computers to the Central Bureau of Statistics (BPS) and its regional offices and was aimed at enhancing information processing capacity, constructing the training center intended for the staff workers of BPS and other governmental agencies, training information processing engineers. The project was implemented from November 1994 to December 2000 with the loan amount of 2,075 million yen.

Relevance of the Project

The project scope of introducing computers and network equipment to the statistic agency, particularly to its regional offices, and of constructing an education and training center for human resource development is considered to be highly relevant in terms of the ability of the executing agency and the subsequent situation of usage and maintenance as well as the reform of statistics regulation.

Efficiency of the Project

The Central Bureau of Statistics had operated the yen loan projects twice before this project and this project proceeded smoothly. As the term of this project fortunately coincides with the period of world-wide Internet diffusion, there were talented individuals who understood this trend precisely and wrestled positively for the introduction of the Internet.

Effectiveness of the Project

In the point of the improvement of information processing capacity, which is one of the objectives of the project, this project turned out to be highly effective, because it became possible to conduct statistics by computers, rather than manually.

In addition, with the help of the diffusion of the Internet, the regional offices and the Central Bureau of Statistics were connected by network, and it resulted in faster processing of statistic surveys. In one case, economic statistics is now publicized within a month, whereas it used to take three months for statistics to be taken and publicized.

With regards to human resource development, the education and training center that was constructed during this project provided not only computer skills but also the training of the social and economic statistics for statistics specialist, and it is also used for accepting trainees from neighboring countries.

Impact of the Project

This project is considered to contribute to the improvement of poverty reduction policies through

the improvement of poverty statistics by enhancing the entire information processing ability of the Central Bureau of Statistics and its regional offices. During the term of this project, decentralization progressed and there were some cases that the regional offices independently conducted statistics by the consignment of the state government. The improvement of information processing ability of the regional offices by this project contributed to operating such self-conducted statistics to some extent.

Sustainability of the Project

This project installed computers and communication equipment to the regional offices of the Central Bureau of Statistics, although budget measures are not enough to renew the equipment frequently. In some regional offices, they substitute the equipment provided by the United Nations Population Fund (UNFPA) and the Japanese International Cooperation Agency (JICA).

5. Comparison and Analysis of the Administrative Information System between China and Indonesia

5.1 "China Model"

Followings are the promoting factors of the State Economic Information System in China: the relevance of the plan and project, the existence of leadership among the leading members of the government, the accumulation of talented experts, the ability of project management, the existence of skills for planning, development and operation, and finally the adaptive responses to changes in situation.

On the other hand, there are some obstructing factors as following; the lack of communication between the central organization and regional organizations, the lack of communication with the Japan side, the restriction of the yen loan framework, the emergence of additional funds for operation.

However, in the case of China, it is considered that the promoting factors, put together, all worked in line to produce the effects that go far beyond the initial expectation.

5.2 "Indonesia Model"

The promoting factors of the Central Bureau of Statistics (BPS) Computer and Regional Computer Installation Project are as follows: the project term which coincided with the diffusion of the Internet, the reduction of political intervention due to the revision of the statistics law, and the existence of talented individuals who promoted informatization within the BPS. No severe obstructing factors were recognized, although the improvement of information processing capacity did not lead to the improvement of the entire business flow within the BPS because of the restriction of the project scope.

The Equipment Supply for Installation of Computer for Industrial Statistics and Planning Project was completed with a considerable amount of reduction in the scope and costs. The executing agency

failed to negotiate with the external bodies, the equipment cost exceeded the expectation. This is considered to have been caused because the development and operation of the system became an objective itself, and the actual needs of daily operation were missed out.

6. Discussion for Recommendations

6.1 Characteristics of IT

In this survey, the case of Korea is taken as a referential example, against which China and Indonesia are compared. Korea has accomplished rapid introduction and diffusion of IT supported by a strong sense of social crisis. As the case in Korea shows, the emulation model, which worked well at the existing industries, did not function at all. It was rather the forward looking model that functioned well, in which people boldly adopt new technology and adjust to each new environment. Such a model functions when the society demands reform. Therefore, when conducting development assistance in IT areas, it is not only the awareness of the government, but of the entire nation that counts.

6.2 Implications from the Case Study of Korea

Informatization in Korea, especially the introduction of the Internet, was not remarkable until the end of the 1990s. However, it improved rapidly in concert with the structural reform of political and economic systems. The informatization policy of the government did work to a certain extent.

Among the informatization policy items, the development of e-government was given high priority. It was recognized as the policy for escaping 'crony' capitalism, and in spite of the sectionalism between government departments, Korea has completed one of the leading systems in the world. The e-government policy is also being promoted in the City of Seoul to provide services that are close to residents' needs.

In developing e-government, Korea did not try to follow other countries for a model, but formulated their own policy based on their own needs. From the case study of Korea are drawn the following policy implications;

- G2G (government-to-government) services should precede others.
- National ID is indispensable to develop the service between the government and the citizens.
- e-government is effective to prevent corruptions.
- Secure specialists within the government.
- Top-down policy is necessary.
- Suppose there is no model.
- Maintain interoperability, expansibility, and scalability.

6.3 General Lessons and Recommendations for Development Assistance in IT sector

To begin with, there is a fundamental question whether or not development assistance should be directed at IT. It is always being questioned whether informatization is useful in development assistance and for what. It is not easy to find direct correlation between informatization by the use of IT and the development of economic activities, especially in developing countries.

We would like to present the three points below as general lessons in continuing development assistance in the IT sector.

(1) The objective of development assistance in IT should not be to increase efficiency by replacing manual works by machinery, but to realize "good governance" through the improvement of the entire business routine.

(2) Informatization should be planned and conducted in the selected area, among others, which most suits the characteristics of the country.

(3) It is necessary to prevent trained human resource to flow out of the country, and to assure the result of cooperation to be fed back to the beneficiary country.

Based on the lessons above, six recommendations are drawn.

Recommendation 1: Grasp as "System"

The most important point of view is to grasp the entire project as "system", distinguished from the hardware. The technology and equipment that are actually introduced to develop a certain system should be recognized as different from the system itself. It is necessary to distinguish the equipment introduced from the system which is constructed on it, and to reconsider the current scheme, which emphasizes hardware.

Recommendation 2: Incorporate Usage Evaluation

Although the effect of IT projects is not clear, quantitative measurement of usage is possible and it is important to in advance mandate executing agencies to conduct usage surveys. It is desirable to incorporate some mechanism to emphasize "customer satisfaction", to review the actual usage regularly, and then to feedback the result to JBIC, external evaluators, and the executing agency itself.

Recommendation 3: Make Much of Networking

From the view point of implementing the project as well as using its outcomes, it is important to make much of networking, which realizes many-to-many connection. The horizontal flow of information that it generates is effective to acquire the latest information and to realize mutual communication. It is one of the greatest impacts that informatization brings about.

Recommendation 4: Establish a Group of In-house Specialists for Information Technology.

It is necessary to establish an IT specialist position in development assistance agencies such as JBIC

to develop a long-living system that exceeds durable years of IT hardware, which obsoletes very rapidly. To prevent a project from overstating hardware and ending with nothing but facilities and buildings, it is desirable to establish an internal group of specialists who can understand specialized areas of information technology.

Apart from the in-house specialists that are just proposed, it is also desirable to have a neutral advisory body, who is independent of the consultants and venders who are involved in projects directly. By cooperating and tying up with such body, it would be possible to promote and evaluate the project from the long term and neutral point of view.

Recommendation 5: Provide Gradual Step-by-Step Support

To implement projects for international cooperation in the IT sector, which innovates rapidly, under the framework of yen loan, it is desirable to divide the entire project into subprojects that are conducted in sequence, and to include some part of the renewal phase after the completion of the project, which is now carried out by the responsibility of the executing agency. It is necessary that the framework of the project gives some room to enable the information system to be renewed continuously and the functions that it provides to be optimized even after the development of the information system is completed. By so doing, the effects of the project are not maintained at the mere level as of the project completion, but it also gives chance to fill a gap between the supposed needs at the beginning and the actual needs which emerge after it began operation.

Recommendation 6: Redefine the Scope of the "IT Sector" from a Strategic Point of View

Concerning the project formation for development assistance in the IT sector, it is effective to redefine the existing scope of IT from a strategic point of view. For a successful implementation of IT projects, talented human resource who can understand the technology are necessary in the beneficiary country, and the training of human resource must be given the highest priority.

However, the scope of human resource development should not adhere to technology field in the narrow sense, but should be redefined to include, for example, radio frequency management, competition policy for the promotion of the Internet and broadband, application in fields such as education, public health, and welfare, electronic commerce promotion, standardization promotion, and the promotion of digital content. National IT strategy and policy is more effective rather than individual assistance policy.

There are high potential not-for-profit organizations in Japan and Asia, which can possibly cooperate to offer training programs in IT. Cooperation with these organizations should be considered.

7. Conclusion: Implications from the Survey and Lessons for the Future

By looking back the survey, we would like to add the following lessons.

(1) Early Implementation of Evaluation

It is desirable to carry out evaluation immediately after the project is completed, since changes are so rapid in the IT sector.

(2) Mandatory Collection of Usage Data on a Regular Basis

Because IT systems do not have obvious effects and it is hard to measure the original state retrospectively after some time passes, it is important to intentionally collect data. It is desirable to, in advance, mandate the executing agency to collect data.

(3) Facilitate the Beneficiary Country to Conduct Evaluation

It is considered to be effective and necessary to facilitate the beneficiary country to conduct evaluation in addition to evaluation on the Japanese side. It would be effective to incorporate a voluntary evaluation process in the implementation framework of the project.

Concerning third party evaluation, it should be considered to adopt local third party consultants. It seems to be suitable for the executing agency to be evaluated by local consultants, who are more likely to be familiar with the actual social conditions of the beneficiary country and region and have good command of the native language to collect and analyze accurate data. It is still effective for Japan to cooperate with local consultants, though it is more desirable that the local consultants take the lead if possible.

(4) Systemize Project Management

Project management should be systemized in the donor. It is to say that data should be electronically recorded and information management should be computerized, so that a series of progress management phases such as appraisal, procurement, and correspondence with the executing agency can be done systematically. It would also be possible that electronically processed records are referred to as reference materials to promote the similar kind of projects as well. Taking this opportunity of the project, we would like to recommend the realization of such kind of systemization.

1. Introduction

1.1 Background and Rationale of the Survey

1.1.1 Increasing Interest in development and IT in the international society

It is widely recognized among today's international society that the rapid expansion and diffusion of information and communications technology (IT) [1] has high possibility to greatly influence what the global society will be in the future. Especially the apprehension that the potential of the diffusion of IT magnifies the differences between developed and developing countries, that is to say "Digital Divide" is getting deeper. On the other hand, the use of IT tends to be emphasized when carrying out development assistance projects to developing countries.

With the opportunity of the G8 Kyushu-Okinawa Summit in July 2000, the Government of Japan stressed the necessity of international cooperation to get rid of the international digital divide, and announced to provide a comprehensive cooperation program for developing countries, which amounts to 15 billion dollars in five years. After the Summit, G8 has organized a "Digital Opportunity Task Force (DOT Force)", which is composed of representatives from the governments of both developed and developing countries, international organizations, and non-profit organizations (NPOs). Then at the Genoa Summit the following year, the action plans prepared by DOT Force was adopted, and at the Kananaskis Summit in 2002, the implementation plans were approved.

On the other hand, the United Nations has established a "UN ICT Task Force" under the direct control of the Secretary-General in November 2001, in response to the request by the Economic and Social Council. It targets at solving the problem of the digital divide from the global point of view and aims to examine the policy of IT promotion into the field of development assistance, to propose action plans and to promote to realize the plans.

This way, IT has been specially given importance in the field of development assistance in recent years. International organizations and development assistance agencies in each country, such as the United Nations Development Program (UNDP), the International Telecommunication Union (ITU), the World Bank, the Organization for Economic Co-operation and Development (OECD), the Asian Development Bank, the United Nations Educational, Scientific and Cultural Organization (UNESCO) have made strengthened efforts in the IT sector. In addition, the Association of South East Asian Nations (ASEAN) and the Asia-Pacific Telecommunity (APT) and other regional international organizations are also getting more actively engaged in the introduction of IT to development assistance projects.

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[1] "IT" stands for "information technology", which literally means information processing technology enhanced by the computer. But in an international context, information and communications technology (ICT), instead of IT, is a preferred term. However, in Japan, IT is used almost interchangeably with ICT, and this report uses the term IT.

Moreover, the United Nations organized the "World Summit on the Information Society (WSIS)" in Geneva in December 2003, whose biggest motivation was dissolution of digital divide. Development and IT come to be widely recognized as a policy issue of international significance.

1.1.2 Rationale for IT Projects

Under such background, the attempt to introduce IT project into the development assistance field tends to be increasing in recent years in Japan. However the practical precedents of the introduction IT into the development assistance project are limited and its effect is not always clarified yet. As the expectation for IT is becoming greater from both developing countries and donor countries, acquiring the common recognition is demanded to make clear whether it is really effective or not, if it is, in which field, how to introduce it and so on.

When resources are limited and the effect of IT projects is not observed clearly, it is difficult to argue against the discussion that food support, medical treatment and agricultural support are more urgent and have more clearly observed effect. In recent years, it is favorably discussed in developed countries that the introduction of IT results in macro-economic effects[2] in a quantitative manner. Although attempts have been made to prove similar effects of IT in Asia, they have not yet been sufficiently clarified.

At the individual project level, the majority of the effect of the introduction of IT relates more to abstract activities such as human knowledge and thinking than to physical construction and supply of equipment. Therefore it is rare that the result is latent visibly and difficult to measure and evaluate its effect.

Not a few constraints in introducing IT to developing countries exist. Generally speaking, it is considered that the insufficiency of basic infrastructure such as telecommunications and electric power is a disadvantage for introducing advanced technology. It is also demanded to acquire technical experts though it is difficult to find such experts in developing countries. The knowledge to overcome these constraints is also required.

In addition, as the change of technological innovation is so rapid that the prompt decision and flexibly response is necessary in selecting appropriate technology and equipment, in planning and installing application systems. In this regard, it is apprehended that the yen loan framework which takes usually several years from project formulation, appraisal, to implementation does not match the rapidly-changing IT sector.

There is another issue of concern. In implementing projects in the IT sector, the products and technology which are installed come from developed countries, but they may not suit the actual

[2] One of these attempts of such research is Masayuki Goto, Izuru Kimura and Hiroshi Sakai. Macro-economical Impact by IT. Journal of Research Institute for Development and Finance. December 2002 <http://www.jbic.go.jp/japanese/research/report/review/pdf/13_03.pdf>.

condition and economical mechanism of developing countries. At the same time, it is strongly disputed that it is rather effective to leave IT to private investment because IT can be started with a small fund and it does not take as long for human resource development as other fields, thus making returns from commercial investment easily. Therefore, it does not suit the scheme of public development assistance.

This survey was planned and conducted in order to obtain objective and persuasive answers as much as possible based on the above-mentioned background and rationale through examining and analyzing selected IT projects that JBIC has been engaged in to date.

1.2 Outline of the Survey

This survey aimed to evaluate the effect of the selected projects funded under the yen loan by JBIC which are targeted at introducing IT among a number of international cooperation projects in Asian countries. More precisely, projects for developing information supply system implemented by the governments of China, Indonesia, and Korea (See Table 1).

Table 1: Evaluated projects in this survey

China	State Economic Information System (SEIS) Pilot Project (1988–1998) State Economic Information System (SEIS) Main Project (1995–2001)
Indonesia	Equipment Supply for Installation of Computer for Industrial Statistics and Planning Project (1982–1989) Central Bureau of Statistics (BPS) Computer and Regional Computer Installation Project (1994–1998)
Korea	Administrative Information System (non loan project) (2000–2001)

In the case of China, the State Economic Information System (SEIS) was designed to provide economic information only for internal government use as an intranet service at in the beginning. However, the plan was amended to adopt the Internet and it turned into a system open to the general society. In the case of Indonesia, the Industrial Statistics system was limited for internal government use while the Central Bureau system led to information disclosure to the general society. In the case of Korea, the objective was to build an information system to provide administrative service which is assumed to be used by general citizens.

The projects in China and Indonesia were implemented accepting yen loan which was designated for developing countries. We analyzed and evaluated operation status, output and outcomes, based on the information collected originally during this survey as well as the result of the previous evaluation that had been operated by JBIC.

On the other hand, Korea, which is now counted as a developed country, constructed information systems by itself, without international assistance, and we consider that objective evaluation would be possible by comparing Korea against the other two countries. Therefore, we refer to Korea as a reference example and examined its present condition and outcomes. We attempted to compare China and Indonesia, and then refer to the examples in Korea in order to gain synthetic comparison and analysis.

This way, we tried to draw lessons and guidance on what contributions can be actually made in the beneficiary country, its society and economy by introducing and applying information and communications technology to development assistance projects, and on what should be taken into consideration when implementing development assistance in the IT.

1.3 Evaluator for the Survey

This survey was operated by the following organizations and staffing.

Center for Global Communications (GLOCOM), International University of Japan

- Izumi Aizu (Executive Research Fellow, GLOCOM and Principal, Asia Network Research)
  General oversight of the project, and local surveys in China and Indonesia
- Motohiro Tsuchiya (Associate Professor and Senior Research Fellow, GLOCOM)
  Local survey in Korea
- Keisuke Kamimura (Assistant Professor and Senior Research Fellow, GLOCOM)
  Local survey in China and Indonesia
- Rika Shinya (Research assistant, GLOCOM)
  Translation and analysis of Chinese documents

Local consultant in China

- Shanzhai Jia Lu Technology Development Co., Ltd.
  Zheng Ye (Coordination with executing agency, interpretation and translation)
  Liu Jian (Coordination with the executing agency)

Local consultant in Indonesia

- Association of telecommunication and information technology in Indonesia / Masyarakat Telematika Indonesia (MASTEL)
  Nies Purwati (Oversight of local survey)
  Agoes Riza Poetro (Coordination with the executing agency, interpretation and translation)
  Taru J. Wisnu (Coordination with the executing agency)

Also we obtained the cooperation of the following executing agencies in each country,

- State Information Center (SIC), Government of China
- Ministry of Industry and Trade (MOIT)3, and Central Bureau of Statistics (BPS), Government of Indonesia

[3] After the project began, the Ministry was renamed the Ministry of Industry and Trade.

1.4 Objectives of the Survey

The objectives of this survey are as follows.

(1) to analyze and evaluate the progress, current operation, outcomes and observed effects of the development of government information systems which were conducted as IT related assistance projects in Asian countries from a third-party and post-evaluative point of view,
(2) to draw lessons and recommendations on how to plan and implement IT-related development assistance projects in years to come through evaluating, comparing and synthesizing the results of selected projects which JBIC has actually conducted to date,
(3) to feedback these results to each executing agency and the individuals concerned.

More specifically, national information systems that were built in China and Indonesia from the 1980s to 2000s will be evaluated individually, and compared with each other. Then, by examining administrative information systems in Korea as a reference case, and comparing China and Indonesia against it, this survey attempts to evaluate these projects as a development assistance program in the IT sector..

2. Survey Methodology

2.1 Survey Schedule

This survey was conducted from February through December 2003. See the schedule below.

Table 2: Overall Schedule of the Survey

	Domestic	China	Indonesia and Korea
February 2003	Literature survey Drafting of Inception Report	Selection of site for local visit Examination of survey items	
March	Discussion of Inception Report	Selection of local consultant Drafting of questionnaires	
April	Delay by SARS	Hearing with JBIC Teleconference with SIC Selection of Survey outline and survey subjects Dispatch of questionnaire I	Selection of local consultant Examination of survey items Drafting of questionnaires
May		Collection of questionnaire I	Hearing with JBIC Coordination for local survey
June			Local survey Jakarta, Bandung, Palembang (10–19) Revision of questionnaires
July		Coordination for local survey	Dispatch of questionnaires
August	Drafting of Interim Report	Local survey I Beijing, Changchun (5–10) Compilation of survey results	Collection of questionnaires
September	Submission and discussion of Interim Report		Additional local survey Yogyakarta
October		Local survey II Beijing, Xi-an, Ulumuqi, Chengdu, Guanzhou, and Shanghai (12–25) Compilation of survey results	Compilation of survey results Local visit in Korea (19–22)
November	Drafting of Final Report Submission of Final Report	Dispatch of questionnaires II Additional local survey (Zengzhou, Hangzhou, Nanchang) Collection of questionnaires II Compilation of survey results	Compilation of survey results
December	Discussion of Final Report		
January 2004	Revision of Final Report Discussion of Final Report Project Completion		

2.2 Selection of Subjects

The primary subjects of this survey were the executing agencies of the projects in each government, that is, the operators and providers of the information systems. And the users of the systems were secondary subjects.

2.2.1 Selection of Subjects in China

In the case of China, the State Information Center (SIC), the executing agency of the project, is the subject for the survey. Its head office is located in Beijing, and 38 information centers in each province and municipality nationwide. The regional information centers were under the direct control, and received a budget from the State Information Center at the beginning of the project. However, regional information centers are integrated into the regional governments. Therefore, there is no control between the State Information Center and the regional information centers, but they only have cooperation relationship through business.

It is impossible to visit the whole land of China for research because of the time and expense restrictions. Therefore, we selected the areas to visit as follows from a geographical and socio-economic point of view, and to cover the whole land as efficiently as possible.

Figure 1: Geographical classification of China

China is generally divided into the coastal area (eastern part) and the inland area (midland and western parts), and we divided the coast area further into two groups depending on economic growth

and income distribution[4]. Subgroup A is the area where the Open-Up policy was taken earlier and has pulled the economic growth of whole China. On the other hand, subgroup B is the area that has been outdone by subgroup A, but developed rapidly in recent years, including Beijing and Shanghai

Table 3 is a list of municipalities where the nodes of the State Information Center are located. These municipalities were selected as the subject of this survey according to the area classification.

Table 3: Classification of Chinese areas and selected provinces, autonomous regions and special municipalities for local visit

Coastal Area		Midland	Western Area
A	B		
Zhejiang (Hangzhou) Jiangsu (Nanjing) Fujian (Fuzhou) Shandong (Qi'nan) Guangdong (Guangzhou) Hainan (Haikou)	Shanghai Beijing Tianjin Liaoning (Shenyang) Hebei (Shijiazhuang) Guangxichuangzua (Nanning)	Hubei Jilin (Changchun) Neimenggu (Huhehaote) Hunan (Changsha) Henan (Zhengzhou) Anhui (Hefei) Shanxi (Taiyuan) Jiangxi (Nanchang) Heilongjiang (Ha'erbin)	Xinjiangweiwuerzu (Ulumuqi) Qinghai (Xining) Chongqing Sichuan (Chengdu) Ningxiahuizu (Yinchuan) Xizang (Lasa) Shanxi (Xi'an) Yunnan (Kunming) Gansu (Lanzhou) Guizhou (Guiyang)
2 areas	2 areas	3 areas	3 areas

(Municipalities in parenthesis are where the information center is located.)

Having discussed with the State Information Center, we selected 10 municipalities altogether from the three areas across the four groups considering the factors of geographical conditions, economic strength, transport access and subgroup classification. Underline shows that local visit was conducted in the provinces and municipalities. Among these, Zhejiang (Hangzhou), Henana (Zhengzhou) and Jiangxi (Nanchang) were visited by the local consultant alone.

2.2.2 Selection of Subjects in Indonesia

In the case of Indonesia, the Ministry of Industry and Trade (MOIT) and Central Bureau of Statistics (BPS) were the executing agencies. We visited the central organization in Jakarta and regional offices in Bandung, and Palembang and conducted research there.

Additionally, the local consultant in Indonesia visited Yogyakarta.

To complement local research visits, we sent the questionnaires to the regional offices by postal mail or e-mail and obtained 51 answers out of 100.

[4] Toshio Watanabe, "Syakaisyugi Sizyou Keizai no Tyuugoku (Socialism Market Economy in China)" (Koudansya Gendai Sinsyo, 1994)

2.3 User Survey

2.3.1 User Survey in China

We attempted a user survey as a secondary survey objective in China. However, we could not obtain sufficient samples to analyze quantitatively due to the reason which is described later in this report.

The users of the State Information Center in China are divided into following stratums.

(1) Governmental organization: Central government agencies
(2) Governmental organization: Local government agencies
(3) Research institutions (e.g. Universities and think tanks)
(4) Corporations: State-owned enterprises, domestic and international corporations (Users of paid and specific information)
(5) Societal users and general public: (Users of free and public information)

In this survey, the main users of the complete economic information system designated as (1) to (4) are considered to be subjects of survey, and the societal users were excluded. However, we could not realize local research visit at the central government agencies because of organizational restrictions in the interior State Information Center. On the other hand, we did get a precise understanding on how information systems were used by visiting regional government agencies. Data from the research institutions and corporations were used as supplementary information.

2.3.2 User Survey in Indonesia and Korea

We did not conduct a comprehensive user survey intended at the direct users in Indonesia due to the time constraint. However, we asked the opinions from a JICA expert in statistics, a professor of the Faculty of Economics of the University of Indonesia, and other experts of the Faculty of Engineering of the University of Bandung.

We only visited government agencies and research institutions in Korea and did not conduct a user survey, since it is used as referential information.

2.4 Methodology of Evaluation

2.4.1 Focus on Local Research Visit

In carrying out the survey, we put a great deal of effort to research to understand accurately the reality, relying on the facts and results actually accomplished by the executing agencies of the projects. After that, we tried to understand social outcomes and impacts synthetically based on research and analysis on the actual conditions and use effects for user/beneficiary practically as much as possible.

We conducted the survey by visiting local agencies and interviewing the individuals concerned. In the case of China, we sent the questionnaires to the State Information Center, which distributed the questionnaires to participating agencies. We also sent some user organizations and experts. In the cases of Indonesia and Korea, we visited the government agencies and interviewed the individuals concerned. We also had a talk and interview with the intelligent persons.

Moreover we analyzed documentation and literature archived in JBIC and the executing agencies. We inspected the information on the Internet.

2.4.2 Evaluation Methodology of Information System

The effect of introduction of the information system that is used widely in the general society is difficult to be latent, and if it is, it takes so much time for the effect to appear that numerical measurement of it is difficult. Quantitative analysis methodology is underdeveloped and objective common indices for the effect measurement of the effect do not seem to be established.

This survey aims to evaluate information systems for nationwide economic activities in such big states as China and Indonesia, and quantitative evaluation is difficult. The difficulty was also recognized in the documentation at the appraisal phase.

Therefore, our survey was primarily based on qualitative evaluation by interviewing with people and collecting actual use cases to reveal the effect of the constructed information systems.

2.4.3 Comparison by Country-Specific "Logic Model"

We adopted the standard evaluation framework that is generally employed, such as DAC5[5], to evaluate the projects where applicable, although the survey still had to experimental and trial as the evaluation of IT-related projects.

Specifically, we drew promoting factors, obstructing factors and causal relations of the State Economic Information System and formulated a "China Model", and in the same way, an "Indonesia Model" was also formulated. Then we compared the two models to gain a synthetic conclusion.

We did not try to compare directly with the other two countries, as it is basically treated as a

[5] The "DAC5" evaluation items are employed by the Development Assistance Committee (DAC) of OECD. Its evaluation is based on "relevance", "efficiency", "effectiveness", "impact" and "sustainability".

reference example and not the subject of evaluation. However, it was meaningful to draw a "Korea Model" to make clear what promotional and obstructing factors and causal relations were in the implementation of the Korean administrative system to obtain different lessons from China and Indonesia.

2.5 Constraints of the Survey

2.5.1 Delay of the Schedule due to SARS

This survey planned to pay local research visits to China in March and May, and to Korea and Indonesia in June.

However, the visits were postponed because of the influence of the Iraqi War in March and the Severe Acute Respiratory Syndrome (SARS) in April. And the survey schedule in China was entirely revised.

We visited Indonesia in June 2003, as scheduled. We even considered postponing the visits to China until the next year. However, SARS subsided earlier than expected, so we paid the first visit at the beginning of August (Beijing and Changchun), and the second in October (Beijing, Xian, Ulumuqi, Chengdu, Guangzhou and Shanghai).

Even when the local visits to China were being postponed, questionnaires were dispatched prior to local visits with cooperation of the State Information Center.

2.5.2 Restrictions in the User Survey

We were not able to collect sufficient data on how the completed information system is used and what effect appeared because of the following reasons.

We only collected data from a limited number of samples for the measurement of actual usage and its effect, as it has been so long time since the project started in China and Indonesia that there are no accurate records of the past operation and usage, also the necessity for the measurement of actual usage and its effect was not perceived sufficiently by the executing agencies.

We tried to collect data from the users through questionnaires, although we could not obtain enough cooperation from the executing agencies and failed to acquire a sufficient number of samples to evaluate the effect objectively.

In addition, in the case of China, the primary user of the information system is the government agencies. Although we officially requested the leading members of the government for cooperation for the survey, interviews with the government agencies were not achieved.

In the case of Indonesia, because it was difficult to identify users of statistics information which was opened to the public for free, and because time constraint was severe, we did not plan to interview with users of the information system.

In addition to the common reluctance against user survey for both China and Indonesia, their concern did not go much beyond the role of the information provider, and they tended not to care enough about how the user actually uses economic information of statistics information that they provide. This tendency also constrained the survey methodology to a certain extent.

3. Evaluation of State Economic Information System Projects in China

The State Economic Information System Projects in China consists of a "Pilot Project", starting in 1988 and the "Main Project", starting in 1995, and the yen loan for each project was divided into two terms respectively. The pilot project carved out a part of the entire project design, and was implemented first, which then was merged into the main project. The two projects were completed around the same time, and implemented by the same executing agency. Accordingly, for the sake of evaluation in this survey, the pilot and main projects are regarded as one project.

3.1 Outline of the Project

The State Information Center (SIC), which is subordinate to the National Development and Reform Commission of the State Council[6] of the Chinese government, was the executing agency. It constructed a system for collecting and delivering economic information within the government. The project started in 1988 and was brought to completion in 2001.

The initial budget was composed of 24,000 yen in the yen loan portion and 782 million yuan (about 12,700 million yen) in the local currency portion. The actual spending of the pilot and main project was 22,567 million yen in the yen loan portion, 1,200 million yuan (about 13,100 million yen)[7] in the local currency portion.

The State Information Center explains that the accumulated amount of investment in this project ran up to approximately 60 billion yuan, but this is considered to be the grand total amount including projects other than the yen loan affiliated projects.

During the project, information centers were set up in 23 ministries and commissions in the central government (corresponding to the ministries in Japan) and with 38 organizations in the local government (provinces, autonomous region, and designated municipalities), the computer and network related equipment were installed to collect and analyze economic information. They revised the project plan in the process of this project, so that the Internet may be deployed, which enabled the government to deliver massive and comprehensive information on economy and statistics to the government itself as well as public users.

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[6] The "State Planning Commission" was renamed "Development Planning Commission" and then "National Development and Reform Commission" in 2003. In this report, we generally use the "National Development and Reform Committee". Its counterpart at the provincial and municipal level may still be called "Development and Reform Commission".

[7] We have used the rate of the Bank of Tokyo-Mitsubishi, Ltd. (weighted average efficiency at the time of performing the loan) as the exchange rate for yuan.

The system can be thought of as one of the largest systems in the world that were integrally constructed and operated by a government, judging from the number of participating organizations, the amount of information and number of user organizations.

An outline of this project can be seen in Table 4.

Table 4: Outline of the State Economic Information System Project

Project Name	State Economic Information System Project
Loan Amount/Loan Disbursed Amount	24,070 million yen／22,567 million yen
Exchange of Notes/ Loan Agreement	Pilot Project 1st Period (CX-P18): July 1988/ August 1988 Pilot Project 2nd Period (CXI-P18): May 1989/ May 1989 Main Project 1st Period (CXVI-P65): January 1995/ January 1995 Main Project 2nd Period (CXVII-P65): October 1995/ November 1995
Borrower	The People's Republic of China
Executing Agency	State Information Center (SIC)
Project Objectives	Installment of hard and software in SIC and Central Governmental Ministries, Commissions, Regional Offices. Development of seven economic information systems for managing macro economy, and improvement of the ability of the Chinese government of policymaking and disclosure by utilizing the seven information systems.
Actual Projects	Development of the following seven economic information systems 1.Macro Economic Information System 2.Enterprises and Products Information System 3.Price and Market Information System 4.World Economic Information System 5.Economic Laws and Regulation System 6.Foreign Loan Project Management Information System 7.Governmental Investment Project Management Information System Development of CEInet Construction of SIC building
Actual Outputs	- Implementation of Information Center in 23 Ministries and Commissions, 36 Provinces and Municipalities - Pilot Project Main Frame x 5, Medium-sized computer x 2,Small-sized computer x 11, Mini computer x 374, Printer x 219, PC x 374, Notebook PC x 6, Server x 12, Workstation x 5, Intelligent Terminal x 84, Network Equipment, Software Training:107.39M/M Consulting: :83.5M/M Materials for Construction work of Information Building: Total 4,208 million (JPY) - Main Project Main Frame x 2, Medium x 48, Mini computer x 161, Printer x 219, PC x 14194, notebook PC x 6, Server x 1404, Work Station x 598, Network equipment x 3091, Software Consulting: 99M/M
Terms and Conditions	Pilot Project: 1st Period: Interest Rate 2.5%, Payment Period 30years (including Grace Period 10years), General Untied (Consulting: LDC Untied) Pilot Project 2nd Period: Interest Rate 2.5%, Payment Period 30years (including Grace Period of 10 years), General Untied Main Project 1st Period: Interest Rate 2.6%, Payment Period 30 years (including Grace Period of 10 years), General Untied Main Project 2nd Period: Interest Rate 2.3%, Payment Period 30 years (including Grace

	Period of 10 years), General Untied
Completion of the project	Pilot Project 1st Period: August 1995 Pilot Project 2nd Period: May 1996 Main Project 1st Period: February 2001 Main Project 2nd Period: December 2000

Additionally, the organization chart of the State Information Center (SIC) in this project is illustrated in Figure 2.

Figure 2: Organizational Structure of State Information Center and Its Subsidiaries

In respect to organizational structure, the State Information Center is broadly divided into three parts. One division is located on the right of Figure 2, which is composed of departments for planning financial affairs, economic prediction and public technical service. This division is in charge of the daily management and operation of economic information systems, and other business related above.

On the left of Figure 2, affiliated companies and organizations are shown. Among them, the China Economic Information Network Data (CEInet Data) Co., Ltd. is most closely concerned with this project. CEInet Data is a commercial company, to which the State Information Center makes a 100% investment, and has charge of offering to the external users the services of the information systems that the State Information Center developed, and maintaining the services.

In addition, on the left of the figure, the China Information University, the China Information Association and the PKI Forum China, which has charge of the standardization of "Public Key" in the security field, are listed. However, the mission did not research these affiliated organizations that current status, because we concluded that these organizations have little direct relations with the objectives of the survey.

3.2 Outline of Survey Conducted in China

The survey in China was conducted by way of local research visits and questionnaire surveys in China. The summary of minute itemized research topics and their results which are designed according to the original evaluation subjects is provided in the "Detailed Evaluation Agenda". We obtained mainly qualitative data about many parts of the research topics originally proposed. However, we could not get the data about the financial standing involving the operation of the State Information Center and CEInet because the State Information Center thought that it was out of the scope of the yen loan project.

Additionally, we could get the detailed data about the economic information systems, utility condition of the network, the user and the subsystem in the central government agency and the local government agency provided by the State Information Center by the field work and the questionnaire.

However, we found the following two aspects of the research about the user agency.

We researched about one of them by securing the help of the business owners with a license within the country and applying for the research plan with the Office for National Statistics, and securing the permission of it because the social research activity by the main body of foreign countries is regulated by the "Public Social Research Activity Control Law" in the Chinese Government. Besides, we needed their help for selecting users for the questionnaires because the operation of the information systems and the network infrastructure constructed in this project was handed over to CEInet Data, a subsidiary of the State Information Center. However, because this company was formally a private for-profit organization, it was extremely negative for the disclosure of the customer list. Although we negotiated with them relentlessly, and as a result, the State Information Center provided us with details of the contact for 11 organizations, we only received replies from five organizations.

3.3 Background of this Project and its Relevance

3.3.1 Background of the Project

This project was designed and realized based on the recognition of the Chinese leaders that the information system for collecting and delivering accurate economic information is essential for China to implement new economic policy to migrate from planned economy to market economy. Consequently, we will first take a look back on the historical background for the economic policy of the day in China.[8]

After the Great Cultural Revolution, the leaders in China pushed ahead with transition to an economic system which is based on the principles of market economy from the then-planned economy which worked in a top-down manner. They changed the agricultural policy, and the surplus revenue in the rural areas enabled "xiangzhen (village and township) enterprises to emerge. First of all, they implemented micro-level reform policies such as granting self-determining rights to the private company in the first half of the 1980s. From about 1984, they began to make an attempt to reform of the macro administrative structure, but this policy reached a limit, and the country confronted over-heating economy and inflation other economic problems in the process.

In 1988, the inflation rate in China rose sharply to 11.0% in the first quarter, 14.6% in the second quarter and 22.6% in the third quarter. Inflation reached an 18.5% annual rate in 1988, and reached a 17.8% annual rate in 1989, which hit a record of the highest inflation rate in two-year stretch since the founding of the People's Republic of China. The citizens and companies had a fear of the further price increase, stocked up with commodity, and withdrew their bank deposit.

The leaders carried out a stringent policy on economy by postponing the "Reform and Open Policy" in order to refrain this inflation. The inflation rate was refrained up to 2.1% in 1990, and 2.9% in 1991 with the result that they strongly pushed ahead with the severe price control, financial management and money squeeze policy. Hereby, the Chinese economy totally witnessed "overkill" situation, and the growing rate plunge to 4.3% in 1990, 4.0% in 1991 from 11.3% in 1989, so it hit the lowest point in the past 10 years. The crackdown on pro-democracy demonstrators at Tiananmen Square happened in 1989, but the Chinese leaders were aware the stable growth of economy is necessary to settle the political situation, and focused on economic policy as highest priority to run the country. The famous "Nanxun Lecture" by Vice Premier Deng Xiaoping was carried out in February 1992, and development policy to allow imbalanced development was implemented and created a special economic zone in the coastal area. In October 1992, "Socialist Market Economy" was initiated by President Jiang Zemin and the serious promotion of the market economy was boldly put forward (Table 5).

The leaders built an awareness that it was important to control macro economy indirectly through the finance mechanism in order to accelerate the reform and open-up policy, and they thought that it was necessary to share economic information across the country with the central and local governments.

[8] See to the foregoing book by Watanabe.

Additionally, they also needed accurate information to provide a platform for attracting the investment of foreign companies as part of the external open-up policy.

Table 5: Brief History of Economic Reform in China

December 1978	"Reform and Open" (Vice President, Deng Xiao Ping), New Agricultural Policy and Xiangzhen Companies in farm villages and townships
1980 onward	Introduction of Special Economic Zone (Shenzhen, Fujian and Hainan, in Guangdong Province)
October 1984	"Decision by Central Red China over the reform of the economic system"
October 1987	Introduction of the "Market Economy (CPC Secretary General Zhao Ziyang)
1988 to 1989	Outbreak of Inflation
June 1989	Crackdown on pro-democracy demonstrators at Tiananmen Square
1990–1991	Economic tightening policy
February 1992	"Nanxun Lecture" (Vice President Deng XiaoPing)
October 1992	Socialist Market Economy (Premier Jiang Zemin)

This project was formulated based on the needs of collecting accurate information on economy timely across the country, and of providing information about the Chinese for the government and other organizations in charge of economic management as well as the rest of the world.

3.3.2 Background of this Project

The State Planning Commission started the planning of the State Economic Information System in December 1983, and it was formally authorized in the Seventh Five-Year Plan (1986 to 1990) and they went ahead with the preparation in February 1986. The delegation of the State Economic Information Center visited Japan in October 1986, and signed a memorandum of understanding on technology exchange and collaboration with the Nippon Telegraph and Telephone Corporation (NTT). To that end, the NTT dispatched a research mission to China in December 1986, conducted a feasibility study and produced a report. The two parties agreed on adopting the yen loan with China.

The State Information Center was established by relocated human resource of the Computer Center of the State Planning Committee and other experts in the field of macro economy, statistics and computer science under joint initiative with the National Bureau of Statistics. The State Planning Commission formally authorized the project as a yen loan project on February 1987.

The Japanese government and the then-Overseas Economic Cooperation Fund (OECF) dispatched a research group for visiting china, conducted feasibility studies of the State Economic Information

System Project, and produced a report to both governments of China and Japan in 1988. To that end, the Chinese side formulated a master plan that they would establish economic information centers all over the country by 2000 and that they would construct five main systems such as (1) price information, (2) macro economy, (3) investment on national fixed assets, (4) international trade balance, and (5) state economic law information. They concluded that they would need an investment of 46 billion yen total in foreign currency.

However, the project in the information system was the first one of the kind for the Chinese side, and this would be going to be a huge project. Therefore, the two countries agreed that a pilot project would be conducted ahead of the rest of the project, and that 4 billion yen loan would be made, which was 10 billion yen by the initial request from the Chinese side.

3.3.3 Background of Pilot Project

The pilot project was started in 1988, which was implemented in coastal cities, such as Beijing, Shanghai, Shenzhen and Guangzhou, and it aimed at developing price information systems that were most urgently required in those days. The purpose of system development was to monitor and control the price fluctuation which takes place during the changes from planned economy where every product price is decided by the central government to market economy where the price is decided by the parties involved.

The price information system in this pilot project consisted of three subsystems such as dynamic price information, price index and commodity price information, price file and document. The computer equipment used in it was composed of mainframes, and network connection was partly available by packet switching network. The system itself was completed and began operation in 1993, two years after the original schedule because of the delay in procurement. The final procurement of equipment ended in 1996. One reason of the delay in procurement was that they could not introduce a new device even if they wanted to do so because there was still a regulation by the Coordinating Committee for Multilateral Export Controls (COCOM) which restricted the import item in the Communist Countries until the first half of the 1990s.

However, the completion of the project as a whole was delayed more drastically and it was completed in 1998, rather than in 1992 as originally scheduled. It was mainly caused by a delay in the building operations of the new-built Information Center Building. Later in this report this delay will be examined in detail.

It is explained that in project management in China, a big project is often divided into smaller pilot and main projects, but that there is no clear practice that a main project is implementation only after a pilot is completed. A main project may start instantly if funding and know-how are provided. It can be said in this project that the price system in the pilot project was merged into the main project on the way.

The estimated cost of the pilot project was 3,770 million yen in the yen loan portion, and the local currency portion of 100 million yuan (about 3,400 million yen), but in actual spending, the yen loan was 3,509 million yen and the local currency was 200 million yuan (about 4,160 million yen)[9].

3.3.4 Results and Lessons of Pilot Project

As stated above, the pilot project was merged into the main project on the way, so the two projects are evaluated as a whole. However, we should evaluate the role, its results and lessons that the pilot project played in advance uniquely based on evaluating the relevance of plan.

According to the State Information Center, the results of the pilot project are listed as follows.

(1) The Chinese side learned how to use the foreign loan.
The State Information Center experienced the yen loan for the first time, and so it became possible to accumulate the working know-how about the effective use.

(2) The Chinese side acquired know-how about system development.
The State Economic Information System was a massive system architecture project, and there were little people that directly experienced so much scale of system development in China in those days. They could have a living experience in the conceptual design, detail design and program development and they were used in the main project.

(3) The Chinese side was able to make a good advice to the decision of the central government in the price system.
They could get a concrete recognition about the relevance of the economic information system as a whole by launching the price system as a pilot system primarily when it gave way to market economy from planned economy, and it was big advantage in proceed with the rest of the project as the main project.

The following issues of concern were pointed out in the pilot project.

(1) Coordination
Coordination between the Japan side, local governments and consultants in order to work effectively together was not easy.

(2) Channel development for information collection
For example, it was the first time ever for China, which had until then fully committed to planned economy, to construct and operate a price information system, to monitor and collect prices, to build a channel and methodology for acquiring information.

[9] The exchange rate of yen against yuan was 1 yuan=33.4 yen in 1988, but it gave way to 20.38 yen in 1993.

NTT International (NTTI) in Japan was hired as a consultant, and offered required information for developing and operating economic information systems to the Chinese side. NTTI's contribution is thought highly of by the Chinese side. Specifically, the following was conducted.

(1) NTTI conducted technical training targeted at almost all of the project staff.
(2) NTTI instructed all such as conceptual design, detailed design and software development.

3.3.5 Transition to the Main Project from the Pilot Project

According to the document records, the Japanese side conducted the Special Assistance for Project Implementation (SAPI) from January to March in 1993 when the operation of the pilot project was started, with NTTI as an external consultant. They reviewed the on-going project in detail, pointed to the problems and troubles, and offered recommendation for improvement.

The NTTI pointed to the following about the pilot project.

(1) The Chinese side needs to identify the principles of macro economic policies in the central government so that local governments can easily understand them.
(2) The Chinese side needs to identify the kinds of information which will be required other than dynamic price information.
(3) The Chinese side should plan to employ OSI (Open Systems Interconnection) to unify the interface for multiple vendors.
(4) The Chinese side should clarify the systems which will be assisted by the yen loan.
(5) The Chinese side needs to strengthen the supervision of the central over the local because they have problems in project management, and particularly, the division of responsibility and communication between the central and local.
(6) It is strongly advised that the then-OECF should promptly answer to the inquiry from SIC concerning the revision and amendment of the project scope and the extent of reporting by SIC to the then-OECF should be clarified.

These issues that surfaced in the course of implementation of the pilot project comprised a good lesson when the main project was implemented. The Chinese side experienced a yen loan funded project, and developed a massive information system all for the first time ever. So, by getting lessons from the experience of developing an information system through implementing the pilot project, the Chinese side acquired sufficient expertise for project management including system development. This experience helped to implement the large-scale main project.

In that context, the fact that the projected was implemented in two steps, the pilot and main,

demonstrate the high relevance of this project.

In addition, as stated later, the Chinese side examined network technology by themselves and decided to employ TCP/IP (Transmission Control Protocol/Internet Protocol) technology, although the Japanese side strongly recommended adopting OSI (Open Systems Interconnection) technology in the transition from the pilot project to the main project. The Chinese side insisted on TCP/IP because the Chinese side concluded that OSI did not have good preceding implementations in the context that the computer is getting smaller in size and faster in performance by the rapidly growing technical innovation of the time. This decision resulted in the expanded disclosure of information by means of the Internet technology later.

3.3.6 Background of the Main Project

The main project, which was formally divided into two parts, was implemented based on the acknowledgement that the effects of the pilot project began to appear. It introduced computer equipment to major government ministries and commissions and provinces and municipalities, and developed seven economic information systems.

The development of the Price part of the Price and Market Information System started in 1994. The development of the Enterprises and Products Information System, the Foreign Loan Project Management System, the Economic Laws and Regulation System, the Macro Economic Forecast System, the Market part of the Price and Market Information System and the Government Investment Project Management Information System started in 1995.

Additionally, the deployment of the China Economic Information Network (CEInet) and the construction of the State Information Center Building began, which were meant to serve as common facilities for the economic information systems above. CEInet, which was modified to be developed on the Internet so as to make economic information from the government widely available by way of the Internet, began operation in December 1996.

The main project was conducted in 23 ministries and commissions of the central government and 38 local governments. 61 organizations altogether participated in the project. The State Information Center was in charge of the overall management and implementation of this project. Originally, 21 central ministries and commissions and 23 local governments participated, and two other central government organizations and 15 local governments participated in 1998 (Tables 6 and 7).

Table 6: Agencies and Organizations of the Central Government which Participated in the State Economic Information System Project

	Project Participation Organization	Homepage Address
	State Information Center	www.sic.gov.cn

	State Council Development Planning Committee[10]	www.sdpc.gov.cn
	CEInet Data Corporation	www1.cei.gov.cn/cedb
1	Personnel Division	www.mop.gov.cn
2	Labor and Social Security Division	www.molss.gov.cn
3	International Audit Department	www.audit.gov.cn (Chinese), www.cnao.gob.cn (English)
4	State Statistics Bureau	www.stats.gov.cn
5	State Supervision Head Office	www.cqi.gov.cn
6	State Commercial and Industrial Administrative Management Bureau	www.saic.gov.cn
7	State Sea Office	www.soa.gov.cn
8	National Asset-Management Office	www.ccgp.gov.cn
9	State Taxation Business Head Office	www.chinatax.com.cn
10	Sea Customs Head Office	www.customs.gov.cn
11	State Information Center (Domestic Trade Division pertinent section)	www.sic.gov.cn
12	China Electric Power	www.chinapower.com.cn
13	Machinery Industry Division	www.mei.gov.cn, www.mei.net.cn
14	Metallurgic Industry Division	www.mmi.gov.cn, www.metal.net.cn
15	China Chemical Industry	www.cncic.gov.cn
16	State Building Material Bureau	www.bm.cei.gov.cn
17	Coal Industrial Communications	www.chinacoal.gov.cn
18	China Spinning Company	www.ctei.gov.cn
19	China Petro Natural Gas Corporation	www.cnpc.com.cn
20	People's Bank of China	www.pbc.gov.cn
21	State Development Bank	www.cbd.com.cn
22	Domestic Trade Division	www.gjgnmyj.gov.cn
23	China Colored Metal Industry Division	www.cnni.net.cn, www.atk.com.cn

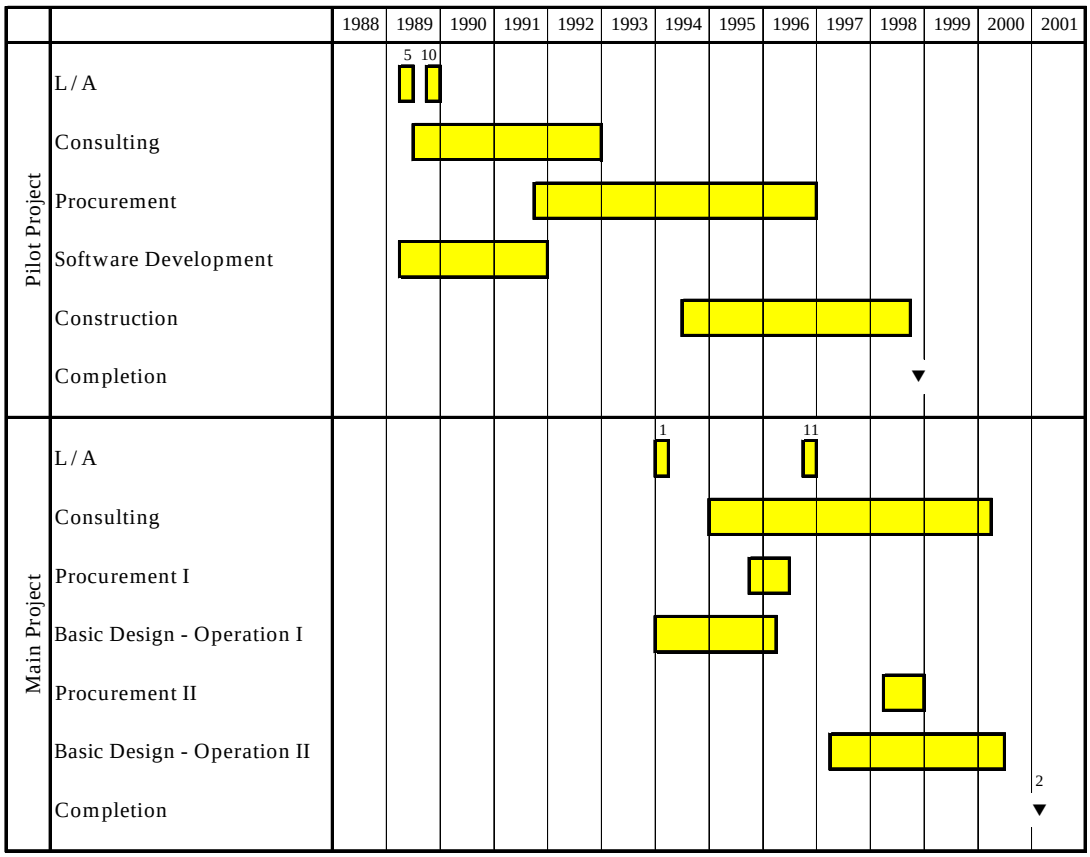
[10] "State Development and Planning Commission" was renamed "National Development and Reform Commission" in 2003.

Table 7: Provinces and Municipalities which Participated in the State Economic Information System Project

	Provinces and Municipalities		Provinces and Municipalities
1	Peking	18	Xiamen
2	Tianjin	19	Guangzhou
3	Hebei	20	Shenzhen
	Handan	21	Chongqing
4	Liaoning	22	Chengdu
5	Shanghai	23	Nanjing
6	Jiangsu	24	Shanxi
	Taicang		Shanxi Pucheng
7	Zhejiang		Shanxi Yangquan
	Hangzhou	25	Jilin
	Jiaxing	26	Heilongjiang
8	Fujian	27	Anwhei
9	Shandong	28	Jiangxi
10	Guangdong	29	Henan
	Fushan	30	Hunan
	Jieyang	31	Guangxi
11	Hainan	32	Guizhou
12	Sichuan	33	Yunnan
	Mianyang		Yunnan Dali Bai Autonomous Area
	Deyang	34	Shanxi
13	Halpin		Xian
14	Shenyang	35	Gansu
15	Dalian	36	Ningxia
16	Tsingtao	37	Qinhai
17	Ningbo	38	Xinjiang Uighur Autonomous Region

The construction of the main system started in 1994, began the operation of the whole system in September 2000, and was formally completed in February 2001 after the consulting, basic design and three-time international purchase in 1995, 1998 and 2000. Implementation of the whole project was promoted as Figure 3.

Figure 3: The State Economic Information System Background of this Project



According to the data of the State Information Center, 1,600 information centers were established in this project and 13,000 people were engaged, including the subprojects of the local governments.

The TRW in the USA and the Mitsubishi Research Institute in Japan were employed as an external consultant. The TRW gave advice on the design and development of the network and information system, and the Mitsubishi Research Institute provided local training on economic forecasting methodology and project management, and conducted observation visits in the local project premises and training in Japan, in addition to lectures on know-how's in local project premises from 1995 to 1998.

According to the State Information Center, they learned a great many of things from the consultants and the contribution which they made for the successful implementation fo this project was great. Additionally, they visited Japan and the USA to learn advanced cases of database projects, among which, they recall, visits to a US business engaged in large-scale information dissemination and to the Local Authorities Systems Development Center in Japan were particularly helpful.

3.3.7 Change of Project Scope: (1) Enlargement of Local Deployment

The project scope was revised and modified several times in the course of implementation of the

main project. Delay in the construction of the Information Center Building, expansion of the provinces and municipalities, and additional procurement of equipment for Internet connection account for these modifications and revisions. Additionally, some work items in the project were abandoned or canceled because they were considered to be no longer meaningful because of the change in circumstance, or better implemented by some other organizations.

Figure 4: Project Sites at the Beginning of the Project

Figure 5: Current Project Sites

It became clear that the actual spending would be far below the estimated cost, and the project scope was considerably revised and modified, and 15 local sites such as Yunnan and Anwhei were newly added. In addition to SIC, economic information system was deployed at the provincial and municipal level, and the whole country became almost covered (Figure 4). Additionally, two central government ministries and commissions also joined.

This reflected the policy changeover with respect to the development strategy by the government in the midland and western part that the development of society and economy got behind the eastern and coastal part. In some provinces and municipalities information systems were developed by the local funds as well as the funds of the yen loan and the central government.

The Neimenggu, Tibet and Hubei are left in blank in Figure 5. This does not mean that they have no information center at all, but it means that they do not have information centers using yen loan. Actually, information centers were formed in all the provinces, municipalities and autonomous regions.

In the initial planning of the project, the Chinese side had already designed to establish information centers all over the country. It is considered that the project sites were narrowed down only for the sake of budget, and the expansion of the project sites was not necessarily an idea that popped up during the implementation of the project.

3.3.8 Change of the Project Scope: (2) Adoption of the Internet

They made a massive change of the project scope and took the bold course of adopting the Internet when it began to prevail drastically on a global scale in the middle of the 1990s. The change

was originally decided on due to pure technical reasons, but as a result of adopting Internet technology, it enabled the government to conduct extensive transmission of information, which is considered to be the most significant impact of the change.

Generally speaking, it is quite unusual to adopt up-to-date technology in a development assistance project in a developing country in the early stage where the assessment of the technology is not yet stable. China was not particularly advanced in the Internet. Then, why was the decision made? Described below will be the results and conclusion of our research on why this extraordinary decision was made.

Data communication by directly connecting between personal computers by way of the telephone line was conducted to transmit and deliver the collected information in some data collection nodes in the pilot project. In the original plan of the main project, traditional network technology (X.25 packet switched network) was to be installed. NEC in Japan provided technical aid unrelated yen loan.

However, the Chinese side decided to change to adopt Internet-based network technology (TCP/IP, Web and Browser) in 1994. This change was decided on from a purely technical viewpoint.

The Internet enables to easily realize by far cheaper and faster information interchange, compared with traditional data communications system. The decision is considered to have been most effective in the development and use of the information systems all over the country. Since then, the use of nationwide communication network became more prevalent, and it drove further the diffusion of the Internet in China.

The State Information Center describes the reason of adopting Internet technology as follows.

First of all, they needed to realize the following three items in this project.

(1) To make it possible to access from the local region to a large-scale system.
(2) To construct a distributed network connecting distributed user organizations.
(3) To adapt to the diversity of users.

Additionally, there were the following three difficulties.

(1) To make it possible to interconnect 61 participating organizations.
(2) To ensure consistency with each participation organization with an independent network.
(3) To make it easy to promote consistency in user interface with each application system.

The Internet was the up-to-date technology that was selected in order to solve these problems. Under this background lies the fact that they had consistently introduced up-to-date technology since the stage of the pilot project and they had been able to follow technological changes well.

They needed to construct and operate an extensive and massive system by interconnecting every

computer in this project, but they generally adopted the exclusive protocol of the particular manufacturer such as IBM and DEC even in a massive network because the technical standard for interconnection in a heterogeneous environment was not popular in the world.

The International Organization for Standardization (ISO) standardized and promoted the "Open Systems Interconnection" (OSI) as a new international standard for interconnection in a heterogeneous environment, and OSI conformant products did not yet appear in the market although the governments of Japan and the USA decided to adopt them officially.

The NTT International, which was employed as a consultant of the pilot project back then, suggested the adoption of OSI to the Chinese side because they thought it was important to standardize interconnection in a heterogeneous environment after they realized the issues and difficulties behind the pilot project in 1993. However, the State Information Center knew that there were no products that had succeeded commercially in the OSI from the viewpoint of the user, and they hoped to introduce TCP/IP that began to be adopted mainly in research and academic networks in the USA and other countries. The NTTI and SIC had technical discussion on this issue. The State Information Center explained that the Chinese side needed to finally persuade the NTTI which was their consultant and did not support the Internet.

According to the State Information Center, they started to use TCP/IP in the last half of the pilot project. The advantage was that they could use any device from any manufacturer if they use TCP/IP, and they needed TCP/IP in order to connect devices from multiple vendors. They said that although they could have chosen OSI for a smaller system, they have been convinced that it was impossible for such a big project as the State Economic Information System Project. In fact, there were few cases in the world operated on OSI on such a large scale as this project.

The State Information Center considered employing the traditional host/terminal model in a basic design of the system, but the client/server model was developed between 1992 and 1993. They found that client/server products were growing in the world, and they understood it would take root in the future.

The State Information Center collected information again and again, continued to examine, held a conference to decide on the procurement content for three days at a hotel in Beijing in October 1994, where manufacturers from the US and Europe, such as Cisco, IBM and Sun Microsystems made product presentations and exhibits. It led to the final decision.

By this time, the State Economic Information System Project had been well-known to the private companies. Suppliers from Europe and the US often came to make sales presentation. However, buildup by Japanese companies seems to have been rare. One interviewee in the State Information Center told us that Japan lagged behind in deploying Internet technology, and that they thought that Europe and the USA got ahead.

Back in those days, the people in charge in the State Information Center took classes on technology

from experts of the Chinese Academy of Sciences and Tsinghua University which were the pioneers of the Internet in China, and they also asked for advice from experts of the University of Beijing or the Aircraft Ministry for the decision. Additionally, the chief engineer in the State Information Center was an expert of computer science, who belonged to the Hebei Computer Laboratory.

In this way, the decision that they would adopt the Internet was made in October to November 1994. Since then, they consulted with JBIC about the revision of the system and shopping list, and received approval.

However, JBIC does not seem to have had a clear awareness and understanding that the proposed change had meant the adoption of the Internet. When the mission asked about this issue to the State Information Center in China, they had the impression that JBIC made judgment based on the external consultant's opinions.

The Mitsubishi Research Institute mainly had charge of economic analysis and project management, the TRW in the USA provided support for system design and reporting to JBIC. But in fact, they started consulting service in 1995 after the Chinese side decided to adopt the Internet, and their opinions cannot have had a direct impact on deciding to adopt the Internet. It is legitimately concluded that SIC made judgment basically by themselves.

In spite of the change and addition of the project scope, the spending of the project fell a little below the level of the initial estimates. That is because they could utilize the trend that the ratio of performance against cost improved to a large extent, and even the prices of the latest devices fell in real terms. This is one of the characteristics of the innovation in information and communications technology.

3.3.9 Relevance of the Adoption of the Internet

Although the project initially was meant to serve the government alone, it became possible to provide or disclose information in the central and local governments to the community by adopting the Internet. This is a considerable change of the project scope, so we researched the background in detail and further examined the historical background.

The use of Internet had expanded among researchers or engineers in the academic field, such as computer science, since the latter half of the 1980s, but the research network that had been operated by the public fund was confined to non-profit use and Internet technology was rarely adopted for general information system until the first half of the 1990s. Experts in the telephone company and other data communications were negative about the Internet, because it had many problems about security and expense.

However, commercial Internet business, which ordinary commercial companies can also use, emerged in the USA, following the demand of the users since 1992 or around. It became widely used by the people. Understanding of the Internet in the telecommunications carriers, regulators in the

government, and the industry in Japan lagged behind Europe and the United States in those days. There is no exaggeration to say that Malaysia, Singapore and Indonesia preceded Japan[11].

It can be said that it was in the very early by international standards when they took the bold course of adopting the Internet as a basic technology of the massive government information system in China because the general recognition about the Internet was still low in 1994. The deployment of the Internet was decided not by the advice of the foreign consultant, but by the original examination and independent decision of the Chinese side, particularly of the State Information Center.

It was in April 1995 when China became able to connect directly to the Internet overseas by leased line. It was in 1995 that the Internet in China reached a turning point. Domestic connection became available, but until 1995, only indirect connection was available for oversea link because of regulation in the USA.

In additional, one of the authors was involved in the first national conference in China for the diffusion of the Internet, held at the University of Beijing and Tsinghua University in November 1994. At this moment, the expectations for the Internet were already high, and the leadership of the Communist Party of China was also engaged in it. But the Internet was not yet available to the general people freely, and the Internet was used only by the limited users such as researchers related to technology.

We cannot clarify, based on the facts, whether or not the State Information Center fully predicted that the Internet would become widely used in society and decided the transition to the Internet. The State Information Center answered to our questions as follows.

> The State Information Center concluded positively that the Internet technology was a technology that had tremendous potentiality after they understood and analyzed the Internet technology.
>
> They built an awareness that an accessible and technical means to provide the economic information to the involved research organizations and the general public had appeared at the same time, including that the enlargement of service area to the government department would be possible in adopting the Internet technology when they constructed the state economic information system and rendered a service for the specified department in the government on each order by using the yen loan.
>
> The State Information Center changed the plan of system architecture at the end of 1995 in

[11] The Office of the Prime Minister was the first government agency in Japan that made their homepage available on the Internet and it started disseminating information in August 1994, and the Ministry of Posts and Telecommunications followed in September 1994. The Central Bureau of Statistics of the Indonesian Government made their homepage available in December 1994. It was far earlier than the Bureau of Statistics in Japan. The White House of the US Government, which promoted the National Information Infrastructure (NII), started disseminating information on the Web in November 1994.

accordance with this recognition, decided to construct the "China Economic Information Network" by adopting the Internet technology absolutely, handed in the idea to the State Planning Committee and it was authorized, and they cleared it with Japan and began to conduct it. As a result, the China Economic Information Network was formally reopened on December 1996, and began to provide the economic information widely targeting the community including the government agency. This was the first portal site aimed at the general public by the government in China. After that, the information centers in some provinces and municipalities followed the technological trends, and opened their original economic information network.

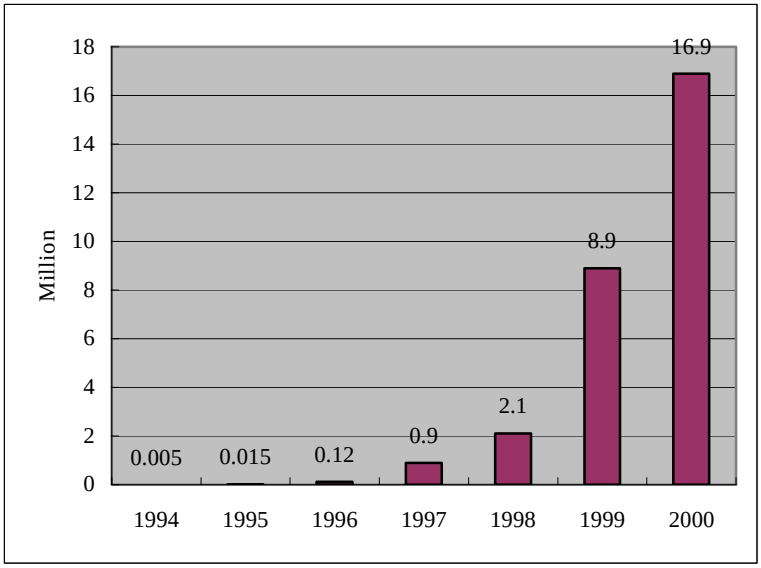
In 1998, the government, under the slogan of the "Government Information Network", decided to release government information in each ministry and commission, and identified the goal that 80% of the government agencies should provide information by the Internet by year 2000. The Foreign Ministry, the Overseas Trade Economic Cooperation Ministry, the State Scientific and Technological Commission and the New China News Agency began to provide information on the Internet in 1999[12].

It can be said that with this fact underneath, the China Economic Information Network in the State Information Center took over the lead to the public information with the Internet in the Chinese Government, and also played a potent role in the diffusion of the Internet in the whole of China.

There were no more than 5,000 users of the Internet in 1994, most of whom were researchers and engineers in the educational and research facilities, such as computer science and natural science. The year was just incunabula. The number of Internet users counted 15,000 in 1995 and no more than 120,000 even in 1996 (Figure 6), so the people who were able to use the Internet for it were limited even if the government began to provide public information. But afterward, the user of the Internet in China continued to grow, being affected by the active diffusion and promotion policy of the government and the sharp rise of the Internet users in the world, and the number of the Internet users in China continued to enlarge. It measured up to the second largest in the world for 1.7 million in 2000 and 6.8 million in 2003 in excess of the number of all users in Japan[13].

12 Aizu Izumi. "Azia kara no Netto Kakumei (Net Revolution from Asia)" (Iwanami Shoten, 2001)
13 China Internet Information Center (CNNIC). July 2003.
<www.cnnic.net.cn/download/manual/en-reports/12.pdf>

Figure 6: Growth of Internet Users in China (1994–2000)



Source: CNNIC/*The Diffusion of the Internet in China,* Willaim Foster, Seymour E. Goodman, CISAC, 2000

In this way, the State Information Center decided to adopt the Internet as a fundamental technology in the system, and then suggested and realized the delivery of information to the general society. It can be said that they had high foresight when the situation of those days is considered. Namely, it can also be said that they responded to the change of social and technical situation flexibly and adequately, and an adequate change of plan was made as a result.

The decision was to adequately understand the actual situation of rapidly-changing information technology, to take the bold course of adopting Internet technology in a full scale, and to entirely change the basic design of the system in a technical sense.

Hereby, it became possible to collect and transmit the low-cost and rapid delivery of information, and then, it became possible to release the collected information to the community on a large scale. The character of system also changed significantly in the social sense. We can conclude that not only the decision pushed ahead with information disclosure by the government, but it posed quite a shock to the society as a whole in China, which pushes ahead with the reform and liberalization policy, which will be described later.

3.4 Evaluation of Efficiency

This project has the following work items through the pilot project and the main project.

(1) To construct information systems to provide the economic information.
(2) To introduce information equipment and system to the State Information Center in order to support the operation of the information systems above.
(3) To introduce information network equipment and system to information centers in the provinces and municipalities.
(4) To procure equipment and devices to construct the nation-wide information network for interconnect information centers in each province and municipality.
(5) To construct the information center building to consolidate the functions of the information center.

These work items overlap partly in the pilot and main project phases. Therefore, this report will evaluate the efficiency of input against output in these two phases for the sake of convenience.

We will evaluate that efficiency with a focus on the introduction of hardware. The effectiveness of the completed systems and network will be described in 3.5 and 3.6.

3.4.1 Pilot Project

The scope of the pilot project is the procurement of computer device, the development of software, training of personnel, consulting and the construction of Information Center Building as the scope of this project in the pilot project. In Tables 8 and 9 are shown the project scope and project cost, both estimated and actual.

Table 8: Project Scope of Pilot Project

	Planned Scope	Actual Scope
Computer	● Medium: 2 ● Small: 2 ● Mini Computer: 2 ● Printer ● Others	● Main frame: 5 ● Medium: 2 ● Small: 11 ● Mini Computer: 374 ● Printer: 219 ● PC: 374 ● Notebook: 6 ● Server: 12 ● Workstation: 5 Intelligent Terminal: 84
Training	● Hardware: 66M/M	● Hardware: 24.87M/M

	● Programmer: 84M/M ● System Engineer: 82M/M (Total: 232M/M)	● Programmer: 43.39M/M ● System Engineer: 39.13M/M (Total: 107.39M/M)
Consulting Services	● 83.5M/M	● Detailed Design:50M/M ● Review: 20M/M ● Other necessary consulting service: 13.5M/M
Others	● Network System	● Network System
Construction Works for Information Building	● Steel materials: 3,900 tons ● Aluminum materials: 6,500 m2 ● Elevators: 4 ● Air-conditioners: ● Computer systems (main frame, terminals, drives, printers, microcomputers, communication controllers, laser printers) ● Operating systems, database management systems, programming languages, communication systems	● Building materials: 65 kinds ● Steel materials: 1,000 tons ● Elevators: 7 (5 for passengers, and 2 for goods) ● Central air-conditioning, fire-fighting equipment: 1 set ● Comprehensive wiring equipment: 1 set ● Building automatic controlling equipment: 1 set ● Electrical equipment: 1 set ● Program-controlled Exchange (PBX): 1 set

Table 9: Project Costs of the Pilot Project

Items	Estimates (Million JPY/RMB)			Actual Spending (Million)		
	F/C	L/C	Total	F/C	L/C	Total
1. Computer Equipment	1,547	20.35	2,247	1,913	10	2,117
2. Software Development	433	4.40	584	0	20	407
3. Maintenance	110	0	110	0	15	306
4. Training	431	3.10	538	344	7	486
5. Construction	1,004	72.80	3,508	1,008	157	4,208
6. Consulting Services	245	0	245	244	0	244
Total	3,770	100.65	7,232	3,509	209	7,768

Exchange rates: RMB 1.00 = JPY 34.4 (Estimates), RMB 1.00 = JPY 20.38 (Actual Spending)

In the plan of the pilot project to improve information system functionality, Beijing, Shanghai and Shenzhen were selected for price data collecting points. Later in the course of project implementation, Tianjin and Guangdong were added as additional data collecting municipalities. Finally, they decided to further install information devices in a total of 40 nodes in four municipalities. They installed large-scale computers in each of the four municipalities, so that the quantity of devices and project costs considerably increased compared to those in planning.

And then, they assumed training for computer operation, but it was difficult to conduct operational training due to the regulation in those days, and, instead, they conducted technological training. Therefore, the originally scheduled training for 232 man-months was not conducted, and it was fastened only for 107 man-months. The project expense for training was cut down to 431 million to 344 million

yen, too.

The local currency portion, rather than the yen loan portion, was appropriated for the expense of software development and maintenance. It seems to be that part of the remaining yen loan portion was allocated to the procurement of computer device. The total project cost, including both the yen loan and local currency portions, rose to 776 million 800 thousand yen from 723 million 200 thousand yen, originally estimated.

Speaking of the project term, the pilot project was going to be completed on October 1992 in the original plan, but in fact, every projecting item was accomplished on March 1998. This is one of the factors that they spent much time on procuring the site for constructing the Information Center Building, and that the work periods were extended.

3.4.2 Main Project

The total expenditure of the main project was 27,073 million yen, out of which the yen loan accounted for 19,058 million yen. Among the expenditure, the investment in the purchase of computer equipment, network devices, software and system integration was 16,476 million yen, which accounted for 80% of the total, and was slightly larger than the plan.

Among the funds that were invested in the main project, the funds that were allocated to purchase of computers were 75 million yen. 9,412 million yen accounted for purchase of the computer device in planning, 1,637 million yen was reduced, and the expenditure of 2,899 million yen was added to the system integration, training and the replacement parts that were not assumed in planning. However, the project cost was compressed by 1,242 million yen because there some items were reduced in cost. By the way, the expense of system integration turned out to be incurred in addition to the equipment cost. It is necessary to take this cost into consideration when the same kind of project is conducted in the future.

As stated above, the compression of funds are seen in the procurement of the computer device, but the number of procured device has been more drastically increasing than that in planning because there was the cheapness of the device price. As procured devices, 1,400 "servers" that did not exist in planning are added up, but this is because their plan was changed into introducing the Internet on the way and the server that had the transmission function of information was introduced.

Part of the difference (3,248 million yen) which resulted from the decreased price of the equipment was allocated to the maintenance of the provinces and municipalities, and departments that were not covered in the original project scope. It is evaluated that it enhanced the additional value of this project. In addition, it can be also evaluated that they intend to increase the amount of equipment and devices, by additionally allocating the contingency fund reserved in the local currency.

The problem in the fund administration is about the sorting way of the devices. As seen in the list of the procurement goods, the sorting of the device is partly conducted arbitrarily. In many cases, high-power PCs are classified as small-scale computers, and it is difficult to trace how funds were

actually allocated on what items.

Table 10: Project Scope of the Main Project

Items	Planned Amount	Actual Amount (Amount for Additional Procurement)
1. Large Computer	1	2
2. Mid Computer	10	48
3. Mini Computer	210	161 (13)
4. Workstation	406	598 (62)
5. Intelligent Terminal		
6. Micro Computer	12,361	14,194 (3,565)
7. Network Equipment	5,767	3,091 (932)
8. Environment Equipment	15,083	5,883 (1,207)
9. Software	4,998	3,937 (508)
10. Server		1,404 (305)
11. Consulting	99M/M	99M/M

Table 11: Project Costs of the Main Project

Items	Estimates			Actual Spending		
	F/C	L/C	Total	F/C	L/C	Total
1. Large Computer	216		216	86		86
2. Mid Computer	688		688	372		372
3. Mini Computer	4,708		4,708	1,262		1,262
4. Workstation	922		922	861		861
5. Intelligent Terminal	1,413		1,413	2,328		2,328
6. Micro Computer	1,465		1,465	2,866		2,866
7. Network Equipment	3,571		3,571	3,300		3,300
8. Auxiliary Equipment	1,561		1,561	2,138		2,138
9. Software	3,341		3,341	2,502		2,502
10. Civil	0	308	3,604	0	69	807
11. System Design	0	119	1,392	0	256	2,995
12. Software Development	0	203	2,375	0	223	2,609
13. Price Escalation	825	19	1,047	0		0
14. Contingency	964	33	1,350	0	137	1,603
15. Consultant Services	626		626	444		444
16. Integrated Training, and Maintenance of Spare Parts	0		0	2,899		2,899
Total	20,300	682	28,279	19,058	685	27,073

* Exchange rate: RMB 1.00 = JPY 11.7

The "China Economic Information Network" that adopted the Internet technology was constructed as the network connecting the computers in each information center by using these procured devices.

Each node (Base) of the State Information Center and the China Economic Information Network

was connected with either Digital Data Network (DDN) or X.25 provided by China Telecom. The original speed of circuit was about 64Kbps to 384Kbps, but the wide area network connection is renewed by 10Mbps to 100Mbps with a wide area Ethernet service or by the speed of gigabit class as the case may be.

In addition, the State Information Center used the communication satellite line, adding to the offer of network connection by general public network, and differently conducted the construction and operation for the Chinese economy that had higher secrecy. This service is used for transmitting and receiving the high secret data or the large volumetric data and is used as the internal network in the central government agency, the local government agency and the private firm.

The service contents of the telecom market brings up to scratch in the network tying each node of the State Information Center and the China Economic Information Network, and the personal circuit has been replaced with Internet network based on the cheapness of price. In the past, it is switched from what it directly connected with the State Information Center with DDN to what it connects with the connecting node in the Internet Service Provider (ISP). The use of packet switching network with X.25 system has been replaced with the Internet network little by little, too.

Additionally, the China Economic Information Network is connected with Database server, Web server, FTP server, File server and Mail server, and the information service on the Internet is sorted out for being provided.

3.4.3 Expansion of the Project Scope

Originally, they planned to introduce the computer network equipment into the information centers belonging to 21 central government agencies (Departments) and 21 local governments (provinces and municipalities), and to construct the information system. However, as stated above, two central government agencies and 15 local governments were added because the object of introducing the information system in this project was enlarged, and 23 central government agencies and 38 local government agencies came to 61 agencies, which took part in this project.

In addition, the total number of bases came to 1,600 because the local government established the information centers in the base of the province and municipalities, and the network connection was conducted.

Table 12: Government Agencies and Organizations which Participated in the State Economic Information System Project

Period	Central Government	Local Government
Phase I	Personnel Ministry; Labor and Social Security Ministry, National Audit Ministry; State Bureau of Statistics; State Bureau of Metrology; State Bureau of	Beijing, Tianjin, Hebei, Liaoning, Shanghai, Kiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan, Sichuan, Harbin, Shenyang, Dalian, Tsingtao,

	Commercial and Industrial Administration; State Bureau of Maritime Affairs; State Bureau of National Property Management; State Bureau of Taxation; Sea Customs Office; State Information Center; Ministry of Power; Ministry of Machinery; Ministry of Metallurgy; Ministry of Chemical Industry; State Bureau of Building Material; Ministry of Coal; Association of Spinning Industry; Petroleum and Natural Gas Corporation, People's Bank of China, State Development Bank (Total: 21 bodies)	Ningbo, Amoy, Guangzhou, Shenzhen, Chongqing, Chengdu, Nanjing (Total: 23 provinces and municipalities)
Phase II (Revised Scope)	Ministry of Domestic Trade; China Colored Metal Corporation (Total: 2 bodies)	Heilongjiang, Jilin, Shanxi, Anwhei, Jiangxi, Henan, Hunan, Guangxi, Guizhou, Yunnan, Shanxi, Gansu, Ningxia, Qinhai, Xinjiang Uighur Autonomous Region (Total: 15 province and ward)
Total	23 bodies	38 bodies

Additionally, the improvement of the information center in the Neimenggu and the Xizang were conducted with Chinese own budget in addition to this project, and at present, all the provinces, municipalities and autonomous regions excluding the Hubei became a part of the State Economic Information System.

3.4.4 Outcomes in the State Information Center

The State Information Center, as an executing agency, oversaw the implementation and progress of the State Economic Information System Project, it also developed seven economic information service systems and the "China Economic Information Network" to transmit and receive the economic information by themselves.

The seven information systems that the State Information Center constructed are the Macro Economic Forecasting System, the Enterprises and Products Information System, the Price and Market System, the World Economic Information System, the Economic Laws and Regulation System, the Foreign Loan Project Management Information System and the Government Investment Project Management Information System, and the information network that connects the ministries and commissions in the central government, and provincial and municipal information centers all across the country. The equipment that was allocated to the seven economic information systems in the original plan is shown in Table 13.

Table 13: Outcomes in the State Information Center

Items		Macro Economy Forecast	Enterprises and Products Information	Price and Market Information	World Economic Information	Economic Laws and Regulation	Foreign Loan Project Management Information	Governmental Investment Project Management Information	CEInet	Total
1. Mainframe	Planned	0	0	0	0	0	0	0	0	0
	Actual									
2. Server	Planned	1	0	1	1	0	0.5	0.5	0	4
	Actual	0.5	1	2	0.5	2	2	2	9	19
3. PC Server	Planned	0	0	0	0	0	0	0	0	0
	Actual	2		3	2	2	2	2	4	17
4. Workstation	Planned	20	2	1	2	7	2	2	1	37
	Actual	2	2	5	2	2	3	3	6	25
5. PC	Planned	100	100	121	22	112	50	28	25	658
	Actual	91	87	406	79	127	158	128	81	1,157

Originally, they restricted the number of servers to be operated, by sharing servers between different information systems, but actually they came to allocated dedicated services to each of the services. (However, the Macro Economic Forecasting System and World Economic Information System were integrated, and now they are stored in one server).

Additionally, they considerably added inexpensive PC servers in addition to high-end servers which required a vendor-developed operating system. This seems to be a result of their action to allow for the additional capacity of development environment and operational environment. The number of PCs itself increased to 1,157 in the actual output from 658 in the original plan.

Meanwhile, the number of workstations decreased. The reason for this seems to be that the merit of the workstations relatively deteriorated because they required the vendor-developed operating system, application software and development environment, whereas more development and operation were transferred to the PC-based platform.

3.4.5 Output in Ministries/Commissions and Provinces/Municipalities

Projects in the governments or information centers of the provinces and municipalities were made up of equipment procurement, province- or municipality-wide information network construction, development of economic information systems and procurement of other equipment and facilities.

In the implementation of the project, the State Information Center showed the implementation guideline, under which the information center in each province and municipality designed the project scope. In developing provincial and municipal economic information systems, the seven system of the State Economic Information System are modeled after, although each province and municipality excluded unnecessary service systems depending on the local needs and situation.

Additionally, the Foreign Loan Project Management Information System was redesigned as a system that provides information for inviting foreign investment in the provinces and municipalities.

Generally, the information network in the provinces and municipalities was made up of the devices and equipment inside the information center, such as digital exchange, router, switch, hub, network server (DNS, authentication, directory and firewall), and was connected by digital data leased line outside the information center. They set up database, Web, FTP, file and mail servers and operate the information system.

In the following sections, the output of project implemented in the provinces and municipalities which the research mission visited will be described.

Beijing Economic Information Center

(Term)

The Beijing Economic Information Center improved the network and constructed the system from 1995 to 1996, and constructed each service system in 1997. After that, they renewed the network and the information system.

(Project Cost)

The yen loan funds of 736,590 thousand yen (738 million yen in the plan) and the domestic funds of 14,290 thousand yuan (13,200 thousand yuan in the plan) were invested in the Beijing Economic Information Center.

(Project Scope and Procurement)

They constructed the Beijing Economic Information Network in order to provide network connection for the government and public users and then constructed the information system for collecting and providing economic information by using the network. The computer equipment procured to construct the network and information system are shown in Table 14.

Table 14: Procured Items by Beijing

Type	Count
Server	31
Workstation	14
PC (Including Notebook PC)	343
Switch	30
Router	6
Hub	8
Others (Software, External Storage, Facilities)	-

Shanghai Information Center

(Term)

The Shanghai Information Center participated in the State Economic Information System Project

at the stage of the pilot project. After that, the pilot project was integrated into the main project, which started in 1995.

(Project Cost)

The Shanghai Information Center invested a yen loan of 1,062,720 thousand (1,070,100 thousand yen in planning) and a domestic fund of 36,310 thousand yuan in this project

(Other Bodies Involved)

The Shanghai Legal System Committee, the Shanghai Traffic Transport Office, the Shanghai Commercial Committee, the Shanghai Trade Information Center, the Shanghai Foreign Economic Trade Committee, the Shanghai Audit Bureau, the Shanghai Statistics Bureau, the Shanghai Pudong New Ward Government, the Shanghai Agricultural Committee, the Shanghai Personnel Bureau, the Shanghai Labor Bureau, the Shanghai General Merchandise Bureau and the State Industrial Boiler Association, and the Shanghai Information Center participated in the project in Shanghai.

(Project Scope and Procurement)

The list of the equipment procured by the Shanghai Information Center in this project is shown in Table 15, but at present, all the equipment except for the equipment for operation of the Shanghai Economic Information Network has been renewed.

Table 15: Procured Items by Shanghai

Type	Count
Server	80
PC (Including Notebook PC)	882
Switch	17
Router	52
Hub	78
Other (Software, External Storage, Facilities)	-

Guangzhou Information Center

(Term)

The Guangzhou Information Center decided to participate in the State Economic Information System Project officially in 1995. The Guangzhou Information Network was accomplished in October 1996 as a result at the first stage of the project, and the economic information service systems that operate on the network were accomplished in March 1997. After that, the second-round procurement was completed in September 1999 and the whole project that the Guangzhou Information Center was involved in was completed officially in December 2000.

(Project Cost)

Funds of 574,290 thousand yen loan (578,100 thousand yen in the plann) and 25,990 thousand yuan (27,940 thousand yuan in then) were invested in the project under the Guangzhou Information Center. Additionally, a total of 30 million yuan, which the participating bodies other than the

Information Center secured for their subproject, was also invested.

(Other Bodies Involved)

The Guangzhou Planning Committee, the Guangzhou Economic Committee, the Guangzhou Foreign Trade Committee, the Guangzhou Statistics Bureau, the Guangzhou Personnel Bureau, the Guangzhou Price Bureau, the Guangzhou Legal System Bureau, the Guangzhou Economic Engineering Development Ward, the Guangzhou Bonded Ward, the Guangzhou Editorial Public Authority, the Guangzhou Construction Committee, the Guangzhou Library, the Guangzhou Agricultural Committee, the Guangzhou Traffic Tactical Editorial Office, 10 Wards and two municipalities at the level of prefecture, and the Guangzhou Information Center participated in the project in Guangzhou.

(Project Scope and Procurement)

The equipment and devices shown in Table 16 were purchased in the project of the Guangzhou Information Center.

Table 16: Procured Items by Guangzhou

Type	Count
Mini Computer	18
Large Server	5
PC Server	57
Workstation	13
PC (Including Notebook PC)	619
Large Switch	5
Switch	65
Router	70
Access Server	12
Hub	73
Other (Firewall Software, Network Management Software, Peripherals)	-

Jilin Information Center (Changchun)

(Term)

The construction of the information network and information system by the Jilin Information Center was planned and conducted as an additional project in the State Economic Information System between 1997 and 2000. The project was completed in September 2000.

(Project Cost)

The project expense was 98,580 thousand (100,000 thousand yen in planning) as a part of yen loan, 2,900 thousand yuan (4,800 thousand yuan in planning) as a part of domestic currency.

The computer device and network device shown in Table 17 were introduced in the Jilin Information Center, the Jilin Economic Information Network that made up a part of the China Economic Information Network was constructed, and the information system that operated on the

network was developed.

(Other Bodies Involved)

The Jilin Information Center participated in the project in Jilin.

(Project Scope and Procurement)

The devices and equipment shown in Table 17 were purchased in the project in the Jilin Information Center.

Table 17: Procured Items by Jilin

Type	Count
ATM Switch	1
Layer 3 Switch	10
Hub	9
Router	2
Access Server	8
Server	6
PC Server	7
Workstation	6
Intelligent Terminal	40
PC (Including Notebook PC)	145
Others (Printer, UPS, Application Software, Development Software, Groupware, Database, Facilities)	

Shanxi Information Center (Xian)

(Term)

The project in the Shanxi Information Center started in February 1997 as an additional subproject of the State Economic Information System Project, and the operation started at the beginning of 2000. Additionally, the completion of the project was formally recognized after the Shanxi Development Planning Committee in December 2000.

(Project Cost)

The invested yen loan funds were 117 million yen (120 million yen in the plan) and the domestic currency funds were 500 million yuan.

(Other Bodies Involved)

The Xian Information Center participated in the project in Shanxi.

(Project Scope and Procurement)

The devices and equipment shown in Table 18 were purchased in the project in the Shanxi Information Center.

Table 18: Procured Items by Shanxi

Type	Count
Network Equipment (Switch, Router)	27
Computer Equipment (Mini Computer and Server)	20
PC	94
Others (Printer, UPS, Application Software, Development Software, Groupware, Database, Facilities)	-

Sichuan Economic Information Center (Chengdu)

(Term)

The Sichuan Economic Information Center was formally endorsed by the State Planning Committee in April 1995 after they participated in the project from the first period of the State Economic Information System Project and it was started as a project financed by the yen loan in 1994. The project was divided into two phases. The first phase principally aimed to construct the information network, and was accomplished in January 1997. The second phase principally aimed to construct an information system, and was accomplished in March 2000. The project term of the Sichuan Economic Information Center was about seven years including the lead period before the yen loan was authorized.

(Project Cost)

The project cost in Sichuan was 970,470 thousand yen (984,000 thousand yen in planning) in the yen loan portion, and was 43,750 thousand yuan (30,000 thousand yuan in planning) as a part of the domestic currency.

(Other Bodies Involved)

In total, 22 organizations of the provincial government such as the Planning Committee, the Personnel Agency, the Bureau on Commerce and Industry and the Social Security Bureau, the information center at the level of municipalities, including the Sichuan Economic Information Center participated in the project in Sichuan.

(Project Scope and Procurement)

The equipment procured in the project in Sichuan is shown in Table 19.

Table 19: Procured Items by Sichuan

Type	Count
Server	30
Network Equipment	27
PC	485
Other (Software, Peripherals, Facilities)	66

Xinjiang Uighur Autonomous Region Information Center (Ulumqi)

(Term)

The project was conducted as an additional project of the State Economic Information System Project in the Xinjiang Uighur Autonomous Region Information Center, connection to the information

network was completed in 1998, and the development of information systems was accomplished in July 2000. The final acceptance of the whole project was accomplished in December 2000.

(Project Cost)

The project cost in the Xinjiang Uighur Autonomous Region Information Center was composed of the yen loan portion of 116,500 thousand (120,000 thousand yen in the plan) yen, the local currency portion of 2,500 thousand yuan (5,550 thousand yuan in the plan).

(Other Bodies Involved)

Branch offices of the Information Center in 15 areas and municipalities in the autonomous region participated in the project, as well as the Xinjiang Uighur Autonomous Region Economic Information Center. In addition, six departments in the government of the autonomous region were connected by the network under this project.

(Project Scope and Procurement)

The equipment procured in the project part of the Xinjiang Uighur Autonomous Region Information Center is shown in Table 20.

Table 20: Procured Items by Xinjian Uighur Autonomous Region

Type	Count
Server	35
Network Equipment	184
PC	190
Other (Software, Peripherals, Facilities)	

3.4.6 Information Center Building

The Information Center Building is located on Qianmen Menwai Avenue, Beijing and about 6 km south of the present State Information Center office.

It was completed in December 1994, 256 million yuan was spent for construction in addition to 10,070 million yen loan. It is an "intelligent building" of 26,215 square meters for the building gross area, equipped with various functions and facilities to operate information systems. Construction was completed in December 1999

It uses power supply equipment by the ABB in Germany, and is duplicated, but it is not equipped with the electric generator for supplying power for the entire building. According to the management of the building, tenant companies have their own UPS for short-time power outage. The self-operated optical fiber, of five or six kilometers' long, connecting to the State Information Center at 4Mbps. China Telecom pulls in the Internet line separately.

Originally, the State Information Center Building was planned to house all the equipment in the State Economic Information System, but it took 10 years for construction to be completed and the building did not meet the timing.

There are two factors that delayed construction. One is that the plan faced trouble in acquiring land because residents in the originally planned construction site resisted moving away. Another is that any new construction plan in Beijing was uniformly frozen up by the municipal government. A kind of construction bubble arose because the authority for issuing construction permission was transferred from the central government to the local authority by deregulation in China. Consequently, the municipal government temporarily froze up the issue of construction permission until they fully examine all the construction plans which were proposed at that time. The construction plan of the Information Center Building was included in the restriction. As a result, the construction period was extended.

Under these situations, they were going to move all the offices of the State Information Center, but that they chose not to move because they did not want to be away from the National Development and Reform Commission. (The present office in the State Information Center is some hundreds meters and five- or six-minute walk away from the National Development and Reform Commission).

3.4.7 Summary on Efficiency

3.4.7.1 Efficiency in the Use of Fund

As stated above, the actual expenditure required for the implementation within the original project scope fell below the initial cost estimate, so the remains were allocated for the additional procurement of devices and systems for central government ministries and commissions and information centers in provinces and municipalities that had not been included in the original plan, thus further improving the nationwide information network. The information network generally has the quality that the more nodes are connected to the network, the bigger the value becomes, due to the externality of network. Therefore, the fact that the residual sum was applied to the expansion of the organization which participated in the project and to the improvement of the communication environment led to the efficient use of the fund.

In some cases, the system that had been already constructed in the pilot project was replaced by the main project. For example, the Price and Market Information System was constructed ahead of the other information systems in the pilot project, but at present, it is operated with the completely new equipment.

3.4.7.2 Management of the Progress

As far as the progress report, the management of the progress of the project worked almost as planned, except for the construction of the Information Center Building and a small part of the procurement of equipment.

The delay of the construction of the Information Center Building had the possibilities that would affect the development of information systems that were originally going to be housed in the

Information Center Building. However, the plan was changed to set up the service system inside the establishment of the original State Information Center, and the development and construction were conducted in the originally scheduled form closely temporally without affecting the delay of building construction directly.

3.4.7.3 Other Issues

It is difficult to maintain the information system on a constant basis. Generally speaking, the information system developed at some point in the past do not necessarily offer all the desirable functions to both service providers and users in a desirable manner because it itself is always under development. Consequently, while the information system is always used, it always must keep on being refurbished.

Additionally, a new type of service, whether network access or development environment, will be introduced at a relatively short interval (approximately two to three years). Because ISP service was limited in China at the time of project implementation, information centers in the provinces and municipalities and ministries and commissions were connected to access nodes or the China Economic Information Network by a long-distance dedicated line and then connected to the external network, i.e. the Internet thereon. However, as ISP business grew, information centers in the provinces, municipalities, ministries and commissions, particularly information centers in remote areas, were able to connect to the external network once they connect to the nearest ISP node provided by ISP even if they do not connect to an access node of the China Economic Information Network with a long-distance dedicated line. At the time of the survey for this research, a number of information centers changed to this connection mode.

The same change can be seen in the "Computer Maintenance Project at the Central Bureau of Statistics" in Indonesia. Originally, regional statistics offices had to connect directly to Jakarta when they interchange information with the headquarters. Expenses for a long-distance communication naturally arose because of the connection with an analog modem between the head quarters and regional offices of the Central Bureau of Statistics. However, as the commercial access service for Internet became widespread all over the country, the regional offices, especially remote offices of the Central Bureau of Statistics were able to use a neighboring dial-up access point and reduce communication expense, and in addition, they were able to communicate in relatively stable quality.

3.5 Effectiveness: (1) Seven economic information systems

This project is aimed at the development and implementation of the seven economic systems which support collecting and analyzing macro economic information. In addition, the development of overall network for smooth operations of the systems and improvement of information systems at the province level is also required.

This section describes the contents of every seven system in detail. Firstly, this section describes the general information of the system including the way of operation, and then the result of the survey will take into the account.

Macro Economy Information System and World Economic Information System were integrated in the course of implementation, but in the study we regard them as two individual systems. Therefore we describe both systems individually.

In addition, in order to access the economic information that CEIN provides, online authentication, which consists of user name and password, is required. The "registered users" in the following description means the user required this authentication. User data including the number of users is provided by State Information Center..

3.5.1 Macro Economy Information System

Macro Economy Information System is composed of two parts, numeric information based on economic model and textual information.

Macro Economy Information System collects the primary data from the National Bureau of Statistics, the Internet, and information centers in provinces and municipalities, then processes it, and finally provides the processed data for users. The primary data consists of comprehensive economic information, industrial economic information, trade information, world economic information, conservancy, forecast, regional economic information (Table 21). The forms of processed data are comprehensive economic information, special development planning information, world economic information, regional economic analysis, economic conservancy information, and forecast analysis information (Table 22). At an earlier stage, this system only provided a monthly report exclusively for government employees, but it began distribution information to public on the Internet.

Comprehensive economic information and special development planning information are updated monthly. The period of update of world economic information, regional economic analysis, economic conservancy information, and forecast analysis information is occasional, but usually updated 70 times a year. The main topic is selected on a case-by-case basis.

It should be noted that original information for regional economic analysis is delivered by email from provincial and municipal governments, but that it is not made available to public.

Table 21: Basic Data for Macro Economics System

Name of Data	Number	Data amount
Comprehensive economic information	-	4GB
Industrial economic information	-	3GB
Trade information	-	2.5GB
World economic information	-	3GB
Conservancy, forecast information	-	0.6GB
Regional economic information	-	1GB

Source: questionnaire response from SIC

Table 22: Output Data of Macro Economics System

Name of Data	Number	Data amount
Comprehensive economic information	-	10MB
Special development planning information	-	50GB
World economic information	70 reports annually-	100KB
Regional economic analysis		20MB
Economic conservancy information		200MB
Forecast analysis information		800MB

Source: questionnaire response from SIC

Today, econometric models, such as computational model, input/output model and economic activity analysis model are created, but the problem is that they do not refer to the same economic indicators. Experts from the World Bank and Chinese Academy of Social Science discuss the indicators to use. The economic activity analysis model are frequently updated based on the latest economic indicators, while the computational and input/output models are not, because with these models are it is important to compare the present with the past. In using the economic models, they consult with economists of Jilin University and the Renmin University of China as well as the Economic and Social Research Institute of Japan.

Operational experts of Macro Economy Information System had been aware of the errors of Chinese GDP data well before US and other foreign experts pointed out. When they examined Chinese GDP with the World Bank in 1996, they knew about the errors, but the source information is taken from the National Bureau of Statistics, and they do not have control over the precision of GDP. The Bureau of Statistics, in turn, edits and processes the source data that it takes from its regional offices. SIC collects economic data by itself in some cases, but it is limited in the extent. SIC holds a nation-wide conference every year, where economists of SIC and other regional information centers meet and discuss the precision of the economic forecasts and data.

3.5.2 World Economic Information System

In order to enrich the operation of the economic analysis division in SIC, this system combines the

world economic data and provide it for researcher in the division. In the course of development, World Economic Information System is integrated with Macro Economic Forecast System. Also the operation of the system is in charge of macro economic forecast division, which is the same division of Macro Economic Forecast System.

This system provides the four categorized data (Table 24). The four categories are : world macro economic information, main state (regional) economic information, Fortune 500 companies information, and international market (oil, stock, exchange), based on the following fundamental data: international market information (oil, stock, exchange), IMF data, World Bank data, State Planning Commission information, Fortune 500 enterprises data, main state and regions economic data, world economic data (Table 23).

Among the fundamental data, IMF data and world economic data are purchased by the toll services. Others are developed from the public information on the website including Dow Johns, London stock market, World Bank, Fortune, Statistical data from countries, or information from National Development and Reform Commission overseas representatives. If the original source is written in English, researchers translate into Chinese, then the system provides.

Nowadays, the output data is only provided for internal use only, therefore, there is no agreement on the secondary use of copyrighted works between SIC and the original copyright holders. But, it is unlikely that no agreement is required on secondary use, because some data, such as IMF data, is provided for fee.

The original articles, whether provided for free or for fee, are considered to be copyrighted works protected by the Chinese Copyright Law and related international treaties, such as the Berne Convention and the WIPO Copyright Treaty. In that case, any secondary use but for the enlisted exceptions such as private reproduction should require prior agreement. According to SIC, however, they have no formal contracts or MoUs concerning secondary use.

At this moment, the absence of formal agreement on copyright is less likely to pose a risk, because this system is provided only for internal users. However, this system may infringe the property rights of the copyright holders in some limited cases, and it is advised that formal agreement be concluded between SIC and each copyright holder concerning the secondary use of the original articles.

Table 23: Basic data of World Economic Information System

Name of Data	Data Amount	Updated Amount
Information of International Market (Oil, Stock, Exchange)	200MB	-
IMF Data	800MB	-
World Bank Data	600MB	-
State Planning Commission information	100MB	-
Fortune 500 Enterprises Data	100MB	-

Main States and regions economic data	1GB	-
world economic data	3GB	-

Source: questionnaire response from SIC

Table 24: Output Data of World Economic Information System

Name of Data	Number	Data Amount
Macro Economic Information	-	1GB
Main States and regions economic Information	-	800MB
Fortune 500 Enterprises Information	-	100MB
International Market(Oil, Stock, Exchange)	-	100MB

Source: questionnaire response from SIC

3.5.3 Enterprises and Products Information System

Enterprises and Products Information System is based on two data: basic company information and basic products information (Table 25). These data is provided not only directly but also processed. Such products price analyzes charts and figures are available.

Basic enterprises information: there are 22 indicators per company and the total amount of data is 270,000 (110MB). Basic products information: there are 8 indicators per a product and the total amount of data is 370,000 (84.5MB). The system is updated every other year, but partial update is held as needed.

Table 25: Basic Data of Enterprises and Products Information System

Name of the Data	Number	Data Amount
Basic enterprises information	270,000	110MB
Basic products information	370,000	84.5MB

Source: questionnaire response from SIC

In the initial plan, other information such as enterprises registration information, enterprises credit information, import/export products information, overall products information was considered to build in the system, but it was canceled. The reason of cancellation is to avoid the duplication of information, because the progress of market economy enabled other organizations to provide similar information as SIC is providing.

Today enterprises registration information is provided by the notary office. Enterprises credit information is provided by banks or private companies. Import/export products information is provided by customs, and overall products information is provided by the State Bureau of Statistics or other sectors. By the progress of market economy, which is the aim of the State Information Project, the role of SIC system itself has changed and improved.

This system provides information for every organization: Central government, regional

governments, universities and research institutions, Chinese enterprises, and foreign enterprises. The channels of information service are both on-line and off-line, which include electronic data, CD-ROMs, paper based media. According to SIC, the prices which required using this service are follows: CD-ROM of primary data for 4,000 RMB, online version of primary data for 1,000 RMB per year, the charge for using each tables or figures is 1 to 5 RMB.

3.5.4 Price and Market Information System (Price)

During initial phases of planning, Price and Market Information System was one system combining price and market information. However, during the implementation it divided into two systems, today there are two independent systems, which are Price system and Market System. The National Development and Reform Commission is operating the Price Subsystem of the Price and Market Information System.

Price System broadly provides information of market prices for the central government, regional governments, universities and research institutions, and enterprises. Based on the regulation, this system operates processing, aggregation, and comparative analysis in terms of numerical and text data, and then report to the upper sectors. State Council, and State Planning Commission apply this data for policy making, also this system is available for other governmental and private users.

At present, the information, which the system provides, consists of dynamic price information in states and provinces and price information forecast (Table 26). Administration of Food Prices, Administration of Major Commodities Price, Administration of Medicine Prices, and Price Policy Regulation develop contents. The part of Administration of Medicine Prices information was added after implementation, but the updated data volume is the largest out of three other categories. The total volume is also larger than other three categories of information. According to State Information Center, price setting of medicines to international competitive prices influences these changes in medical price information. In addition, the interest of medical price is related to the reform of health insurance system. Through legislative change, patients should pay for the cost of medicine. As a result, corrective action of medical price was required, and then standard price tender should be also required.

Table 26: Basic Data of Price and Market Information System (Price)

Name of Data	Data Amount	Update Amount
Administration of Food Prices	1.8GB	0.3GB/year
Administration of Major Commodities Price	3GB	0.6GB/year
Administration of Medicine Prices	7.5GB	2GB/year
Price Policy Regulation develop contents	3GB	0.6GB/year

Source: questionnaire response from SIC

In addition, there are new functions, which were added after implementation of the system.

Although the original aim of the system was to collect accurate data of domestic commodity price information, nowadays the new function in which international commodity price flow is analyzed and reported added to the system. For collecting domestic commodity price information, other networks, which are independent of SIC, are developed in every prefecture.

The available data fall into four types: price flow information, wholesales and futures market information, cost price information, and price forecasting information. The total amount of information was 15.3GB at the point of the first visit interview.

3.5.5 Price and Market Information System (Market)

Market Information System is a part of the Price and Market Information System which was initially planned an integrated information system. Nowadays, the information of large-scale retailers is provided for domestic users including the central government, regional governments, universities and research institutions, and enterprises (Table 28). In the initial stage, this system were planned to contain these three contents of information (wholesales and futures market information, dynamic price information, and price forecasting information). The information of large-scale retailers is usually updated every 10 days, and the total amount of data is 1.7GB.

Table 27: Basic Data of Price and Market Information System (Market)

Name of Data	Number	Data Amount
Large-scale Retailers information	7.4 million	420MB

Source: questionnaire response from SIC

Table 28: Output Data of Price and Market Information System (Market)

Name of Data	Number	Data Amount
Large-scale Retailers Information	9.6 million	1.7GB

Source: questionnaire response from SIC

3.5.6 Economic Laws and Regulation System

Economic Laws and Regulation System collects the primary data from four categories of laws and regulation: Central Statutes, Regional Statutes, Political Regulations, and International Treaties, then processes it, and finally provides the processed data for users. The forms of processed data are: National People's Congress (NPS) Law, State Council Law and Regulations, Judicatory, Regional Statutes, Sectors Regulations, and International Treaties.

In order to collect the economic laws and regulation, information network and equipment were installed in central government and local information centers in provinces, municipalities, and autonomous region as well as NPS Committee, State Council, Supreme Court of People, Supreme

Prosecutors Office of People.

The amount of basic data is shown in Table 29.

Table 29: Basic Data of Economic Laws and Regulation System

Name of Data	Number	Data Amount
NPS Law, State Council Law and Regulations	3,477	57MB
Judicatory	6,031	
Regional Statutes	41,084	246.5MB
Sectors Regulations	34,475	206.8MB
International Treaties	4,265	25.6MB

Source: questionnaire response from SIC

3.5.7 Foreign Loan Project Management Information System

Foreign Loan Project Management Information System has been developed to provide the information for the foreign loan project management.

Two servers operate this system in SIC. In addition to them, "sub-system" which independently provides similar information as SIC servers do is operated for regional governments. No network exists between central system and regional sub-systems, therefore information are exchanged by means of off-line such as CD-ROMs. It cannot be helped taking into the consideration of the security reason and the frequency of data update.

Foreign Loan Project Management Information System collects the primary data from the following: Conditions of Foreign Loan Basic Information, Conditions of Foreign Loan Planning, Conditions of Foreign Loan Contracts, Conditions of Foreign Loan Implementation, Schedule of Foreign Loan Application, Conditions of Foreign Loan Projects, Macro Economic Indicators, Forecast Indicators, Exchange Rate, Code, and Interest Data (Table 30). All middle to large-scale projects information since 1979 is recorded in this system. The interval of updating the basic data is twice a year, and the amount of annual input data 300 at the lowest, and 2000 at the highest depending on the year. In terms of the amount, the lowest is 10MB/year, and the highest is 40MB/year..

Table 30: Basic Data of Foreign Loan Project Management Information System

Name of Data	Number	Data Amount
Conditions of Foreign Loan	300/year	20MB/year
Conditions of Foreign Loan Planning	400/year	10MB/year
Conditions of Foreign Loan Projects	700/year	40MB/year
Conditions of Foreign Loan Implementation	2,000/year	40MB/year
Exchange Rate, Code, and Interest Data	1,000/year	10MB/year

Source: questionnaire response from SIC

Based on input primary data, this system then processes it, and finally provides the processed data for users. The contents of processed data are: project feedback information, Conditions of Foreign Loan Basic Information, Conditions of Foreign Loan Planning, Schedule of Foreign Loan Application Comprehensive Debit and Credit Feedback, Forecasting Debit and Credit Information, Exchange Rate and Interest Data, Policy Making Assistance Information. In addition, in case of "foreign loan council feedback information", "foreign loan construction progress chart" and "categorized project comprehensive feedback", these contents were to be contained when this project was decided. Nevertheless, they were canceled by uncertain reason.

3.5.8 Governmental Investment Project Management Information System

Governmental Investment Project Management Information System started in 1997, but there was test operation until 1998. The full-scale operation has started in 1999.

This system is used for the project planning and management. The targets are the following projects: projects within governmental budgets, national middle to large-scale public investments, projects funded by government bonds. Therefore the information contained this system is classified governmental confidential, thus the use of it is exclusively limited for central government including State Panning Commission Investment Projects Admission Office, regional governments which are related to the implementation of projects, and some state enterprises. The media of information are via closed network, by facsimile, and by post.

The projects, which are managed by this system, are the following:

(1) The projects which totally funded by the government.
(2) The projects which partially funded by government, and the cost of projects are over 30 million RMB or more.
(3) The projects which are determined or certificated by the government by policy reason.

Thus, large-scale projects such as Three Gorge Dam construction project should be managed by this system. The cumulative budgets of the projects which were managed by this system reached over 660 million RMB during 1998 to 2002. The average number of the projects is approximately 300 projects a year.

Because the information of this system is national confidential, there are not sufficiently disclosed. However, according to SIC, due to the system efficiency of projects management as well as flexibility of demand adjustment by analyzing accurate data of project implementation has improved. If a project is financed both by government investment and by foreign loan, it is registers in both management systems.

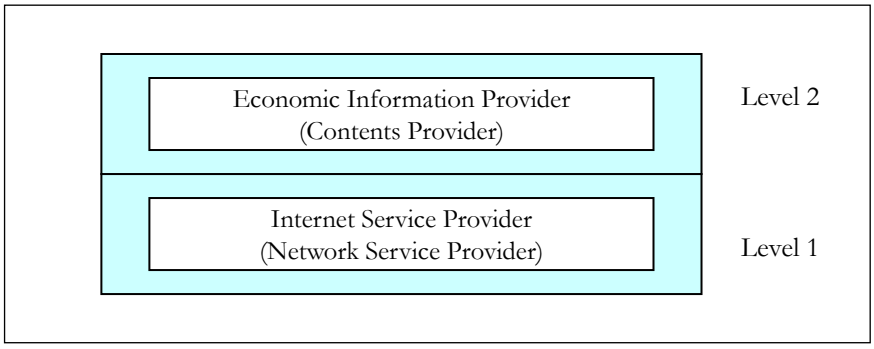
Furthermore, simplification of the system is now under consideration corresponding to the China's WHO accession.

3.5.9 China Economic Information Network (CEInet)

In June 1996, SIC established a subsidiary company called CEInet Corporation, to separate the economic information service and IT assistance service from the main business of SIC. CEInet Corporation is in charge of the development, operation and maintenance of the China Economic Information Network web site. As a private enterprise independent of SIC, CEInet Corporation runs based on the revenue of database sales, but at large, it belongs to the family of SIC and the company is managed in close relationship with SIC.

China Economic Information Network (CEIN) is the name for network platform, which was developed across the whole country by this project. In detail, the structure of CEIN is a "two-storied" building (Figure 3). The first layer operates and hosts the physical networks and functions as an Internet Service Provider (ISP). The second layer functions as a contents provider, such as providing macro economic information, based on the network in the first layer.

Figure 7: Structure of China Economic Information Network (CEIN)



3.5.9.1 Role of SIC as an Internet Service Provider

SIC also acted as an internet service provider, because there were hardly internet service providers in China at the beginning of the project. Thus CEInet constructed almost all network among governmental organizations. Along with the development of the ISP provided by state enterprises such as China Telecom or private enterprises, CEInet was plunged into competition. Today, CEInet offers service particularly for state organizations, such as the National Development and Reform Commission.

The network infrastructure at the first layer was supported by the advanced technology at that time. According to the appraisal document, public phone network (2400–9600bps), packet network (CHINAPAC: 9600bps), and public postal service were considered for wide area data exchange system.

However, due to the technological development, Internet based network was substituted for the formerly planned network, and then Internet network was developed across the whole state.

In terms of contents service, there are two kinds of services. One is online service by Internet, which is based on the pooled information in SIC. The other is closed-network service among governmental organizations and enterprises, which is provided by satellite and leased circuit. In China, there are many organizations unwilling to connect Internet due to security reason, for which CEInet provides information service by satellite broadcasting.

Figure 8: Network Topology of CEInet (Quoted from the brochure of SIC)

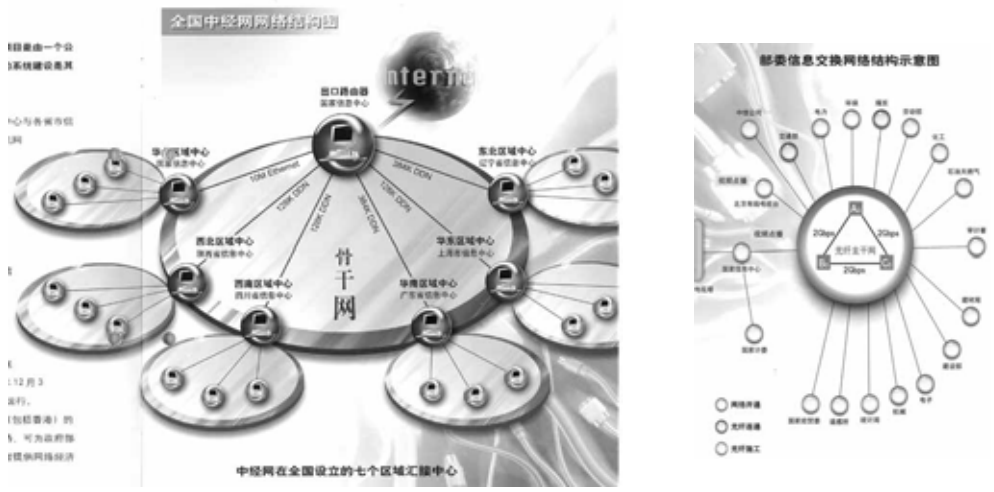


Table 31 describes the service and tariff information of CEInet

Table 31: Service Offerings and Prices of ISP Service of CEInet

Service		Style of Charge
Domain Application	Domestic Domain	500RMB/year
	International Domain	1,000RMB/2 years
Virtual Hosting	PC Server	2,000RMB/year(40MB)
	Small-sized PC Server	2,000RMB/year(20MB)
	Addtional Storage (PC Server)	40RMB/MB/year
	Addtional Storage (Small-sized PC Server)	100RMB/MB/year
	Exclusive Mail Server Installation Fee	500RMB
Housing	Housing Fee	500RMB/month
	Line Fee (unmetered)	2000RMB/month
	Line Fee (metered)	2RMB/MB
Leased Line	Initial Fee	15,000RMB
	Port Fee	3,000RMB/year

	Access Line Charge (within city)	1,500RMB/64Kbps-2,500RMB/256Kbps
	Access Line Charge (inter city)	2,000RMB/64Kbps-3,200RMB/256Kbps
	Monthly Charge	4,000RMB-7,300RMB
Optical Fiber Access	Initial Fee	50,000RMB
	Access Charge	13,440RMB/month
	Monthly Charge	27,000RMB/month
Home Page Production	Site Construction Fee	From 1,000RMB-(depends on consultation)
	Home Page Production Fee	300RMB/page
	Site Updating Fee	50RMB/page/times
	Special Page Arrangement Fee	(depends on consultation)
Dial-up Access	Under Planning	
Roaming	Under Planning in 6 cities	

As illustrated in Figure 8, CEInet serves as an gateway through which each provincial and municipal information center connects to the Internet. If connection between SIC the Internet is slow, effective communication is difficult between SIC and each information center no matter how fast the network is between them

Network capacity between SIC and the Internet is 200Mbps as of September 2003. For a week of 1 through 7 September, the total amount of upward traffic (traffic from SIC to the Internet) is 1.685TB, and downward traffic totals 2.317TByte. Average usage is 23Mbps (upward), and 31Mbps (downward). As far as network traffic is concerned, CEInet is efficiently utilized.

The network usage mentioned here is affected by the external conditions of the network and the internal configuration of the network and does not necessarily show the amount of communication requests that the users placed. But it is referred as an experimental measure to understand how effectively the network is operated.

At an earlier stage of the project, the economic information that SIC provides was meant to be offered to research institutes and private enterprises other than the government. But at that time, information was to be distributed by way of physical media, such as hard copy publication, floppy disk, and CD-ROM. Email was also planned, but for a limited number of users. With the development of the Internet, SIC gradually came to emphasize the importance of the distribution and sale of information services by way of the Internet.

CEInet Data Corporation developed an online database service based on the Macro Economy Information System. Table 32 shows the content and tariffs of this service.

Table 32: Service Offerings and Prices of CEInet

Categories	Name of Product		Style of Charge	Note
CEIN Leased Circuit	Government Version Bank Version Enterprise Version		Individual Setting	
Online Information	CEIN Contracts		45,000RMB/year	
	CEIN Data	English Version	$1,000/3 monthes-$3,000/year	
		Per Content	1,000RMB/year-8,000RMB/year	7 contents
		Per Sector	300RMB/year	697 sectors
		CD-ROM	4,800RMB/unit (Member), 6,000RMB/unit (Nonmember)	
		Database Search	50RMB/time (Yearly Order), 100RMB/time (Monthly Order)	
	CEIN Commercial News	Comprehensive News per Content	300RMB/month	10 contents
		Industry News per Content	100RMB/month	20 contents
		Per Speciality Content	300 RMB/month	2 contents
	Economics	Contents Search	200 RMB/month-500 RMB/month	12 contents
		Contents Download	400 RMB/month-600 RMB/month	11 contents
	Commercial Study Center		Individual Setiting	
	CEIN Automobiles		5,000 RMB/year	
	Regional Economy	Comprehensive Regional Information (per content)	200 RMB/month-2,000 RMB/year	8 contents
		Provinces and Municipalities Information (per unit)	100 RMB/month-1,000 RMB/year	
		All regions	1,200 RMB/month-12,000 RMB/year	
		News Release	1,200 RMB/month-12,000 RMB/year	
		Search	1,200 RMB/month-12,000 RMB/year	
		Site Connection	1,000 RMB/year	
		Information Service	1,000 RMB/year	
		Above Both	1,500 RMB/year	
	China Economy	Statistical Information	$2,200/ year、$1,600/a half year	
		Market Analysis	$1,900 / year、$1,400/ a half year	
		Above Both	$3,500/ year、$2,700/ a half year	
	CEIN Article		40 RMB/month 0-3,500 RMB/year	

	World Economy Article		400 RMB/month-3,500 RMB/year	
	Industry Perspective		Uncertain	
Special Information	CEIN Major News	Printed edition	800 RMB/copy	
		Electronic edition	1,600 RMB/copy	
	Oxford Analysis	Chinese Electronic edition	3,600 RMB/year	
		Chinese-English Electronic edition	4,000 RMB/year	
		Chinese Printed edition	4,000 RMB/year	
		Chinese-English Printed edition	4,800 RMB/year	
	Industry Edition	Printed edition	2,400 RMB/year each	32 sections
		Electronic version	4,800 RMB/year each	

* The member of regional economy automatically allowed to connect the site or news service at free of charge The member of connecting site and news service can choose one of the search service of regional economy and use it at free of charge among a half year.

Figure 9: Website of CEInet

In the appraisal of the Main project, the information services based on the operational systems were planned to expand to non-governmental users. Through the operational systems, processed and

edited information started to be provided by Internet, which promotes to increase users more than expected.

In Japan, China BS Corporation (http://www.cbs-n.com/) is a distributing agent of CEIN online, and offline products and service such as databases and CD-ROMs. Partial databases are available in Japanese as well as Chinese originals.

Table 33 shows the service menu that CEInet provides.

Table 33: Menu of CEInet

中外要报	每日要报 每日图片 国内经济 国际经济 政府动态
中经商讯	动态快讯 政策法规 市场行情 招商投资 专利技术
中经数据	中经指数 中经观测 宏观月报 地区月报 行业月报 经济年鉴 地区年鉴 世经年鉴 金融数据 经济地图 名词解释
地区经济	政务信息 投资指南 地区快讯 分析预测 领导论谈 区域研究 政策法规 发展规划 招商引资
地区报告	分析报告 发展规划 统计公报 政府工作报告
中经评论	宏观经济 金融观察 区域发展 产业纵横 经济改革 企业经营
中经医药	价格公示 行业动态 分析评论 行业指标 生产企业 经销企业
中经汽车	行业动态 技术趋势 行业研究 分析预测 行业法规 产销透视 效益状况 进口出口 市场行情 车型资料 厂商介绍 流通企业
世经评论	近期热点 专题研究 全球走势 区域观察
牛津分析	全球 东亚 东南亚 美国加拿大 其他
行业报告	行业发展报告 行业季度报告
50人论坛	宏观经济 产业分析 体制改革 世界经济
联合论坛	宏观经济 财政金融 体制改革 产业分析 企业研究 外经外贸
经济学人	学人专栏 学人新论 中经观察 中经学人 新书介绍 研讨会专辑
中国企业.产品库	中国外资库 中国上市公司 中国企业集团 加入中国企业·产品库
环境发展	发展战略 政策法规 绿色产业 环境专题 环境资讯 环保数据库
中经价格	价格热点 价格政策 市场价格 价格预测 产品报价 国际价格 地方专栏
发展规划	规划政策 规划研究 地方规划 规划论坛 海外信息
为您服务	气象预报 航空时刻 公务宝典 商务顾问 视听指南 公交线路

3.5.10 Information Center Building (Information Tower)

The State Information Center Building is located on Qianmen Menwai Avenue, Beijing. It is composed of Towers A and B. 2,000 square meters of Tower A is occupied by subsidiary companies and organizations of SIC. The basement and the floors up to the third level are offered for rent for general tenants, including transport and commerce organizations.

According to SIC, there are 33 tenants in the State Information Center Building, which includes software development companies, human resource training companies, network and system integration companies, consulting firms, and sales companies. Among the 33 tenants, 11 tenants are related to SIC,

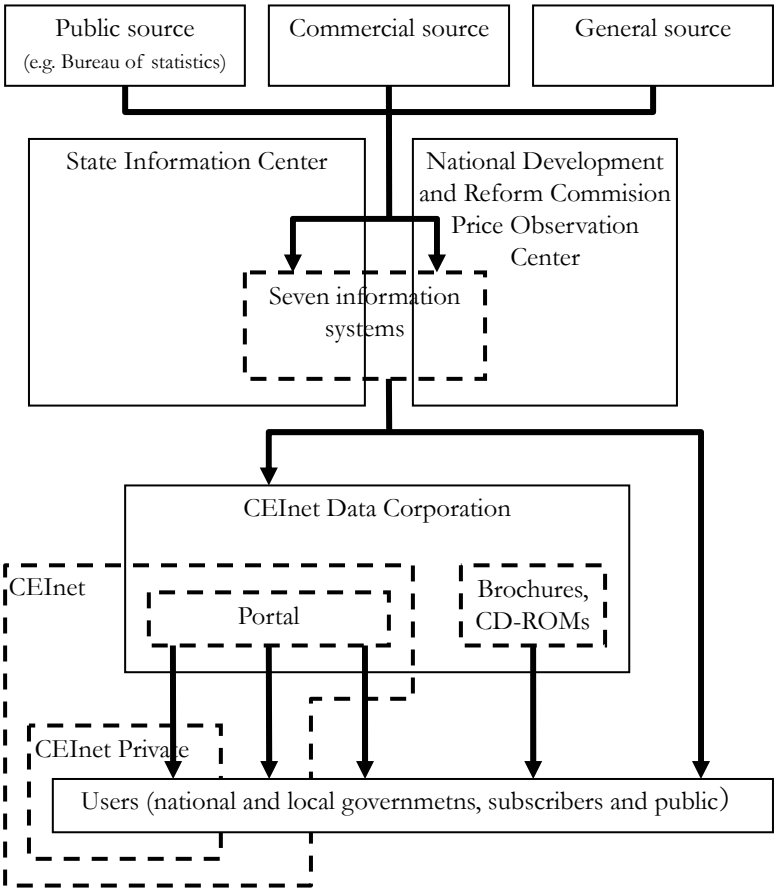
which occupy 20,766 square meters of the floor of the Building.

In addition, due to the delay of construction, the system equipment which operates the economic information systems and the China Economic Information Network was installed in the SIC headquarters instead of this building.

3.5.11 Flow of Information in the CEInet services

In conclusion, the flow of information in the seven economic information systems, CEInet as a network service provider, and the CEInet web site as an information portal and how they interact with each other are illustrated in Figure 10.

Figure 10: Information flow of the CEInet



As illustrated in Figure 10, the seven economic information systems take raw data from three sources: government authorities, such as the National Bureau of Statistics and provincial/municipal information centers, commercial information and database providers, and public information available

on the Internet. The raw data taken from these sources are aggregated and analyzed by each responsible section of SIC, and processed into information services. (In the case of the price part of the Price and Market Information System, the Price Observation Center of the National Development and Reform Commission will aggregate and analyze data.) Processed data is delivered publicly by way of CEInet Data Corporation, or delivered only to internal users (mostly employees in the central government) by SIC or the Price Observation Center of the National Development and Reform Commission.

CEInet Data Corporation further processes the data that they acquire for web-based or CD-ROM content. The Corporation provides information for free of charge on their portal web site, "China Economic Information Network", or on a commercial basis through the portal or other medium.

The information service is delivered through the information network infrastructure, "CEInet", which was developed as part of the State Economic Information System Project. CEInet also serves as an ISP for government ministries and agencies, which means that CEInet is also utilized when the government access economic information through the Internet.

CEInet as a network infrastructure has two grades of service, CEInet and CEInet Dedicated. CEInet Dedicated is a secured and value-added service provided via a communications satellite.

As have been mentioned, the components of the State Economic Information System well function with each other in the entire system, thus contributing to the collection and analysis of economic information in China.

3.6 Effectiveness: Information System and Network in Provinces and Municipalities

By the State Economic Information System Project, information centers were established in provinces, autonomous regions, and designated municipalities all across China at present, and each information center serves as a "subsystem" providing raw data to seven service systems to the information systems of the State Information Center.

Additionally, there are many cases such as e-Government where a local government takes their own initiative and develops their original information systems.

Hereinafter, we will mainly introduce and analyze the characteristics of the case that the mission visited actually in this research. Additionally, we will also introduce and analyze the result of questionnaires to local information centers. As a whole, the information network and information system in the information centers at the provincial and municipal levels are operated in a self-sustainable way, and their technology is moderately refined. It is generally concluded that information systems in each information center, which the research mission visited, are operated in a good condition, and the quality and quantity of provided information, the operational framework for information updates and other operations, to a varying degree depending on the information center.

Hereinafter, we will evaluate the effect of the projects implemented in the provinces and municipalities concerning the extent to which the equipment and devices procured in the information center in each province and municipality contributed to the information network and information system.

3.6.1 Beijing Economic Information Center (Beijing)

(Information Network)

Including the Beijing Economic Information Center provide external network connection mainly to the People's Government of Beijing and other organizations related to the local Government, such as the Beijing Development and Reform Commission. They offer technical support about server operation such as LAN configuration, email and web servers, and the creation of web sites.

The Beijing Economic Information Center went ahead to the State Information Center in connecting to the Internet, when they connected to the Chinese Academy of Sciences via microwave in 1995.

At present, they run an Internet data center of 400 square meters, as well as the information network and 40 portal sites. They perform functions that go well beyond a mere ISP for the Municipal government and other related agencies and companies.

(Information System)

The Beijing Economic Information Center constructed information systems related to economic information (Market and Price System, Macro Economic Forecasting System, Policy Decision Support System and Foreign Investment Business Management Information System). They also redistribute the information that they collect from these economic information systems, through "Beijing Economic Information Network", "Yixin Network", "Beijing Investment Platform", "Food Trade Information Network", "Foreign Investment Network", "Beijing Planning Commission Network" and "Beijing 21th Century Sustainable Development Network".

Additionally, the Beijing Economic Law System, the Beijing Investment Management System and the Policy Decision Support System are cited as the information system that the Beijing Economic Information Center constructed by themselves.

The Beijing Economic Law System is a service that provides over 10 items of law information such as the law and regulation, the administrative measure, the legal interpretation, the department regulation in the state and municipality and the standard document in cooperation with over 40 administrative organizations such as the ward and prefecture including the Beijing People's Government. The frequency of renewal is once per week, and at present 20 thousand law data (volume of data: 200MB) are stored. The basic data can be used without charge, but value-added services, such as expert search in the law database, are only offered with paid registration (1,800 yuan per year). There are one million accesses per year, and it is highly appreciated by the municipal government and the public users alike.

The Beijing Investment Platform provides notices about public investment projects in Beijing, information on analysis of the investment situation in the municipality, investment environment, preferential benefits, and investment trends mainly for investors. The number of the notices made on this platform rose to 600.

(Usage and Effectiveness)

The user of system in the Beijing Economic Information Center is mainly the Beijing People's Government and the Beijing Development and Reform Commission, and it is used for the policy decision process. Additionally, a part of information is publicized to private companies and the public through a portal site operated by the Beijing Economic Information Center.

This project contributed to the practical training of engineers in the Beijing Economic Information Center, and contributed to cultivating the recognition in the whole information center. As a result of the accumulated experience among the engineers, the Center is currently in a position to lead the implementation of e-Government projects in the municipal government such as Beijing Investment Platform and the Olympic-related Tender Announcement System.

The Beijing Economic Information Center also gives consulting service about information network management and operation inside the municipal government. They have planned to improve the

performance of the network by renewing the device five times by 2003 since the opening-up in August 1996. Additionally, they provide ISP service for affiliated organization and companies.

In March 2001, the Beijing Municipal Finance Bureau asked the Beijing Information Center for the development of the "Foreign Capital Investment System" to attract foreign capital companies, which resulted in the reduction of the number of personnel from 37 to 0.5. The reduction in personnel is not explained by the deployment of information systems alone. Information system itself led to the reduction in personnel, but the decrease in the absolute amount of business associated with decentralization is another factor. And the personnel were reduced, but the quantity of collected information did not decrease at all.

Original data of the Foreign Capital Investment System are registered by cooperating companies on a voluntary basis. The system is not only aiming at improving the efficiency of the civil service, but it also provide information about the laws and regulation related to the ward- and prefecture-level finance departments, large institutional customers, and the foreign-invested companies without charge. This site is small, but it is practical and functional and easy to use.

All the laws and regulations and registered projects in the system are disclosed to the public without charge, and the merit to private businesses is large. The application forms for the municipal government processes are available online, and notices and announcements for businesses are conducted online, so that they need not to communicate individually with the businesses.

The future issue is that they need to develop new applications and enlarge the amount of data.

3.6.2 Shanghai Information Center (Shanghai)

(Information Network)

The Shanghai Information Center is placed as the Shanghai node of the State Economic Information System, and lays down the regional backbone consisting of the ATM network and optical fiber. Users connect to this regional backbone, and further connect to the external network such as the Internet by way of the State Information Center.

The "Shanghai Economic Information Network" improves the core network by the ATM network in Shanghai, and connects to the external network such as the State Economic Information System. This network is publicly available to general users for charge, as well as users in the municipal government. It can be accessed with the public switched telephone network and ISDN.

(Information System)

The Shanghai Information Center used the devices and equipment mentioned above to constructed three fields of database: Policy Decision Support Database, Public Service Database and Industry-Specific Database.

The Policy Decision Support Database includes Government Document Integrated Database,

Macro Economic Database, Entrepreneur Credible Index, Products and Price Database, Human Resource Database, Government Law Database and Investment Abroad Project Database.

The Public Service Database includes Economic Information Consulting and Pooled Information Database, which are available to the public.

The Industry-Specific Database includes "Online Companies", "Industrial Classification", "Chinese Foods", "Chinese Toys", "Shanghai Companies" and "Product Database". The Online Companies database includes the following services. The "Shanghai Economic Consulting", which analyzes, extracts and classifies the articles which report about Shanghai from general media such as newspaper, television and magazine. The "Entrepreneur Credit Index", which renews the credit index of the companies and entrepreneurs every season. The "Company Database", which gives the outlines of companies in Shanghai and their major products, in order to facilitate information exchange and information sharing between companies. The "Price Trends and Price Analysis and Forecast" works up production outputs in some hundred kinds of industry in Shanghai, and adds analysis and forecast by the experts of economics, and it furnishes out the development of electronic commerce. The "21st Century City" is the most typical example which represents the Industry-Specific Database, has rich fixed assets information, and provides the analysis of market situation and the latest research results.

(Effectiveness)

The effect of the State Economic Information System Project in Shanghai is that firstly, web-based economic information systems of their own were constructed in Shanghai. Secondly, they constructed information systems at each department inside the municipal government and contributed to computerize the service. Thirdly, they developed human resource locally in Shanghai in process of project implementation. And then, fourth, they expanded the communication channel between the government and private businesses.

Additionally, the Shanghai Information Center insisted that not much off the entire system in Shanghai was constructed by yen loan, considering the scale of the whole system in Shanghai, and that yen loan's contribution to e-Government in Shanghai may have been great in the beginning, but it should not be overstated.

3.6.3 Guangzhou Information Center (Guangzhou)

(Information Network)

The Guangzhou Information Center is positioned as the Guangzhou node in the State Economic Information System. It constructed the Guangzhou Information Network (Gznet) that consists of dedicated digital data line, frame relay network and fiber-optic network. The Guangzhou Information Network connects 64 computer center nodes in 10 wards and 2 prefectures. In addition to the external connection through the State Information Center, the Guangzhou Information Network is connected to

the Internet through Gznet and CASnet of the Chinese Academy of Sciences as well. At the time of completion, they connected between the government-related agencies in Guangzhou via 100Mbps optical fiber, to the Guangdong Internet Exchange Center at 100Mbps, to the China Economic Information Network at 10Mbps, and to the Internet backbone of Guangzhou Telecom at 2Mbps.

(Information system)

The Macro Economic Forecasting System, the Market Information System, the Enterprises and Products Information System, the Economic Law Information System, the Price Information System, the World Economic Information System and the Foreign Loan Project Management Information System were developed as the service system. Among them, the World Economic Information System collects and provides the data aiming at Hong Kong, and the Foreign Loan Project Management Information System is provided to use the stand-alone system. The Domestic Investment Project Management Information System was not constructed in the Guangzhou Information Center among the service system shown in the guideline of the State Information Center.

Additionally, 12 information systems were developed in addition to the information systems developed under the guideline of the State Economic Information System in the Guangzhou Information Center (Table 34). In addition, the original business package developed by a system integrator in Guangzhou is employed for the internal administrations directly related to the municipal government.

Table 34: Information Systems Operated by Guanzhou Information Center

System name	Contents
Web site information resource management and search system	Information collection and edit at Web site, System management, auto-creation and disclosure of homepage, Web site information resource auto-search, Realization of Search and management all information at Web site
Multifunctional Web site management system	Management of government site account, Information collection and edit, Dynamic page generation, Function of searching all sentences
Multimedia video information server system	Multimedia and Video information service
Information Web site navigation system	Web site navigation, soft download function
Information resource intelligent search system	Information search function
Multimedia VOD system	Video information collection, Video information on-line, VOD, Video radio
Dial-up user authentication and accounting system	Dial-up user management, Authentication and control, Time zone and discounting preferred accounting, user expense search and statistical analysis, fare plan and on-line search and change of pass word
Private line user traffic measurement and accounting system	Total traffic data, user and distribution information, International and inland, Province distribution information, accounting way, Traffic statistical result

Document processing tool software system	Document preliminary treatment, hyper text massive auto-creation and file transfer
Service automation system	Public information management, public document management, office management, system management, all sentences search
Equipment management system	Yen loan equipment data input, reform, search statistics management
Stock market information system	Stock market transmission, changeover, addition and immediate delivery of market information

(Usage and Effectiveness)

The Guangzhou Information Center cites the direct effect in this project as follows.

(1) Promotion of computerization in the Guangzhou People's Government-related agencies
(2) Digitalization of data, networking of municipal government-related bodies, and offering of equipment and network environment construction to advanced management technology
(3) Diffusion of knowledge of computer and network in the personnel
(4) Development, use and promotion of information content and promotion of information communication in the entire municipality
(5) Improvement in efficiency of public service and improvement of policy decision ability in the municipal government

It can be recognized that the computerization and sharing of policy decision process are large.

Guangzhou is one of the "designated municipalities" established after the reform and open policy was taken up. There are 14 designated municipalities including Guangzhou. The plans, human resource and budget in the designated municipality are directly administered by the central government, not by the provincial government. Therefore, Guangzhou developed original systems and services even in the level of county and ward, which are administrative units under the municipality. Some of the civil services for residents went online, and application forms are now available through the Internet. We actually observed the portal site, but the information and content of their service can be said to be one of the most enhanced among the municipalities in China.

The socio-economic effect through the project in Guangzhou is that they supported computerization in the municipal government directly by constructing the information systems and information network through installing the devices and equipment. It is also reported that it improved the consciousness for computerization in the municipality officers, which led to the improvement in performance. In addition, indirectly, it can be thought that it had great significance in promoting computerization locally and introducing the latest technology because the investment made for this project was the greatest among all.

Recently, e-Government services are provided for the public at the level of administrative district,

and it can be said that this project brought about an effect for forming the basis of e-Government. Additionally, it is said that they utilize their experience of yen loan, take on the consulting function of computerization projects inside the municipal government and have charge of evaluating and managing public tenders for procuring information systems by in other departments.

3.6.4 Jilin Information Center (Changchun)

(Information Network)

The "Jilin Economic Information Network", which was built on an ATM backbone, was constructed. They connected beween the Jilin Information Center and each node of Jilin by using the DDN service of China Telecom, X.25, public switched telephone network, microwave communication network of the Department of Broadcast and CATV network. Additionally, the Jilin Information Center originally laid down optical fiber inside the province, and constructed network. This became possible because they were admitted to use the underground public utility conduit as the Jilin Information Center was a public agency.

(Information system)

The information systems constructed in the Jilin Information Center were Macro Economic Forecasting System, Enterprises and Product Information System and Foreign Loan Project Management Information System. Additionally, Policy Law Information System that was additionally planned in process of the project implementation. The Foreign Loan Project Management Information System was integrated to the Foreign Loan Project Management Information System operated by the State Information Center on the way of the project.

(Usage and Effectiveness)

The access to the information network is confined to public service bodies, such as the agencies of the provincial government, at present. The users of the economic information systems include manufacturers such as the Changchun First Automobile Manufacturing Factories, Co. Ltd., and public users.

The Jilin Information Center planned to modernize the collection, analysis, transmission and dispensation of economic information by this project, and contributed to enhancing close cooperation in the whole economic management in the province among related bodies. They reported that they also provided value-added economic information for the provincial committee of the Communist Party, Jilin government-related agencies, and the society. Additionally, it is said that information dissemination by the Jilin Traffic Bureau is actively conducted. They said that notices of public construction tenders and law information on the express highway, buses and taxis were frequently used.

3.6.5 Shanxi Information Center (Xian)

(Information Network)

1,800 computers in over 40 organizations of the Shanxi Provincial Government are connected to the Shanxi Information Network. Each organization is connected by optic fiber, microwave and dedicated digital data network to the Shanxi Information Center. At the same time, it has the function of ISP for universities, research agencies and companies. 1,500 computers were connected by the ISP service and 12,000 user accounts were issued on the completion of the project. They set up the DNS server, proxy server, mail server, Web server and database server for providing the Internet connectivity, and also set up a video server for hosting video conferences in each department of the provincial government.

(Information System)

There are four systems such as Macro Economic Forecast System, Laws and Regulation Information System, Enterprises and Product Information System and Foreign Loan Project Management Information System.

The Macro Economic Forecasting System collects economic information on the entire nation as well as the municipalities and autonomous regions in the province, and provides processed information. The Laws and Regulation Information System electronically stores over 40,000 statutes by the Shanxi government and the Congress of People's Deputies (on the completion of the project), and provides them for private companies and the society, as well as the Shanxi government. The Enterprises and Products Information System registered 7,000 companies in Shanxi, and it promotes information exchange between companies, thus promoting the local industry. The Foreign Loan Project Management Information System was constructed as the Shanxi subsystem of the Foreign Loan Project Management Information System by the State Information Center.

Four information systems such as the Macro Economic Forecast System, Laws and Regulation Information System, Enterprises and Products Information System and Foreign Loan Project Management Information System were constructed under the guideline of the State Information Center, but the "Shanxi Business and Investment Attraction Information System", for attracting companies and investment to Shanxi, and the "Procurement and Public Tender System" (for paid members only), for announcing public bids on government procurement, were originally developed. The creation of web site for promoting information distribution in Shanxi was conducted at the same time, and the "Shanxi Economic Information Network (web site)", the "Shanxi Government Public Information Network (web site)" and the "China Eastern and Western Cooperation Investment Trading Investigation Committee (web site)" were produced.

The procurement and public notice system on the Government Public Information Network were developed and operated under the approval of the Shanxi Planning Committee in Shanxi. This

advertises procurement and public notices related to project audit, design, implementation, equipment and material supply in the Shanxi Government.

Additionally, there is an information system for attracting investment in Shanxi, 10 municipalities in Shanxi in addition to the Shanxi Goernment, deliver information on 825 cases of projects is available as of November 2003. It is possible to search the projects by specifying the region, investment type and industry.

In addition, online recommendation of a vice governor of the province is possible, and an email address specifically for filing complaints and consultation is available. Additionally, the management of the examination of public servants of the whole province is also gone online, and the examinees can examine their record after the unified test is finished.

3.6.6 Sichuan Economic Information Center (Chengdu)

(Information Network)

They constructed the internal information network in the Sichuan Economic Information Center and the Sichuan Government, and the "Economic Information Exchange Center" for interconnecting the information centers in the 24 counties, municipalities and districts. It ties up the State Information Center and the Sichuan Information Center, and it is opened to the society.

(Information system)

Five information systems constructed in this project: the Macro Economic Forecasting System, Economic Laws and Regulation System, Enterprises and Products Information System, Foreign Loan Management Information System and Government Investment Project Management Information System. Among them, the Government Investment Project Management Information System was originally developed at the level of the province, but at present, it is placed under the authority of the State Information Center.

The analysis meeting for economic analysis is held, consisting of experts in the Sichuan Statistical Department and the Sichuan Planning Committee including staff economists at the forecasting department in the Information Center. They previously announced short-term economic forecasts three or four times, but at present, mid- and long-term forecasting of economic trend is held. The role of the Sichuan Economic Information Center about the economic forecasting is that they provide the objective and accurate information and analysis about macro economy, and it is highly valued by the Sichuan Government for this role.

(Effectiveness)

The information recorded or stored were not shared until the information network and information system came into play, and vertical communication and reporting, which did not operate fully before the information network and system came in, were improved. Additionally, it is positioned

as a base of network development in the whole western district. It was reported to be great that they mastered new technology though this project was great for spreading its effect.

The great indirect effect is that they lay the foundation of e-Government in Sichuan, and at present, the "Digital Sichuan" Project is gone ahead as part of the e-Government project on the extension of the constructed project by yen loan in Sichuan. This aims at digitalizing the data about the geography and economy in Sichuan, and making them useful for the government in Sichuan. The improvement of information equipment in the under-provincial information centers with the fund of yen loan was conducted, and local computerization was also done by the information centers in the districts and counties.

3.6.7 Xinjiang Uighur Autonomous Region Information Center (Ulumuqi)

(Information Network)

The Xinjiang Uighur Autonomous Region Information Center interconnected six departments and committees by the yen loan project. Additionally, the equipment was installed in the information center branch office at 15 counties and municipalities in the Xinjiang Uighur Autonomous Region, and each branch office has the function as the node for both the information network and information system.

Additionally, the Xinjiang Uighur Autonomous Region Information Center contributes to constructing web sites commencing the Autonomous Region People's Government and promote computerization in the Xinjiang Uighur Autonomous Region.

(Information System)

Four economic information service systems such as the Macro Economic Forecasting System, Foreign Loan Project Management Information System, Government Investment Project Management Information System and Economic Laws and Regulation System in the Xinjiang Uighur Autonomous Region Information Center.

The Xinjiang Uighur Autonomous Region is large in area, and they also set up servers for the information systems in the information center branch offices in 15 counties and prefectures, not only in Ulumuqi. This is a measure that was taken considering the situation of network availability in remote areas.

The Macro Economic Forecasting System stores various kinds of economic figures in and after 1991, such as the total of investment about fixed assets. The use of information is limited for the Xinjiang Uighur Autonomous Region Government. The Government Investment Project Management Information System is mainly used to announce public bids related to government procurement. By the local regulation, bid announcements are made both in the Xinjiang Economic Newspaper and on the web site of the Xinjiang Uighur Autonomous Region Information Center.

The Foreign Loan Project Management Information System is developed and operated as a system

for distributing information to move the investment out of the Autonomous Region, regardless of overseas and inland, not a system for managing foreign loan projects.

(Effectiveness)

The most dramatic effect of the improvement of the information network in the Xinjiang Uighur Autonomous Region is the efficiency of communication among government agencies. It overcomes the geographical conditions of the Region. The Xinjiang Uighur Autonomous Region is 166 square kilometers in area and about five times as large as Japan, makes up one sixth of the landmass of China, and a vast district where the length of border line makes up 1/4 of the whole China. There are 19 million people scattered around, and it is located between the European Continent and the Asian Continent as one of the bases of the Silk Road.

Xinjiang Uighur is more than 2,800 kilometers away from Beijing, and it takes 3 days (by express) to 10 days (by surface) to mail. The Xinjiang Uighur Autonomous Region extends over 2,000 kilometers in north and south and 1,600 kilometers in east and west. The development of transportation is underdeveloped, and naturally, the handicap of communication is large, too. It can be thought that the significance of the information network is far great in that two-way communication became possible almost instantly.

The construction of the "Vertical Network" connecting among the Development Planning Committees in the central government, and all the provinces and major municipal governments, which enables video conferencing and IP teleconferencing in the real time is being developed by using the technology and experience of the yen loan project. The Vertical Network brings about an effect that thickens the communication inside the government. Considering the cost and time for travel to and from Beijing, it can be said that the use of these network has high effect in remote areas especially. Additionally, information for inviting investment from abroad is actively provided, and contribution to the economic development is expected recently.

3.6.8 Summary

3.6.8.1 Information Network

The "Shanghai Economic Information Network" is shown in Figure 11 as a standard configuration example of the information network.

In the project of the information center in every province and municipality, the information network has been developed to serve a role of the "Regional Backbone" in the given province or municipality. The equipment and protocols are different depending on the scale of the province and municipality and on the technical skill level. In Shanghai, the information network was built upon an ATM network in Shanghai, but the information network in Guangzhou was built out of digital private line, frame relay and optic fiber network.

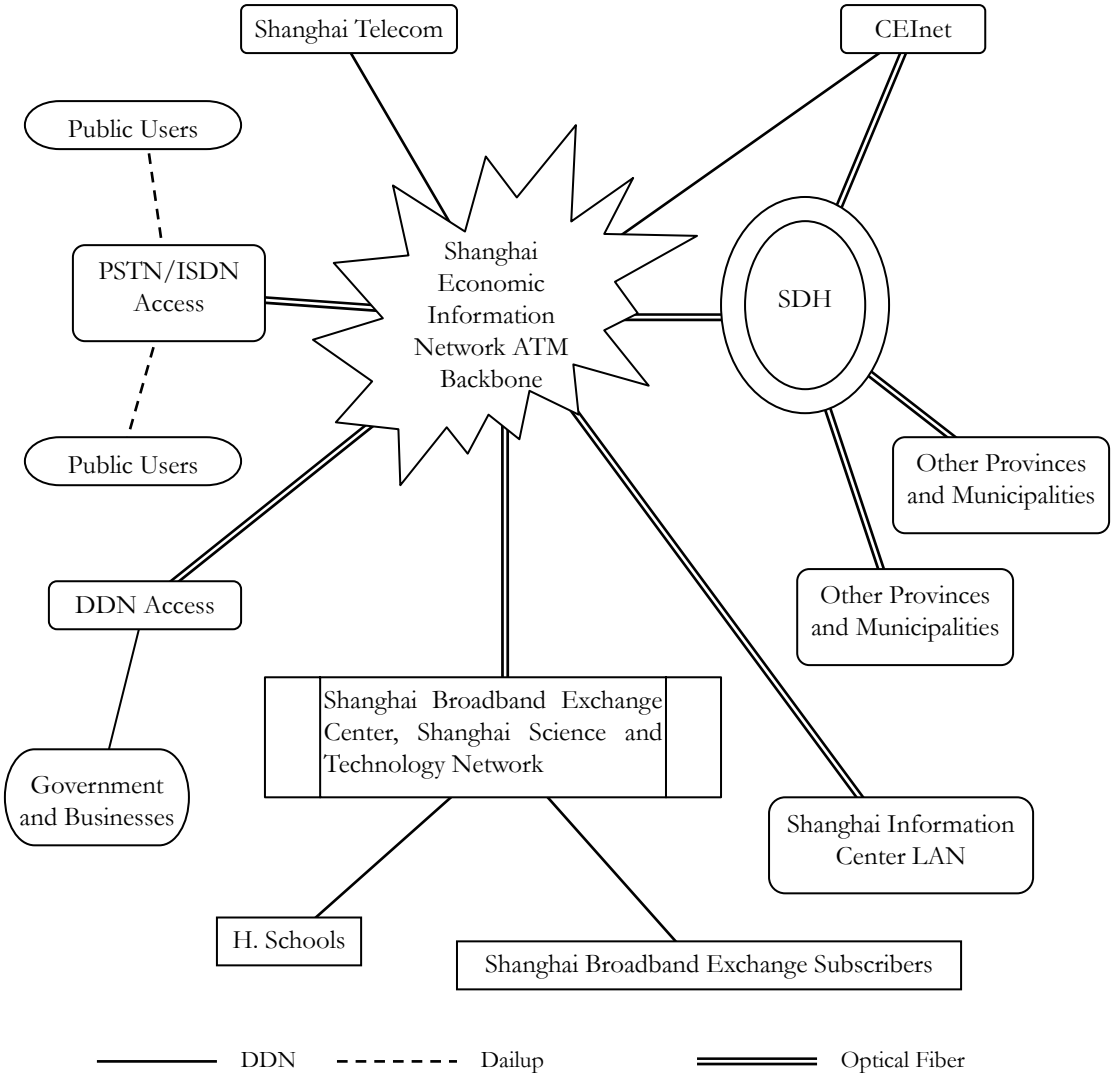
The case that they connected to the China Economic Information Network node at five places in the country with digital private line prevailed in the upper connection to the China Economic Information Network from the backbone in the province and the municipality just after the project was accomplished, but the connection service beside the China Economic Information Network has been available in Beijing, Jilin and Guangzhou since then, and the China Economic Information Network was not necessarily the only upper network.

At present, soon after the completion of the State Economic Information System Project, most information centers connected to one of the five access node of the China Economic Information Network to go out to the Internet. Although in Beijing, Jilin, and Guangzhou, access service other than CEInet was already available at that time.

Now, more information centers are coming to connect to local access nodes other than CEInet to gain redundancy in external connection. And where necessary, they adopt Virtual Private Network (VPN) so that they can wipe away security concerns. For connection below the local backbone (from ISP to the user), dialup access is provided in almost all provinces and municipalities. This is because they needed to provide self-operated access points as ISP service had not yet prevailed in the planning phase of the project, but at present, the service by specialized ISPs has been matured. The information centers at the provincial and municipal level as ISPs have fulfilled its initially planned role, and they will move over to offer dedicated access for local government agencies.

With regard to the information network, the "Vertical Network" that connects between the National Development and Reform Commission and the provincial and municipal subordinates. This is not constructed on top of the information network of the yen loan project, but this is an example that the information centers in each province and municipality that had developed a new nation-wide network based on the experience of the yen loan project.

Figure 11: Conceptual Diagram of Shanghai Economic Information Network



3.6.8.2 Information System

It is described in the report of the executing agency that in the information centers of the provinces and municipalities, all or part of the seven economic information systems were developed. However, in fact, information systems other than the seven models were developed to fit the needs for local computerization. The actual systems developed in the provinces and municipalities specifically reflect the local economic volume and demand, and naturally, variation among the provinces and municipalities is very wide. On the contrary, the information network in every province and municipality has similar configuration.

The information systems at the level of province and municipality are modeled upon the seven

information systems in the State Information Center, but some provincial or municipal systems have different functions from those of the State Information Center although they bear the same names. The Foreign Loan Project Management Information System was developed as an information system for managing loan projects in the State Information Center, whereas the Foreign Loan Project Management Information System in a level of the province and municipality was very often changed into the information system for attracting the investment abroad.

Economists were positioned for the Macro Economic Forecasting System in the State Information Center, and they have charge of collecting, analyzing and forecasting economic information, but in a level of province and municipality, information centers do not have their own economists, and rely on the human resource of the local planning commission, so that some information centers only provide basic data for macro economy, rather than forecasts.

Applications and services that aimed for e-Government has been started based on the result of this project even in the information center in a level of each province and municipality at present. However, that content is at a stage of an announcement and notice system, such as public bids, and it does not reach the stage of realizing transaction-based disposition with external bodies. Therefore, it is impossible to complete dispositions on the information system alone. In the public bid, the announcement is inserted on the homepage, but the procedure from there on is advanced through the medium of online like that in the past.

This is a problem that cannot be solved only by the information system because they need the improvement of the laws and regulation over electronic authentication, electronic signature, electronic document archive, all of which are the basis for e-Government. In order to deepen the role of information system, these issues will be need to be addressed along with adequate financial resources.

3.7 Overview of the Utilization of the Systems

To evaluate how and to what extent the SEIS systems are utilized, interviews with selected individuals who are or have been engaged in the operation of the systems. Illustrated here is the answer that SIC gave with regard to the questionnaires on the utilization of the systems.

Table 35: Conditions of Seven Economic Information Systems

Name of the system	Condition of Use	Examples
Macro Economics System	1. Very high√ 2. Good 3. Neither 4. Rather low	Flexibility for demand and practicability are essential for Macro Economy System. Through the parallel research of economics, and placement of the demand from cooperative projects SIC Department of Economic Forecast tried to improve system functions as follows: 1. SIC Department of Economic Forecast need a lot of documents for study. Therefore the system should provide more appropriate functions such as easy searching, and analysis. (i.e. SIC Department of Economic Forecast Information System); 2. Corresponding to the demand from individuals, the primary database of the system such as Macro Economics System was developed. (i.e. "15 years" programs interim evaluation database, world economics analysis system); In short, through the developing application project, the information of the system improved and utilized sufficient for researchers.
Enterprises and Products Information System	1. Very high√ 2. Good 3. Neither 4. Rather low	The clients have accessed this system everyday since 1997. Service Format and Price of Chinese Enterprises and Products: 1 pay service for online search by internet URL : http://www.ceie.com.cn (1,000RMB/year) 2 pay service for search by CD-ROM 4,000 RMB for all industry segments search, 1,500 RMB for one industry segment search 3 pay service for order based information 1-5 RMB/ a enterprise 4 free service for enterprises information and products information news release 5 development of the free online search sub-system in Provinces
Price and Market Information System	1. Very high√ 2. Good 3. Neither 4. Rather low	1 (Market) Online search 2 (Price) Document Service: data collection, analysis, and comparison along with the regulations. These documents will be the basis of the analysis of comprehensive analysis. Documents are distributed for non governmental users in order to support production and consumption activities as well as for State Council、State Planning Commission in order to support policy making. Also, all documents have been pooled in database and provided for research documents for individuals.

World Economic Information System	1. Very high√ 2. Good 3. Neither 4. Rather low	Depends on the requirement from individuals of State Planning Commission, Bureau, appropriate information has been provided.
Economic Laws and Regulation System	1. Very high√ 2. Good 3. Neither 4. Rather low	WWW network/ station search research by CD－ROM E-mail Dispatch Documents Portal search service among clients LAN
Foreign Loan Project Management Information System	1. Very high 2. Good√ 3. Neither 4. Rather low	State Level System: State Planning Commission decides the conditions of the information utility, and certificate the information policy for State Council and other financial organization of Bureau. Province Level System: Depend on the situation, the system can be decided independently in province level.
Governmental Investment Project Management Information System	1. Very high√ 2. Good 3. Neither 4. Rather low	This system has been operated since 1997, in which middle to large scale projects have been managed. Also, database, search system, and analysis of government bond during 1998 to 2002 have been accomplished, which satisfied the demand of individuals.

(Answered by SIC)

This questionnaire asked the operating staff of SIC about the utilization of the seven economic information systems. Table 35 summarizes their answers. Their answers show that the seven systems are well utilized as far as the executing agency is concerned.

However, some of the answers are made from a perspective of the service provider, rather than the user of the service, and reflect that they do not necessarily fully understand the actual utilization of the system.

3.7.1 Utilization of Macro Economy Forecast System

The users of this system are mainly organizational users including State Planning Commission, State Council, National People's Congress, SIC, and other governmental organization. However, economic conservancy information and forecast analysis information are provided for universities and research institutions and Chinese companies. The largest class of users is the National Development and Reform Commission, and the Development Bank of China and the Ministry of Finance follow. They often use more of textual data than numeric data. The Macro Economy Information System provides raw data with the users, but SIC also provides processed data as well.

Economic Conservancy Information and Forecast Analysis Information are provided to universities, research institutes and Chinese companies.

According to SIC, the registered users of Macro Economy Information System via Internet are

approximately 100 people. In detail, 30 users are within SIC, 70 users are others including regional organizations. Because the users are limited, traffic is not so high compared to its website. However, as shown in Table 36, the number of accesses increases constantly, from 2000 page views in 1997 to 3500 page views in 2002. (The figures for 2003 were quoted as of August 2003.)

Table 36: Utilization of Macro Economy Information System

	1997	1998	1999	2000	2001	2002	2003*
Number of Registered Members	50	80	80	80	80	100	100
Total Access Time	40,000	64,000	64,000	64,000	64,000	80,000	80,000
Number of Access	2,000	2,600	2,600	2,700	2,700	3,500	3,000

Source: questionnaire response from SIC

3.7.2 World Economic Information System

Since only the National Development and Reform Commission and SIC themselves are the users of this system, there is no tariff range. There were only 50 users until 2002, because users had been limited within the SIC or provincial and municipal information centers. Due to the improvement of the frequency of data update and the National Development and Reform Commission became a new user of the system, the number of users increased 10 times (Table 37).

Table 37: Utilization of World Economic Information System

Year	1997	1998	1999	2000	2001	2002	2003*
Total Number of Users	50	50	50	50	50	50	500
Total Access Time	1,000	1,000	1,000	1,000	1,000	1,000	15,000
Access Number	600	600	600	600	600	600	2,500

Source: questionnaire response from SIC

3.7.3 Enterprises and Products Information System

The condition of use of the system is only revealed as the average number of access (Table 38). The complete information of the system is available on CD-ROMs, which might explain relatively small access numbers[14]. The online service is mainly used by enterprises including consulting firms, trading companies as well as research institutions.

Table 38: Utilization of Enterprises and Products Information System

Year	1997	1998	1999	2000	2001	2002	2003*

[14] The sales records for CD-ROM products are not provided.

Number of accesses	1,000	1,000	1,000	1,000	4,000	4,000	4,000

Source: questionnaire response from SIC

3.7.4 Price and Market Information System (Price Part)

The traffic information of the Price part of the Price and Market Information System is described in Table 14. Because of the service started in October 1998, the traffic data in 1998 is extremely low compared to the traffic data in 1999. As the table shows, the number of all contents has increased since the beginning of operation. Also, access time and counts per user have increased.

Table 39: Utilization of Price and Market Information System (Price Part)

	1997	1998	1999	2000	2001	2002	2003*
Registered User		100	1,500	2,000	3,000	3,500	2,000
Total Access Time		2,000	30,000	75,000	120,000	140,000	80,000
Accessed Number		6,000	100,000	200,000	300,000	500,000	280,000

Source: questionnaire response from SIC

This system made it possible to provide price data sufficiently, which led to the abolition of State Price Bureau, which was a division of price control in the central government. However, it did not lead to the abolition of price bureau in provinces because of the instability in domestic commodity price.

3.7.5 Price and Market Information System (Market Part)

This system is targeted at the ministries of the central government, provincial and municipal governments, universities and research institute, Chinese companies and foreign companies. The service is free of charge for the government users, and provided on a for-fee basis for other classes of users.

As shown in Table 40, the number of registered users has increased since the beginning of the operation, in 2002 there are 1500 users. The total access time and access counts have also increased, but these are not so much compared to other systems. It might be related to the fewer contents.

Table 40: Utilization of Price and Market Information System (Market Part)

	1997	1998	1999	2000	2001	2002	2003*
Registered Users	300	500	800	1,000	1,300	1,500	1,000
Total Accessed time	900	1,400	2,560	3,500	4,680	5,100	3,300
Accessed Number	10,800	16,800	30,720	42,000	56,160	61,200	39,600

Source: questionnaire response from SIC

3.7.6 Economic Laws and Regulation System

In addition, the laws and regulation information, which are available on Internet, is partial. The complete version is available by a series of CD-ROMs. The data is available not only for governmental official, but also for enterprises and citizens. In terms of charge of the data, NPS Law, State Council Law and Regulations is free of charge, but others are toll services. It takes around 10 RMB per one output of statute.

In addition, the laws and regulation information, which are available on Internet, is partial. The complete version is available by a series of CD-ROMs. The service, including the quarterly updates, is available for the individual user at the price of RMB 5,500 in the first year, and RMB 1,000 annually from the second year on. The LAN-based corporate user needs to pay a fee of RMB 10,000 for the first year, and RMB 2,000 for renewal from the second year on. Real-time update service can be purchased for RMB 100,000.

The paid service is limited to the legal information of the central government. Not a few provincial and municipal governments provide information on the local regulation under their jurisdiction for free of charge. The Municipality of Beijing offers most of the legal information for free while offering the rest as a paid service for RMB 1,000 annually, which can be accompanied by consulting with additional costs.

The number of monthly access to the Economic Law Information System of the Municipality of Beijing counts one million. Therefore the system is highly evaluated by the municipality government and the citizens.

The social effect of this system is quite significant, because this system has developed as overall comprehensive laws and regulation system including criminal laws as well as economic laws. Although the original aim of the system was providing only economic laws and regulations, such development is considered eligible and the system becomes authoritative in China.

As the table shows, the traffic of Economic Laws and Regulation System on-line version has increased since the beginning of operation. The number of registered user gradually increased since 100 in 1997. It has reached in 1900 in 2002, and in 2100 in May 2003. Also, access counts have increased from 10,000 page views in 1997 to over 160,000 page views in the end of 2002 (Table 41).

Table 41: Utilization of Economic Laws and Regulation System

	1997	1998	1999	2000	2001	2002	2003*
Registered Users	100	400	850	1,300	1,600	1,900	2,100
Total Access Time	800	2,000	5,000	9,200	11,000	13,500	700
Accessed Number	10,000	30,000	60,000	110,000	130,000	160,000	60,000

Source: questionnaire response from SIC

The private users are estimated approximately 300 users. Most of them are lawyers in the firms,

other are considered to be supposed the researchers in universities and research institutions. Nowadays, judicial precedent database and WHO literature database are added. The database of judicial precedent is called "legal literature database" in which the latest 10 years judicial precedents are available. The WHO literature database was added in 2002 due to China's WHO accession.

This system contributes to dispel a misunderstanding of China's monocracy. According to the interview held in SIC, Economic Laws and Regulation System played an important role to dispel misunderstanding of infringe human rights which against world opinion or private enterprises' rights in China which entrepreneurs and investors believe. For example, in the case of a plane hijack by Chinese criminal in Japan, the communication through this system proved the misunderstanding of the criminal penalty, which led to extradition of criminal.

3.7.7 Foreign Loan Project Management Information System

The users of this system are exclusively for the Central government, regional governments, universities and research institutions. The number of registered users (organizations) is constantly kept around 100 from 1997 to 2003. Basically, this system is an information system for the central and local governments, so application and registration for periodical use are required on the occasion of universities and research institutions use.

According to the SIC, the foreign loan projects which are recorded in this system have been implemented since 1979 and whose term is over one year. Although Ministry of Finance is in charge of foreign loan, SIC collects the data of foreign loans via State Planning Commission that is administrative organization of the Ministry of Finance. Due to such coherence organization, SIC can collect primary information easily, thus this system operates as a part of Decision Support System (DSS).

An effect of the system is "Alert System", which operates loan redemption in regional governments. In detail, "Alert System" manages loans systematically concerning the period of redemption or conditions, then conveniently alerts to the institutions concerned. By this system the data can be collected every three months, which promotes more appropriate decision making than before where the data was available once a year.

Furthermore, the Asia economic crisis becomes a good lesson for China, by which Chinese government try to learn how to prevent the crisis by managing and keeping track of the data. Particularly, the case of Korea is full of learning where inadequate management of foreign loans led to a financial crisis.

3.7.8 Governmental Investment Project Management Information System

Government Investment Project Management Information System is used for managing and planning projects which are financed by the government budget, those that construct large- or

middle-scale infrastructure, or those that are financed by government bonds. The information retained in this system is classified as national secret, and only used by the limited sections in the central ministries and the Project Management Section of the National Development and Reform Commission. Consequently, access statistics, such as the growth of the number of users, are not provided.

This system was targeted at the Bureau of Investment of the National Development and Reform Commission, but later in 1999, other bureaus began to use the system. In addition, regional governments are also using the system, although the details were not disclosed.

Because the system is available only for internal use in the government, and the information that it deals with belongs to national secret, the statistics and information concerning the utilization of the system were not available. Any further detail than is described here was not obtainable.

Table 42: Users of Government Investment Project Management Information System

	1995	1996	1997	1998	1999 through 2003
Users	Office of Public Facility, Bureau of Investment	Office of Public Facility, Bureau of Investment	Office of Property Management, Bureau of Investment	Office of Property Management, Bureau of Investment	Bureau of Investment, Bureau of Agriculture, Bureau of High Technology, Bureau of Primary Industry, Bureau of Society, Bureau of National Land, Bureau of Industry, National Bureau of Stockpile

3.7.9 China Economic Information Network (CEInet)

China Economic Information Network (CEInet) is a privatized service both for Internet access and economic information, which was separated from SIC. Some of the economic information of CEInet is offered on a commercial basis and to inquiry into the utilization of their service is to inquiry into their clients.

Inquiry into the service encountered a harder resistance than we anticipated. In addition, CEInet Data Corporation, which is funded by SIC, is now organized and managed independently of SIC, and it did not cooperate on the inquiry at first, disregarding the significance of the client survey,

Client survey was impossible without their cooperation, and for a number of times we requested through SIC that CEInet Data Corporation help with our survey, referring to the importance of the survey.

In the end, CEInet Data Corporation agreed to cooperate on the survey and to disclose the contact information of 31 of their major clients, whose names are listed publicly on the web site of CEInet

Data Corporation, although 22 clients out of the 31 had stopped using CEInet, leaving only nine ready for inquiry.

And out of the nine clients, only four of them responded to our questionnaires. Those four include the Document and Information Center of the Chinese Academy of Social Sciences (Beijing), China Petroleum and Chemical Corporation (Beijing), Shanghai Stock Exchange (Shanghai), Boshi Fund Management Co., Ltd. (Shenzhen) Below is the summary of the answers of the four clients.

3.7.9.1 Document and Information Center, Chinese Academy of Social Sciences

They are relatively a new user. They started to use CEInet in July 2003, for obtaining economic information. They feel that the service has poor usability and is priced too high, and that available information is limited and not sufficient. They also use other information services, and question that they will continue to use CEInet.

3.7.9.2 China Petroleum and Chemical Corporation

They started to use CEInet in September 2000, in order to obtain information on state policy related to their business, and industry information. They only use the for-free information because the service is priced too high. They feel that the service abounds with information and has high usability. They are not sure they will continue to use CEInet.

3.7.9.3 Shanghai Stock Exchange

They started to use CEInet in April 2002 in order to obtain economic information. Within Shanghai Stock Exchange, 89 of the staff, including the management and the employees, use the CEInet information service. They pay RMB 12,500 for the service every month, which they feel is expensive. Their impression about CEInet is that it abounds with information, although it is difficult to find the information that they want, and that the quality of the information is high enough for their professional needs in spite of the the narrow scope that CEInet covers. They also mention that they are not sure they will continue to use CEInet.

3.7.9.4 Boshi Fund Management Co., Ltd.

It is not known when they started to use CEInet. They use the service to obtain economic information. They feel that the service is reasonably priced. Thirty-five of the employees use the CEInet information. They also feel that the service abounds with information, which makes it hard to find the information that they want, and that the quality of the information is high enough for their professional needs in spite of the the narrow scope that CEInet covers. They mention that they will continue to use CEInet.

3.7.10 Information Center Building

Most of the tenants of this building are subsidiary or related companies of the National Development and Reform Commission. Ten tenants are related companies of Guoxin Information Head Office Corporation, which is the largest of the related companies of SIC, and offers a wide range of information business. CEInet Data Corporation is the second largest to Guoxin.

The construction of the Information Center Building was delayed. As a result, the function and office of SIC was not relocated to this building, and it was repurposed as an office building for rent. In considering that the delay in construction was an inevitable and external cause, the building is effectively utilized for related businesses of SIC.

The southern part of the Municipality of Beijing, where the Information Center Building is located, is short of office buildings, based on which SIC decided to let the Information Center Building. At present, comprehensive redevelopment of this area is under way towards the Beijing Olympic Games in 2008, office capacity is growing and the competitiveness of the Information Center Building is relatively decreasing.

3.8 Usage of the Information Systems

We conducted and researched the visiting interview and the questionnaire about the usage of system and its concrete effect.

The government agency took a leading part in the users of the State Economic Information System, the Central and local government agencies were divided between Class I to III in a hierarchical fashion, other state-run companies were defined as the "Social Users", and the kinds and contents of the available information were basically decided under this classification (Table 43).

The social users were originally limited to the state-run companies and the government-affiliated financial institution narrowly. On the way, the change of the plan was conducted, and at present, the information services were widely open to public users through the Internet, they became sold with charge as a database and the users were widely enlarged. By this change, the character, function and effect that each services of this system had were significantly changed in quality and quantity.

Table 43: Classification of the Users of the SEIS Systems

Classification	User Organizations
Class I	Economic management authorities, such as the State Planning Committee and State Council
Class II	Central government ministries and commissions, and provincial and municipal governments
Class III	Ministries and commissions, and provincial and municipal governments that are not included in Class II
Societal Users	Private enterprises (e.g. Capital Steel Corporation, Changchun First Automobile Factories, China Real Estate Corporation, Times Corporation, Shanghai Trade Center, Beijing Department Store) Research institutes (Development Research Center of State Council, Chinese Academy of Social Science)

As follows, we will describe the usage in the Government agencies.

3.8.1 Usage in Central Ministries and Commissions

The biggest user of this system in the Central Government is the National Development and Reform Commission. The bigger users beside the National Development and Reform Commission are the Development Bank and the Financial Department, but a variety of other organizations also use the systems to a greater or lesser degree.

They often send the processed data including the raw data from the Economic Forecasting Department to the Development Bank and the Financial Department. They very often use the document data, and very often use by getting a hint of the way to read numeric data after referring to

the State Information Center by telephone when they use numeric data.

In the local government, the usage naturally shows varied aspects. Among them, they have charge of the economic policy, the National Development and Reform Commission each province and municipality located on the nerve center of the local government very often generally use most continually, an they use them for getting and forming the reason corroborating the economic policy through the search and collection of the analysis data and document information, and through the information sharing among the institutions concerned from the collecting and getting the raw data with a focus on the economy-related information.

Some provinces provide and use the common platform used by all the organizations in the province government, and some use other network beside the Planning Committee. At any rate, they commonly contribute to infiltrating the use of network in the government and to the efficiency of the service by that.

Additionally, the National Development and Reform Commission proceeded with the construction of the "Vertical Network", literally connecting organizations from top to bottom in the hierarchy. This is used for the meeting and the contact between the central government and the local government by providing services such as video conference and the IP telephone with high-speed access.

3.8.1.1 Economic Forecasting Department, State Information Center

The special post that has charge of the economic forecasting beside the department that collects and delivering the information in the State Information Center is originally set up.

This department constructs the economic model as an input data such as the economic figure provided by the State Bureau of Statistics and other economy-related department adding to the economic information that the State Information Center itself collects, conducted the economic analysis such as the business forecast based on that, and provides the result for the economic policy planning department regularly.

We often sum up the report individually according to the request. Accordingly, it can be thought that the economic forecasting department can judge the availability of the economic information from the stance near the user in the government.

As follows, we summed up the result of interview to Chief Economist, Zhu Bao Liang, of the Economic Forecast Department of the State Information Center.

> Among the Development and Reform Commission, young men are different from old men in the way of use. Young men collect the data, and use the report well. They praised the database in the Macro Economic Forecasting System wholly. We do not quantitatively know the contribution playing the economic policy in the government such as the price policy, but it can be said that they serve to the perspective formulation in the state economy qualitatively. When they constructed the

system, the inflation accelerated, but at present, it is in the deflationary situation. Adding a tinge of them, we deal with them changing the view point.

Concretely, for example, we handed in the report concerning the undercut of yuan to the State Council Development Research Center after we used the data in the State Information Center and analyzed them at the time of banking crisis in 1997. We analyzed them because the inflation is recently overheated, and we analyzed and reported the yuan appreciation in August 2003. Then all the used data were collected in the database in the State Information Center. Additionally, we cannot unveil the contents of this report because it corresponds to the state secrets now.

At present in China the Social Science Academy and the National Development Research Center including the State Information Center make the economic model of the same kind. The State Information Center announces the analysis several times per year, but the State Development Research Center does not analyze them regularly, and the Social Science Academy reports them in the year-on-year. Additionally, it is said that the model software and interface technology are only in the State Information Center. The analysis of the State Information Center increases the frequency of renewal, so the analysis of the Social Science Academy is very often used by the researches while the Development Committee and the companies increase the frequency of use.

3.8.2 Usage in Local Governments

3.8.2.1 Beijing Development and Reform Commission

Almost all of the 100 officers in the Beijing Development and Reform Commission use the government policy decision support system. This was constructed as the internal information system in the Beijing Development and Reform Commission, consisting of the policy decision in the government service, the policy support platform and the municipality information system and it plays a significant role in the Beijing Government.

The items of information are four of the internal information in the Beijing Development and Reform Commission, Beijing Municipal Government Service Information, Related Research Result Document and Economic Forecasting Data.

These contribute to the efficiency of the service, and the government practices and Beijing Situation in the previous day can be known when the personal computer is opened. Previously, they sent the news from the municipal office by fax, copied them and handed in to 12 management posts. It is said that it took a few weeks the important document to be reached to the first person from the last person by fax by now, but now they became transmitted in a moment by the Internet and it became very convenient.

Additionally, the automation of the service is promoted, and the documents that were circulated by the paper base before are delivered by the network now. The items of information content are the

"Daily Activity" and the evaluation index of each office staff in the human resource department, and they are revised by listening to office staff's opinions as needed.

The economic numeric database is used in the forecasting department in the Macro Economic Forecasting System and they are not opened to the public. There are monthly observations, seasonal forecast, seasonal industry business research and fiscal forecast in the forecasting decision information service, and a part of them can be used by the public users through the Beijing Economic Information Network.

3.8.2.2 Guangzhou Development and Planning Commission

There are about 140 officers and they are divided into 20 departments in the Guangzhou Development Planning Commission. The personal computers become widely used on a one-computer-per-person basis, the service automation system developed by a local company in Guangzhou.

According to the research in 2001, 3,000 personal computers for 10,000 staff officers were widely used in the research of 40 agencies in Guangzhou Government. This shows that 50% to 60% of staff officers has personal computers excluding the Department of Public Safety (Police Station).

It can be said that the information system construction project by the yen loan made up the infrastructure of the computerization in Guangzhou. After that, the computerization budget in Guangzhou had been more and more increasing. It can be said that the information system by the yen loan changed staff officers' traditional thoughts of a job. Some people felt satisfaction with the manual labor till now, but they could not part with the system.

There are the Intranet and the Internet in Guangzhou. The Intranet is used in the internal service, and the OA system is used including the yen loan. This was developed by the local SI agency in Guangzhou, and it is used in the Planning Commission. The OA system in the whole municipal government is developed other SI company and the Financial Agency invested and it was constructed. The network ties in the compatibility between both systems, but it is said that there are no applications operated commonly.

The Intranet is basically used in the internal service, and there are many announcements and documents exchanges, but the Intranet is used for collecting the information. Various evaluations are very often passed in the job of the Planning Commission. The paper media is basically used for applying the project, and the paperless is promoted in the internal, and it is printed with the paper media finally, and it is posted with paper.

The Planning Commission uses the data in the China Economic Information Center when they hand in the issued quarterly report. The expense for that is born by the Information Center, and a part of them is charged. However, they are not automated by the service system because there is the service business ties connection exchanging the received and analyzed information between the local and central

State Information Center, but the State Information Center can receive the local information in a way regularly.

3.8.2.3 Jilin Planning Commission

It took only a few days to collect the data for the policy formulation by way of the library and by fax traditionally in the Jilin Planning Committee, but it takes only one to two hours to do so by using this information system. They became able to get the more refined data conveniently. That effect is said to be high. In Jilin, there were not the needs that they used the Macro Economic Data for developing the economic policy until this system was made first of all.

3.8.2.4 Shanxi Development and Planning Commission

There are many experts of the economic policy in the Shanxi Development Planning Commission, and this system is largely used. Especially, the economic information system plays a potent role. It became possible to collect the right information from the localities and to understand the trend of the central government and province, and the trend of investment than it was in real time.

The information exchange with the Planning Commissions in other provinces is regularly conducted more than 10 times a year, too. Especially, they maintain an interchange at the end of the fiscal year. There was the interchange before the system construction, but the information exchange was conducted by the telephone base, but now the direct exchange is conducted by on-line.

3.8.2.5 Sichuan Economic Information Center

Most of the data output in the Sichuan Economic Information Center are opened on the Web. The result of the regular economic analysis is opened, too.

They provide them by the paper media for the Development Planning Committee. There are some high ranking oldsters in the province government, so it is said that they like papers because their eyes feel tiring and it is easy to memorize in reading.

There are some old models about the Economic Forecasting Model, but they are constructing the new model now because Chongqing was separated into the ordinary municipality in 1997, and they are comparing with the new one and the old one in the experience rather than the data.

Previously, the Bureau of Statistics, the Planning Committee and the Information Center collectively held the meeting for analyzing the economic situation three or four times in a year by accompanying the experts in the external universities. At present they reduce the number of times for releasing analysis and the focus of trend analysis the mid-and-long term.

3.8.3 Usage in Research Institutes

The China State Economic Information System is used in universities and research agencies, too. In the research this time, we called on the researchers in the Beijing Normal University, the China Social

Science Academy, Tsinghua University, and Shanghai Jiao Tong University, and researched the reality and the evaluation of utility by the researchers.

As follows, they talked about system usage.

3.8.3.1 School of Management, Beijing Normal University

Dean of the School of Management and Professor of Economics, Tang Ren Wu uses this system as follows at the Beijing Normal University Management Academy, or a management academy corresponding to the business school.

He very often uses the macro economy and the world economy. He specializes in the data about theoretical economics and macro-economics. He got the data about the Western development from the data in the China Economic Information Network when he had been involved in an Asian Development Bank research project on the development of China. He needed basic data, but he got substantial help because he thought it unreal that he got the data by visiting 10 provinces and autonomous regions in the west. He collected the basic data by the Internet, and selected the visiting places case by case. He could save much budget. The expense was paid from his research budget. He paid 100 yuan for the portal use in the China Economic Information Company. He paid for each classroom or each project. He did not think it very expensive.

However, they have disadvantages such as the pay as a whole, the low about the correctness of the data and renewal frequency and the difficulty of searching the information.

3.8.3.2 Institute of Quantitative and Technical Economics, Chinese Academy of Social Sciences

Dr. Zhang Tao belongs to the Institute of Quantitative and Technical Economics of the Chinese Academy of Social Sciences that is a state-dominated think tank, and he is a young highly targeted person as an economic researcher, and is a tender age of 30 years old, but his latest thesis was inserted on the People's Daily. He uses them as follows.

> The service of the China Economic Information Network has been used since he was a postgraduate three years ago. The Institute of Quantitative and Technical Economics in the Chinese Academy of Social Sciences has 40 researchers and more than half of them use the China Economic Information Network. Not that the persons that are not in use do not use them, but they cannot use them because there are many old persons and they have them download the necessary information and they printed them and handed to them.
>
> If we see only the information amount, you may see the general search engine in the China Economic Information Network. However, we select the China Economic Information Network for the technicality. The merit of the China Economic Information Network is to get the processed data in a way. It is the network owning the technicality and does a great service in researching the macro economy. Among the CEInet information services, "China

Economic Data" is the most important to analyze the macro economy although there is a few utility frequency. We think that the "China Economic Data" dominates the data in the Bureau of Statistics, but they have suspect accuracy and they are exhaustive and have authority, and they can evaluate because the renewal is frequent. We must evaluate the external environment, assuming that we forecast the annual economy in the Chinese Academy of Social Sciences. Then, we very often use the "World Economy Critics" in the China Economic Information Network. We very often see because they have a significant impact on the import and export.

Concretely, we used the data in the China Economic Information Network (interest-rate in the developing country and developed country) when we authored the "Trend analysis in the Chinese Economy as a master's thesis.

3.8.3.3 Chinese Economic Research Center, Tsinghua University

Professor Li Zinai, Chairman of the Chinese Economic Research Center and Director of the Economics program of the Business Management Academy of Tsinghua University, which can be said to be proximate to the nerve center of administration which throws up Mr. Zhu Rongji, the former Prime Minister and Mr. Hu Jintao, the current Prime Minister , use this system as follows.

There are many macro economic researchers at the Management Academy, and they very often make contact with the China Economic Information Network Company and the State Information Center because they have developed partnership with them since the State Information Center was originally established and because the condition of network connection is good.

The China Economic Information Network Company has great authority, and this symbolizes that they hold the convention at the Great Hall of the People in Beijing once a year. The China Economic Information Network Company was noticed for the authority about that status and the provided data. It is important to collect and true up the basic data. There was a talk about the database creation in the Management Academy, but they decided to use the service at the China Economic Information Network by thinking of the construction and operation cost.

3.8.3.4 An Tai School of Management, Shanghai Jiao Tong University

The mission met with Professor Zhang at An Tai School of Management of Shanghai Jiao Tong University, whose status has recently risen. The former Premier, Mr. Jiang Zhemin is an alumni of this school.

They were received statistical data in a level of the whole country and the province at the time of cooperative project with the Vienna Technical College by receiving support from the UNIDO (United Nations Industrial Development Organization) between 1997 and 2000. They used for creating the

Shanxi Industrial Development Strategy. They developed the policy decision support system. They created the proposal by using the data at the China Economic Information Network in order to apply the budget about the State Natural Science Fund when they created the project protocol at the high-tech park in each province in the regional planning between 2001 and 2002. Then, they received the job information and the industrial structure data from the China Economic Information Network Company. They used the students, too. In addition to this, they consulted the State Service Situation (Information service at the State Council) Macro Economic Collected Papers. There is a difference that the raw data is provided for the China Economic Information Network, and the report is provided for the State Council.

Additionally, the present student as a post doctor used the data at the China Economic Information Network through the university when he was on the register of the doctoral course at the Tianjin University. It is easy to look for the data concerning GDP, GNP and Industrial origin data. However, they had a lot of trouble with finding the intimate data at each business world because the way to range the data was different when they researched the real estate management. It is said that they run short of consideration to the output.

3.8.4 Usage in Private Enterprises

"We could hardly send out questionnaires about the usage of the information systems in the company as follows, but we could cover at the time of make an inspection of the local. The following is a concrete example that we abstract it from among them."

3.8.4.1 China International Economic Consultants, CITIC Group

The China International Trust and Investment Corporation (CITIC) Group is the largest state company group in China, and the state makes a 100% investment, and it is not strictly a private firm, but the management mode stands on a par with the private firm, and they compete with the market.

We visited the China International Economic Consultants that conducts the consulting of the business world such as the electronics and cars in the consulting category.

The Vice President in charge knows the name of the China Economic Information Network, but he has never used it earnestly, and he did not use the pay service. He has found it by thinking that he should use the pay database, but he could not find the appropriate database. It is said that he uses the analysis report of each industry.

However, he very often uses the Internet and his search by the Internet makes up 70% out of the information used on business, and he receives the pay information, too. He has bought the oversea database (For example, data monitor), and he very often uses the portal site such as the journal Fortune and Wall Street Journal.

It is said that he has never used the information at the Information Center in Shanghai, and the

reliability is low, too. This is because the information system in the government is low in quality and too bureaucratic. It is a serious issue that they make sure of the reliability of data source in a broad area of China, and it was pointed out the information in the government still has a problem with the reliability.

3.8.4.2 Changchun First Automobile Manufacturing Corporation (Jilin)

The northeastern part in Jilin historically has a superior sense of heavy industry, and the big factories manufacturing the cars and train compartments are located in the Changchun, Changchun First Automobile Manufacturing Corporation is a machine industry under the control of the First Train manufacturing cars, and is a state company and has 1,200 staff officers.

They have used the system and the company and product information provided by the China Economic Information Network since April 2001, and they have collected the product information in the shareholder in the country. They have 20 users in the company. The users belong to the research development and production departments.

Additionally, they give publicity to the company by using the mail magazine issued by the Jilin Information Center, and use them for procuring the raw material. This mail magazine is issued to 2,000 companies. In the future, they create the portal site and want to receive an order of products in cooperation with the Information Center.

3.8.4.3 Shanxi Information Comprehensive Company Service

The "Company and Product System" developed in Shanxi depends on the network in a level of province. There are the Province Planning Committee and Province Economic Trading Department as a government user, and provide the value-added service for other companies and the general society.

First, they provide the company list, the product database, the brand-name goods and supplying hot line. There is a Web page by business worlds such as the foods, the chemistry and travel. The evaluation of the company brand-name decided based on the index selected in the exclusive qualification agency by the State.

They can get the more intimate information about the contact address and product in these company and product information when they become enrollment members. As they lag behind other nations in the exploitation of the west district, they are going to provide the service without charge for the time being, but they think pay in the future.

The store in the initiating party bears in the exclusive portal site at the stores, and it is about 3,000 yuan (45,000 yen) in a year. It is said that the restaurants had increasing customers. The number of the customers had been increasing by advertising by the Internet in The national franchise specialty store of a special noodle starting business in Xian called the "Liang Pi Food " a famous example and had already renewed 4 times. It is said that this store moved in and branched in the overseas such as the Southeast Asia.

3.9 Direct Impact

We will consider as follows what kind of impact they manifested for the whole Chinese society by that the Economic Information System was constructed and used in this project. First, it is considered that they manifested by using the economic information system by the government agency in the original purpose. We will describe what direct impact was.

3.9.1 Improvement of the Management of Macro Economy and Decision Support for Rationalized Economic Policy Setting

The following three top-level goals were expected to be realized because of the economy-related information being provided and used on network.

(1) Improvement of macro economic management function in the government
(2) Support for rational economic policy formulation
(3) Efficiency in government service

Both (1) and (2) are the purpose related to the economic policy, and we will describe them in the block in thick relation to one another.

It was made sure that the following function was realized for managing the macro economic policy in the government from the research to the Economic Forecasting Department in the State Economic Information Center, the economic policy person in charge in the major local government and the economic researcher in the research agency.

(1) To create the macro economic model and collect the basic data required for it regularly
(2) To create and offer the quantitative economic analysis and forecasting based on the output data in the macro economic model
(3) To analyze the economic trend intended for the document information qualitatively
(4) To support the plan and formulation of the economic policy based on them above.

It can be said that this is a result that directly allowed the improvement of the macro economic management function the rational economic policy formulation support in the government as stated above.

It was confirmed that the problems that had existed before this project began were improved as follows. The efficiency of communication and use of information about economic policy had been widely improved and it can be thought that it brought efficiency of economic analysis and policy plan service. (Table 44)

Table 44: Observed Improvements in Communication

Issue before the introduction of project	(1) Communication was delayed (local to central, central to local). (2) Correctness of information was low (because it was sequentially reported according to each "grade"). (3) It was difficult to use because information was not standardized. (4) Communication of information was scarce (local to central, central to local). (5) Communication way of information was delayed (paper media, by and large).
Improvement after the introduction of project	(1) Communication, counting and analysis speed of information was largely increased by using the network and computer technology). (2) Correctness of information became high by using the direct report and software technology in many offering points of local data. (3) Unification and standardization of application were realized by using the more Internet Web technologies. (4) Communication of information and level of sharing were boosted up from the technology.

However, it is difficult to establish that the qualitative repletion of economic policies lead to the immediate implementation of the policy. Especially, it can be said that it is impossible to measure quantitatively the effect of macro economic policy management in this system.

However, it can be judged that there were qualitative effects as follows because the related persons' remarks supported these facts about the concrete policy decision and implementation in the economic policy in the government.

3.9.1.1 Timely Decision Making Enabled by Quick Collection, Analysis and Delivery of Data

The vast amounts of the data and documents about the economic information became quickly collected, ranged and analyzed, delivered and shared by way of the Internet. Hereby, the examining and analyzing term before the policy decision in the government was shortened, the speed of systematic decision making was largely improved and so it became possible to decide them timely. The following is users' opinions.

> The information was shared among related persons in the government, and the service became efficient because of introduction of this information system. Before the information systems were deployed, each annual plan was originally planned at the beginning of the fiscal year (in January), and they were in fact conducted after the report and decision was made in summer or fall, so the timing was very often lost.
>
> This information system was introduced, the information sharing became conducted, so that the work flow was speeded up, the annual plan was finished in March or April, the plan became possible two times a year if the improvement was included and it became possible to be

conducted more adequately.
We could cope with the accidental and current events in each case. In issue of the appreciation of yuan, we got the local economic information through the China Economic Information Network and we could discuss and make decisions about the appreciation of yuan based on it. As a result, we could cope with emerging problems in real time. (Chief Economist Zhu, the Economic Forecasting Department, the State Information Center)

We could understand the affairs of State and the previous Beijing situation when we opened our personal computers for this system. The important documents became transmitted at once by the Internet although it took one or two weeks for a document to go from the first person to the last person when delivered by fax.
The automation of service was promoted, and the documents that circulated in paper originally are delivered by network now. Their contents are the "Daily Actions" and evaluation index of each staff officer in the Personnel Division, so we modify them after we ask staff officers' opinions. (Beijing Development and Reform Commission)

It became possible to collect the data about the policy plan in about one or two hours by using this information system although it took two or three days to do so by way of the library or by fax originally. We can save the time and the energy for collecting the documents by using this system, and we can more correct data conveniently, as a result, the effect is large. (Jilin Planning Committee)

3.9.1.2 Improvement of Objectivity about Decision Making and Reduction of Subjective and Arbitrary Decision Based on Accurate Data

It can be thought that this system becomes a help that the parties concerned conclude more objectively in a process of decision about economic policy by collecting and providing the correct data about economic situation. Therefore, it brought about an effect that curbed the subjective and arbitrary judgment or decision. Quoted below are users' opinions.

Although the decision was not necessarily conducted by an unscientific way previously, we can collect the local data from the State Information Center and report comparing the data, and they become information for objectively making decisions in the upper staff now.
We analyzed and reported the appreciation of yuan in August as one of the recent hottest topics although we cannot tell you about the concrete contents because it belongs to the state secrets. We got all the data from the database in the State Information Center.
We analyzed the effects on the national economy and made an announcement about the result at the time of SARS, but the China Economic Information Network was of help to judgment

about economic policy. We reported by judging that it would be possible to recover without getting more strained in the long run unlike with the surrounding general viewpoint as a result of the data analysis. It associated with the early introduction of the tax relief policy to the restaurant business in Shanghai, for example. Some departments in the central government and the information center associated and corresponded in the SARS.

Reading the report from the subordinate part made up most of services for the top in the pat in the Planning Committee because the process of the policy decision changed, too, but we can get to work from getting the information form network ourselves now, and we can judge them more spontaneously or rapidly. (The State Information Center Economic Forecasting Department)

Bringing rich information amount into play was of help to supporting for the policy decision. We can get the information including the direct field about ourselves easily, and we can compare with the past data easily, too. This is impossible in the paper media, and we could realize by getting the information by way of the Internet. (Beijing Development and Reform Commission)

The Sichuan Economic Information Center provides the information from the objective stance for the plan such as the economic policy in the state government, concretely the annual government revenue and the annual government expenditure, the unemployment policy, the public works, the external induction and the infrastructure construction. The direction of the upper and lower was very bad before the system construction. The central government did not report to the local, and the local did not, either. We can conduct the objective and scientific policy decision by sharing the data that was stored and memorized till then after introduction of this system.

The laboratory in the government collects the information for policy decision, but we are independent of the government. Only the Economic Information Center does not begin the business about the economic forecasting under the province government. The role of the Information Center is to analyze them objectively from their own viewpoint.

For example, they uniquely handed in the report about economic forecasting in 1999, but it was different from the forecasting in other agencies in the contents, and so the report in the Economic Center was evaluated finally, and many agencies adopted them.

They analyzed that the province economy would receive a blow in the short run, but it would not receive a big blow in the medium run. The expert group that was given a commission by the province government reported the opposite report, but they became criticized in the end. Then they telephoned to us that they wanted the analysis results disclosed by us when they

reported them to the central government. It can be thought of as the following reasons that our forecasting is relatively or extremely precise.

(1) They can collect the information absolutely.
(2) They are in the organization, so they are blind to the viewpoint of the state government.
(3) They conduct the forecasting service in the long run, and they accumulate the know-how.

(The Sichuan Economic Information Center)

3.9.1.3 Nation-Wide Policy Planning and Implementation Enabled by Complete Data Collection from All over the Country

In China, the social and economic gap between the coastal district in the eastern part and the outland district in the western part is far wide, the inequality about the traffic, transportation and communication is large in the districts far away from the coastal district geographically and it enlarges the economic gap. The conventional way of communication that had depended on the physical media such as paper and post was by far underserved in cost and speed.

In this project, they promoted the deployment of the Internet in remote areas such as the West, realized the use of network by the latest communications technology, could receive and transmit the information with a very cheap charge instantly independently of the distance, and they could reduce the geographic inequality relatively and they could get the big merit therefore.

In fact, the research mission visited Ulumuqi in the Uighur Autonomous Region, Chengdu in Sichuan in the West and Xian in Shanxi in the entrance of the West, and they could realize the effect of communication by the Internet.

(The Xinjiang Uighur Autonomous Region)

The capital city of the Xinjiang Uighur Autonomous Region, Ulumuqi is a city in the desert developed along the Silk Road and it is located on the westernmost of China, and it is a city inland most in the world. It is very far away from Beijing and it takes seven days to mail by ordinary mail or three days even by express from Beijing to Ulumuqi. At the same time, when the Internet is used, it becomes possible to receive and transmit the information nearly instantaneously and the difference is by far large. And that it does not cost much to consult by email of on homepage individualistically.

In the Xinjiang Uighur Autonomous Region, the area makes up one sixths of the whole territory of China and the region extend 2,000 kilometers south and north and 1,600 kilometers east and west, but there are only 19 million people there. Palpably, the effect of the Internet is very large compared to the conventional physical means of communication not only in the central but also in the Autonomous Region.

In fact, this project was conducted in 15 states and prefectures in the Autonomous Region, and the

information center was established. The farthest place is 2,500 kilometers from Ulumuqi, and it becomes difficult for the users at each place to access them because of line situation when the equipment concentrates on Ulumuqi. Therefore, they persuade the State Information Center to deploy the server at each district. There are a few situations like this beside the Xinjiang Uighur Autonomous Region in China.

It has handicap geographically like this, and the big merit is that it became possible to transmit and share the information freely by using the Internet.

The same thing applies other remote provinces. There is an example that the information center was established at the rim of government organization which facilitated policy making by sharing of information even in a district that is not necessarily a remote region. The Yue Xiu Ward division of the Guangzhou Information Center represents the case, where information sharing in the government is promoted by deployment of information system, and cooperation among the related agencies is promoted, and policy making was done in a scientific way, and management and direction became efficient.

3.9.1.4 Improvement of Transparency and Reliability of Information Disclosure on Policy Decision and Implementation by the Government

The transparency and reliability of policy making and implementation were improved owing to the promotion of information disclosure, and as a result, the reliability of the people upon the government improved, which was considered to be the strongest among the impacts brought by this system.

In one aspect, information disclosure means the government disseminates the vast information that they own to the general society. In another, it means that people's opinions and requests are transmitted to the government authority by way of this system, they are taken up in a process of policy making, and then they are reflected on the change and modification of the policy. The following is evaluation on the two aspects of information disclosure.

3.9.1.5 Information Disclosure to General Public

This system greatly contributed to the publication for the general society of the every information monopolized by the government in the past, and it had an effect on promoting market economy that is rooted in free trade, and also promoting reform and liberalization. Not only economic information but laws and regulation information also brought an effect on them. The following can be pointed out by the expert on the economic research.

> In a large sense, it can be said that the system of the China Economic Information Network was of help to promotion, reform and liberalization of the market economy. The largest thing is that they could make it known to the nation what the State was doing. (Beijing Normal

University Professor Tang Renwu)

It is impossible to evaluate how this system contributed to the government ruling circles quantitatively, but qualitatively, the following two items can be shown.
In the first instance, the very great contribution is that they could use the Internet in the government, and it was of help to efficiency on the government. In the second instance, they can transmit the information to the general society, and the nation including us can use the vast economic information. This is an indirect effect, but it largely contributes. The very big merit is that they disclosed to the public. The significance that the information having no access could be disclosed is immense. (Tsinghua University Professor Li Zinai)

However, in this way, the information in the local government is widely, massively and intimately transmitted to mainly provinces in the country, autonomous region, and major municipalities, too, and the big effect was clearly shown on the related persons' witness who had visited the local center and collected news data in fact.

In each local, the renewal frequency of information is high and the massive examples are seen in the contents, which can be checked in this report 3.6 and 3.8.1.

3.9.1.6 Reflection of the Opinion of Experts and Public on Economic Policy

Both the expert and the public can discuss economic policy and associate with the process of planning it even indirectly, mediated by the China Economic Information Network in addition to the dissemination and sharing of information. When they decide the price of public utilities and plan development projects, this system is widely used for hearing the citizen's opinions, too.

This information system, even in a limited sense, is thought to have done a lot of good for reflecting public opinions upon the traditional policy decision that works "from top to down". The following is users' opinions.

Only the researchers and the experts in the organization, or the internal related persons were concerned with the price decision on the public utility charges, and there was no room for being attended by the public. Now public hearings about price on the public utility charges (railroad, water service and electric power) were announced through the China Economic Information Network, and the public can attend.
The policy assessment is often conducted in the local hearing. For example, they raised the price of train ticket for Chinese New Year naturally without taking counsel with common people in the past, but it can be permitted now. Even the hearing about the dam construction and road construction is often opened in the local project.

> This hearing that was conducted three years ago is regarded as the effect of information dissemination by the China Economic Information Network, and it can be thought that it realized improvement of transparency in the process of policy decision, change and maintenance of the arbitrary judgment into the valid judgment. (The State Information Center Economic Forecasting Department)
>
> The portal site of the China Economic Information Network is one of them that the researchers at the Tsinghua University Business Management Academy Research Institute very often use. They very often use the data collection, the document search and consultation on economy, experts' opinions. Both students and teachers very often use the forum such as the "Associational Forum" and the "Fifty Persons Forum". In my opinion, the enabler of the China Economic Information Network portal site consists in that they provide the platform of technology, and then realized the place that they could discuss. (Tsinghua University Professor Li Zinai)

Besides, some municipalities such as Shanghai and Guangzhou have "Discussion Forums" on their portal site, where argument and discussion on economic policy are taking place on the spot.

3.9.1.7 Active Publication of Negative Information

In general, the government was inclined to keep secret information that was not necessarily favorable to them in the past, but this inclination is seen to be changing recently.

They described as follows about SARS and information disclosure in Guangzhou where SARS (Serious Acute Respiratory Syndrome) primarily arose and spread.

> In the event, the SARS promoted the public information in China. Until now, China was a country that gets the impression that they did not disclose the minus information to the public. Certainly, even the government thought that the social disruption would happen when all the information was disclosed because there were many people in China, made efforts not to disclose the minus information, and they took control of even the mass media similarly.
> However, at present when the mobile phones and the Internet became widely used in response to SARS, the government themselves are going to mend recognition, getting a lesson that it is impossible to keep the information close at any rate, and that it would work against citizens of the world not to disclose them. The demand to open the information by the public became very high. In the future, we think that the public information would be more promoted under the idea that the damage would extend if the minus information were not promptly disclosed. (Guangzhou Information Center)

However, this is rather a result of the Internet, the mobile phones, and the short message becoming common in the general society, than the information systems of this project. It can be said that it is possible to use the State Economic Information System in that the channel for the communication in the Government is acquired.

3.9.2 Improvement in the Efficiency of Administration

They have promoted the efficiency and simplification of administration-related tasks, administrative reform including the organizational change in addition to the promotion of economic reform and liberalization. This system had a purpose for supporting and promoting this trial indirectly.

Firstly, information exchange and sharing among organizations in the central government was improved after the introduction of this system. It is obvious that data exchange and sharing that gave reason to the policy planning was progressive because it became possible to exchange information instantaneously online.

It is said that compartmentalization between ministries and agencies is harmful in China to the same degree as other countries or even worse. It is unclear, however, whether or not this system contributed to cross sectional information exchange over the "territory" among the ministries and agencies.

We fully confirmed after visiting local governments that this system effectively contributed to vertical communication within a ministry or commission of the central government, thus improving communication between a ministry or commission and its local offices.

The fact is that the policy decision was made possible based on the exchange and analysis of correct information between the central and local governments, between local governments, and within a local government respectively, and it can be said that it contributed to improve the efficiency of government by accelerating decentralization of authority.

Especially, in the local government, each information center responsible for developing the system used the network (both LAN and WAN) which was constructed for this system, and on that basis, they uniquely constructed each application for realizing efficiency of service in addition to this system and they very often are used. For example, we will take up Jilin, Shanxi and Zhejiang including Beijing, Shangihai and Guangzhou. The following shows the witness supporting the fact.

> The information exchange was conducted in the province by using this system, the information sharing was conducted with e-mail, fax and Web among each information center affiliating with province, government agencies, companies and group, and it contributes to reduce the cost and time required for the information exchange largely.
>
> They became painfully aware that timeliness of information collection was progressive, and it

came into quite different situation from the past. They used the library, telephone, and fax in the past, but it took two or three days to get through a job, and it takes only a few hours by using this network.

The accuracy that they could get their required information was largely progressive by applying the Web page and e-mail. This network boosted exchanges between one province and the other province, and the reason of advice to the province government became efficiently found. (Jilin Information Center)

The existence of service changed in the introduction of this system, the efficiency was planned. They handed in the report a few times a year before introduction of this system, but four times a month after introduction of this system, and they are nearly in distress in the job site.

The number of staff officers was reduced to 140 persons at present from 130 persons three year ago in the Planning Commission. Six persons changed into four persons in the Directorate for General Affairs, but the amount of their job was more increasing, and it became twice as large as it used to be. The amount of service has been increasing, but the computerization and decentralization were progressed, and efficiency was progressed, too. (Guangzhou Information Center)

3.10 Indirect Impact

We cannot disregard the indirect impact that this project gave to the whole Chinese society in a broad sense adding to the direct impact that was manifested by the use in the government.

The top-class objectives of this project are as follows.

(1) Response to Globalization
(2) Response to Market Economy
(3) Promotion of e-Government

In the historical context, the point of project planning, (2) Response to Market Economy was focused more strongly than other two. Since then into the first half of the 1990s, (1) Response to Globalization came to be emphasized. And after year 2000, (3) Promotion of e-Government is being paid more attention to than the other two objectives.

3.10.1 Response to Globalization

There are various definitions about "globalization", but we want to adopt for now the interpretation from the view point of developing nations that the globalization in our ages has taken the form of infiltrating American model of market economy and democracy to the whole world while the only central country, the USA was supported by a brisk business of the IT revolution and property market since the Soviet breakup here.

Concretely, the USA is the only super power after the demise of the Soviet and East European socialist system breakup and the cold war has promoted the enlargement of free economy, has further deregulated trade under the WTO system and has drastically reduced the regulation of foreign capital, so it can be said that a basic tideway is an integration to the global single market by the market opening. It can be said that the "IT Revolution", especially the diffusion of the personal computer and Internet that technical innovation leads is the flow that will alter all the social activities from the business aspect such as production, sales, distribution and finance running into culture, adding the opening of political system by democracy, public information and the promotion of corporate governance requiring for transparency to this.

The leadership of China built awareness that they could not avoid this flow of globalization in order to keep up the system, and they have promoted in stages the reform and opening policy including the commitment to the free trade system by affiliation into the WTO with the aim of the "Socialist Market Economy".

In this flow, this economic information system was positioned as an important part of the measures to globalization in China, and they continued to construct them in order to restructure and

support the mechanism of economic management by collecting and delivering the information correctly and rapidly to keep the deregulation of price and market competition that form the basis of the free economy.

Additionally, it became possible for the local to transmit the information to the overseas with the Internet, and it can be seen that it was conductive to be directly taken charge of the trading promotion by the local corresponding to globalization.

In fact, we tested how this system contributed to response to globalization based on the related person's witness.

> It is necessary to transmit the information to the overseas on getting the overseas information while the Chinese economy integrates with the global economy. They need this system for it. It was very difficult to get the overseas information in China three years ago, and they could get only the delayed information. When we came back by finishing the overseas education to Europe three years after, we could get the information in real time. (The State Information Center Forecasting Department)

> It can be thought of as a factor that the economic globalization and the network of information associate with each other and irritate each other. The base of globalization is to be networked. Unless there is no high computerization, there is no globalization, too.
> China was an exclusive country before 1994. They did not think of globalization because they did not expose the information to foreign countries. It can be said that the promotion of globalization started on and after 1994. This helped promoting networked information. Additionally, the foray into the international market from the domestic market is an important factor, too, as a result of penetration of market economy. It can be thought that the information network became necessary because they had to sell the products from China in the overseas. (Beijing Normal University Professor Tang Renwu)

> In addition to this, there were many cases that they moved the capital investment intended for the foreign companies by the original transmission of information in the local government that we visited this time. It is natural that there were such cases at the coastal advanced cities such as Beijing, Shanghai and Guangzhou, but there are the same cases in the West.
> For example, they are the investment induction network in the Xinjiang Uighur Autonomous Region and the information system of investment induction in Shanxi. The system that they can really run a simulation of the calculation about the investment cost such as the land cost and the power cost adding to the detailed information such as required documents is arranged, made for practical importance, and it is said that there are many inquiries by e-mail.

> However, it is difficult to evaluate whether this system brought about a concrete effect, apart from the common belief. In fact, there are some opinions such as it.
>
> We can tell you that the Internet was of help to internationalization, but we do not know whether we can tell you that the China Economic Information Network itself directly contributed or not. The data of the China Economic Information Network is of help to researching people such as researchers, research companies and consultants, but we think it cannot be said that they are of help to the public society. (Tsinghua University Professor Li Zinai)

The responsible person at the Shanghai office in the China International Economic Consultants, as a CITIC Group that sets out the consulting to the advance to China of the foreign companies thinks of it as critical about this system.

> We know the name of the China Economic Information Network, but we did not use it for real. The pay service is not used in this company (at least in the Shanghai Branch Office). We were going to buy it as database, but there were no adequate things. We did not use the on-line service. We use the industrial analysis report.
> However, at present, we get 70 % of the information required for business by searching them by the Internet. We bought the foreign database, and we very often use the portal site such as Fortune, Wall Street Journal.
> We did not use information from the Shanghai Information Center because the reliability was low. The improvement of quality should be planned in the information system in the government. A part of them is too bureaucratic. (Shanghai Office, China International Economic Consultants)

The CITIC Group that the China International Economic Consultants belongs to is the largest government-owned company group and every money is invested by the State, so it is not a private company strictly, it competes in the market about the service contents, and had consulting to the companies such as appliance and cars. Seen from person in charge that is at the forefront of business with the foreign capital, the evaluation of the China Economic Information Network is outspoken even in these government-owned companies. The demand about development of information service industry and progress of the market economy is strict, too.

> It is desirable that the market economy is progressive, the number of private business workers for information service increases and the correctness of data is progressive. Recently, the client

> has high requirement about the correctness and source of data. The state-dominated business workers for information service should perform the task of improving the service continuously. It is difficult to maintain the quality and quantity of information. In a large country like China, it is difficult to make sure the correctness of the data rising from the job site. (Shanghai Office, China International Economic Consultants)

Additionally, the definite fact there was an advance for introduction of this system about the economic policy management and the transparency of corporate governance was not especially seen in only this research.

3.10.2 Response to Market Economy

The foundation of market economy consists in the free setup of price for working out the transaction only by consensus among seller and buyer and the existence of free market for that and the free competition developed by that.

This information system is not a mechanism itself to work out directly the market economy as a system, but it can be thought that it has played a role of the completeness system to understand rightly each market information and product information including the price as a result of that.

The price monitoring system introduced at the beginning of the pilot project played a role of the pioneering figure in the whole of this project, realized the collection of price information in the country serving as a foundation for the introduction of market information, contributed to the implementation of economic policy with a central focus on the price such as the inflation measure in the macro economic operation, and it can be predicted that it supported the promotion of market economization. The expert's opinion on the economic research backs it up.

> In a large sense, it can be said that the system in the China Economic Information Network was of help to the promotion of the market economy and the reform and liberalization. The large thing is that the State can inform the nation in real time what they are doing. There was little information because the internal mainly used in the first half of the 1990s. In those days, there were a few users even if it were opened. However, on and after 1999, the contents changed, too when the system was opened. We do not know when it started, but it is not that the offer noticed that the information the State Economic Information System held should not observe secrecy any longer. (Beijing Normal University Professor Tang Renwu)

In short, it may be said what was originally the system in the government had huger subordinate effect in that it was used as a role of the public information to the nation.

> Once there was no technology for making reason because the upper person did not listen to us if we provide the reason of making decisions. In this system, we cannot take the gauge of improving this quantitatively, but it had significance qualitatively.
>
> For example, the government was going to reform the price, concretely they was going to enhance the price at the end of the 1980s. It was a basic concept of the State Council and the Central Government in those days. However, the question is up to where they can enhance it, and it was necessary to predict them at that. Consequently, the original SIC took charge, handed in the forecasting result, and it became the reason for deciding the policy and the material for indicating it in those days. (Tsinghua University Professor Li Zinai)

However, that is not necessarily so although that situation exists in the same way at present, too. Even more private companies are setting out the project as it became possible to collect and sell the information, in the future, the information collection and offering project in the State will be confined to the part that only the Government can do.

> Considering only the information amount, the general engine is better than the China Economic Information Network. The reason that they select the China Economic Information Network lies in the technicality. The merit of the China Economic Information Network is that they can get the data processed in a way. It is a network owning the technicality and it is of great help to the research of macro economy.
>
> We have to evaluate the external circumstance on the assumption of predicting the annual economy in the Social Science Academy. Then, we very often use the "Global Economy Criticism. We very often see it because it is affected by the export and the import. The commercial database will increase in the future, but it will center on the industry analysis and circumstance analysis. The organization like the China Economic Information Network will have interest in the macro economic analysis, so there will not be the direct competition. (Professor Zhang, China Academy of Social Science)

3.10.3 Promotion of e-Government

We cannot especially neglect how they contributed to promote the e-Government when we evaluate the indirect impact in this project. It can be clearly admitted that this project largely contributed to promote the computerization in the central government do the groundwork of promotion in the e-Government.

However, at this moment, the dynamics for promoting the e-Government in the central government gives way to other agency from the SIC, and this project should be regarded as contributing to introduce or promote the e-Government more largely in the local government than in the central

government directly.

In the short run, the e-Government has wide range to aim at it, and they can divide into the following three kinds, dividing them widely.

(1) Computerization of disposal of business affairs in the government
(2) To transmit the governmental information and disclose it to public society
(3) To provide the service to the nation by way of the network such as the Internet

It can be said that this project contributed to (1) and (2) directly, and is contributing to (3).

Without applying only to China, (1), (2) and (3) as stated above are going to evolve and develop by turns.

The State Information Center describes as follows.

> This system accelerated the computerization process in China, and the project participating agencies in each Department Committee widely contributed to the department committee belonging to each. Many project participating agencies were of help to making infrastructure redounding the computerization in this agency. For example, the custom office, tax service and commerce industry laid the foundation for Jin Guan project, Jin Shui project and Chi Dun project respectively. Many participating agencies contributed to local computerization, and they became the local network control center and connecting center. The computerization offices in many provinces were established in the participating agencies. (The State Information Center)

3.10.3.1 e-Government Projects in Beijing

The Beijing waits in the wings of opening Olympic Games lays stress on the promotion of computerization including e-Government Project with the slogan of the "Digital Beijing". The Beijing Information Center responsible for the construction of this information system became the major promoting matrix of the e-Government project in the municipality.

The Beijing Government transformed the information of the advertisement about investment issue and analysis of the investment situation into the portal site opened to the public and provided them as the "Investment Platform" for the Fixed Assets Management System, and it can be said that this became the existence of model in the Beijing E-Government.

They can know the investment circumstance, the preferential treatment policy and the investment trend in this site, and there are 1 million 200 thousand accesses a month. It is said that 600 projects are enumerated at their highest, and the company that looks for the investment side is inundated with inquiries about that they wanted to know begin more elaborate situation by telephone in an average of four or five persons per day, and about ten persons before the public bid. There are many inquiries that

they want the detail drawing.

According to the questionnaire conducted about satisfaction level of users and improvement at Web site by the Beijing Planning Committee, this investment platform is very often used by the general companies, the consulting companies, the universities and government-related organization.

They use this investment platform, and they conduct the bid announcement of project for the Olympic Games in 2008, too.

However, the offer of approval and permitting service for the public by the Internet still lies at an early stage, they examine the solution because there are some legal problems left. There is not a cause for concern technologically, but the legal problem is still solved.

3.10.3.2 e-Government Projects in Shanghai

e-Government Projects are actively developed in Shanghai, too. They are going to invest 350 million yen for five years in the future. This on-line procurement system in Shanghai is promoted by Shanghai Information Center. It aims at the effect for restraining the outbreak of corruption by raising the transparency by the on-line public bid. The construction and operation of these systems did not become possible until they have experience to construct and operate the previous information system.

There is a problem about that the new removal and redistribution of rights are generated by the e-Government, and the right structure of organization changes according to Professor Zhang of An Tai School of Management of the Shanghai Jiao Tong University that they conducted consulting about the computerization in the whole municipality and the e-Government to the Shanghai Information Center. Till now, even in the public bid, the leak of the internal bid rigging and the internal information were conducted, so it led to the decay, but the government lost the "rights" because the public bid was opened. The officer in the government became only an office worker. It is said that there is naturally resistance against this.

3.10.3.3 e-Government Project in Guangzhou

Guangzhou participated in the pilot project, and on top of its outcomes, it largely contributed to the computerization in the local government. For the municipal government, the Guangzhou Information Center conducts consulting service for evaluating public bids and managing the implementation of computerization projects using the experience of yen loan.

In addition, they developed an original system and service even at the level of ward, administrative unit below the municipality. Some of the citizens' service was offered online, and citizens are now able to obtain application documents through the Internet.

3.10.3.4 e-Government Projects in Jilin

In Jilin, based on this information system, the e-Government project in the province is promoted. The e-Government Construction was promoted at the Province Planning Committee in the information

system construction project in the Information Center in the same province, especially the service such as the government disclosure, the e-Government and the information search by the Internet has remarkably made progress. Additionally, they can refer to the information each other when they promote the each service in the Province Planning Committee just as they can promote the information exchange between the provinces in the construction of the network platform, and they can provide the information support effective with the macro economic control and the planning policy indirectly.

However, in Jilin, the Province Information center is in cooperation with the Province Government Traffic Bureau and the portal site is set up, and they actively proceed with the information transmission about the whole traffic government such as the construction and management of the road including the express way, the traffic government and the traffic law such as buses and taxies for the general society.

Hereby, they act as the intention support function for the policy plan about the traffic, and they are of help to the use of the general society including the car and taxi business world. The public showing bid information about the express way construction are inserted, too, but it is said that as a whole the information about the law is very often seen. Hereby, it is said that in the past the direct inquiry reached us, but they can make a reply and dispose by saying "Please look at the homepage". It can be said that this is a figure of e-Government, too.

3.10.3.5 Issues of e-Government Promotion

However, the function of e-Government realized at the time of research is a level that it became possible to notice by on-line and send round the documents, and the concrete service that they accept the final decision by on-line and the application of the public and business owner electronically has not been provided yet.

It can be seen that this is because the legal system about the documentation management such as the computerized document has not been adjusted yet, and the effectiveness of digital signature has not been admitted.

Even if the ordinance had been adjusted, the current thing would not necessarily develop into the transactional system steadily because a large encumbrance is generated technologically, expensively or operationally compared with the present information system in the development of information system. In the future it will become an important key for promoting the e-Government in how way and who will have charge of these encumbrances.

3.11 Secondary Impact

The following cases manifest the secondary impact to the top-level goal in this information system.

3.11.1 Promotion of Computerization

It can be thought that there was a huge effect that they can promote the computerization in the whole China and the diffusion of the Internet in this project.

It is said that this information system is the most extensive as an information system developed in China by the latter half of 1980 to 1990. The project cost is a total of 30 billion yen, the introduced servers are 1,400, and the personal computers are 14 thousand, and 15 thousand people directly engaged with development and operation. As stated above, the construction and operation of the system was a fair measure of success.

The State Information Center affiliated with the State Planning Commission took a leading part, most of provinces in the central government and all major local governments (provinces and municipalities) participated, they introduced information equipment into all administrative organizations in China, they promoted the project to enable the collection, exchange, transmission and sharing of the information by using the Internet. And the implementation of the project contributed to governments and information-related companies that participated in the system construction by accumulating technological know-how and developing human resources. Hereby, it is concluded that the system made a definite contribution to the promotion of computerization in all societies in China.

3.11.2 Effects of the Adoption of the Internet

The adoption of the Internet was originally judged and decided from the technological necessity, at that time, they did not think that they opened the information collected by the government to the public.

According to the State Information Center, they originally aimed at the use in the government, and so they were going to construct seven main systems and one network. It was the incident after that that they transmitted the information through the Internet widely. Owing to technology in the State Economic Information Network, it became possible to construct the subsystem that the information center in the local, to operate and use the portal site including to connect to seven main systems. There were neither the e-Government nor the promotion of disclosure of official information in planning originally, and all of them were developed after that.

They began to develop the information systems within the State Economic Information, and the resulted systems were mainly used in the government widely and drastically. It is not because there was a technological restriction, but because there was political decision.

They could not understand the direct situation about this, but it is assumed from the fragmentary narrative of those involved and some data that it was generally the following situation.

The "modernization of science and technology" as one of the promoting policies of the "fours modernization" in the beginning of the 1990s in China was promoted. Among them, in the information communication field, the original Ministry of Electronics (Corresponding to the Department of Trade and Industry in Japan) jockeyed for position with the Post Office (Corresponding to the General Post Office in Japan) violently. Mr. Hu Qili, General Manager[15] of the Ministry of Electronics leads had charge of the nurture policy of electronic industry, and they was concerned that they would fall behind the information communication industry, and then the whole Chinese economy from the world's flow if the monopolistic situation of communication project at the state-owned telephone company, or China Telecom affiliated with the Post Office continued. They insisted on the competitive introduction into the communication field, offered the establishment of the joint communications and involved the executive officer in the Post Office, the Communist Party and the central government standing against this, and continued to argue them violently. However, what the Premier Jiang Zemin stood used to be an Electron General Manager stood for them, and as a result the initiative at the Ministry of Electronics was nearly admitted in the information communication policy[16].

The Ministry of Electronics promoted the "Three Golden" Projects: "Golden Bridge" (maintenance of the high-speed communication network), the "Golden Gate" (computerization of trade, exchange and custom duty) and the "Golden Card" (introduction of credit card). The "Golden Bridge" project developed into an Internet-based project. After them, other projects, such as "Golden Tax" (taxation service) and the "Golden Education " (education) were added to the "Golden Projects" family, and the State Economic Information System was regarded as a computerization project of the "Golden Macro (Economy)".

This project was a primary important project of the computerization policy in this China Government, and it aimed at the computerization promotion itself just as they promoted the modernization of economic policy by the introduction of the latest information system.

It was in March 1993 when the organization of China was connected to the Internet between the

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15 Mr. Hu Qili, the general manager, was noticed as a key-man of the reformist that led the way in the computerization policy in China, and this project is also seen as a project of the Electronic Department system. He joined the party in 1948, and he graduated from the Beijing University Mechanical Department. He fell from power at the Great Cultural Revolution, but he was restored. He went through a vice president at the Tsinghua University and Tianjin Mayor, and selected as a Communist Party central commission, and he participated in the Supreme Ruling Circle, but he fell from power with the general secretary Zhao Ziyang at the crackdown on pro-democracy demonstrators at Tiananmen Square in 1989. It can be thought that he took objection to the enforcement of the martial law. He was restored as a vice manager at the Mechanical Electronics Department and noticed, an Electronics general manager in 1993 and he retired after the 10th Chinese People's Political Consultative Conference in March 2003.

16 Milton Mueller and Zixiang Tan "China in the Information Age: Telecommunications and the Dilemmas of Reform" Center for Strategic and International Studies, 1997 and William Foster and Semour E. Goodman "The Diffusion of the Internet in China" The Center for International Security and Cooperation, 2000.

High Energy Laboratory that participated in the science academy and the Stanford University in the USA. It was on and after 1996 when China Telecom started the service called ChinaNet that the general users except researchers could use the Internet, and till that, the Internet could be used only for the academic research in the universities and the research agencies.

At present when the Internet become widely used, it may be thought that it is not very difficult to adopt the Internet, but in the situation of 1993, at least the government and public agency constructed and operated the system by the Internet, which was generally impeached from the viewpoint of the security and safety if anything. It was on and after summer in 1993 when the NTT recognized the importance of the Internet, but this was selected so that the General Post Office might draw the survival tactic by receiving the pressure of "Division", and it was nearly in the end of 1996 when the NTT realized the Internet connection service in fact.

3.11.3 Social Effect by Information Disclosure

They realized the public information targeting at the users of the general society widely because they adopted the Internet.

About this, the State Information Center describes as follows.

> They opened the service in the each grade planning committee (At present the National Development and Reform Commission) and the related government agencies, intensified the connection with the government agencies and the general nation. For example, the 15-year plan at the State Planning Commission was constituted by incorporating the opinions of the expert and the nation abroad widely through the column at the China Economic Information Network.
>
> Many people participate in the 50 people's forum at the China Economic Information Network. They have a relationship with the top-level expert, and express the sense of the hot topic and the problem.

The opened information is wide-ranging, a great deal of information was provided widely by the information center in the local government adding to that of province and agency in the central government. This admits to the improvement of reliability for the government that holds up the promotion of the "Democracy", adding that this complies with the individual needs.

As you know, China is a people's democratic state where the Communist Party has led till now since the nation-building in 1949, and the information management and regimentation policy in the government has been consistently continued. They were not necessarily allowed to express their opinions against the Party, the State and the government freely, and the system that the important information should not be opened to the nation, of course has continued for a long time.

The introduction of the Internet means that various kind of information goes into circulation across borders internationally, freely, in a moment and with almost no cost. It includes opinions that criticize the government, the ruling of the Communist Party, and the State establishment in China. And the inflow of their information was regarded as unfavorable.

The leadership of China placed much value on the plus side, measured the minus side and took the bold course of introducing the Internet by comparing and judging the plus effect and the minus effect carefully. The plus side is the advancement of technology and the anticipation to economic development effect by it. The minus side is the inflow of unfavorable information as stated above, and they adjusted the control system about it legally, and reacted to it by confining the connection point with the overseas and filtering the information[17].

In this trend, they could actively promote the public information of the government through this system. This means a big change in the long run for the government and social system in China.

However, there are some issues. According to the State Information Center, they cannot open the information to the public only through the China Economic Information Network in terms of security even if they want to do so because they originally designed it as the enternal using exclusive system in the government.

Additionally, it is said that even information that is not worth hiding from a perspective of ordinary people cannot be sold because they design the system based on the needs of the government and collect the information about the contents, too.

Even the people select the field such as the economic information, started the pay database project, and the competitor is increasing. Most recently, the newspaper publisher specializing in the economy put out the word that they will start the on-line information service, and the China Economic Information Network treats the appearance of the strong competitor. The China Economic Information Network is a private firm that the State Information Center owns, but it is possible to be an issue from the viewpoint of the free and fair competition to sell the collected information by the organizing power of the state.

There were only a few users in the government-related departments in the original plan and they did not think that they shared the information freely with the public society including the important information in this system. To make matters worse, they did not think of the transmission to the foreign countries at all.

Nevertheless, after that they introduced the Internet at the beginning of diffusion of that, opened the information to the public widely, too, promoted the pay sales and promoted the active transmission

[17] For policy-making on Internet deployment in the Chinese government, see William Foster and Semour E. Goodman, The Diffusion of the Internet in China, The Center for International Security and Cooperation, 2000

of information to overseas, too.

They made political arrangements again and again, conducted the selection of the field and contents, and promoted the public information. It can be evaluated as the measure and the changing policy of globalization, compared to the strict information control policy that China had adopted at least till that.

3.11.4 Human Resource Development

It goes without saying that the key of the consequence in the project lies in the supply of quality and quantity of manpower in charge. It is said that they will construct the collection, analysis and delivering system of the large-sized information all over the country through the Internet in this project, too, and it can be thought that they faced various difficulties because they did not experience it till that in China.

They mainly gained appointment to a high position inside the State Information Center and the Bureau of Statistics in the human resource, but it is said that the manpower in the technological field was recruited and adopted from among the part of the people. There are about 120 people who participated in the construction project in this system at each department, and it is said that among of them, the rate of the high-class engineer was about 15% at the time of starting the project in 1994, but it went up to 30% at the time of completion in the project in 2001.

It can be thought that the human resource grown in this project is taking an active part in other information-related system construction. In fact, even as a result that they visited some information centers in each district and researched it, they could cultivate and get the necessary human resource to perform the project in many cases. The State Information Center itself describes the manpower as follows.

> They cultivated many controlled human resources and technological human resources in all the assisted agencies. At present, the controlled human resources and technological human resources that participated in the yen loan project are stepped aside for the important job in each assisted agencies. The successful experience of the yen loan project was widely used for the construction of other information systems already, and it worked wonders.

3.11.5 Administrative Reform and Computerization in Local Governments

In China that owns a broad nation's land, it can be thought that the Central Government needs to understand the local information rightly and rapidly in order to develop the effective policy. In the same way, it goes without saying that the Local Government needs to get and use the information in the Central Government rightly and rapidly in order to perform the effective policy, too. This project was constructed and operated in order to exchange the information inside the Central Government and to

mainly exchange the information between the Central Government and the Local Government at least originally.

However, after that, the local own information was additionally planned and developed just as the flow of administrative reform and devolution of power. Namely, The information exchanging system inside the Local Government and the system for exchanging the information between the local government agencies and the organization other than the government was developed, and they developed. It can be thought that this played a decisive role in supporting the introduction of market economy and promoting the reform and open of economy in the local, and it can be said that it is a main propagation effect.

3.11.6 Negative Effect

No negative secondary impact is found in this project. However, recently, the recycling problem of information equipment is being taken up internationally, and possibilities would not be denied that they will result in environmental pollution in the process that the equipment introduced in this project is disposed.

3.12 Sustainability

We will evaluate the sustainability of this project in terms of the organizational structure and human resource development and fund allocation for maintaining and operating as follows.

3.12.1 Organization for Operation and Maintenance

The State Information Center, the executing agency of the project, was reorganized into a nonprofit corporation to which the Chinese Government made a 100 % investment after this project was accomplished. Additionally, the operation of the Price part of the Price and Market Information System was handed over to the Price Observation Center of the National Development and Reform Commission.

Additionally, the network operation on the "Level 1" is consigned to the CEInet Data Co., Ltd., which is a commercial company to which the State Information Center makes a 100% investment. The operation of the information portal at "Level 2" and offering of service for customers are also carried out by the CEInet Data Co., Ltd.

In the future, it can be thought that in proportion to the development of the market economic system, the competitor who owns the project for collecting and selling the economic information itself originally will increase. Because the State Information Center was established as the state organization, they have the authority to collect and provide the government-related information, but some companies will be able to establish the private firm under the control of their own organization and promote the offer of the information not through the information center even if they are state organizations as the private firm makes its way that will perform the offer of higher quality of and cheaper information when they settle for the exclusive existence, as a result of that, it can be thought that there is a possibility that they will put the base of the State Information Center at risk.

3.12.2 Staffing for Operation and Maintenance

As of October 2003, there are about 1,100 staff workers in all including the full-time and part-time ones in the State Information Center. Among them, there are 248 full-time employees that are directly employed by the State Information Center. Additionally, in addition to that, there are 423 employees involved in the operation of the China Economic Information Network because there are 175 employees at the China Economic Information Network Data Co., Ltd. that have charge of the operation of the China Economic Information Network (see also Figure 12). The remaining is those employed who work on a contract basis for development of individual services.

When they changed the organization, the form of employment of staff was changed, and there were some cases that they transferred their school registration from the administration official to an affiliated company, or the China Economic Information Network Co., Ltd.

175 employees belong to the China Economic Information Network Data Co., Ltd, but most of them in the project have no relation with yen loan, and only some 10 of them are in charge of the yen loan project.

Since 1994, it is estimated that the number of employees increased 2.9 times over the last 10 years or so, because the number of staff workers at the State Information Center is reported to have been 380 (145 of them were technology professionals, and 125 of them were economists or economics professionals). The staffing of skilled professionals have never been reduced in the past. In the process of structural reform of the State Planning Commission by Premier Zhu Rongji, the number of staff at the management department was reduced in 1998, but that affect did not affect the staffing of professionals.

Seen as the whole organization, it can be said that the sufficient staff required for making the effect of this project hold up were kept in the State Information Center at present.

Table 45: Internal Organizations and the Number of Employees in the State Information Center

	Division	Number of Employees
State Information Center	General Office	37
	Planning and Accounting	16
	Public Technical Service	55
	Information Network Assessment	12
	Economic Forecasting	32
	Development and Research)	12
	Information Resource Development	49
	Other	35
	Sub-total	248
CEInet Data Company		175
Total		423

Figure 12: Organizational structure of State Information Center and its subsidiaries

3.12.3 Maintenance of Equipment and Information Systems

We will describe the maintenance situation of equipment and system introduced in this project. The table 46 shows the number of specialists who operate and maintain each of the service systems (staff engineers who develop and maintain the software and those who operate and maintain the hardware) and the annual budget.

Table 46: Technical Staff and Operational Expenditure (in Thousands RMB)

Name of System	Tech. Staff	1998	1999	2000	2001	2002	2003*
Macro Economy Forecast	5	80	80	100	100	100	100
World Economic Information	5	50	50	50	50	100	100
Companies and Products Information	3	500	500	500	400	400	400
Economic Laws and Regulation	5	-	-	-	-	-	-
Price and Market Information (Market)	6	-	-	-	-	-	-
Price and Market (Price)	16	1,500	1,500	1,500	1,500	2,000	2,000
Government Investment Projects Management Information	6	300	300	300	250	250	250
Foreign Loan Project Management Information	4	200	200	200	200	200	200
Total	50	-	-	-	-	-	-

Table 47 shows the main barrier arisen in the service system. The barrier arisen till now has never been reported about the price and the market information system (Price Part), but the system barrier by the external factor such as the computer virus and the domain name management about other service systems arose. It is reported that 20 barriers a year arise (a few times a month), and more barriers than those of other service systems rise. It can be thought that it is necessary to carve up the cause and to improve the stable system operation.

Table 47: Major Troubles Experienced by the Seven Systems

Name of System	Departments in Charge of Operation	Main Operational Barrier
Macro Economic Forecasting System	Economic Forecasting	The system barrier arose for the virus infection and it took one day to be restored.
Company and Product Information System	China Economic Information Network Data Center	The service could not be used because the renewal procedure was delayed.
Price and Market Information System (Price Part)	State Development and Reform Commission Price Observation Center	Nothing particular.
Price and Market Information System (Market Part)	Information Development Department Market Section	Less than 5 troubles a year arose which the system was stopped for about 5 minutes because of the trouble about compatibility

		of the hardware.
World Economic Information System	Economic Forecasting	The system barrier arose because of the virus infection and it took one day to be restored.
Economic Law System	Information Development Law Information Section	An average of 20 barriers a year arose The service could not be used for about two minutes because of the trouble about the law system.
Foreign Loan Project Management Information System	Public Technical Service Applied Development Section	Power accident happened, and it took 7 days to be restored. The main server broke down and it could not be restores by this barrier.
Government Investment Management Information System	Public Technical Service	Nothing particular.

We got the response that all the equipments procured in this project were renewed and they are not used at present when we asked a question about the situation of equipment to the China Economic Information Network Co., Ltd that operates the "China Economic Information Network" in the research at the actual place of this project.

3.12.4 Other Activities

However, the State Information Center set out various projects other than the project targeting at the yen loan, and there are the following organizations. It can be thought that this organization operation has a relationship with the durability and the independence development of the whole State Economic Information System. However, we asked a question about these of other project departments including financial contents, too, but we could not get the intimate response because this research targets at the yen loan project part.

Table 48: Subsidiaries of the State Information Center

Name	Role and Function
Media Development Center	It makes adjustments to the public information at the State Information Center and develops the business model provided the economic information with an electronic edition.
System Integration Department	It researches, develops and produces the system integration, the software development and the marketing of the software and hardware and conducts the business activity in the IT field.
CEInet Data Company	It operates the China Economic Information Network.
China State Information Corporation	It performs the office counter work to offer the market information service under the tuition of the State Information Center.
Research Institute for Information Strategy	It performs the development strategy in the mid-and-long term in the national economy, the development strategy and plan of computerization, the theory and practice of network economy, the applied research about computerization such as the e-commerce. It researches and examines the development of information industry and the related policy in the state.
China Information	It performs the job training based on the social needs for the information

University	technology.

Additionally, as stated above, it can be noticed that the new network connecting the Development and Reform Commission in the local provinces and municipalities with the central Development and Reform Commission through the exclusive net "longitudinally" and "Vertical Network" is constructed based on the Economic Information Network.

This is a network with a broadband possible to exchange the information and have a relationship through the image and voice service such as the Video On Demand for accumulating and providing the TV program and the IP Telephone that they can telephone at low price with a focus on the TV conference with high-speed line, and each information center has charge of that construction, and it is said that they could make use of their experience about the yen loan project.

There is an absolute evidence that the system achieved evolution and growth independently beyond the original plan although it was not eligible for this research directly as the yen loan was not used the construction fund in this system at all.

They need this system inside the government in a broad China, and we can understand well that they will achieve an effect. That depends because the administrative organization is different, but when it can be thought that there is no network in real time such as this connecting the central government with the local government in Japan, at least in the present time, it can be regarded that they achieved a great effect in the knock-on effect or in the point of the durability and the independence development because the economic information system was constructed in China.

4. Evaluation of Government Information Systems in Indonesia

4.1 Equipment Supply for Installation of Computer for Industrial Statistics and Planning

4.1.1 Outline of the Project

This project was implemented by the Ministry of Industry and Trade (Ministry of Industry, at the time of project implementation) of Indonesia. Its objective was to establish the foundation for industrial statistics, to promote the maintenance and effective use of information, and enhance office automation, and to achieve technology transfer and training of computer and statistics experts.

Table 49 shows the outline of this project.

Table 49: Outline of the "Equipment Supply for Installation of Computer for Industrial Statistics and Planning" Project, Indonesia

Loan Agreement	May 1982
Loan Amount / Loan Disbursed Amount	1,731 million yen / 975 million yen
Borrower	The Republic of Indonesia
Executing Agency	The Ministry of Industry (MOI) and the National Development Planning Agency (BAPPENAS)
Final Disbursement Date	May 1989
Project Objective	Basic for industrial statistics Maintenance and effective use of information Rationalization of office work Technology transfer and training of computer and statistics experts

4.1.2 Outline of the Project

Survey items are as follows.

- Hearing with individuals in Japan:
  JBIC headquarters, JBIC Jakarta Office, a JICA expert of the Central Bureau of Statistics (Mr. Nishi)
- Review of documents
- Interviews with the executing agency
  Center of Data and Information, Ministry of Industry and Trade
  Metal Industry Development Center, Ministry of Industry and Trade

The local survey was implemented as follows. (This study was implemented at the same time with the local survey on the Central Bureau of Statistics (BPS) Computer Training Center and Regional Computer Installation Project (IP-435).)

Table 50: Outline of the local survey in Indonesia (1)

Period of local survey	June 10 - June 19 2003
Member of study group	Izumi Aizu (International University of Japan, GLOCOM), Keisuke Kamimura (International University of Japan, GLOCOM), Agoes Riza Poetro (MASTEL)
Visiting Place	The Center of Data and Information, The Ministry of Industry and Trade (Jakarta), the Metal Industry Development Center, the Ministry of Industry and Trade (Bandung), The Faculty of Economics, the University of Indonesia

4.1.3 Relevance of Planning

In the project, one of the initial objectives was to develop the basic for industrial statistics in order to support the planning of well-balanced industrial policy and national development plan. Although the BPS existed as an expert organization of statistics services, it did not have the authority to release the statistics by itself, and the statistics was not available publicly in other ministries and government offices. Considering these situations, the initial objective, which is to develop the basic for industrial statistics, seemed to be relevant.

Additionally, the other two objectives, maintenance and effective use of information through introduction of PCs, and rationalization of office work, were conducted in order to promote office automation, therefore they were also relevant.

On the other hand, the objective, training of computer and statistics experts, was not to be achieved according to the initial purpose. Under an immature market condition, it seems to have been necessary in a short term, however, in the long term, because of the unexpected transition in the utilization mode of the computer, there was no significance of the mainframe computer. However, considering the rapid change of technological innovation in the information and communication sector, and the implementation period of this project, this consequence was inevitable.

In addition, this project also planned to network between the MOI and the BAPPENAS through optical fiber, however, this plan was cancelled halfway through, and the installation of the computer equipment for the BAPPENAS was also cancelled. According to the PEDAC report, the reason of this cancellation was that the exceeding bid price and failure in adjustment with Perumtel. In the background of the fact that optical fiber was considered as means of network lay the needs to escape the high cost of the leased line which Perumtel offered.

However, in terms of the level of market maturity, technological level, and regulatory framework, this plan was not realistic. Even in the developed countries where the communication infrastructure was

developed, it was too early to establish an optical fiber network. Therefore there was no doubt that it was impossible to implement the plan. Besides, the preceding plan to network among the central government was also cancelled approximately in 1984. Even though a few years had passed since then, the situation apparently did not improve. As the result of the cancellation of the networking plan, the equipment for network connection was not included in the procurement at all (refer p. 15 of the appraisal documents of Central Bureau of Statistics (BPS) Computer Training Center and Regional Computer Installation Project (IP-435). Consequently, because a part of the project, an optical fiber network, was cancelled, the relevance of the rest of the project was recognized.

4.1.4 Output and Effect

4.1.4.1 Ministry of Industry and Trade

Although the development of application programs was taken as a part of the project, only two out of five application programs for the mainframe computer operated as it was planned, and later on, the three remaining programs were developed as PC based programs.

This might be a result of the delay in spite of the fact that this project was planned in 1979 and authorized in 1981 after the detailed study. The project was delayed, and it started in 1985, rather than in 1982 as initially planned. Equipment procurement started in 1988, rather than in 1983. The 1980s was the transition period from services treated by mainframe computers to PCs. Thanks to technological innovation, PCs enhanced their hardware capacity and prevailed rapidly due to the decreasing sales price, and software improved.

This is a typical problem that it is difficult for the general framework of the yen loan to adjust in the field which experiences rapid technological innovation. If it takes two years to complete the process including appraisal, L/A, selection of consultants, and implementation, and another one year for input at a usual pace, it is expected that the system becomes obsolete at its completion, and this project is one example. This could be caused by the long procedure for procurement in Indonesia. Fortunately, continuity of the application was maintained by porting the developed software from mainframe to PCs, and there were no direct negative effects. However, the calculation of endurance years remained a problem.

In the MOI, JICA dispatched experts for the purpose of maintenance and development, however even if support of technology transfer was provided, it was difficult to develop computer programs for the MOI staff by themselves.

Collection of data on industrial statistics by the MOI, which was supposed to be a primary objective, is not conducted any more. Preliminary statistics are now acquired from the BPS. This was because there was no company which voluntarily provided data for the MOI, although original data was supposed to be collected from individual companies on a voluntary basis. Because there was no

institutional measure and legislation, and it was impossible to oblige companies to provide their data. After all, there was no obligation or incentive to provide data voluntarily. Therefore, it was difficult to collect industrial statistics continuously within the conditions of the project.

Although the BPS was supposed to report its statistics data only to the President, it was obliged to report it publicly due to amendment of the Statistics Law in 1997, and as a result, the data was also provided for the MOI.

The MOI gained two kinds of the preliminary data from the BPS, which were data on the industrial sector, and data on export and import.

On the other hand, improvement of the gained information and its free information are promoting as they are planned at the planning stage. These statistics data are organized by media such as CD-ROMs and updated once a year. One part of the data is on the web.

For the impact of these supplied data, the data is utilized for industrial analysis in the MOI, and it is monthly reported to the President's Office as the basic reference for policymaking. However, the actual condition in detail is not understood.

In addition, the MOI operates part of the system through the Internet, such as the application of the license for importation and the issue condition. By this system, importers are able to know the timing of the import permission. This can be regarded as an application of the electronic government, and the secondary effect of this project.

All PCs of the Center of Data and Information are now connected by LAN, however, in the other divisions of the MOI, only one out of three PCs is connected to LAN. Today, the Center of Data and Information, which took charge of the project as an executing agency, still takes the initiative in carrying out informatization of the MOI, but the networking of the overall ministry remains as an issue.

4.1.4.2 Metal Industry Development Center, Ministry of Industry and Trade

This project included installation of the equipment to the regional research laboratories of the MOI in four areas (Jakarta, Bandung, Surabaya, Yogyakarta). The equipment was utilized for the Computer Aided Design (CAD), the Computer Aided Manufacturing (CAM), and general office work.

In the Metal Industry Development Center, which was the visiting place in this study, three PCs were introduced in 1989. However, the equipment is no longer utilized today because of inadequate performance. Considering that fourteen years have already passed since the procurement of the equipment, the regional research laboratories in other three areas are considered to be under almost the same condition.

After computers were introduced in 1989 by yen loan, they were updated by the government budget once, and by ADB in 1999. As the assistance of ADB in 1999, 45 computers were introduced for CAD/CAM. Equipment was also supplied by JICA.

As far as the Metal Industry Development Center which we visited at this local survey is concerned,

it is highly significant that the project arranged the environment for CAD/CAM. The effects are that the staff of this center starts to maintain an Internet site of CAD/CAM (Laboratory of CAD/CAM and IT <http://www.cadcam.or.id/>) and that in cooperation with the Bandung of Technology, extension classes are offered for students (as a part of the university curriculum).

4.1.5 Sustainability

Since the cost to maintain and manage the mainframe computer, which was introduced in the Ministry of Industry and Trade, continued to increase, the operation was halted after six years, which was the durable term supposed at the planning stage.

The programs, which were run by the mainframe computer, were ported to the PCs, and they are still utilized now. The porting of the programs was carried out by the staff in the Center of Data and Information. Additionally, the operation of computers and programming were also conducted by the in-house staff during the mainframe period. Considering these things, in the Ministry of Industry and Trade, the extreme high human resources were maintained, and in that regard, high sustainability was achieved.

On the interview, the lack of human resources was recognized as a serious issue. Because of the insufficient budget for employment, it was difficult to cope with the rapidly obsolescing technology. The budget for ICT was doubled. This phenomenon is related to the fact that the connection with Internet could not be included in the budget, however it is now included.

The executing agency of this project recognizes that human resources are much more important than hardware. Internal training has started to be included in the budget from the last year, and training facility was built. The budget for the training is hoped to rise continuously. Unexpectedly, the high recognition of significance of the human resources seemed to be different from the view that JBIC, other donors, and we had got. It is generally pointed out that development assistance tends to be hardware-centric. However, the executing agency was aware of the importance of human resource development, which hopefully strengthens the sustainability of the project.

4.2 Indonesia: Central Bureau of Statistics (BPS) Computer Training Center and Regional Computer Installation Project

4.2.1 Outline of the Project

Table 51: Outline of the "Central Bureau of Statistics (BPS) Computer and Regional Computer Installation Project", Indonesia

Loan Agreement	November 1994
Loan Amount/Loan Disbursed Amount	3,027 million yen / 2,075 million yen
Borrower	The Republic of Indonesia
Executing Agency	The Central Bureau of Statistics
Final Disbursement Date	December 2000
Project Objective	Improvement of the information processing skills by installing the BPS with computer equipment Training of experts of the information processing by constructing training center buildings for staff of the BPS and other governmental organizations

4.2.2 Outline of the Study

The following surveys were conducted in terms of the evaluation of this project.

- Hearing with participants in Japan
  JBIC headquarters, JBIC Jakarta Office, JICA experts of the BPS (Mr. Nishi)
- Review of documents
- Interviews with the executing agency
  BPS headquarters, the BPS South Sumatera Province office, the BPS Palembang City office, the BPS West Java Province office
- Questionnaire with the executing agency
  BPS regional offices (100 offices)
- Interviews with individuals
  Business Incubation Center, Bandung Institute of Technology,
  Faculty of Engineering, Bandung Institute of Technology,
  Faculty of Economics, the University of Indonesia

The local research visit was implemented as follows.

Table 52: Outline of the Local Research Visit in Indonesia (2)

Period of local survey	June 10 - June 19 2003
Member of study group	Izumi Aizu (International University of Japan, GLOCOM), Keisuke Kamimura (International University of Japan, GLOCOM), Agoes Riza Poetro (MASTEL)
Visiting place	Field hearing study: JICA experts, BPS headquarters, BPS regional offices(South Sumatera Province office, Palembang City office, West Java Province office) Faculty of Engineering and Business Incubation Center, Bandung Institute of Technology, University of Indonesia

* The local survey was implemented at the same time with the local survey on the Equipment Supply for Installation of Computer for Industrial Statistics and Planning (IP-251).

4.2.3 Relevance of the Plan

The setting of the project scope including installation of computer and network equipment especially for the regional organizations and construction of the building for training of human resources seems to have been relevant in terms of the capacity of the executing agency, the situation of utilization and maintenance after the project, and the institutional reform.

The project was implemented as the third project following the proceeding the "Computer Training Center and Regional Computer Innovation Project (IP-195)" and the "Computer Training Center and Regional Computer Expansion Project (IP-318)", and utilization of computers had been already established in the BPS.

However, in the point of networking, the prevalence of Internet was not supposed in the planning stage. In fact, during the implementation period from 1995 to 98, Internet prevailed rapidly all over the world, and in Indonesia, the advanced organizations such as the Bandung Institute of Technology promoted utilization of Internet.

Although awareness of the BPS about Internet use was not quite low, the executing agency and JBIC did not have a sufficient understanding about the function of Internet, at least in the project.

4.2.4 Efficiency

4.2.4.1 Staffing and Capability of the Executing Agency

The executing agency, the BPS, played an advanced role in terms of the imformatization of the Indonesian Government. Among the East Asian/developing countries, the evaluation on Indonesia in the statistical field was relatively high. However, in recent years, Indonesia could not give accurate statistics due to insufficient capacity. The major cause was inadequate capacity of the computer processing.

The operation of the BPS is characterized as a research service, and in that regard, it seemed to maintain the system of the human resources in order to accept informatization. Before the project, the "Computer Training Center and Regional Computer Innovation Project (IP-195)" and the "Computer

Training Center and Regional Computer Expansion Project (IP-318)" were implemented in the BPS, and it possessed the experience and skills for the planning and implementation.

4.2.4.2 Existence of the "Champion"

In addition, during the implementation period, the role of Mr. Sugito Suwito, the Director General of the BPS, was important. He personally had the strong interest in the promotion of informatization in the BPS, and took leadership.

In the BPS, information dissemination through the Internet started in December 1994. At that time, even in Japan, only the Prime Minister's Official Residence (August 1994) and the Ministry of Posts and Telecommunications (September 1994) provided information through the Internet, and the Agency for General Affairs (1994) did not utilize the Internet for information dissemination. In comparison with other cases, the BPS started the Internet relatively earlier.

When technology, especially the Internet prevails among the community, the person who installs the technology, and takes leadership in prevailing it among the community is called a "champion", and Mr. Sugito was the person.

4.2.4.3 Existence of the "Informal Group"

As a result of the interview, it was realized that the existence of an "informal group" which actively played a role of promotion and prevalence of Internet was significant in terms of promoting utilization of Internet in the BPS and starting transmission of information.

The Internet in Indonesia was informally started in the 1980s by the Pusat Ilmu Komputer Universitas Indonesia (PUSILKOM UI). However, international exchange of email was only available on part of the computers within the country. From 1988, the University of Indonesia called for PT Indosa Perumtel (PT Telkom), PT Lintasarta, and various institutions to cooperate, and established a group known as PAGUYUBAN. PAGUYUBAN established a cooperative relationship with all research institutions in Indonesia, and it is called a pioneer of the Internet in Indonesia.

One of the biggest factors which brought about the success of PAGUYUBAN was a mailing list called PAU-MIKRO. At that time, the mailing list was a communication tool among students of Bandung Institute of Technology who studied abroad. By developing technical argument publicly on the mailing list, the value of the mailing list came to be recognized. In November 1994, the research network, called IPTEKnet, was organized, and it became an important body for development of the Internet. Most of the major members of IPTEKnet were members of these mailing lists.

Through the informal communication by the mailing list or other means between the staff of the BPS or the Ministry of Industry and Trade and the pioneers, the staff gained the effective advice for providing the statistical data on Internet.

For the implementation of the training program by the BPS, a technical leader such as Mr. Onno, the Bandung of Technology, took a leadership, and these human networks supported the initial

development of the information network.

There is a group which promotes advanced technology like the Internet in the Bandung of Technology, though it is not directly related with the project. Professor Suhono of the Incubation Center, who we met in the research visit, is a colleague of Mr. Onno's, who promotes Internet, and Mr. Taru who works for an NGO which supports the Internet shopping of flowers in the suburbs of Bandung. He contributes to establishing the technical environment in order to utilize the Internet and to promote informatization.

4.2.4.4 Significance of the Revision of the Statistics Law

The revision of the Statistics Law in 1997 was significant for informatization of the BPS. Before the revision, the statistics data collected by the BPS was reported to the Minister of the President's Office, and after that, it was released by the Minister of Information. Therefore, political judgment intervened in the decision making on whether the statistical data is released or not.

After the revision, it became possible for the BPS to release freely statistical data such as import and export data and economic statistics. In terms of information disclosure by the government, it was revolutionary that the Statistics Law was revised before the change of the government in May 1998, and at the same time, the free statistical information by the BPS came to be promoted. The law was revised under the Suharto regime, and censorship system toward speech such as newspapers was enhanced. Some papers were banned from publishing, and the student movement was monitored and suppressed by military authorities, and therefore, in general, there was tendency to reverse free information by the government.

In fact, before the law was revised, outside institutions, even ministries and government offices, could not gain the information collected by the BPS. The background of the "Computer Training Center and Regional Computer Innovation Project" was the circumstance that the Ministry of Industry and Trade had to create industrial statistics.

4.2.5 Impact

The BPS Computer Training Center and Regional Computer Installation Project in Indonesia was implemented following the Computer Innovation Project and the Expansion Project, however, it gave the following impacts by especially focusing on development in the provinces and installing the equipment for training the staff.

4.2.5.1 Promotion of Network

The wide area network, especially the Internet, had been introduced from the initial period in the BPS. In the regional offices, from the planning stage, it planned to establish the regional network and to connect to the wide area network, and awareness about networking existed.

For networking, at the planning stage, both the regional network inside the project, and the

wide-area network by using analog modem via the public switched telephone network was planned. Local area network is utilized actively for the sharing of data on the server, and the sharing of resources such as printing equipment.

As a wide area network, the host network via the public switched telephone network, not the Internet, was originally planned for deployment. However, as the Internet prevailed, the modem equipment for the host network was repurposed to connect to Internet. Only one computer in each regional office can connect to the wide area network. The reasons are that there are few computers which is equipped with the analog model, and that money for communication charge for connecting all computers in the regional offices on the Internet is insufficient.

In the regional offices, there still are many unconnected computers to the Internet. This is because that there is no access point of the ISP near the office, or because it is impossible to connect to the Internet due to the closure of neighboring access points, rather than inadequate equipment or technical problems. (If the office bears long distance call rates, it is possible to connect to the access point in the remote areas. However the cost burden excessively rises.) On this point, a weak awareness of the level of necessity for budget for networking may be pointed out as an issue to be addressed.

In the regional offices, because most computers are connected to LAN in order to share printers or files, it is logically possible to connect all computers to the Internet by connecting the whole LAN to the Internet, even though a modem is not added, though there still remains a problem of speed. However, as mentioned above, the budget constraint is a major bottleneck, and the Internet is utilized only in some offices.

Considering the large land and constraints of transportation in Indonesia, the Internet is expected not only to deal with transmission, connection, and sharing of information rapidly, precisely, and cheaply but also to give further indirect impacts in the future.

4.2.5.2 Operation and Repurposing of Equipment

The PCs which this project provided are still being utilized now, but they tend to be replaced with the newer PCs that the central government or other international organizations than JBIC donate, and statistical works are conducted with these newer PCs. The provincial office in West Java conducts statistical works with the computers which JICA and UNFPA provided. This seems to be because newer PCs have higher performance and faster user-interface response, and improved functionality and usability.

In regional offices, the number of PCs is small compared to the number of workforce and the amount of workload, and older PCs are still in use both for statistics and general business. But when newer PCs come, older PCs are often converted to office administration and general word processing, rather than statistical works.

The servers that were introduced as part of this project had the highest performance and be

equipped with a large volume of external storage at that time, although they were outdated by newer PCs which had even faster performance and larger storage. The original servers are RISC (reduced instruction set computer) models, rather than Intel-based models. Although RISC-based model are highly compatible with Intel-based models, they require a different line of peripheral products, such as memory, external storage and hardware interface cards, which are limited in choice. As a result, peripherals for RISC models are priced higher than those for Intel models, and expertise and knowledge in operating RISC models are less available. It seems to have been difficult to purchase appropriate and reasonably priced peripherals for the RISC models in the local market. In reality, the provincial office in South Sumatera gave up using the RISC servers, and they put newer PCs to server use instead.

4.2.5.3 Utilization for the Statistical Works

Statistical services are built upon a relatively simple work of counting survey results, so it fits processing by the computer easily.

As a result, for instance, computer processing shortened the time to gather export and import statistics from two months to one. Additionally, statistics on poverty are now released every August without delay.

Consequently, as mentioned in the PEDAC report, even at a quite primary level, the impact from installation of computers seems to be high.

4.2.5.4 Improvement of Statistical Services

According to the Kegiatan Statistik BPS Tahun 1994–2002, which was obtained during the study, the statistics activity of BPS shifted as shown in Table 53. By a simple observation, the number of cases decreased to less than 50 owing to the influence of the Asian Crisis. However, since 2001, it recovered to the level of before the Crisis. Since the project was completed in April 1998, this phenomenon cannot be a direct influence of the project. However, if there is time-lag to meet with success after implementing the training, the project seems to have given indirect positive impacts on the improvement of statistical services.

Table 53: BPS Statistical Activities

Year	1994/95	1995/96	1997/98	1998/99	1999/2000	2000	2001	2002
Number of cases	62	68	65	56	53	49	68	62

(Data from BPS)

Since the statistical implementation structure was developed, 38 studies are implemented every year. Moreover, the "statistics project study", the "manufacture monthly production index (only large- and middle-scale manufacture)", and the "housing and settlement study" are implemented continuously. The two formers were implemented for 5 years from 1998/1999 to 2002, and the latter were implemented

for 5 years after 1997/1998, except for 1999/2000.

In addition, although it took three month to release a monthly report on the economic census, the result is now released in the following month. In the same way, the GDP quarterly statistics was released three month later, while today it is released in the following month.

These are specific examples of improvement of statistical services as a result of installation of computers.

When the BPS collects the national population census implemented in 2000, it succeeded in speeding up collection and release vastly by using not only PCs but also optical character readers (OCR) supplied by JICA.

Consequently, the 2000 population census was implemented in June, the preliminary results were released in December, and the final results were determined in May 2002. In the population census in 1990, where the results were typed in by hand, and the final results could not be collected, with only the male and female population released, and the population by age groups released with only a 5 percent confidence.

In terms of this point, it is proved how effective utilization of computer is in the statistical services in Indonesia.

However, there are problems of the quantity and quality of the statistical information. According to an expert of regional economy, the information released publicly on the Internet is merely a summary, and in order to gain statistics in detail, it is required to purchase publications by the BPS.

In addition, in terms of improvement of statistical services, some problems remain. The data from the provinces is supposed to be integrated in the BPS headquarters. However, there are some cases that headquarters do not maintain the information of provinces and prefectures accurately. The possible cause is that by decentralizing the statistical services, it became difficult for the headquarters to collect the information.

4.2.5.5 Utilization of Statistics

During the implementation of the project, owing to revision of the Statistics Law, the BPS was obliged to release statistical information publicly, and the information was released through Internet. This change enhanced the impacts of the project.

However, the sufficient data has not collected to verify how the statistics is used, because the BPS has low awareness in measuring the usage of statistics by access analysis or questionnaires. This was also the case in China. However, some statistics experts do not give priority to understand how the statistics is utilized by the users, though they are willing to prepare systematic, exhaustive and accurate statistics information.

Progress of IT is likely to mean release and sharing information and its effective outcome, although it seems to be necessary to oblige the executing agency to measure usage and utilization of the statistics.

4.2.5.6 Education and Training Center

The Education and Training Center carries out training in social and economic statistics as well as in the computer skills. In recent years, courses related to computer skills are available for citizens, but the advantage of the training in the Education and Training Center is recognized as their statistical methodology. In addition, the training for government managers and the IT training for the staff and their family are also provided. 26 trainees from overseas were trained in the center in 2001,

The center encourages trainees to share what they learn with 5 colleagues back in the regional office after the training. This is a measure to extend the effect of the training under the constraint on the number of trainees. However, "technology transfer" is not functioning well according to the South Sumatera Province office. As mentioned in the PEDAC report, some regional offices implement this measure, and each regional office has different conditions of sharing of outcomes of the training.

4.2.6 Impact

The project has the following impacts.

4.2.6.1 Example of Utilization and Application of Statistical Data

We gained the following answers to the question on what users think about the statistical data.

For instance of the Ministry of Agriculture, when the statistics say that productivity of rice declines, the Ministry inquires the reasons. For statistics on export and import, the data becomes more intimate than before, and as a result, the appropriate policy of export and import can be conducted.

For economic policy, the Bank of Indonesia formulates specific policy, and the BPS is in charge of economic forecast. The National Accounting Division of the BPS predicts GDP, however the BPS does not understand in detail how the statistical data is utilized.

The South Sumatera Province office in Palembang sometimes gets inquiries about statistics through the Internet from foreign businesses such as Japanese enterprises which want to investigate the possibility to expand their business into the regional market. For local economy, it is the first time to release information directly to overseas not through the central authorities with the help of inexpensive technology like the Internet, thus achieving a high cost-benefit ratio.

4.2.6.2 Impact on Poverty Policy

The appraisal document of the project of the BPS Computer Training Center and Regional Computer Installation Project, expects contribution to promotion of poverty policy.

The project contributes to implement the population census and the SUSENAS and to improve their efficiency by installing computers broadly in the regional offices of the BPS. These statistical data is utilized at least indirectly by poverty policy of the government. At the same time, the statistics, which are newly gained by the project, are utilized as basic data by the international organizations such as the

World Bank when they formulate aid policies. (http://poverty.worldbank.org/files/14019_Indonesia_I-PRSP.pdf: for reference)

Consequently, the statistics on poverty of the BPS, and services of counting and releasing the social statistics were improved by the assistance of this project. However, whether actual poverty policy was implemented effectively by using the results of the statistics is unknown because we could not gain the specific materials, which show the direct relationship between poverty policy and the improvement of the statistical services. In consequence, although there is no way except for prediction based on the results of hearing with staff, it is not impossible to conclude that the system of statistical study installed by the project contributes to improve poverty policy. However, this evaluation is no more than estimates, and therefore it does not have factual evidence of the effect.

4.2.6.3 Other Aspects of Impact

As can be implied from the PEDAC report, because of the improvement of skills in statistical processing, some regional offices of the BPS are able to receive commissioned research from the provincial government. In the trend of decentralization, where power shift from the center to the local is taking place, it is extremely significant that the provinces have a key role in implementation of statistics for appropriate policy making. From this consequence, it can be concluded that the project gave indirect impacts beyond on the scope of the BPS.

The BPS gained the system of the statistical administration which was the richest among ASEAN countries through the project. The BPS advises other ASEAN countries about the establishment of a statistics law and a statistical administration body by providing training and seminars. This is so called the "south-south cooperation". The BPS takes leadership in this field in the ASEAN countries.

Presidential election in Indonesia had been executed as an indirect election by the Parliament, but in 2004, it would be direct election by citizens for the first time, therefore its political significance is extremely high. In Indonesia, which has 200 million population and huge lands which consist of approximately 17,000 islands, it is impossible to execute a direct election, count the votes and determine the result in a short period without the computer systems all over the land. In terms of the point, the indirect impact of the project can be well observed.

4.2.7 Sustainability

4.2.7.1 Support of Other Donors

As the PEDAC report mentions, the BPS receives equipment from the JICA and the UNFPA in addition to the installation of computers by the loan of JBIC. As referred to above, the equipment for registration as a basis of voters' list for the election of the President in 2004 was purchased by the budget of the Central Government (the Ministry of Finance). In addition, OCRs provided by JICA is going to be utilized for the population census in 2000.

In the BPS, the services, which were originally conducted by the computers provided through the yen loan, are now conducted by newly provided computers from these other donors.

This situation can be seen that the computer firstly installed was stopped to use earlier than its schedule. Putting it aside, however, it should be understood that the computer contributed to specifying the needs of services. And it should be understood that the specified needs are met by substituting new equipment effectively.

In this sense, although direct coordination between donors does not exist, sustainability is indirectly enhanced by utilizing the equipment flexibly.

4.2.7.2 Obsolescence of the Equipment

Some computers provided by the project are not utilized for statistical services in the front line at present. This was because that new high-performance computers were provided by the government and other international organizations. It was not because that the existing equipment broke down, and not because that the increase of statistical services required a task that exceeded the processing power of the computers. It is not surprising if the users think, "If you have newer and higher-performance computers, why not use them?" The equipment, which is stopped to utilize for the statistical services, are repurposed to general services outside the statistical services.

Theoretically, if the task does not exceed the processing power of the existing computers, it should be possible to continue using the same computers. However, it is difficult to expect users to use in such a manner.

Additionally, there are some concerns about maintenance of the equipment. The personal computer is not designed for use over a long period. Mechanical parts of a PC such as a storage disk and a cooling fan are easy to have a breakdown, compared to electronic parts such as a processor and a memory chip. So the durable term of a PC does not exceed more than several years.

Another factor, which prevents from using a computer for a long period, might be a short lifespan of the PC as a product. The sales period of one model is extremely short, and it is not unique that even if your PC breaks down and you want to purchase the same model to replace the one you have used, the same model may already have disappeared from the market.

This is the case not only of hardware but also of software. Even though the software, which was installed in the implementation stage of the project, is required additionally, there are only the newly updated products available in the market. In that case, only the newly installed equipment can be introduced the updated software, and the working condition loses integrity because the data may not be shared between the new and old versions.

The environment for the usage of hardware and software based mainly on personal computers has different market models and different models of utility from that of main frames. The result of the hearing in the local research visit shows the difficulty of continuous management for the project

including procurement of a large number of personal computers.

In terms of this point, the problem arises that the durable period set generally at six years was inappropriate to the reality. This report will make a recommendation on this issue in 6.3.

5. Comparative Analysis on Government Information Systems between China and Indonesia

This chapter attempts a comparative analysis by creating models of the projects that developed government information systems in China and Indonesia, which introduced and applied IT for the purpose of development assistance.

In general, we can think of some funds invested by loan at an earlier stage as a promoting factor, and there are some other factors causing successful construction and operation of a government information system as followings:

(1) Relevance of ideas and plans
(2) Leadership and the understanding and support of leading members in a government
(3) Stock of skilled people
    Ability to manage a project (organization management)
    Ability to plan and develop a system (specific skills)
    Ability to operate a system (practical skills)
(4) General skills
(5) Selection and development of practical applications
(6) Ability to deal with unexpected situations appropriately

However, deficiency of these factors prevents an unsuccessful result. In addition, the followings are considered to be obstructing factors:

(1) Inconsistency of awareness and thoughts in an organization
(2) Negative sides of bureaucracy
(3) "Enforcement" of a system or technologies inapplicable to the country
(4) Shortage funds for operating and updating machines, equipment, and software

In this chapter, we attempt to establish logic models for China and Indonesia by considering promoting and obstructing factors like those above. Then, we compare the models of the two countries.

5.1 "China Model": Considering Promoting and Obstructing Factors

This section attempts to establish a "logic model" of China that underlies the State Economic Information System Project by mainly considering promoting and obstructing factors.

5.1.1 Promoting Factors for the Project in China

The following factors are considered to be factors promoting the State Economic Information System in China.

5.1.1.1 Relevance of Ideas and Plans

As discussed in 3.3 of this report, it is possible to state that the ideas and plans of the State Economic Information System Project were appropriate because they were based on its national strategies and its international position.

5.1.1.2 Leadership of Leading Members in the Government

During the late 1980s, when the projects began, national leaders in China recognized the necessity of collecting, analyzing, and sharing accurate information on their economy in order to transform their economic policies into macro-oriented ones. We can argue that it was an appropriate decision to introduce a nation-wide information network system, in other words, a "neural system," at the center of the organization, which was engaged in economic policies in order to construct market economic systems. Especially, it is amazing because China was then a people's republic administered by the Communist Party of China.

It was the 1990s when many countries, especially developed ones, started to make much effort on information policies. There were a few important events such as US President Clinton and Vice President Gore's continuing proposal of "Information Super Highway" since the 1993 election, National Information Infrastructure (NII) right after their acceptance of office, and Global Information Infrastructure (GII) in 1994 that extended the scope of NII. "Information Society" of the EU, "Advanced Information Society" of Japan, and "KII (Korean Information Infrastructure)" of South Korea were all proposed in line with the trend from NII to GII in the US.

However, this project (in China) had been planned and conducted before these trends appeared, and they speculated what would occur in future. The "Four Areas of Modernization (agriculture, industry, military power, and technology)"[18] agenda, progressed by Mr. Deng Xiaopin, the Vice Chairman of the Communist Party, played an important role in formulating of the project.

During the 1990s, in face of the end of the Cold War and collapse of the Soviet Union and East

[18] 'Four Modernization' is a fundamental strategy of China that Prime Minister Zhou Enlai proposed in 1975 and that Vice Chairman Deng Xiao Pin popularized as new 'national goals.' (Nakajima, Mineo, *China*, Chuko-Shinsho, 1982)

European countries, the leaders of the Chinese government recognized the expansion of information network underlying "globalization" centered on the US, and they considered that it would be inevitable to introduce and spread internet in their country. Thus, they put a governmental priority on active progress of information network.

In this project, such leadership functioned in favor of the active usage of the Internet and the decision to openly disseminate governmental information to the public. Although the Internet was originally accepted mainly for technological reasons, its potential later became more and more recognized.

5.1.1.3 Stock of Skilled People

One of the most important factors for success in development assistance is the stock of people who would contribute to the country. In this sense, although China is classified as a developing country, quality and quantity of science and technology are at almost the same level as developed countries. In this project, it is considered that stock of highly skilled people (e.g. engineers) was large in China. This is the case not only in the national government but relevant institutes in local governments. Specifically, the people who were good at the following abilities were appointed and educated in China.

Ability to Manage a Project

Ability to manage the whole project is definitely important in constructing a large system, like the one in this project. The State Information Center responsible for the whole project held this ability.

The leaders of the projects knew that China did not adequately experienced to develop such a large information system and so learned and acquired special knowledge and skills by seriously listening to advice and instruction from experts inside and outside of the country.[19] And the leaders of the project actively observed the ongoing trend of the world and attempted to introduce the latest technology such as the Internet.

Although there were some troubles in communication with local institutes at the beginning, the project leaders assisted most of the local governments to make them capable organizations by establishing information centers in each local government across the country, and by educating the staff systematically. This shows that ability to manage a project was very high in China.

The State Information Center then stayed at the position between the national and local governments, and held more power than the local organizations in terms of providing command and funds to the local information centers. Nevertheless, their position was not always "superior" in fact, and the information centers of local governments did not necessarily obey to the State Information Center. It was possible that the local information centers sometimes behaved differently from the commands of

[19] This statement comes from descriptions about the process written in "Project Report," and the homepage of Chinese SIC. The advice and instruction from Japanese consultants partly derive from interviews with relevant people from NTTI and the Mitsubishi Research Institute.

the State Information Center. This frequently occurred in fact.

Furthermore, a relationship between the State Information Center and local information centers changed from "organizational" to "business" in the middle of the process. This reflects the fact that the State Information Center became unable to provide funds and commands to the local information centers. But the functions of the whole system were still at work, and they tried to exchange among the local centers by actively communicating with them.

Ability to Plan, Develop, and Manage a System

The leaders of the project clearly understood actual needs and reasons of what they had to do to develop the system. They constructed a large, complicated system step-by-step, separating the pilot project from the entire project scope, so that they could locate possible problems. They recognized the importance of training people who were highly skilled. Under the background of it, there was good cooperation with educational institutes such as universities, which enhanced technological foundation levels.

In constructing and managing the system, they did not think of constructing it itself as an end, but they pursued practical merits created by smooth operation. JBIC had been afraid that construction might be an end, but practical thoughts in China (like pragmatism) were functioning to construct the main parts of the project.

5.1.1.4 Selection of Practical Applications

The reason why China adopted the Internet was that the Internet was practically necessary to connect between different types of computers. They also selected applications useful for practical usage in the system, not for theories.

5.1.1.5 Ability to Deal with Unexpected Situations

In a large, long-term project like this, it is not unusual that unexpected accidents occur in a process. Results depend on how people deal with the accidents. This project was not an exception. The leaders of the project dealt with the following unexpected accidents appropriately and flexibly.

It must have been difficult to decide to develop the information systems ahead of the delayed construction of the Information Center Building. This resulted in successfully anyway.

In addition, other factors causing this project to be successful include their recognition and acceptance of the importance of the Internet, and their utilization of decreasing prices of computers accompanied by technological innovation. They were very flexible in choosing ways to achieve major objectives. This flexibility is quite significant in the field of IT, which changes rapidly.

5.1.2 Factors Obstructing the Further Development of the Project in China

In contrast, we can think of the following issues about obstructing factors in China.

5.1.2.1 Deficiency of Communication between the Central and Local Governments

In the pilot project of the project at an earlier stage, some local information centers tended to construct their independent systems without understanding what the central authority was planning. This is pointed out by JBIC. Later also, some local governments worked without enough understanding of meaning of the system.

5.1.2.2 Deficiency of Communication with Japan

According to some comments of interviewees and document records, it seems that communication between China and Japan mainly was not smooth from the early to middle stages of the project. For example, one of the project leaders in the State Information Center stated that one day Japanese response was pretty later than China had expected. It often happened when they wanted to have procurement items checked, especially when they wanted to add and change items. However, JBIC thought that there were some difficulties in understanding the situation, since China was late to contact JBIC. Some of the troubles seem to have occurred because it was not clear how much discretion was allowed to the Chinese side in discretional contracts. In addition, one day, a shopping list was sent to Japan before the system design was not yet finished, and the Japanese side feared that the Chinese side was too hardware-centric.

Because of these, the mid-term supervision and SAPI took place in the process, which helped Japan find out problems and reach solutions. China also began to issue periodical reports on the progress of the project.

Finally, these remedies became at work positively for Japan, but the Japanese side hardly understood how the Internet technology had been adopted and how information through the Internet had been widely open to people in China. These two revisions greatly contributed to the qualitative change of the project, and so the Japanese should have known the reasons at that time.

5.1.2.3 Low Interest in Utilization of the System

It is often observed in construction and management of an information system that people on the supply side of a system are less active in understanding how the system will be utilized, and stick to the "logic of the supply side." This caused people on supply side not to grasp people's real needs and current changes. We saw such a tendency in many places in this project.

This was the case in the State Information Center. Especially, those in the center were not interested in even how the services of their affiliate company, CEInet Data Corporation, were utilized.

In this sense, the local information centers had more interest in how the system was utilized, partially because they were closer to the users physically and socially. But there were not many cases where users' satisfaction levels were surveyed systematically, or where the status of users' access to the system was analyzed.

The same tendency was also found in Indonesia.

5.1.2.4 Limitation of the Yen Loan Framework

Although it may not be exactly appropriate to consider this to be an "obstructing factor," this issue was pointed out both in the surveys in China and Indonesia. The problem is that the framework to yen loan may be inappropriate for IT development assistance, because it usually takes three to four years from the planning to the implementation of yen loan.

Since the executing agency which implemented the system in China was an organization under the immediate control of the national government, the mission was suspected that their services might be affected by the negative side of bureaucracy. However, we could hardly find serious problems caused by the bureaucracy in our survey. Also, we could not see "enforcement" of systems or technologies inapplicable to the country.

5.1.2.5 Funds for Managing and Updating

Deficiency in funds for managing and updating equipment (e.g., maintenance of machines, communication fee, and updating equipment and software) can prevent the executing agency from independent management of IT systems.

In China, there were few cases where a deficiency in funds was a problem. The State Information Center and local information centers were not rich, but they did not have such problems as some institutes were not operating, or as their performance levels were low because of their poor maintenance.

Some parts of the State Information Center were privatized, and they started several kinds of other business. They tried other businesses, such as system development and consulting by using their experiences and knowledge acquired in the State Economic Information System Project so that they could obtain necessary funds. Nevertheless, this is only our guess since we could not survey any other organizations than we originally targeted at, and so we do not have any evidence.

In local areas, we also saw some cases where information centers obtained funds by receiving business from local governments to develop their systems and to consult them.

It is sure that both the national and local governments recognize the importance of promoting IT development and a high possibility of IT as a financial source. It never occurs in China that funds from the national government are completely stopped to be distributed, causing no more operation. If computers and their network are utilized for routine work in governments, computers will be perceived as being necessary for any business.

In this process, we must notice that the resources that people actually used do not necessarily match with the information and services that the information system provided. The databases and services that supply sides produced by investing much money and time might not be useful.

In this sense, the supply side in China was hardly interested in how their services were utilized, which suggests the possibility of some problems in future.

5.2 "Indonesia Model": Considering Promoting and Obstructing Factors

In this section, two projects in Indonesia are considered from the viewpoint of promoting and obstructing factors. We attempt to establish the "Indonesia model".

5.2.1 "Central Bureau of Statistics Computer and Regional Computer Installation" Project

Promoting factors and obstructing factors in the "Central Bureau of Statistics Computer and Regional Computer Installation" Project are considered here. A case of the Ministry of Industry and Trade is treated as only a reference, because a size of it was relatively small, and because it took too much time after its construction and it already stopped operation.

This project greatly contributed to opening of statistical information by the Central Bureau of Statistics and local statistics bureau offices. The following three factors were at work.

(1) Diffusion of the Internet
(2) Reduction of governmental intervention into statistical information
(3) People who made efforts in computerization inside the Central Bureau of Statistics

The first factor, diffusion of the Internet, was a completely external factor and out of control of the executing agency of the project. The diffusion of the Internet made it easy to "connect to information network" and created a foundation of information dissemination by the Central Bureau of Statistics.

First, the diffusion of the Internet caused external network to penetrate. The project scope of the Central Bureau of Statistics excluded the construction of network itself, but included connection with host computers in Jakarta through existing networks (public switched telephone network). Since it occurred at the same timing as development of the Internet, connecting to a nearest access point provided people with enough services, instead of connecting with the host in Jakarta by a long-distance call. In this way, it seems that one of the promoting factors was the fact that information exchange enabled through existing external networks.

Second, reduction of governmental intervention into statistical information was achieved by a reform of the Indonesian Statistics Law. Statistics were taken primary by national strategies, and making statistical information public was controlled under the Minister of the President's Office. Information development was not a national strategy, while statistical business was very important for the government.

Before the reform of the Statistics Law, if people wanted to make the statistics public, they needed

permission from the Minister of the President's Office. However, after the reform, they did not need it. Furthermore, the Central Bureau of Statistics itself had to make the statistics public under the new law.

We can state that IT produced such new significance because they were installed by the Central Bureau of Statistics. That is, they opened the statistics to people through the Internet as well as they made statistical information analyzed and arranged on computers. A factor, reduction of governmental intervention into statistical information, was an external factor for the Central Bureau of Statistics, but at the same time it was an internal factor (on a national strategy) functioning to develop IT of the Central Bureau of Statistics.

Third, we can think of a leading individual, Mr. Sugito Suwit, who was a director of the Central Bureau of Statistics. He had initiatives in introducing the Internet into the Bureau. His leadership greatly contributed to smooth construction of a website of the Bureau in December 1994, which was earlier than other institutes. (At that time, in Japan, making information public through the Internet was not achieved; rather, the Internet was not known.)

Of course, the great achievement was not completely attributed to a single person, and his efforts should be understood in the context of much interest in new technologies in the society as a whole. His contribution was the fact that he triggered adoption of the new technology. Technological development was further encouraged by such a flexible person like him in the Bureau who managed the project smoothly.

In addition, it was important to notice that Indonesia then had a better national statistics system and more skilled people than other Asian countries. The Central Bureau of Statistics provided educational opportunities for officials in other countries (such as Myanmar) who were engaged in statistics. This shows that there were enough educated people in Indonesia who could deal with new technology.

On the other hand, what kinds of obstructing factors were at work in project management and its effective operation? We can not recognize many strong factors that prevented the project. Even if there were a few, installation of new machines in local offices did not necessarily lead to standardization of business flow. This is because the goal of the project was to improve skills for statistical work 'thinly and broadly'.

The goal of the project was to improve activities related to Indonesian statistics by installing IT machines and educational environment. The loan agreement of the project was signed in November 1994, and the project was completed in December 2000. The contents and timing of this project were important in considering promoting and obstructing factors.

First, this project was not conducted under information strategies at the national level, but it aimed to improve statistical skills of the Central Bureau of Statistics specifically. Therefore, a view of constructing an information system was not formed.

For instance, in terms of project evaluation, the "Central Bureau of Statistics Computer and Regional Computer Installation" Project was not united as a whole. There were some different formats in each business flow, such as exchange of statistics between local statistical offices and the Central Bureau of Statistics. However, they did not have a "system", including error check, examination of consistency of their data, and automatic data collection. Because the project of the Bureau aimed to improve their everyday business by computer installation, the effect was limited to achievement of more effective business flow.

Second, we discuss about their information system. Information development in business is classified into the following four stages.

(1) Find methodologies and procedures of business
(2) Make business mechanical and automatic (replace a part of or the whole handwork)
(3) Systematize business (informatize the whole business)
(4) Improve business (reform the part of the business flow recognized as inefficient by informatization)

The term, "system", is used broadly, and often misunderstood. We here define a system as a "systematized business" as a state where all necessary tasks for a specific purpose can be completed by IT. In this sense, the business of the Indonesian Central Bureau of Statistics is not systematized because they stopped at the second stage ((2) above), and they do not adequately improve existing procedures and business contents.

However, the project of computer installation by the Central Bureau of Statistics in Indonesia had large effects on their everyday business, but we can not find as great expansion or development of business as in China.

5.2.2 "Equipment Supply for Installation of Computer for Industrial Statistics and Planning" Project

We see many obstructing as well as promoting factors in considering the "Equipment Supply for Installation of Computer for Industrial Statistics and Planning" Project.

The project was conducted in the 1980s when office automation (OA) became paid much attention to. Considering the problem relevant with Indonesian industrial statistics (statistics of the Central Bureau of Statistics was not publicized freely), it makes sense that they had motivation to conduct independent statistical business.

However, the project did not pursue an integrated "information system"; rather, its purpose was

assumed to automatize business. Also, it seemed to be hardware-centric and lacked in a view of understanding the whole business flow, considering that data collection that they asked other agencies were not conducted properly.

Concerning network development, although they made a plan to develop networks among governmental ministries through optical fiber, it was too early to deploy. They could not reach an agreement with relevant government bodies, especially with a national telecommunication corporation. So they abandoned the plan. This also shows their tendency of hardware-centric attitude.

Moreover, it was difficult to obtain a sufficient number of skilled staff locally, and so they needed to train programmers by themselves. (There were no labor markets of programmers at that time in.) Special personnel were assigned to the Ministry of Industry and Trade. Therefore, the development of planned application software was achieved, but they were not flexible or capable enough to develop the system for long. This seems to be a negative side of such an information system as well as to come from the limitation of system architecture of the mainframe computer. There were some software elements in the project, but they were at work only during the working period of the mainframe.

The biggest effect of the "Equipment Supply for Installation of Computer for Industrial Statistics and Planning" Project was that computers replaced handwork. The business flow produced in this project shifted from the host computer system to PC, and it is operating still now.

5.2.3 Comparison against Hypotheses

In the Inception Report, we proposed the following five hypotheses of obstructing factors affecting the Indonesian project.

(1) Unclear relationship with national strategies
(2) Economic system for development under the leadership of a nation
(3) Deficiency in expertise in constructing an information system
(4) Thinking of construction and operation of a system as a goal
(5) Inadequate reaction to situational changes

There were some more factors, but this section focuses on these five that appear to be more important.

Concerning the first hypothesis (unclear relationship with national strategies), we can state that neither two projects had clear relationship with the national strategies of information development. However, as indicated above, the project of the Bureau had a positive effect on opening the statistical system to people, which had been under control of the national government.

The second hypothesis (economic system for development under the leadership of a nation) did not necessarily seem to function as an obstructing factor in Indonesia, because strong leadership in the

project enabled the introduction of new technology. However, a part of the project in introducing computers into industrial statistics was ended because of no leadership.

About the third hypothesis (deficiency in expertise in constructing an information system), we can not state that there was serious deficiency considering that they were active in introducing new technology. (Remember the introduction of the Internet by the Central Bureau of Statistics and in-house development by the Ministry of Industry and Trade.)

Rather, they seemed to think of construction and operation of the system as a goal, that is, they appeared hardware-centric. We can speculate it from the fact that they were reluctant to systematize the whole business and to improve the existing business.

Concerning the last factor (inadequate reaction to situational changes), there was a difference between the Central Bureau of Statistics, which spent remaining funds on further machines and equipment, and the Ministry of Industry and Trade, whose project cost was simply reduced because of the cancellation of the optical fiber network plan. The former could react to the changes flexibly, while the latter could not.

Current Indonesian situation is very severe in terms of funds of system maintenance, operation, and updating. Although IT funds from the government are increasing, there are no enough monetary sources to develop IT across the country, including regional offices. It would not be expected that they can obtain sufficient support from other countries, considering that their population amounts to 200 million. Although IT may cost less than before, because the prices of computers are declining and the quality of domestic computers is enhancing, they should not be so optimistic. In addition, since the income standard of governmental officers is very low, the officers who acquired IT skills may transfer to private companies. These seem to be another obstructing factor for introducing IT.

5.3 Comparison between "China Model" and "Indonesia Model"

A comparison between the China model and Indonesia model is summarized in Table 54 below.

Table 54: Comparison between China and Indonesia Models

	China	Indonesia
Promoting factors		
1) Governmental leaders' recognition	***	*
2) Understand needs	***	**
3) Construct step-by-step	***	***
4) Grasp current global trend	***	***
5) Pragmatism emphasizing facts	***	*
6) Flexible reaction to situational changes	***	*
7) Absorb opinions of external consultants	***	**
8) Educate & instruct local facilities appropriately	***	**
9) Stock of highly skilled people	***	**
Obstructing factors		
1) Poor communication between center and local	*	n/a
2) Poor communication with Japan	*	X
3) Low interest in users	***	***

*** : Very applicable ** : Applicable * : Partly applicable X : Inapplicable n/a : Do not know

Among the promoting factors shared by China and Indonesia, it is important that both countries understood well current global trend, especially technological trend. They had recognized the potential of the Internet well before it became popular in the early 1990s, and they started to introduce it almost at the same timing as developed countries. This led to solid foundation of their system development. If large funds had been invested in what is called 'legacy system' such as large computers and old communication systems before the Internet appeared, they must have ended up spending much money on upgrading the hardware and system. If so, it would have been very difficult to have enough money and time for transformation to new systems.

Although each country had different conditions, the construction of the systems step-by-step played an important role in achieving successful results. While China planned a large system as a whole at the beginning, Japan suggested that they should be more practical. Thus, China separated the pilot project out of the main project. Such a lesson at the beginning stage contributed to the later successful reform in the project of constructing the inexperienced large-scale system. Because a sudden unexpected change in technological trends occurred in the process, they received another benefit, that is, timely introduction of new technology in their step-by-step construction.

Indonesia is different from China in that the Indonesians did not think of the possibility that the system would be constructed quickly, so they introduced the system to some possible sites gradually.

This was because promotion of their project depended on technology and organizational ability of the responsible institutes.

Both countries were good at grasping needs properly, reacting to situational changes flexibly, instructing local institutes well, and obtaining skilled staff. We cannot evaluate exactly which country was better at these aspects, but it is plausible that the China model was functioning relatively better.

While pragmatism was observed in many cases in the project implementation in China, it was not observed in Indonesia as far as we know.

It seems that China was more active in receiving instructions from external consultants and in absorbing knowledge, even though Indonesia was also active to a lesser degree.

Turning to obstructing factors, the leaders of the project in the executing agencies in both countries had low interest in how the systems were utilized. And in order to reform the existing systems, they were reluctant to understand specific needs of users. They could have improved the utility of the systems more, if they had constantly measured the real usage of the systems and users' satisfaction levels, and then obtained feedbacks, which would not have cost so high.

We saw a tendency of poor communication between the central and the local agencies in both countries. But there were only a limited number of samples in Indonesia, so it was difficult to evaluate exact local situations. We also found this problem in some cases in China, but it was not wide spread across the country.

5.4 Lessons from a Comparison between China and Indonesia

The following lessons in the projects of constructing information systems in China and Indonesia are drawn from a comparison between the two countries in promoting and obstructing factors. The surveys of this study included the development and operation of governmental information systems that were made public as a result. In this sense, the findings of this study do not necessarily apply to IT-related development assistance in other sectors. We first focus on governmental information systems, and then discuss what elements we can generalize in the process of introducing IT.

5.4.1 High Autonomy Matters

If we summarize three of the four promoting factors shared by the countries that are indicated above (grasp clear needs, construct step-by-step, and grasp current global trend), it is possible to state that high autonomy in the projects existed in these developing countries. High autonomy is important in any field, and it is also an important factor in deploying IT.

This may not be amazing because the systems are utilized by the government. However, China or Indonesia hardly relied on simple emulation of the models of developed countries. This is a very important point in deploying IT in developing countries.

Generally speaking, it is expected that, since development level of IT industries seem proportional to their economic development level, developed countries would lead other countries in terms of the application and deployment of IT. It is also expected that developed countries should assist developing countries. It is true that there was a gap in technology between developed countries and the two developing countries, but we can not find such a big gap in technology as seen in economy. There were some (though not many) skilled people who had knowledge and experience of IT, and their leadership played an important role.

It is an important point that it does not take so much time to make people familiar with at least specific technology and knowledge of IT. This is because many details of IT are usually open to everyone, and many changes occur frequently.

In addition, most technical information about the Internet is available on the Internet, unlike other professional fields such as manufacturing, medication and nuclear power, all of which require us to experience highly professional education and instruction. Also, we can obtain answers to our questions about IT, and it does not cost high. It is also relatively easy to conduct experiments of IT.

Usually, in order to acquire specific knowledge of other fields, we need to pay for expensive tuition, textbooks, practices in experiments, and preparation for environments. However, in the fields of computers and the Internet, it is relatively easy to share with other people specific knowledge that someone already acquired.

In other words, it will hardly cost much in acquiring IT knowledge and skills, only if we have high

motivation. This may mean that this field requires high autonomy.

5.4.2 Recognition of Leaders Matters

There was a big difference between China and Indonesia in terms of governmental leaders' recognition of the importance of IT projects. In China, the leaders of the party and the government strongly recognized the importance of introducing and developing the newest technology constantly for their economic reform during the 1980s and for their reaction to globalization during the 1990s. Especially, they were interested in the importance of IT as a national strategy.

In contrast, among governmental leaders in Indonesia, the importance of IT was hardly recognized as a national strategy or as a practical policy during the Soeharto administration. There were only a few people who recognized it, such as the Director of the Central Bureau of Statistics, Mr. Sugito, as described above, but they were exceptions.

In the survey, we focused on what quality and quantity of financial and human resources each project received under the influence of governmental IT development. Besides the surveys of the main projects, we also collected some more data by interviews with experts outside of the executing agency.

The results show that the "State Economic Information System" Project in China met the broad goal of the nation in terms of IT development across the country as well as development in the executing agency. In addition, the project was strongly supported by the goals set by the national policies because the project aimed to develop IT in the whole country.

However, both the "Equipment Supply for Installation of Computer for Industrial Statistics and Planning" Project and the "Central Bureau of Statistics Computer and Regional Computer Installation" Project in Indonesia had been conducted before national strategies of information became clear. A goal of the projects was limited to internal development in the executing agency.

That is, while in China there were some opportunities where the leaders' recognition of the importance of IT projects directly appeared, in Indonesia there were few such opportunities. Thus, the gap between the leaders of the two countries was created, which might cause different results of the projects in the countries.

To achieve successful results in IT projects, it seems to be important that national leaders should recognize the importance of IT and they should direct local institutes actively.

5.4.3 Flexible Reaction Matters

Since many changes occur in the IT sector, we need to be ready for accommodating sudden changes flexibly without losing a global picture. In this respect, the State Economic Information System in China came to deal with changes flexibly in general, because it had been operated for long. However, in Indonesia, it was a problem that their early plan included the deployment of optical fiber in the "Equipment Supply for Installation of Computer for Industrial Statistics and Planning" Project, which

seemed to be impossible to be achieved because their low technological maturity. Although they were active in deploying the Internet, they have many problems for later development.

Of course, it is no doubt that they dealt with many problems in the process both in China and Indonesia. However, the Chinese project achieved the flexible deployment of the Internet, which promoted IT development in the whole society beyond the original goal of constructing an economic information system. In contrast, the Indonesian project did not have such an effect. Instead, they flexibly adapted to the reality, abandoning the initial plan of optical fiber network and the connection among the ministries, but their flexibility led to the shrinkage of the overall project. In Indonesia, they could not expand the effect of the project to outside the executing agency beyond the initial plan. This may suggest that we should be flexible without being stuck to an early project plan.

5.4.4 Economic Status is an Issue

It is speculated that the biggest problem faced by Indonesia is their economic status, compared to China. The governmental budget is not large, and so they may have serious financial problems in updating old IT machines in future.

This is a problem that must be discussed seriously when we decide to assist the deployment of IT into developing countries.

It is possible to say that the current IT equipment expires in three to five years. Therefore, it may be difficult that current forms of development assistance contribute to long-term operation of systems in economically poor countries such as Indonesia. This will also be an issue in future.

In the IT sector, we still see a general trend where IT keeps improving in functionality against price. Therefore, simple maintenance of the IT at the level of on the project completion leads to a gradual and relative decline in project effects. In other words, IT always requires additional investment in comparison with other kinds of infrastructure. Although the borrower country or executing agency are responsible for maintaining project effects, there is a need for donor countries to think of possible solutions.

6. Discussion for Recommendations

6.1 Characteristics of IT

This chapter discusses the case study of South Korea, although the primary focus of this study is China and Indonesia. South Korea succeeded in introducing and popularizing IT rapidly with sense of crisis. South Korea is no longer categorized as a developing country and became one of the developed countries recently (it was 1996 when South Korea became a member of OECD). Korean experience could be suggestive for other developing countries.

Local surveys were conducted as in Table 55 below.

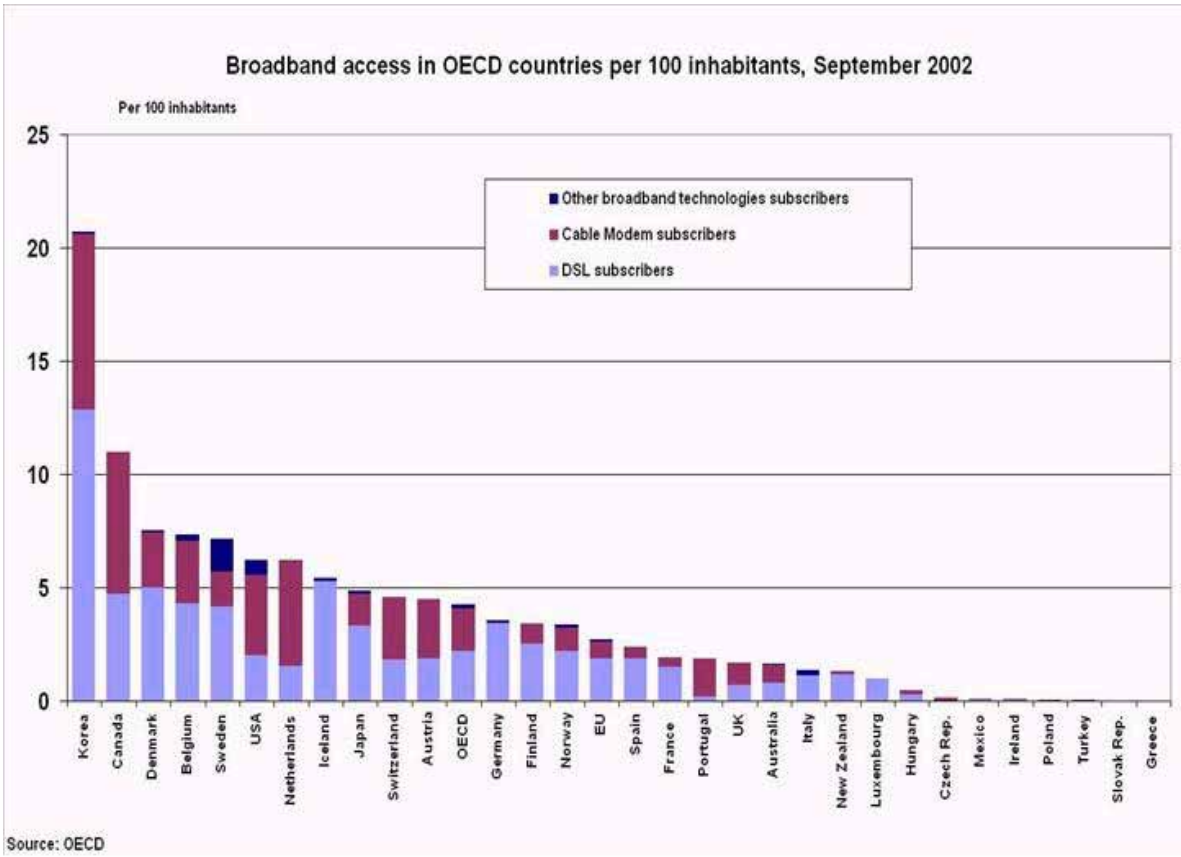
Table 55: Overview of Local Survey in Korea

Survey period	19–21 October 2003
Investigator	Motohiro Tsuchiya (International University, GLOCOM)
Visiting places	● Seoul City Office ● Dr. Jong-Sung Hwang (NCA：National Computerization Agency) ● Persons concerned with the Ministry of Government Administration and Home Affairs in the national government ● Prof. Sangbae Kim (Seoul National University) ● Dr. Joo Seong Hwang (KISDI：Korean Information Strategy Development Institute) ● Dr. Seon-Gyu Goh (The Sejong Institute) ● Prof. Yong-Jin Park (Hanyang University) ● Prof. Yongwhan Lee (Yonsei University)

Successful approaches of technological introduction in South Korea are different from the ones in other countries. Following developed countries had led to successful results in previous technological policies. In fact, concerning automobiles and semiconductors, the US was followed by Japan, which was followed by South Korea.

However, Korea abandoned their strategy of following Japan at least in broadband policies, because of economic and currency crisis in Asia. Korea Telecom and other carriers attempted to follow ISDN (Integrated Service & Digital Network) to which Japan paid attention then, but the Korean government required Hanaro Telecom to shift to ADSL (Asymmetric Digital Subscriber Line), which took up successfully. However, Japan did not easily accept ADSL soon, and in the US, where the technology was invented, ADSL was not so widespread either. According to OECD statistics, South Korea shows the highest rates of broadband access in households in the world (Figure 13).

Figure 13: Broadband access in each country (September 2002)



Source: Organization for Economic Cooperation and Development (OECD)

Assuming that the previous technological introduction is interpreted by an emulation model (emulation + alpha), IT policies can be understood by a forward-looking model. An emulation model focuses on followers' benefits that are produced by emulating leading countries and by adding some uniqueness to the original. In contrast, a forward-looking model emphasizes benefits obtained through active adoption of appropriate technology to immediate environments.

The deployment of IT does not cause direct or immediate economic effects. Economists argue that IT effects on productivity are not as high as they expected. However, the reason why introducing IT is still considered to be necessary is because IT can destroy old systems and customs and may have strong effects on political authority.

Thus, the deployment of IT can scare the authority potentially. The authority may have some difficulty in finding their incentives to introduce IT. In other words, it is when a society needs change that IT is introduced. A forward-looking approach is needed in a sense that our society considers the future seriously. A keyword is "sense of crisis." It is plausible that South Korea had sense of economic crisis then and so they were able to succeed in broadband.

However, it is not easy to sustain sense of crisis. Crisis may become very common afterward, if it lasts for long. A loss of sense of crisis may eliminate our incentives to achieve innovation.

Assuming an approach of governmental development assistance, we can hypothesize that a country with few incentives to introduce IT would not succeed even though it receives governmental development assistance. Among the countries receiving assistance, some with strong sense of innovation among people in general as well as in governments are more likely to introduce IT actively.

The following sections show South Korean experience mainly about its effort on e-government.

6.2 Implications from the Case Study of Korea

6.2.1 IT Development in South Korea and Sense of Social Crisis

South Korea leads ahead of other countries in e-government policies. "World Public Sector Report, 2003" published by the United Nations in 4 November 2003, ranked development levels of IT policies of each country. It ranked Japan as the 18th, Singapore as the 12th, and South Korea as the 13th, although that report was somewhat simple in that it used indices to evaluate the information quantity that governments and public offices disseminated on the Internet and the numbers of computers and the Internet users per 1,000 people.[20] Another report selected the nation's capital Seoul as the best of 100 cities in the world in the evaluation of e-government.[21] Although it might not be completely objective evaluation because the evaluators were from the Global e-Policy e-Government Institute of Sungkyunkwan University, and the E-Governance Institute of Rutgers University, it is possible to state that South Korean e-government is at the high level in the world.

What is the root of this development level of South Korea?

In Korea, Korean Information Infrastructure (KII) was started in 1995 during Yongsam Kim administration, and the Framework Act on Informatization Promotion was established to promote e-government. The year after, the Action Plans for Informatization Promotion was formulated. Some of the goals of KII were achieved already. For instance, all the schools were connected to the Internet in December 2000, and 32,505 facilities related to the governments became connected to the Internet by 39,239 lines.

Table 56: Overview of KII

	KII governmental sector	**KII public sector**	**KII testbed sector**
Main user	Government	Household, private companies	Research institute
Investor	Government	Private	Government & private
Main target	Backbone	Access	Testbed
Phase 1 (1995–1997)	Among 80 call zones	Optic fiber to large buildings	Between Seoul and Taejon by 2.5Gbps
Phase 2 (1998–2000)	Among all the 144 call zones by ATM switch	ADSL or CATV in 30% of the households	Among 5 large cities by 2.5Gbps
Phase 3 (2001–2005)	High quality service	Service of over 20Mbps for households	Optic fiber by 40Gbps

Source: Jong-Sung Hwang, National Computing Agency

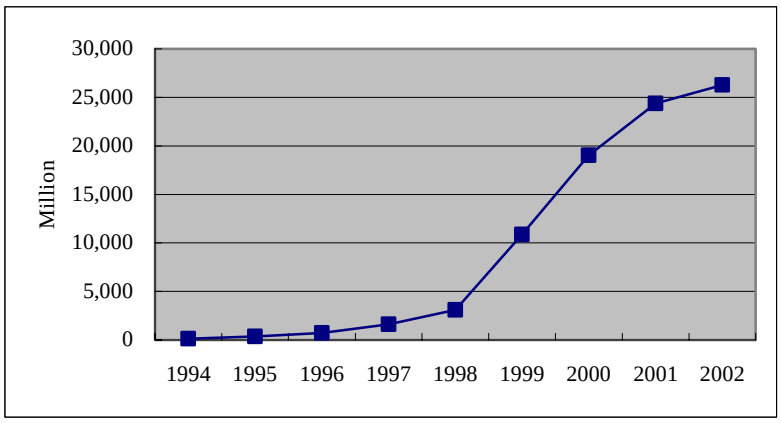
However, information development in South Korea, especially the Internet adoption, had not been

[20] Kyodo News Service "E-Governmemt, Japan 18th, UN's World Ranking" (Nov. 5, 2003).
[21] "Seoul at Top 'E-Government of World 100 Cities'" Chosun Daily News. (Nov. 17, 2003) <http://japanese.chosun.com/site/data/html_dir/2003/11/17/20031117000014.html>

so obvious until the late 1990's. The diffusion level of PC in South Korea was higher than in other countries, but Koreans used computers without connecting to network, or only connected through personal computer communication. Personal computer communication is a sort of the network connection, but it is the network only among subscribers of the personal computer communication providers. Also, it was connected by telephone line, and so it is totally different from the Internet with broadband connection.

We can think of several factors of the sudden Internet diffusion after 1998, as illustrated in Figure 14 and Table 57. The most important one among them is economic and currency crisis in 1998. The crisis was started in Thailand, and some countries were affected. The fundamental problem of it consisted in economic structure of the countries.

Figure 14: Trend of the number of the Internet users in South Korea (1994–2002)



Source: The Ministry of Information and Communication

Table 57: The Internet Usage in South Korea

	Statistics	World Ranking	Source
% of the Internet usage	58.0%	5th	KRNIC, June 2002
Average hours of the Internet usage per week	11hours 54minutes	1th	KRNIC, June 2002
The number of people subscribing to broadband	10,000,000	1th	The Ministry of Information and Communication, October 2002
The number of .kr domains	486,695	5th	KRNIC, September 2002

Source: Special Committee for e-Government Republic of Korea, Korea's e-Government: Completion of e-Government Framework, January 2003, p. 8.

Economic development of NIES and later ASEAN countries in the 1980's was achieved on unstable conditions. Those countries relied on the US and Japanese markets, which means that they

developed their economy under protective policies with funding provided by industrialized countries. However, as shown in Table 58, the long-term depression has affected economic structure of Asian countries. It lead to slow growth rates of GDP of Asian countries in 1997 and then to minus growth because of a domino effect in 1998. The fact that their economy was recovered after a while may mean that Asian countries succeeded in structural reform after the economic crisis to some degree and that they had large potential. Nevertheless, it is true that it was difficult for the Asian countries to deal with the crisis.

Table 58: Trend of Real GDP Growth Rates in the World (1990-2004)

	90	91	92	93	94	95	96	97	98	99	2000	2001	2002	2003	2004
世界	2.7	1.4	1.8	1.5	3.1	2.7	3.2	3.5	2.2	2.9	3.9	2.3	3.0	3.2	4.1
先進工業国															
米国	1.7	▲ 0.5	3.1	2.7	4.1	2.7	3.6	4.5	4.4	4.3	4.2	0.3	2.4	2.2	3.6
EU / ユーロ圏	2.5	1.3	1.2	▲ 0.5	2.7	2.3	1.5	2.4	2.8	2.5	3.3	1.4	0.8	1.1	2.3
日本	5.3	3.1	0.9	0.4	1.0	1.6	3.5	1.8	▲ 1.1	0.8	2.4	0.4	0.3	0.8	1.0
発展途上国															
NIEs4	7.1	8.0	6.2	6.6	7.8	7.4	6.3	5.8	▲ 2.9	7.8	8.3	0.8	4.6	4.1	4.5
ASEAN4	8.5	7.2	6.6	7.2	7.8	8.4	7.2	3.3	▲ 9.6	3.2	5.2	2.6	4.3	3.9	4.3
中国	4.0	9.2	14.3	13.5	12.8	10.5	9.6	8.8	7.8	7.1	7.9	7.3	8.0	7.5	7.5
中東	2.7	9.0	10.0	3.6	3.9	3.4	1.0	2.7	1.6	▲ 9.2	2.8	1.4	4.5	5.1	4.9
アフリカ	2.0	1.0	0.0	0.6	2.8	3.3	5.3	3.1	3.5	1.9	3.2	3.6	3.4	3.9	5.2
中南米	▲ 0.6	4.2	3.4	4.2	5.2	1.5	3.6	5.1	▲ 0.5	0.1	3.8	0.6	▲ 0.1	1.5	4.2
移行経済地域															
中・東欧	19.8	▲ 7.5	▲ 11.0	▲ 6.4	▲ 7.5	0.5	0.1	2.4	▲ 0.3	3.3	6.0	3.0	2.9	3.4	4.3

（備考） 1. 2000年までは世銀資料の各国実質GDP（1995年価格ドル表示）を合計して地域のGDP伸び率を計算した。
2001年以降はIMF資料から転記した。
2. 2003年、2004年は見通し。
3. 「EU/ユーロ圏」については2000年まではEU15か国データで計算。2001年以降はIMF資料にEUという区分がないので便宜的にユーロ圏データとした。
4. 「NIEs4」とは韓国、香港、台湾、シンガポール、「ASEAN4」とはタイ、マレーシア、インドネシア、フィリピンとする。
また、「中・東欧」にはロシアを含む。
（資料）世界銀行「WDI」、IMF「World Economic Outlook, April 2003」から作成。

Source: http://www.meti.go.jp/report/whitepaper/index.html

South Korea had a deficit balance of international payments rapidly, but late Yongsam Kim administration had no treatment for it then. The next president Daejung Kim, who was expected to recover the Korean economy, accepted the program for structural change and pursued the transformation of social and economic systems.

Economic and currency crisis greatly shocked the awareness of Korean people. They were strongly shocked because they started to get proud of their country when South Korea became one of the industrialized countries then. However, this provided them a good opportunity to change their economic system, which had been referred to as "crony capitalism". In South Korea, labor unions had much power traditionally, and a job market was based on connections under Confucianism values (e.g., five financial combines, and 30 large companies). Therefore, the unemployment rates were low statistically. Economic and currency crisis expelled unemployed workers still staying at companies from the companies, which promoted competitive participation into the labor market. Thus, capable job applicants became favored strongly.

To improve skills became very important for people of all the classes and all the industries, as well

as unemployed people. Then, the keyword "globalization" and IT business such as "Dot Com" obtained much popularity.

South Korea assumed that Japanese economic system was their model until the late 1990s. Japan was considered to possess advanced economic system, and it was also more similar than the Western countries to South Korea in terms of geographical features, cultural background, economic levels, and industrial structure. Korea began to pay attention to development of the technology that Japan had developed, such as fiber, steel, ship, electric appliances, automobile, and semiconductor chips. And the Koreans employed some strategies to take possession of Japanese market share by selling their products at lower prices.

However, South Korea noticed that Japan was no longer their model, because Japanese economy stayed at long-term depression after economic and currency crisis. Then, the Koreans had an interest in the US that was in the middle of prosperity during Clinton administration (1993–2000). Especially, during the second term of the Clinton administration (since 1997), the diffusion of the Internet in the US society was accelerated and the US stayed at prosperity (over 4% growth rates). It was told that there was no more business cycle because of the advent of "new economy." Thus, the Internet was introduced to Korean society rapidly.

Specifically, it was outstanding that the number of the Internet cafes, called "PC ban", which had broadband lines, increased. Many unemployed people opened PC bans since they thought that it would be easy to earn money by that business. PC bans became popular especially among young people. Young people were first interested in Internet games, and then in more advanced communication such as BBS chatting and auction. Besides them, the Internet spread into the entire society, including middle-aged people who would like to improve their skills, housewives who were interested in stock exchange, and the elderly who wanted new community activities.

Public policies assisted this trend, too. Dae-Jun Kim administration performed a policy initiative, "Cyber Korea 21," and announced that they would be within the top 10 in IT industries in the world soon. Post offices sold cheap computers used for the Internet, called "People's PC", and IT workshop was held aggressively (e.g., campaign of IT development for one million housewives). Concerning cellular phones, they succeeded in sales of CDMA technology, which had hardly been successful in business.

Table 59: Process of Korean Laws Relevant with IT

1986 Computer Network Act
1996 Framework Act on Informatization Promotion
1999 Digital Signature Act
2000 Digital Content Management Act
2001 Digital Divide Closing Act

Source: Mr. Jong-Sung Hwang, National Computing Agency

Young people started to want broadband connection because high-speed access were better for the Internet games. They favored PC bans with faster lines, and so competition among PC bans became severe. The Ministry of Information and Communication required IT industries to adopt ADSL in order to meet such large demands. They promoted to develop ADSL modems and to lower the prices of them, since then they expected that 100 million people would subscribe to them. Thus, Hanaro Telecommunication was required to develop broadband connection of ADSL actively. As a result, the number of subscribers far exceeded 100 million.

Since most of the Korean population lived in apartments, Hanaro targeted apartment residents. Their strategy was to draw optic fibers to undergrounds of the apartments, providing ADSL access by using existing phone lines there. Now that Hanaro was successful, Korea Telecom also shifted from ISDN to ADSL, although they had preferred ISDN before. Furthermore, other companies also started to use ADSL, and so competitive provision of ADSL service began. As a result of the competition, the price of ADSL declined and the speed became fast. Thus, South Korea achieved the largest diffusion of broadband in the world, which might also be affected by their nationality of conformity.

In short, In South Korea, social awareness of crisis produced by economic and currency crisis made possible their rapid IT development, which was also contributed to by the governmental policies and their nationality. Such national awareness of crisis played an important role, considering that the pace of IT development there was not as rapid as other countries before the crisis. In the following section, we will overview relationship between social backgrounds and their e-government policies.

6.2.2 Social Innovation and Policies of E-Government Promotion by South Korean Government

As shown above, the basic plan of IT development in South Korea, which was drown up in 1996, was composed of three phases, each of which held periodical goal. In the first phase (–2000), the followings were proposed as primary tasks.[22]

- Build an effective government with IT development (though small one)
- Establish the infrastructure of information education to grow helpful people in an information society.
- Create environment that can easily access to academic data to improve information foundation of the nation.
- Promote IT development across all the industries and to enhance ability of companies.

[22] "Trend of IT Policies in the Countries Leading Information"
<http://www.icot.or.jp/FTS/REPORTS/H13-reports/H1403-AITEC-Report5/AITEC0203R5-html/AITEC0203R5-ch8-1.htm>

- Enhance usage rates of social infrastructure by IT development.
- Assist IT development in local areas.
- Improve medical services by using IT.
- Construct data system for security to prepare for disaster.
- Improve security level of military and diplomatic information system.

Tasks on e-government was put top priority on among them above. These tasks continued during Dae-Jun Kim administration in 1998 to 2003.

Three reasons why Dae-Jun Kim administration promoted e-government were as following:

(1) Issues of North Korea
(2) Well-balanced development to reduce economic gaps among people
(3) Governmental reforms

E-government promotion was deeply related to (3) governmental reforms. President Kim thought that construction of a nation with intellectual foundation was important to reform the economy, and so that they would need IT development across the whole society. He also insisted that the government should play a leading role in IT development.

Although we saw some scandals late in the Kim administration, the policies of IT development and e-government still continued to be evaluated positively. During his last year in office, the president considered that he should complete these IT policies at least and put his energy into the relevant policies. People also expected that e-government promotion could have a side effect on development in many industries in South Korea.

As stated above, Korean economic system had been referred to as "clonie" capitalism. However, South Korean government thought of economic and currency crisis as a good opportunity to leave such a situation. For instance, it was almost common that a bribe was needed to receive governmental service. Governmental section was criticized of being the most ineffective in South Korea then, and they prevented the country from achieving economic development. The government was too large because of its historical background; it was bureaucratic and based on sectionalism; and officers did not work so hard.

There is a Korean word, "minon" (requesting various services from, and consulting with, government agencies) which is difficult to translate into Japanese or other languages. This refers to people's involvement in decision making and requests and claims toward the government in ordinary life. South Korean political system is a presidential government, and so most of the officers in the governmental post change on the change of presidents. In such a system, bureaucrats tend to receive as much benefit as possible while holding office. As a result, they sometimes make political decisions

beneficial to themselves and make use of privileges in their positions.

The diffusion of IT and electronic accounts makes possible to reform that system. First, both bureaucrats and people were recommended to use credit cards in settling accounts. Since people were not so familiar with credit cards yet, and bankruptcy increased unfortunately. However, this made tax offices examine transactions easily.

Next, it became the most important policy to computerize as much communication with the governments as possible. The more frequently people communicate, the more rooms for bribes they use. Putting the Internet among people in monetary exchange creates some evidence of their communication and enables fast and clear communication. By computerize minon, the government can create an impression of active direct communication between themselves and people. President Moo-Hyun Roh attempts to show that he himself reads minon emails from people.

These needs for social reforms motivate the South Korean government to promote e-government.

The Ministry of Information and Communication and the Ministry of Government Administration and Home Affairs were engaged in e-government. They correspond to the former Ministry of Posts and Telecommunications and the former Ministry of Home Affairs of Japan, which were now united as the Ministry of Public Management, Home Affairs, Posts and Telecommunications, In South Korea, these two ministries had conflicts for initiatives.

The Ministry of Information and Communication expanded their business to IT in a broad sense, including broadband and contents industries as well as electronic communication, along with IT development after the 1998s. In the process, it is natural that they were interested in e-government. But conflicts with the Ministry of Government Administration and Home Affairs appeared after the infrastructure became ready.

Their conflicts began in 1987. National Basic Information System established in 1987 led the South Korean e-Government system. National Basic Information System started to produce database, and collected statistics about finance, land, automobile, trades and economy. Their work became almost completed about 1990 and was open to people. The Ministry of Government Administration and Home Affair played a leading role in this process. Then, the Master Plan of IT development was built in a framework of the basic plan of IT development in the late 1990s. The Master Plan was formulated three times in 1996, 1998, and 2001. In the first plan (1996), the project of e-government was defined. At that time, the policies relevant with information society were recognized as a part of the Master Plan, and then initiative is shifted to the Ministry of Information and Communication that was familiar with technology.

As a result of the conflicts, President Kim decided to assign the Ministry of Government Administration and Home Affair to promote e-government, but the conflicts were not completely resolved. Therefore, to command the whole bureaucrats, the special committee for e-government was established (February to December 2000), whose chair was treated as Minister. Members of the

committee were collected from ordinary people and researchers. The committee selected 11 main projects, as shown in Table 60.

Table 60: 11 main projects in e-government policies in South Korea

A: Innovative and better services for citizens	
1	G4C：Government for citizens
2	Link between 4 main information system of social security
3	Home Tax Services (HTS)
4	G2B: System for united electronic procurement
B: Supply and governmental efficacy	
5	General security system for national budget
6	General administration system in local governments
7	National information system for education and administration
8	Supportive system for personnel policies
9	Exchange electronic documents in among governments
C: Advanced infrastructure for e-government	
10	Electronic signature and stamp in governments
11	Unite governmental computing centers together

Source : Mr. Jong-Sung Hwang, National Computing Agency

Thus, the Ministry of Information and Communication and the Ministry of Government Administration and Home Affair conducted the tasks independently. That is, the Ministry of Government Administration and Home Affair promoted e-government, while the Ministry of Information and Communication and NCA, a subsection of it, conducted evaluation projects. In the Moo-Hyun Roh administration, the Presidential Committee of Government Innovation & Decentralization began to evaluate e-government.

There are two income sources of e-government: (1) general income distributed by the financial authority and (2) Informatization Promotion Fund, established by the Framework Act on Informatization Promotion, which is managed by the Ministry of Information and Communication. The income sources of the fund are (1) some proportion of sales of communication industries, (2) license fee of IMT-2000 (next generation cellular phone) and (3) general budget. 29.1 million dollars were invested in 328 projects from 1994 to 2002. The details are shown in Table 61. And Figure 15 exhibits a trend of IT-related budget from 1998 to 2003. Approximately 20 % of IT budget has been invested in something related to e-government every year.

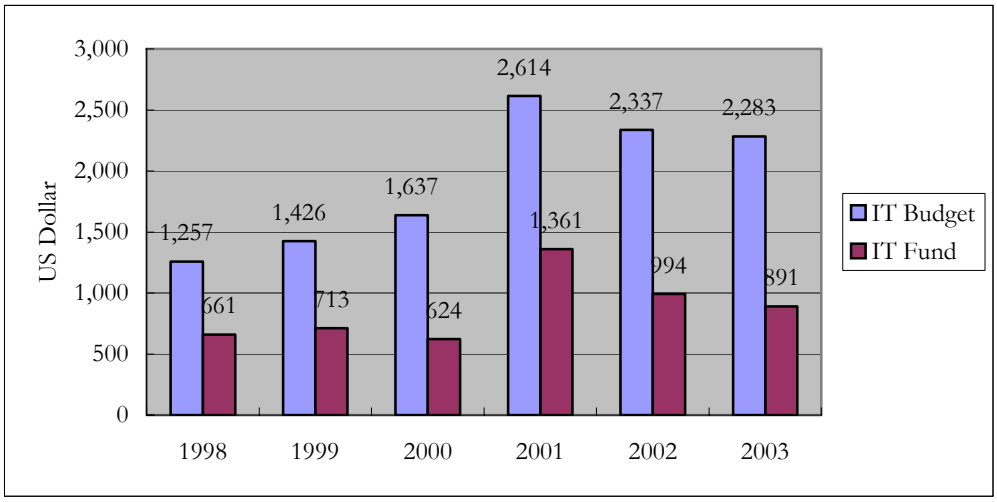
Table 61: Details of Investment in Projects related to e-Government (1994–2002)

	Amount (US dollars)	Number	Main tasks
National IT projects	242,000,000	225	Electronic procurement, budget management, etc.

Local IT projects	10,000,000	41	Local information system
Experimental projects	38,000,000	62	Online study, long-distance medication and treatment

Source : Mr. Jong-Sung Hwang, the National Computing Center

Figure 15: Trend of IT-related budget (1998–2003)



Source: Mr. Jong-Sung Hwang, the National Computing Agency

Note: The average increasing rates of IT budget is 12.7%. About 20% of IT budget is invested in something related to e-government.

6.2.3 Problems Associated with E-Government Policy

Table 62 classifies governmental IT policies into three stages. One of the points is that Kim administration proposed a set of policies, called Cyber Korea 21, in 1999, which accelerated development of e-government. A roadmap of e-government by the president in August 2003, selected an agenda of a five-years-plan (1993–1997) for the most open government in the world.

Table 62: Three Stages of South Korean E-Government Policies

The first stage (1987–)	The second stage (1995–)	The third stage (2001–)
Digitalize and put governmental information on network	Make official services online across governmental organizations and sections	Unite governmental tasks and services
- National basic information system (1987–1996)	- Framework Act on Informatization Promotion (1995) - KII (1995) - Master Plan for Informatization (1996)	- Establish the special Committee (2001–2002). 11 projects selected. - Committee for Governmental Reforms (2003). Proposed a roadmap for e-government

	- IT evaluation (1997) - Governmental assignment for CIO (1998)	

Source: Mr. Jong-Sung Hwang, the National Computing Agency

The following results were observed, according to Seon-Gyu Goh, the Sejong Institute.

- Shared database of residents, official registers, and national taxes is used.
- Over 20 sorts of attachment files are abolished.
- 24% of taxpayers use electronic application, payment, and certificate receipt.
- 97% of governmental supply is conducted electronically.
- One stop service in cooperation among the national pension, workmen's compensation insurance, health insurance, and employment insurance.
- Constructing general information system of local governments made possible some sorts of electronic register services (e.g. residence, automobile, birth place).
- People can change ten kinds of information such as automobile, insurance, and welfare by submitting documents of address change.
- 15 items were reduced to 11 items in application for people's basic life
- 91.3% of account settlements are conducted electronically.
- 82.9% of document circulation is conducted electronically.
- Proposal and receipt of electronic documents were increased.

However, there were some problems. When e-government began to operate in the 1980s, they aimed to change information written on papers to electronic data. At that time, managers of database created too many number of items because if their favorites, and so the database included some duplicate items. Also, since they included the data that could not be controlled, the database became out of service. According to an official engaged in it then, they should have started e-government after recognizing quality of the data by comparison between paper data and other data, and they should have considered the possibility of sharing the database to avoid duplicating unnecessary databases.

One of the factors that easily led to e-government in South Korea is national ID. This was originally introduced to recognize North Korean spies, and it includes the information on name, birth place, birthday, picture, and fingerprint of the holder. In practice, it successfully contributed to finding spies, because the ID cards were needed to submit a document of a house-move to a local government and to complete paperwork of move-in. But the ID system is now functioning in several situations besides the original functions. For instance, the ID is needed to subscribe to the cellular phone, and it is required to produce ID numbers in several kinds of e-commerce sites on the Internet. ID system, which was introduced for other purposes than e-government, is becoming to have a big impact on promotion

of e-government. Needless to say, some problems of privacy were pointed out on usage of the national ID. Especially, while the government wants to shift from the present ID card (made of plastic) to a "smart" card with an IC chip, other people object to it. Therefore, the government thinks that this sort of objection would prevent another national ID system from being introduced and that it was lucky that they already had the ID system that could be applied into e-government.

As described above, the government was promoting economic policies, and so we may have an impression that the supply side was active in South Korea. However, were people on the demand side so active? In Korean modernization, leaders in the governments were active partly because of the country's dictatorial tradition, as this could also occur in many developing countries. Concerning e-government, they first built infrastructure and then created the database. However, it is told that Korean people are indifferent to e-government. People know about easy policies such as taxes, but they are unfamiliar with major projects established by the government. The government is investing in IT ahead of people's conscious needs, which has in fact led to successful results. But people do not know so much.

No survey of the actual usage of e-government services has been conducted, except for partial observation indicated above. Some people state that the users are only 7–8% of the population. This percentage is low, considering that a number of people are now using the Internet. Many people say that the most frequently visited service is the residence certificate. However, there still remain some sorts of paper-based business. The initial plan was to make all the business electronic, but now there are two sorts of business: electric one and paper-based one. So some people complain that there is more business than before. E-government improves the quality of services for people, but the productivity in the government has not been enhanced.

Such a mismatch between demands and supplies is criticized because of the advent of e-democracy, which is a byproduct of IT development. That is, the more openly the government shows their information to people, the more complaints people have toward the government. We see the trend of 'netizen' movements, which are organized through the Internet, such as in the FIFA World Cup football tournament, a presidential election, and scandals of American army in Korea. People are more active politically and have more power than before.

An example is NEIS (National Education Information System). This is a database of education, and one of the 11 projects, although people have not paid attention to it for the previous three to four years. In the case of students, for example, a university puts information of students into the database, including family structure and economic status as well as academic records, and faculties and staff can access to the database. However, unions of faculties and staff pointed out its problem, and so parents are becoming interested in it with some objection.

However, while it is difficult to observe an effect of services on citizens, some specific services are at work well. 100% of customs duty and 80% of patent can be applied through electronic services. According to the NCA, although it may take time to spread services to citizens, services inside the

government and among government agencies and those between the government and private companies tend to become electronic sooner.

System development for e-government projects in South Korea was outsourced to private companies. According to the NCA, investment was done by private entrepreneurs without any prospect of enough future budgets during Doo-Whan Chun administration. On construction of the Administrative Computer Network, private companies first began it by using their funds, and then the government reimbursed afterward. The government is still paying off the money, and the repayment will be completed in 2005. The government benefits from it because they can begin the development of a system easily, while contracted private companies also benefit from it because they can surely earn money.

Now, we must be careful to avoid technical lock-in. A part of e-government system used in South Korea is based on Windows 98, so it can not be upgraded. This problem occurred because there is partly no compatibility between Windows 98 and Windows XP. In Singapore also, there are some old systems based on Windows 95, and they can not be upgraded.

To avoid such a problem, Japan, South Korea, and China have been developing their own OS by applying open-source software since the mid-2003. Korean experts insist that they should cooperate in it actively because their cooperation causes themselves to benefit from external networks and large markets. Korean government is afraid of software controlled mainly by American companies.

The government has evaluated the projects since 2001. They attempt to evaluate outcomes of their large investment. In the process of the evaluation, it became evident that each section of the government prevented information from flowing freely. Each section encloses their own information, and it does not try to share it with other sections. People generally complain that they are required to submit their private information in every section.

6.2.4 E-Government System in Seoul City

South Korea has a centralized governmental system, and e-government systems of local governments tend to be based on the one of Seoul City. An e-government system of Seoul City (e-Seoul Net) will be reviewed here.

According to one of the interviewees, the reason why Seoul City started to promote electronic development is that they expected that making governmental business electronic could cause the business among governments and for citizens to be effective. Now, e-government of Seoul City is at the fourth stage ("unity"), after it experienced the first stage ("providing information simply"), the second stage ("interaction"), and the third stage ("online business").

However, even though the government promotes IT development, it would be meaningless if citizens can not use the system. Therefore, another core of e-government should be citizens who are main customers of Seoul City. If citizens' ability to access to information is poor, the effect of the

system is also lowered. Thus, to enhance citizens' ability to access to information, Seoul City is also investing in people who appear indifferent to the information system.

The budget of e-government in Seoul City this year is 113.6 million won, which occupies 1% of the entire budget. A budget for e-government is distributed through discussion in a group promoting IT development to check duplication and relevance of projects, after each section calculates their budgets of the projects relevant with information. Then, the final estimation is submitted to the budget section, and the budget is secured.

Information development of Seoul City was promoted by the first Chief Information Officer (CIO) and the second CIO. The first CIO was appointed by the Mayor Kun Goh (present Prime Minister), who strongly promoted reforms of city system, which was established in 1999. Since a leader of a group to plan IT development, Mr. J. H. Park joined the government in order to run the e-government projects that had progressed until then, Seoul City has promoted several projects such as the deployment of ultra high-speed information networks and integration of the Internet homepages.

Concerning usage of the system in the City Office, 116 types of business systems are operated, and the officers including the mayor deal with mostly electronic supply. Produced documents are shared by all the officers through Electronic Document Management System (EDMS), which enhances efficiency in business. Services for citizens are separated into information dissemination and residential services. The section of information dissemination includes politics, daily milieu, public service, information on general usage of residential services, while that of residential services includes consulting about residence, application and issue of certification, electronic bid, and payment for local taxes.

Especially, in the system of residential services opened online, administration on residential services of Seoul City that could produce bribe are made public on the Internet. Therefore, people can check how a minon request relevant with their life is dealt with in the government. Also, they can propose a problem, if they found it dealt with wrongly. In these ways, Seoul City attempts to enhance transparency of city administration by allowing citizens to monitor for 24 hours and to prevent the officers from delaying business and dealing with it unfairly. Table 63 shows usage of minon system.

Table 63: Usage of Minon System

Classification	Contents	Notes
Visitors a year	2,162,214	70,892 (average per month)
Registered business	110,725	3,630 (average per month)
Registered documents	606,884	19,897 (average per month)

Source: Brochure issued by Seoul City Office (date unknown)

According to Seon-Gyu Goh in the Sejong Institute, the following two items are frequently utilized by citizens.

Internet Local Tax Payment System (http://etax.seoul.go.kr)

Goals: Enhance transparency of tax politics, and unite local tax businesses

Contents: Payment for local taxes, declaring a tax income, and check payment. Citizens can pay for local taxes of residence, office, automobile, local development and so on through credit cards and the Internet banking.

Period under construction: April 2000 – December 2001

Evaluation: Tax payers can check the payment immediately they paid, which lowers their time cost. Efficacy was also enhanced because of automation in administrative business. Because of no need of receipts, budget is lowered, and papers are saved (good policy for the environment). Integration of public and private systems (17 banks participate).

Online Public Administrative Services System (http://open.seoul.go.kr)

Goals: Make Seoul Special City administration transparent, preventing the government from corruption, and make administration effective. Ensure reliability and fairness in procedure of the politics. Achieve administrative services for citizens online, establishing a government that citizens can apply and check, while staying at house or office.

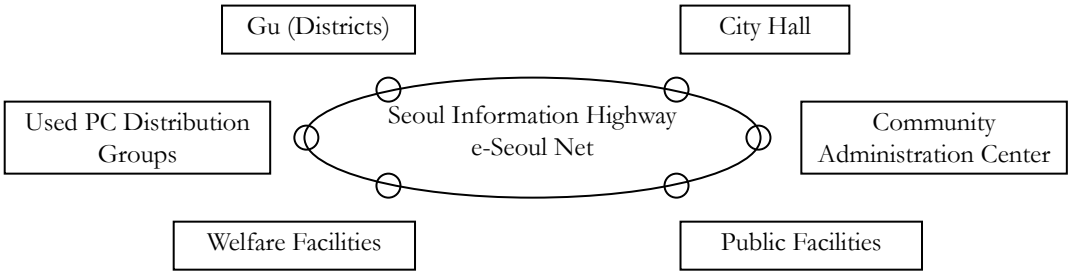
Contents: In each of the political section, information on the services is made public, such as transportation, residence and architecture, environment, urban planning, construction, industrial economy, sanitation and welfare, fire service, culture and tourism, and administration.

Period under construction: January 1999 – April 2002

Evaluation: Decline in political corruption: Residence and architecture (29.8%), construction (17%), urban planning (9.9%), and transportation (9.8%). Establish cyber supervision. Enhancement in administration efficacy: change in speed of dealing with issues (construction of plants 17%, admission of advertisements outside 28%). Ensure reliability and transparency of administration.

In addition, to follow the trend when the network environment is beginning to adopt multimedia, ultra high-speed optical fiber networks for households connecting 36 facilities (such as the Seoul City Office and the governments in 25 wards) were constructed by merging optic fiber rings of SDH (2.5 Gbps) with metro-Ethernet (2.0 Gbps), along the subway rail. This information highway completed in February 2003, amounts to 180 km in total, and 11,900 million won was invested. A control center was built in the Seoul City Office, which always monitors the highway. The highway is utilized for education. The construction of this network for households reduced approximately 3,700 won of the fee a year.

Figure 16: Concepts of e-Soul Net



Source: http://japanese.metro.seoul.kr/minsun/vision2/19.html

With respect to security, a control center is now being prepared, and firewalls and IDS (Intrusion Detection System) were already equipped. A team for project information is organized and deals with inccidents of virus and craking. Also, to protect private information, the system where responsible staff is assisted in each section is operated, periodically showing on their web page how to protect it.

Experts in the City Office play an important role in constructing a system. There are some posts for experts who control the system. Although actual system construction is sometimes outsourced, such experts are assigned to assist development from the viewpoint of users. These posts were originally occupied by keypanchers, but speciality became required. Now, applicants for the posts must pass the second level of examination of technology.

As a result of these attempts, people consider that the the services beccame better because they can apply for services without visiting the City Office or the Ward Offices, and they can receive documents through vending machines. Moreover, people also positively evaluate the effort to reduce a digital divide by conducting online education for housewives, the elderly, and the disabled, by providing PCs and printers for facilities of the elderly, and by providing people who are alienated from information development with secondhand PCs for free.

6.2.5 Considering "Korea Model"

Did South Korea emulate a model of other countries in formulating the policies? Most of the people's answer is that some cases of other countries were suggestive, but South Korea had to establish their own model. When South Korea creates the policies, they usually investigate the US, Britain, Canada, Australia, and Japan, but they could not find a successful model for e-government. Although they found some suggestive aspects in these countries, there was no country as a model. In the case of Seoul City also, there are few cases, and so they are going alone.

It is interesting that although the US adopted IT first and Japan and Korea followed, the most developed country in e-government is South Korea, while the least is the US. We see a paradox in that sense. There is a need to reconstruct an existing system to establish e-government. Some problems of

unity occur more or less, when the existing system is transformed to another one. What we call "legacy problem" occurs.

A governmental person responsible for e-government project points out that the reason why Japan in less developed than Korea is because local power is strong in Japan. This statement is inconsistent with a general opinion about necessity of making local governments independent. However, Korea has centralized government, and there is a possibility that presidential order may change policies dramatically. Although Japan does not run a federal regime like the US, local governments in Japan are strong from Korean viewpoint, since Japan adopted local government system of the US after WWII.

This person also alarms that, generally speaking, we tend to define developed countries as being democratic and developing countries as not democratic. According to him, when people's modernization is ahead of that of their government, the government becomes democratic; in contrast, when a government becomes ahead of information utilization, the society may become a monitored one such as "Big Brother". So enlightenment and education toward people is necessary in order for the government to develop IT in a democratic way.

Summarizing the analyses above, South Korean model is that sense of crisis triggered people's request to change the society and the government provided appropriate policies and services. In other words, at the timing when people need to change it, strong leaders planned and conducted policies. This implies two points in general. First, people's demands are not produced without a special situation (that is, crisis). Second, if the government leads IT development without people's demands, unnecessary services for people and harmful tools to monitor people may be produced.

In short, we can summarize promoting and obstructing factors like the following.

Promoting Factors

- Strong request of people to change a society by economic and currency crisis
- A number of people living in apartments
- Introducing competition by governmental policies
- National ID
- Centralized political system and leadership of the national government
- People's preference for speed
- Flexible plans of budget
- Stock of skilled staff in the government

Obstructing Factors

- Deficiency in careful projection of demands
- Sectionalism among ministries
- Technological lock-in by relying on specific technology

- Social instability and "connection" system based on Confucianism
- Economy dominated by financial combines

Although these obstructing factors were not completely eliminated, their influence was weakened in the period of a big social change. South Korea actively tries to break an old type of system and custom. People's recognition of IT as a tool to change a society contributed to development of the e-government project.

6.2.6 Policy Implications

We can think of the following points as policy implications drawn from Korean model above.

G2G (Government-to-Government) Service should Precede Others

If electronic services between the government and citizens are developed first, it is highly possible that the efficacy lowers since the services are partly overlapped with paper services, which creates extra tasks. It is better to develop IT services inside the government and among governments first and then to expand the services to those for private companies. If services for citizens are developed first, it ends up unsuccessfully when citizens are not ready to use them.

National ID is Indispensable to Develop Services between the Government and Citizens

In South Korea, national ID was adopted in order to find North Korean spies. The System holds people's names, birthdays, places of birth, and fingerprints. This is also utilized to purchase cellular phones and for e-commerce, and it is useful for e-government, too. South Korean national ID system was created because of such a historical accident, but adoption of this system at an earlier stage in developing countries makes possible to avoid unnecessary troubles. However, there may be a negative side, since this system may provide the government with a useful tool to monitor people. So we need to establish the ID system that holds only the minimum information on people and is used only for fair governmental services.

E-Government is Effective for Preventing Corruptions

Making business electronic can contribute to preventing bribery related to government administration. In Korea, making minon, which had been the source of bribery, electronic has ended up successfully. Making any governmental business accessible online not only causes preventing bribery but improves government efficacy.

Secure Specialists within the Government

Actual construction of business system can be outsourced, but the government should hold inside

experts who can evaluate and utilize the system. If experts in the governments are not engaged in construction and development of database and application of e-government, the system may result in as being useless. To acquire capable stuff, it may be good to create posts of experts by national examinations.

Top-Down Policy is Necessary

Objection from inside may appear. To overcome sectionalism preventing information sharing, we should change an organization on the basis of top-down, and keep knowledge in the organization. Although there are objective standards of values in markets, no such standard exists in the government.

Suppose there is No Model

We should not emulate other countries' models, although they may be suggestive. Because of different environment and histories, emulation may not be at work. We should try to create an original system, based on speculation of our future need in advance.

Maintain Compatibility, Expansibility, and Scalability

There is a possibility in IT field that an initial system environment may limit later potential of a project. So we should keep in mind the possibility of future compatibility, development, and expansion. It is a good idea to use open-source software with many possible choices in order to avoid technological lock-in.

6.3 General Lessons and Recommendations for Development Assistance in the IT Sector

What sort of general lessons can we draw about development assistance in IT field by reviewing the cases above? What sorts of recommendations should we have from the lessons?

6.3.1 General Lessons about Development Assistance in IT Field

There is a fundamental question whether we should assist IT development. The question is always asked about how IT can be used in development assistance. It is not easy to show evidence of a direct relationship between introducing and promoting IT, and economic development in a developing country.

What should we pursue in development assistance of IT field? What should we pay attention to in promoting IT development in a developing country? In this section, on the basis of our findings above (p. 157 and p. 193), we would propose the following three lessons: goals of development assistance in IT field, locating important points in IT development appropriate to a country, and assistance that can contribute to the country.

6.3.1.1 Goals of Development Assistance in IT Field: For "Good Governance"

IT functions as a base of social, economic, and cultural activities, but it does not only contribute to transforming these activities into an information system. In the process of "transplantation," IT development makes people review the activities, which is meaningful. If people do not so, it is the same as the process where we simply replaced primitive agricultural tools for useful new machines in history. It is possible that reviewing previous ones accompanied by IT development can provide a new meaning for development assistance in IT field.

Even though IT may have few obvious effects on economy, it does not simply mean that IT is not applicable to development assistance. As discussed in 6.2 (p. 177), if the process of IT development makes irrationality in business public, this can lead to "good governance" by which other development assistance projects in other fields may function well, too. It development in South Korean governments was successful in eliminating governmental bribes by making their business electronic. In China also, making governmental information public has been contributing to transparency and "good governance," even though the results are limited.

Similar effects are expected in other developing countries. It is considered that introducing "e-government" in an appropriate way can contribute to improving business efficacy and governance. This is also the case in local governments as well as national governments, as indicated in China and South Korea.

6.3.1.2 Important Points in IT Development

IT is basically neutral technology and can be the basis of other social, economic, and cultural activities. So, in future, IT may be out-of-date along with the activities in a society, similarly to other natural technology such as water supply and electricity. In this sense, IT is applicable to any fields, compared to other technologies. But there may be the best field where IT is accepted, matching political, economic, social, or cultural backgrounds of a country.

For example, in South Korea (p. 177), one of the primary fields in IT development was political innovation, which caused more rapid promotion of e-government than in other countries. And IT development in Japan and the US was promoted especially in academic fields at least at earlier stages, and later in economic activities such as e-commerce.

How about Chinese and Indonesian projects from the viewpoint of the best field in introducing IT? In Chinese project, information exchanges on networks were used for grasping macro-economic trend, and so the keyword was "economy" (p. 26). In contrast, in two projects in Indonesia, the goals were to reform business of the Central Bureau of Statistics (p. 146) and to understand industrial statistics by the Ministry of Industry and Trade (p. 141). So the keyword was "statistics".

In these ways, approaches to IT development are various in terms of what sorts of social, economic, and cultural activities are assumed on information network. It is important to select the most appropriate field in promoting IT development in the country by noticing the backgrounds, instead of focusing on some specific aspects.

6.3.1.3 Assistance Helpful for an Assisted Country

While rapid development of IT leads to better social life, it may deprive a developing country from chances to catch up with leading countries and that a gap between developing and developed countries becomes larger and larger. In general, intellectual workers including IT engineers have high mobility. Therefore, educating people without mature domestic markets may produce experts who will flow toward labor markets in other countries.

As far as our survey shows, in China, those engaged in the State Economic Information System Project are basically staying inside the State Information Center or the information centers of the ministries and local governments, although some of them moved to other organizations and subsidiaries. They are making effort to maintenance and expand the effect of the project (p. 133). In comparison, in Indonesia, although there is no evident flow of the staff to outside, both the Ministry of Industry and Trade and the Central Bureau of Statistics have difficulties in acquiring and maintaining the staff (p. 145, and p. 153).

Thus, it seems that although the institutes can not maintain the staff inside of them, they should have high incentives to keep the skilled people in their domestic labor markets or at least in their country. This may contribute to maintaining the project effects. In comprehensive policies for "Cooperation for a solution to international digital divide" reported in July 2000, Japanese government argues that educating

people is discussed as an issue of international cooperation of IT, and we need to be careful not to have such a result as shown above.

In Japan, the main purpose of IT development shifted from "Equipment of the Internet environment; the lowest monthly fee in the world; e-commerce; and equipment of e-government system" (e-Japan strategy) to "Active innovation of the socio-economic system utilizing IT infrastructure" (e-Japan strategy II). Similarly, about a developing country that is assisted, we should know that the importance of an information system is related to political, social, economic, and cultural activities and languages of the country (e.g., information system enabling e-government), instead of only focusing on communication infrastructure narrowly.

6.3.2 Recommendations for Development Assistance in IT Field

Finally, we summarize general recommendations about development assistance in IT field that are drawn from the comparison between Chinese and Indonesian models and the implication from South Korean survey.

There are three points underlying the cases of China and Indonesia and consistent with the implication from South Korea: maintaining experts in a country, leadership of top-down, and consideration of possible compatibility, development and expansion. Moreover, two more points are added: understanding an information system as a "system," and conducting evaluations about how it is utilized.

Some specific lessons are drawn from South Korean case in order to promote IT development in a government. Some of them ("effects of IT development on preventing bribes," "maintaining experts in a country," "leadership of top-down," and "considering possible compatibility, development and expansion") are consistent with the lessons that we obtained draw from yen-loan projects in China and Indonesia.

We propose the following six recommendations by summarizing these points.

6.3.2.1 Recommendation 1: Grasp as "System" [Toward JBIC and Executing Agency]

The most important point in the project management of development assistance in the IT sector is to understand the entire project as a system, separating hardware from the system. In other words, we need to deal with hardware and system in different ways. We also need to recognize that technology employed to construct a system is different from the system itself.

The life span of hardware is different from that of an information system which is developed on hardware (p. 143). An information system is not hardware but a system, and its life span is not as short as hardware. Suppose we introduce an Internet electronic mail system. Once email prevails among

people, the email system will last beyond the life span of the computers that have operated the server program. Even when we change server machines, the function and role of the email system will never be abandoned.

In addition, concerning a database system of economic information, both issues are related each other: "What kinds of information should we obtain and distribute to users?" and "What kinds of technology should we adopt, such as large computers and dialup, or small servers and broadband Internet?" However, we need to consider them as different issues (p. 89).

It frequently occurs that we change our decisions about the kinds of technology that is adopted, so that we could achieve goals of a system. If a system is considered as an organism, technology and hardware would be cells. Even if each component is renewed, the life still continues to exist.

We should focus on a system and its functions, and try to update specific technology that implements the system. This will consequently contribute to the wholesomeness of the system and its functions.

In reality, an information system may be appropriately updated for the lack of funding. But procurement for updating the system is not related to the concept of the system or solution, rather it relates to implementation.

Now, it is time to change our ways of thinking. In the projects of development assistance in IT, it is necessary to utilize the loaning scheme in order to catalyze the entire informatization process in the beneficiary country, rather than to purchase and install a certain set of hardware for a given objective. In this scenario, a master plan for informatization in the beneficiary country should first be drawn, and then the flow of information and business in the executing agency should be analyzed, so that the area that is most suitable for informatization may be selected. After the master plan and the information and business flow in the selected area are clarified, appropriate solutions should be chosen considering the development stage of informatization in the beneficiary country. The role of the loaning scheme is to show a success story by making intensive investment in the selected solution in the selected area, thus encouraging the beneficiary country to put informatization forward by themselves.

Information systems are usually updated frequently, and in evaluating the sustainability of an information system, it is advised that the frequency of updates be considered as an indicator of the level of maintenance.

This recommendation alarms toward the view of many present development assistance projects, where hardware equipment tends to be perceived as being fundamental.

To understand a project as a system, it would be effective to prepare a model based on a modeling technique, such as the Universal Modeling Language (UML), so that the entire project including installed hardware and business flow may be captured integrally at the stage of planning. It would also be meaningful to create standard project specifications which describes a standard set of hardware, software, and network configuration that are required in an information system, so that it will be

possible to compare the initial project plan with its actual progress.

It is also advised to review the existing hardware-centric assistance scheme, in order to understand the entire project as a system, and to develop a comprehensive mapping which covers equipment, machines, staff, training, system maintenance and upgrade. This is what is called a "total solution" approach.

As a result of formulating a project as s 'system', we can speculate that IT development can lead to "re-engineering" of the existing business effectively. Moreover, qualified personnel, such as system analysts or system administrators, who can manage the information system based on the flow of information and business in a given area, should participate in the planning of a system. In addition to IT engineers in an ordinary meaning of the term, we need those experts who can decide on the technology to be installed to meet given needs, as well as those who can evaluate the project design objectively.

6.3.2.2 Recommendation 2: Incorporate Usage Evaluation [Toward JBIC and Executing Agency]

IT was considered to be not measured by quantitative methods, but this includes the two problems as below.

The first problem is that we overlooked some items suitable to quantitative measurement in the IT field. In our evaluation project, we measured the traffic going in and out through the network gateway as an indicator to understand the effects of the project (p. 71). We need to be more aware of such a measurable item. For databases, it is possible to measure the status of users' access to each institute. However, in China and Indonesia, such an attempt was not considered yet, except for a few limited cases (p. 93). In South Korea, such measurement and analysis of records are conducted and these are in fact functioning effectively. Considering the levels of the present systems, it is highly possible to measure at least the status of users' usage.

The other problem is that it would be difficult to measure and collect quantitative data of an information system without an incorporated methodology and obligation of collecting and storing usage data. In order to do so, cooperation from executing agencies may be necessary. It is almost impossible to measure project effects retrospectively without having baseline data at the initial stage. Unfortunately, such an attempt was not conducted in China and Indonesia. In other words, if we include such a methodology in advance, we will be able to measure the project effects either in the course of the project implementation or at the completion stage.

At an earlier stage of development, when the awareness of IT development is growing gradually, the development of a system that works without any errors is emphasized. Engineers tend to emphasize "producing something that operates appropriately." Then, at the adoption phase of a lifespan of a specific technology the opinions and ideas from an engineer's point of view tend to be overstated, and analysis on system usage and utilization is not paid enough attention to. The projects in China and

Indonesia began when social awareness of IT development started to grow, and most people were not aware of the meaning or necessity of analyzing the access and usage of the system.

In light of the further development of the project, it would be natural to evaluate systematically and constantly how people are using the system and how they benefit from it, and to draw some findings to improve quality of services and content.

In introducing IT to development assistance, it is definitely important to adopt "customer satisfaction", which is also becoming common among private IT companies, and to evaluate what kind of effect the project brings about, and what sort of benefit users receive.

6.3.2.3 Recommendation 3: Emphasize Network [JBIC and Executing Agency]

We can consider that the biggest difference between IT development and OA development is network. Network here refers to one that enables "many-to-many" connection, instead of "one-to-many", which prevailed during the period of large computers (that is, a small number of host computers and a huge number of terminals). George Gilder argued, "A stand-alone computer is no different from a car in a jungle." It is more important to introduce computers with minimum network than a large number of stand-alones.

"Network" is also applicable to human networks as well as computer networks.

In both the "Central Bureau of Statistics Computer and Regional Computer Installation" Project in Indonesia and the "State Economic Information System" Project in China, it seems that a "community" that cooperated with each other was nurtured inside and outside the project (p. 148, p. 44). The community played an important role in introducing the Internet at an earlier stage. The more the Internet came to be used in the project, the larger became the community.

Many-to-many connection produced not only information flow in business in vertical relationship, but it also created horizontal relationship across ministries and user groups. One interviewee who the mission met, referring to the meaning of the deployment of the Internet, mentioned, "We opened a new communication channel between the citizens and government". The horizontal information flow enables mutual communication and acquisition of the latest information. This is the largest of the effects that information development brings about.

6.3.2.4 Recommendation 4: Establish a Group of In-House Specialists for Information Technology [Toward JBIC]

Because IT is such a specialized area and it is changing so rapidly, it is advised that a group of IT specialists be kept in-house (p. 188). This is particularly true if donors, such as JBIC, wants to construct a system that would last beyond the life span of hardware. That group should be expected to play a role of "system engineers" who can decide on the hardware and software which would be appropriate in operating a certain task from the viewpoint of users of the information system. In order to prevent the system from being hardware-centric and becoming useless eventually, it is expected to designate a group

who are familiar with particular technology.

In addition to the group of specialists, it is also advised that there should be a neutral advisory body, which is independent of the consultants and venders who are directly engaged in project implementation. Based on cooperation with such a neutral advisory body, it would be possible to plan an information system from a neutral and long-term perspective and to make advice on development assistance and to evaluate implemented projects.

6.3.2.5 Recommendation 5: Provide Gradual Step-by-Step Support [Toward JBIC]

Concerning how to deal with the IT sector, which innovates frequently, under the frame of yen loan, we would recommend a gradual step-by-step support scheme.

The fact that technological innovation rapidly occurs in the IT field means that IT is not mature enough yet, and that there are still much room to be improved. Maintenance of an information system is not done only in order to keep its abilities of the time when the system was constructed. Maintenance of IT has different aspects from other technological fields (p. 143, p. 155).

In performing an assistance project in the IT field by using yen loan, continuous assistance is necessary to compensate for "inevitable deficiency" inherent in IT, after the project is completed. To do so, it is desirable that room should be left in advance to upgrade and optimize the completed IT system continuously.

One of the ideas to upgrade and optimize the IT system is to divide the project into two phases: a phase of constructing an initial system, and a phase of upgrading and optimizing the initial system. It is also necessary to distribute the budget for each phase. Completion of the initial system should be considered as one milestone in the whole project, and technological innovation which unavoidably occurs after that should be continuously adopted for a predefined period of time (for example, six years as a life span of the original system). By doing so, we can not only maintain the levels of the project effects at the time when the project was completed, but also we can obtain an opportunity to reduce a gap between initial needs (at the time of planning) and later needs (after the system begins operation).

6.3.2.6 Recommendation 6: Redefine the Scope of the "IT Sector" from a Strategic Point of View [Toward JBIC]

In the IT field, there are many difficulties in the process of project formulation. One of the findings from our survey is that, both in China and Indonesia, there were enough talented individuals and experts who understood technological trend and actually followed the trend (p. 44, p. 148). That is, in order to make a project in the IT field successful, the staff who can understand technology is needed in executing agencies, and the education and training of the staff should be emphasized.

We should reconsider how to educate the staff more carefully from a strategic point of view without limiting IT into a narrow range of information technology. The following fields are becoming more and more important recently with regards to IT.

- Radio frequency management (Cellular telephone, mobile communication, and other emerging areas)
- Promotion of the Internet
  Cyber café, community center
  IP address, Management of domain names, operation of internet exchanges
- Competitive policies to develop broadband (cable, ADSL, etc.)
  Activities to popularize broadband in several fields, such as education, public health, welfare, the senior, women, community
- Development of e-commerce
- Promotion of standardization, assistance in developing local language software (e.g., character code)
- Development of open software

Most of these are important to build a foundation to develop IT rather than directly to develop IT. It is important to create such a technological environment in order to introduce and promote IT in developing countries. In some fields, it is possible to earn constant income by maintaining domain names, if they can save some money. Also, since it is a public operation that is not suitable for commercial investment, it can function as possible assistance of JBIC.

These areas are closely related to information and telecommunications, public health, commerce and trade, education and culture, and the government of the beneficiary country has policy initiative and policy priorities over them. Thus, a project in these areas may be a success or failure depending on the factors that are external to the yen loan project scheme. The IT sector is becoming liberalized in order not to inhibit innovation even in developing countries, but liberalization may not is taking place in other areas. Public health, trade and commerce, education and culture are in most cases under strict regulation in order to fulfill social responsibility, which may inhibit the deployment of IT in these specific areas. The beneficiary country should be aware that the implementation of IT projects may entail the reform of domestic legal system and reorganization of the government. And, the government of Japan and JBIC are advised to encourage the beneficiary country to understand and implement the systemic and societal changes that IT may entail. Consequently, development assistance in the IT sector should be focused on the cross-cutting development of human and organizational capacity which is required to draw a grand design on national IT strategy and policy in addition to the ability to implement and manage individual IT projects.

In addition, projects to develop digital content also matter. Especially, creation of digital archives of local culture written in local languages, and maintenance of voice data of folklore are necessary in developing countries.

Although there are only a small number of training institutes in Japan, the following non-profit organizations that were not included in the previous development assistance should be considered to have institutes of high potential for training IT field.

- Center of the International Cooperation for Computerization (CICC)
- Japan Network Information Center (JPNIC)
- Internet Association Japan (an organization of the Internet business)
- BHN Association (an international NGO supporting humanity by communication and IT)
- WIDE Project (a group of developing and applying the Internet technology)
- Furthermore, the following institutes should be expected to provide cooperation in Asia.
- Asian Institute of Technology (AIT) (Bangkok)
- Multimedia University (Kuala Lumpur)
- APDIP (Asia Pacific Development Information Programme/United Nations Development Programme)
- Pan Asia Networking (Singapore/IDRC Canada)

It is also effective to build and maintain cooperation with these institutes to promote IT development in future.

7. Conclusion: Implications from the Survey and Lessons for the Future

7.1 Consideration and Lessons of this Survey

Finally, we discuss how project evaluation of IT field should be organized and conducted on the basis of our experience in the research and evaluation work, and draw lessons for future evaluation surveys.

7.1.1 Limitations and Recommendations of Evaluation in the IT Sector

For both JBIC and GLOCOM, it was the first time to evaluate IT projects which were implemented by development assistance. Limitation of the research does exist due to lack of our experience. But IT is a relatively new target in development assistance and attracting attention gradually these days, and it seems to be important to point out several issues at this point in history.

7.1.1.1 Early Implementation of Evaluation

First, evaluation was conducted considerably after the project was completed. This was one of the biggest limitations in the evaluation work. The project in China had been implemented over the period of 10 years or longer. When the mission visited MOIT, a considerable length of time had passed after the project was completed.

Obtaining accurate facts was difficult because among those who were responsible for the project, some were displaced and others forgot details. It was difficult to find concrete facts only from archived records and data.

Degree of change in the IT sector is remarkable. Because a cycle of technical innovation is short, the lifespan of a system is also short. Project evaluation should be conducted as soon as possible after the project is completed.

7.1.1.2 Mandatory Collection of Usage Data on a Regular Basis

Appropriate collection of data also matters. In most cases in the IT sector, a system is introduced, and so it is difficult for its effect to become obvious. And it is even difficult to measure the previous state, once time passed. Therefore, we should consciously collect data before and after the project, instead of doing so only after.

In any field, if we do not have baseline data as evidence of objective comparison, we cannot obtain it retrospectively. Especially in the IT sector, there are more soft system outputs than physical outputs, and so collecting baseline data is important.

Although it is important to conduct a third party's evaluation, it is very ineffective that only the third party collects data. The executing agency should also collect data constantly.

Thus, in order to exactly evaluate a project in the IT sector in the future, it is desirable to mandate the executing agency to collect data before and after the system is introduced.

7.1.1.3 Facilitate the Beneficiary Country to Conduct Evaluation

It should be effective and important that developing countries evaluate the effects of the project by themselves as well as the Japanese side does.

The mission visited three executing agencies and a number of related institutes in China and Indonesia. An in South Korea the mission visited the central and local governments. Through those visits, we noticed that some institutes were willing to evaluate the project effects by themselves, while others were not.

In general, those who are willing to do so and are actually doing so in fact are likely to have project effects more evident. It seems that the sustainability of the projects is related to the responsibility and autonomy of the executing agency, and so it seems to be effective to plan to give guidance for such active evaluation of a project.

In addition, third party's evaluation has been carried out by Japanese consultants so far. We should consider the possibility of employing local consulting in the beneficiary country.

Again, it is highly possible that the effects of IT system would appear indistinctly, rather than explicitly, in mixture with other elements of society. So, in order to conduct data collection and analysis more accurately, local consultants who are more familiar with the country and society and can speak the local language should evaluate projects.

It is also possible that the consultants of Japan and local consultants in the beneficiary country cooperate to conduct evaluation together, as in our survey where local consultants were responsible for the additional survey. If possible, it would be desirable that local consultants in the beneficiary country take lead on project evaluation.

7.1.2 Systemize Project Management

During the evaluation work, we examined boxes of documents and literature which are archived by JBIC. All the previous records are paper-based. These documents did not have indices or were not arranged in order. It took longer to review them than it should, and productivity was quite low.

We should now remember the lesson from the "Foreign Loan Project Management Information System", which was developed as part of the State Economic Information System in China in order to achieve systematic management of projects. This system was developed by the assistance of JBIC.

It is surely necessary to utilize a filing system, whether or not the system is paper-based. Moreover, we recommend that project management should be systematized, especially in terms of computerizing data, and systematizing information management.

If we maintain at least the basic data and the main information in a system by putting them into

electronic format, we could utilize them for multiple purposes such as appraisal of a project.

Also, we could utilize the information as reference sources to develop a similar plan as well as to evaluate a project afterward. We hope that our recommendations will be useful in promoting such a successful system.