Local Government Science and Technology Policies in Japan: Emergence and Challenges

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1. Introduction

After WWII, Japan recovered in dramatic speed and now has the second largest GDP in the world, second only to the United States. During the 60s and 70s, Japan kept a rapid pace of development. Even after the depression because of the Oil Shock, Japan recovered its growth pace and kept it until the early 90s.[*1]

With this rapid growth, Japan invested a vast amount of local infrastructures all over the country. The growth was concentrated in the "Pacific Belt Zone" that included major cities, such as Tokyo, Osaka, Nagoya, and Fukuoka. This growth caused two problems. First, the overconcentration caused a decrease in the quality of life in the large cities. Second, the difference between developed cities and lagged local societies increased. To address this problem, the Japanese government developed the slogan "Balanced Development" in 1970. A part of its Comprehensive National Development Plan, the goal of its national development, and based on that concept, investments in local society infrastructures, such as roads, rails, water, and sewage, were justified.[*2] Japan developed a centralized government organization and the national government controlled and balanced the investments all over the country.[*3] With these "balanced" investments in social infrastructure, Japan established a relatively "balanced" country where gaps among regions were relatively small. The balance was good from equality point of view. However, the balance prolonged relatively less efficient societies and industries in local areas that could not be maintained in a more competitive circumstance. Also, the over centralized structure of the government caused the uniform, but inefficient, policy administrations.[*3] In the past, Japan enjoyed rapid economic growth and so the national government maintained local development, even without that inefficiency.

However, recent long-term economic depression and an ageing society made it difficult for the national government to fully support the local governments to fulfill all their demands. Also, the efficiency of the policies should be improved. Today, more efficient public policies suitable for the needs of each local society are required and decentralization is the key to realizing this reality. Consequently, there is currently a strong trend for decentralization in Japan. The detailed discussion for reallocation of authorities and resources are held between the national government and the local governments, while actual decentralization has progressed.

In the Science and Technology field, there is also a need for a qualitative change in policies. The Japanese development was based mainly on the manufacturing industry. The national government invested a vast amount of infrastructures to support the growth. This development was seen, especially in the Japanese manufacturing industry that was good at manufacturing high quality products based on a mass production system that employed many subcontractors with strong technical skills. They captured the innovative technology of leading countries (such as the United States and the European Union) and improved it. With this strength, the Japanese manufacturing industry enjoyed their growth, even without R&D in completely new technologies and products. However, changes in the international competition regime made that strategy difficult to succeed. First, based on the more freely international competition, a simple manufacturing firm can't could not compete with other countries, such as China, where firms could access low wage and high quality workforces. Manufacturing firms in Japan could not live without

the cooperation of these firms and it caused the hollowing out of manufacturing industries, especially in regional societies.

To overcome this competition, regions must produce higher value-added products and, for that purpose, the regional basis for research and development is necessary. Second, the growing center of the whole industry shifted from manufacturing to knowledge-based industries. In knowledge-based industries, innovation and new knowledge creations are the sources of competitiveness. Stronger intellectual property rights make it impossible for the firms to "copy" the others' idea. Developing the "new knowledge creation" and industries based on this is important not only for the national government, but also for the regional governments, since they suffered directly from hollowing out of industry. Given this view, the role of local governments in Science and Technology policy has been emphasized – that it is necessary to activate local industry and to improve the quality of life in the regions. For example, local Science and Technology policies are treated as important issues in the Basic Law on Science and Technology (1995) and the Science and Technology Basic Plan based on the law.

Under this circumstance, I will argue that local governments are expected to exert each government's ability and make policies that fit to each local situation. As for legal structure, many rules concerning the relationship between the national government and the local governments have been changed to encourage each local government's initiatives. However, because of the long-term history of centralized government, the local governments tend to have limited ability so far to plan complete unique policies in every policy field so far. Consequently, even now, local governments rely heavily on the national governments.

In this paper, I will argue that local governments currently have insufficient abilities for setting policies by reviewing the local government's reliance on national policies. This inability contributes to the deepened discussion of resource reallocation. First, I will briefly introduce the regional distribution of Japanese R&D abilities, and then I will discuss several policy tools concerning Science and Technology policies in local government and the effect on the national government. As for the unit of analysis, I will mainly use prefectures because they are suitable for Science and Technology policies.

2. Centralized local policies and current trend of decentralization

In Japan, the modern government was established in 1860s-70s after the feudal society in the Edo era. The new government, the Meiji government, abolished the clans that took charge of the local administration in the Edo era in decentralized manner and established the centralized local government system. After WWII, the local policy system was changed significantly. For example, in the Meiji system, the head of each prefecture was assigned by the national government. After WWII, the popular election system was introduced. However, the characteristics of the centralized local policy system remained with the remaining administrative functions imposed upon local governments by the central governments. In addition, "During the high-growth period, along with the development and growth of public administration, new type of centralizations of autonomy, such as control by instructions and subsidies, has been accumulated.

This centralized government system was suitable for concentrating scarce resources in the central

government and for the efficient utilization of the strategic focus on certain sections or regions. This characteristic contributed to the economic development of our lagging country at that time and contributed to catching up with the leading countries in a relatively short period.

However, the centralized government system had significant problems, such as restricting the local autonomy, realizing the national unity, corrupting the local economic basis for national economic development, depriving the local resources and energies, and over concentrating the resources, such as authority, financial resources and human capital at the national government, and to discounted the variety of regional circumstances and discouraged the regional and unique cultures by emphasizing the national unity and equality.[*3]

Given these problems, beginning with an "Appeal for the promotion of local autonomy" in Diet in 1993, there has been a strong trend for the enlargement of local autonomy. The basic motivation for the decentralization was described in the appeal as follows:

"There is strong expectation for the role that local public governments should carry out to remove the over-centralization to Tokyo that generates various problems to promote the balanced development of the nation, and to realize a society where people feel comfort and affluences. Based on that, the voice of people that hopes to promote decentralization by reviewing the form of the centralized government forms a strong flow today.

In response to expectation of people, followings are the urgent missions; to review the role of the national government and local governments, to strengthen the local governments' autonomy by handover of power from national government to the local governments and strengthen the local governments' financial basis, and to establish the local governing suitable for the 21st century."[*4]

In short, the logic is that the stronger autonomy of the local governments solves the problems of over-centralization in Tokyo in order to realize the balanced development of the nation and to realize the comforts and affluences.

After the appeal, the Committee for the Promotion of Decentralization was established in 1997, and around the committee, various stakeholders had intensive discussions about the concrete plan.

That the main action of the decentralization started from national government side, not from local side, is interesting. For example, the appeal in Diet that I described above shows that the reason for the decentralization seems to stem from the national point of view, rather than from the local view. The Committee also stated the reasons for the decentralization in their interim report as follows:[*3]

- Fatigue of centralized government system
- Response to the changing international society
  (National government should concentrate on the issues that require international management.)
- Correction of the overconcentration to Tokyo
- Establishment of a diversified local society
  (Local society should be unique based on their endowments. Rulings from the national government should be minimum.)
- Response to the aging society and the society with fewer children
  (In response to these problems, more comprehensive policies and collaborative activities among government and other players are required. It is not suitable for the centralized system and requires

ideas of local governments.)

These arguments also seem based on the national viewpoints. Then, what was the role of local governments during this discussion? Actually, local governments played a significant role. They formed six associations of local governments (association of governors, association of mayors, association of town and village heads, association of prefecture assembly chairmen, association of city assembly chairmen and association of town and village assembly chairmen) and these associations input their opinions, both jointly and separately.[*5] Their opinions affected national planning significantly. Even now, there is an active exchange of opinions between local governments and national governments, especially for the reduction of national government subsidies and the transference of tax revenue sources.

As a big milestone, the Law on Decentralization of Government Power was enacted in 2000. The law declared the change of the government system from a centralized administration to decentralized one. Furthermore, the local governments were defined to be on equal footing with the national government. Policy interventions from national government to local governments, such as instructions not based on any law, were reviewed and were limited to the minimum.[*6] In addition, with these changes in rules, the "plan on the Reform of the Three Major Policies (government subsidy, transference of tax revenue sources, and local allocation tax)" had been discussed and partly implemented.

3. Science and Technology policies in local governments

As discussed above, local governments were supposed to establish their own Science and Technology policies suitable for the needs of each locality. It may contribute to activating the local industry and to improving the quality of life in the regions. The current distribution of Science and Technology activities is far from balanced, so the adequate policy should be diverse among the regions. In this section, I will introduce the various Science and Technology activities in the region and their distribution.

3.1. Research Institutes

There are 498 research institutions owned by local governments (47 prefectures and 12 cabinet-order designated cities) (as of FY 2004). These institutions employ 13,630 researchers, 3.4% of total researchers in Japan, and also spend 293 billion yen (US$ 2.5 billion), about 1.5% in total R&D expenditure in Japan. The public owned research institutions are widely distributed among prefectures (see figure 3.1.1. Gini coefficient = .203). The distribution of researchers is a bit more concentrated (see figure 3.1.2 Gini coefficient = .221). That the correlation between the number of institutions and the number of researchers in each of the prefectures is relatively low (corr = .534) is interesting. The number of researchers is more correlated with the total populations of each prefecture (corr = .738). Actually, the six top prefectures in the number of researchers are among the nine prefectures in total population.

Most of their research funds come from prefectures. These funds correspond with the 46% of

total Science and Technology expenditures in the local governments. The expenditure of these institutions is highly correlated with the number of researchers. It is quite natural because more than 55% of their expenditures are, on average, labor costs. Most of the researchers in the government-owned research institutes are life-long employees, so it should be considered a fixed cost. It is interesting that more than 70% of the institutes receive funds from outside, but the average amount of funds of each institute (those who received funds from outside) is only 31 million yen (US$ 270 thousands). In total, the funds from the outside are less than 5% of the intramural expenditure on R&D. This result brings skepticism about the market value of research in the research institutes.[*7]

Fig 3.1.1 Number of research institutions owned by local government

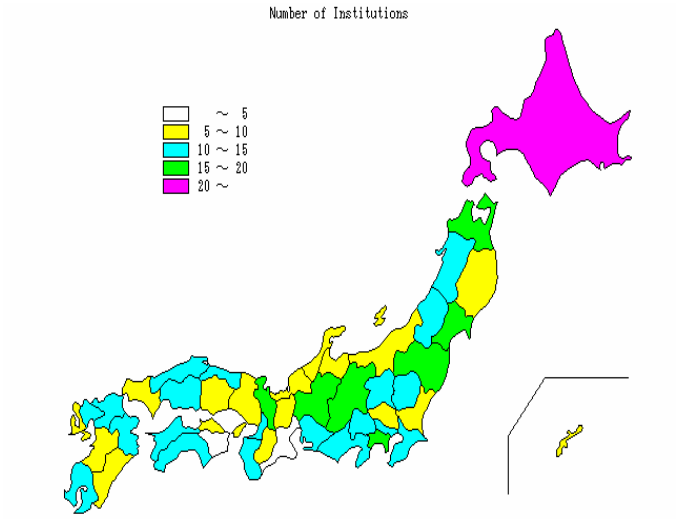
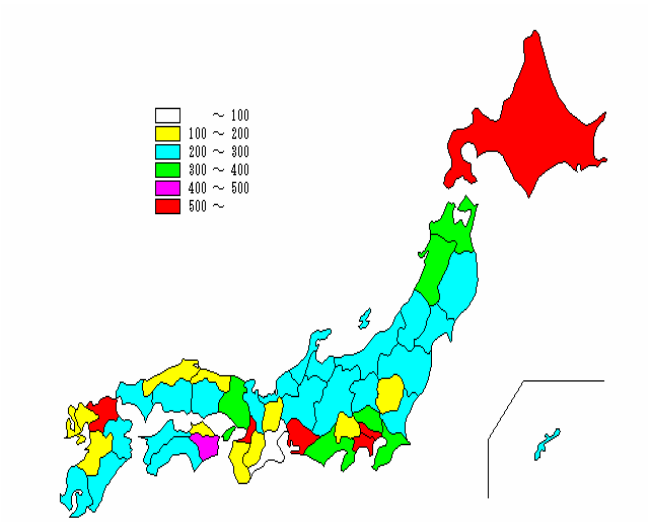


Fig 3.1.2 Number of researchers



Source: Survey of Research and Development FY2005, Ministry of General Affairs, Japan

Figure 3.1.3 shows an increasing patent ownership by public research institutes owned by local governments. However, as of 1999, only 16.3% of the public research institutes have licensed at least 1 patent (Figure 3.1.4). The statistic is far lower than national research institutes (including independent administrative agencies), or government-affiliated corporations.

Worth noting, however, is that most public research institutes have the function of technological service, such as technology guidance and diffusion for local companies. So, patents, or licensing only, cannot represent the value of public research institutes; some research institutes concentrate on technological service, rather than on the research activities.

Fig. 3.1.3 Number of patents owned by public research institutes owned by local government

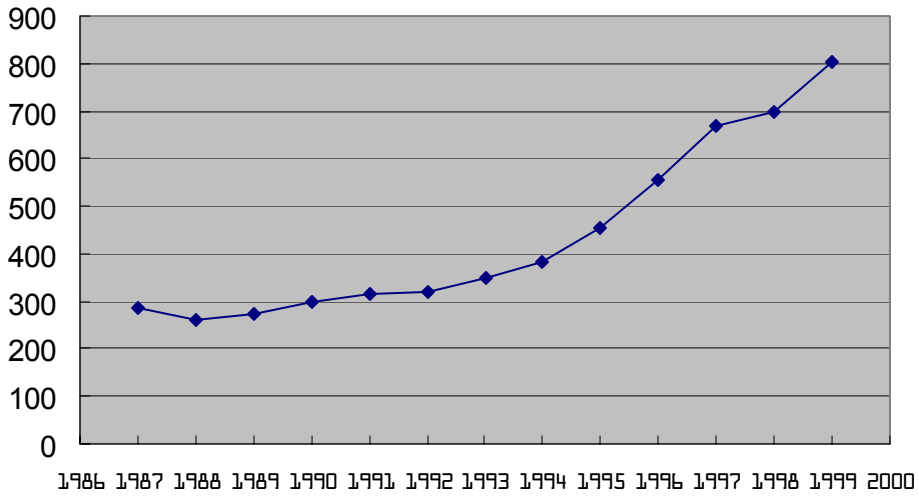
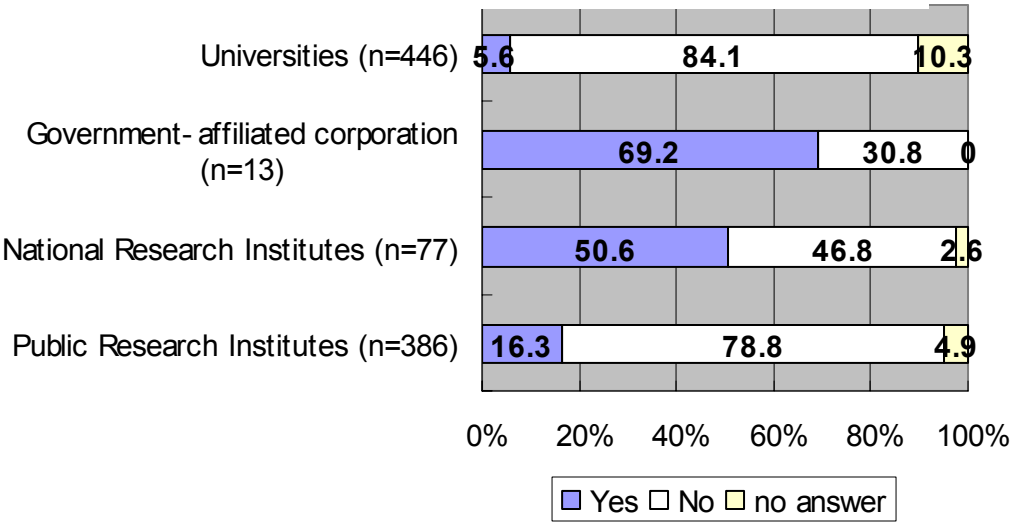


Fig. 3.1.4 Presence of patent licensing in each institution



Source: "Assessment for the Effects of R&D Policy on Economic Growth (Interim Report)" NISTEP 1999

3.2. Universities

There are 726 universities in Japan as of FY 2004. Among these, 87 are national universities and the other 86 are public universities owned by local governments. (Actually, all national universities became independent administrative agencies in 2004 and this change increased the autonomy of each university. However, there are still subsidies and policy interventions directly from the national government. In this paper, I will use the term "national university" for these universities.) Universities are concentrated to the large populated prefectures, especially Tokyo (123), Aichi (49), and Osaka (52) (Gini coefficient is .494). However, national universities and public universities are more equally

distributed. (Gini coefficients are .336 for national universities and .398 for public universities). This is important because in Japan national universities tend to have more active and superior research, in general. For example, as for Grants-in-Aid for Scientific Research (or "Kakenhi"), the largest competitive research grant in Japan (40% of competitive grants from the public sector), was among the top 30 universities and research institutes that received the grant. Of these universities, 26 were national universities. What remains are three private universities, two public universities, and one national research institute. In total, every prefecture has at least has two universities, including one national university.

As for the number of students in graduate schools, they are more concentrated. (Gini coefficient is .610). The distribution is relatively equal for national universities (Gini coefficient is .53) and relatively concentrated for public schools (Gini coefficient is .715) (Ten prefectures do not have graduate schools.) and private schools (Gini coefficient is .796).

From the viewpoint of Science and Technology policies, it is interesting that six prefectures do not have universities owned by themselves (Tochigi, Chiba, Tottori, Tokushima, Saga and Kagoshima). They surely have some handicap about Science and Technology human resources.*7

As of FY 2004, Universities (including colleges and research institutes inside the universities) spent 3,274 billion yen (US$ 28 billion) as the intramural expenditure on R&D. National universities spent 41.8% of them, public universities spent 5.8%, and private universities spent 52.5%. Private schools spent more than 1.3 times per regular researcher than national and public universities, but two-thirds of them are labor costs.

There is a significant difference among the universities in terms of received funds. In total, 15% of their intramural expenditure is from received funds. This rate is especially high for national universities (22%). In contrast, it is low (8.7%) for public universities. This rate could show that the research quality in public universities is relatively low.*8

Fig. 3.2.1 Number of universities

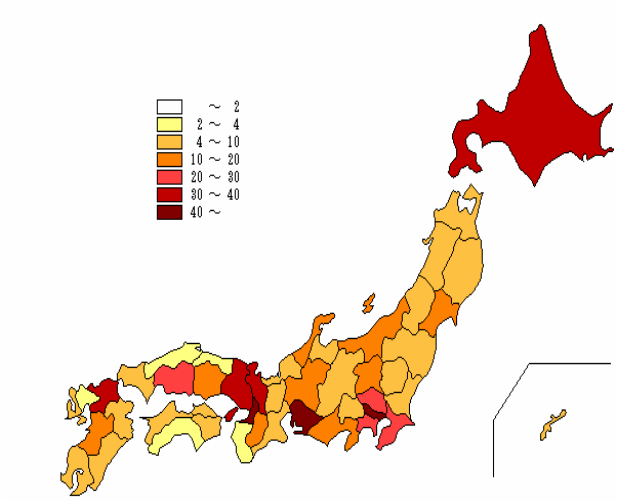
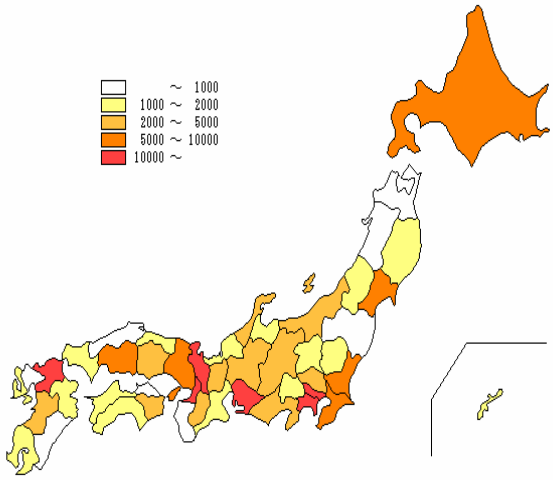


Fig. 3.2.2 Number of graduate students



(Source: data from Basic School Survey FY2005, MEXT)

3.3. Expenditure of Local Governments

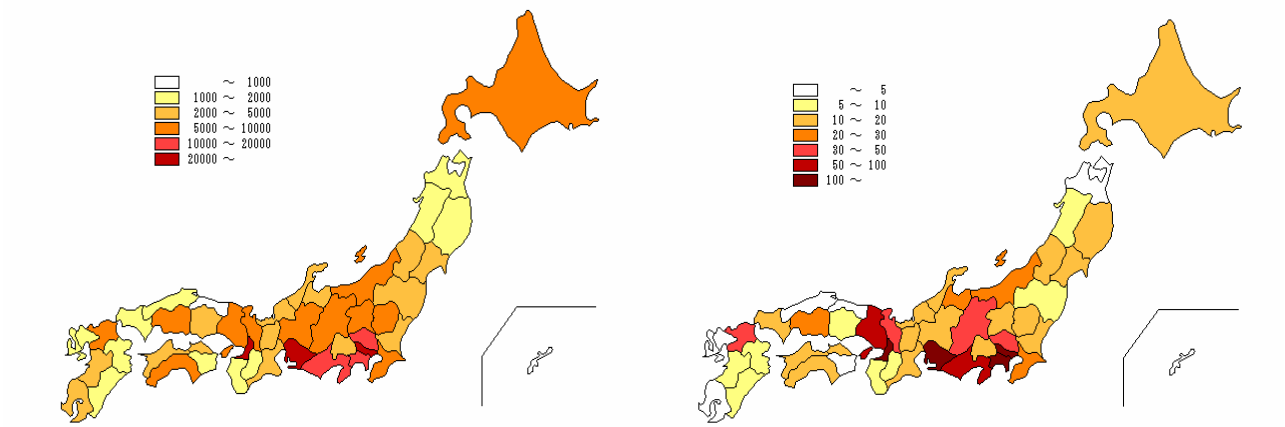
In Japan, local governments spent 781 billion yen (US$6.8 billion), roughly 17% of the government (national and local) expenditures in Science and Technology fields (as of 1999). 46% of them were funded to public research institutions, and 33% of them were funded to universities and other higher education institutions owned by the local governments. In their expenditures, subsidies from the national government were only a small portion (around 5% as of 1999). For example, in 1999, the percentage of subsidies from the national government in total Science and Technology expenditures was around 5%, on average, and there were only three prefectures in which subsidies from national government exceeded 20%. Among these three prefectures, investments for improving facilities corresponded to more than 20% in two prefectures. Another one prefecture was a special case where they received a certain amount, or subsidy, in exchange for accepting nuclear facilities. From the national government's side, subsidies for local governments were a small portion in total R&D expenditure. In FY 2003, more than 85% of the total R&D expenditure of the national government was spent in the end on national research bodies, such as national universities, national laboratories, government-affiliated corporations, or independent administrative agencies. In contrast, local public research bodies (public universities and public research laboratories) correspond to less than 1%.[*9]

3.4. R&D Activities in Private Companies

Private companies are the most important players in R&D activities. As of FY2004, private companies spent 70.0% of the total R&D expenditure in Japan. They also have 56.7% of the total researchers. They also filed more than 90% of patent applications.[*7, *10]

Fig. 3.4.1 Distribution of manufacturing firms

Fig 3.4.2 Distribution of manufacturing firms that capital is over 1 billion yen



Source: Establishment and Enterprise Census 2004, Ministry of Internal Affairs and Communications

Unfortunately, there is no official statistic on the distribution of R&D expenditures by private companies. However, one can assume its characteristics by using the distribution of manufacturing firms,

especially those that have large capital. Statistics show that the manufacturing firms spend 87.5% of total R&D expenditures by private companies. The manufacturing firms capital is more than 1 billion yen (US$8.7 million) spend 79.7% of total R&D expenditure by private companies.[*7]

Figures 3.3.1 and 3.3.2 show the distribution of manufacturing firms. The manufacturing firms are concentrated (Gini coefficient is .5025) and the large manufacturing firms (those that capital is more than 1 billion yen (US$8.7 million)) are more concentrated (Gini coefficient is .7175). But, on the other hand, most prefectures (except Tottori and Okinawa) have more than 1,000 manufacturing firms, and all the prefectures, except Tottori, have at least two large manufacturing firms. These can be each region's key players for Science and Technology policies.

3.5. Distribution of Patent Applications

As of 2004, Japanese residents applied for 368,416 patents. The applications are concentrated in Tokyo (49.1%) and Osaka (17.0%). Gini coefficient is .835.[*10]

(Actually, this statistic is based on the place of application, not the place of R&D. Consequently, a significant portion of the applications are applied for in the region of the company's main office, not in the R&D facilities.)

As I describe later, encouraging the acquiring of patents is one of the common items in the basic Science and Technology plan in each prefecture. How has the distribution of the patent applications among the prefectures changed over time? Table 3.5.1 shows that the total number of patents applied for by Japanese and its Gini coefficients between 1997 and 2005.

Table 3.5.1 Number of patent applications by Japanese and Gini coefficients among prefectures

	1997	1998	1999	2000	2001	2002	2003	2004
Total application	350,807	359,381	360,180	387,364	386,767	369,458	362,711	368,416
Gini coefficients	0.8386	0.8387	0.8348	0.8322	0.8345	0.8339	0.8343	0.8351

Sourece: Annual report of Japan patent Office

That both the total number of applications and the Gini coefficients are stable over time is interesting. However, in the prefectures level, there is a significant difference in the trends of patent applications. Table 3.5.2 shows the change in the number of applications from the average of 1997 and 1998 to the average of 2003 and 2004. On the one hand, Aomori doubled their applications. On the other hand, Fukushima decreased its application more than 30%. For reference, both of these prefectures are relatively country and resemble the characteristics, such as the number of universities (8 for Aomori and 9 for Fukushima), the number of public research institutes (16 for Aomori and 15 for Fukushima), and the total population (1,452,000 for Aomori and 2,106,000 for Fukushima). It shows that, even among local prefectures in the countryside, there can be significant differences.

Table 3.5.2 Top 5 prefectures and worst 5 prefectures

in the change of number of patent applications

Aomori	109.2%	Miyazaki	-18.4%
Ibaraki	95.0%	Kumamoto	-19.4%
Akita	53.7%	Shizuoka	-21.4%
Kouchi	52.9%	Yamagata	-25.5%
Wakayama	46.9%	Fukushima	-31.1%

Sourece: Annual report of Japan patent Office

3.6. Conclusion in this section

3.7. Conclusion in This Section

Based on the data above, the R&D activities are generally concentrated on the Pacific Belt Zone. The Population, education, and general economic activities are also concentrated in those prefectures. As for the public owned research institutes, the distribution is more balanced among prefectures, but the number of researchers show that there are still significant differences among prefectures; generally more populated prefectures have more resources and more research activities. Some prefectures do not own public universities. In short, the difference among prefectures is very large.

Given that circumstance, some policies that work in a prefecture might not work in another prefecture because of such differences. For example, collaboration activities between research institutes and local companies may have very different effects on the local market. If there is not a sufficient number of companies in the region, the effect may be quite limited. Prefectures must review their own endowments to develop their own policies.

For the national government, these differences are an important political agenda. Decentralization does not solve this inequality problem; even with their best effort, lagging prefectures may not catch up with the leading prefectures because of less endowments. Of course, it is not feasible to give all prefectures the same high level of research abilities. However, the national government must set their goal of the distribution of research abilities and support lagging prefectures based on that goal.

4. Effect of the national governments' policies on local government

In the last section, I discussed the importance of the unique Science and Technology policies suitable for each prefecture's need. The next question is whether prefectures establish unique Science and Technology policies. Of course, in a small project level, the prefectures may review local needs and abilities, but how about their broad plan? The plan is quite important because each prefecture (especially lagging prefectures) must develop their unique set of Science and Technology based on future development and this requires long term strategies.

In this section, I first introduce the Basic Law on Science and Technology and the national Science and Technology Basic Plan as the basis of analysis. Then, I analyze the basic Science and

Technology policies in prefectures. When are they established? What are their goals? How the national basic plan affects them?

4.1. The Basic Law on Science and Technology

The "Basic Law on Science and Technology" was enacted in 1995. The law was enacted by the political initiative and was the first kind of law that defined the basic direction of the national Science and Technology policies. It was based on the idea that Japan must stand with innovation and with Science and Technology. At that time, Japan was undergoing an economic boom, but there was some sense of stagnation because people felt Japan lost their immediate goals. Japan needed to change their role in international competition from a “catching up” country to a “front runner” country. This change was necessary for future, long-term development, but required more investment in Science and Technology. In the law, the national government is required to establish its Science and Technology basic plan. The Law includes general guidelines for the later policies in Science and Technology as follows:*11

- Balanced Promotion of various levels of R&D
- Securing researchers and supporters
- Improvement of facilities
- Promotion of implementing information technology for R&D
- Promotion of exchange in R&D
- Effective use of R&D funds
- Making public the results of R&D
- Support of efforts by private enterprises
- Promotion of International Exchange
- Promotion of learning on Science and Technology

4.2. The Basic Law on Science and Technology and the National Science and Technology Basic Plans

Followings are the brief overview of the detailed policy measures in the first term of the Science and Technology Basic Plan. The plan was established in 1996 based on the Basic Law and its planning horizon was between 1996 and 2001. The main political impact of the plan was the commitment of 17 trillion yen (US$148 billion) expenditure in five years for Science and Technology and the establishment of more flexible human resource policy in national universities and research institutes. Also, it includes quite wide range of policies.*12 This structure may be an example of Science and Technology basic policy in prefectures.

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I. Securing Researchers and Improvement of the R&D System
   (1) Securing and Training Researchers and Supporting Staffs
   (2) Developing the R&D system
      Utilize manpower from outside
      Promote human exchange (joint research, granting priority
      rights on the achievement, permission of 'outside work',
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joint use of facilities)

Flexible organization management and effective use of funds

(3) Various Evaluations (R&D subjects, R&D institutions and researchers)

II. Developing and Improving the R&D Infrastructure

(1) Establishing and Improving R&D facilities and equipment

(2) Promotion of the Information Infrastructure for R&D (Network, Database)

(3) Improvement of the Intellectual Infrastructure

III. Expansion of Various Types of Funds

(1) Expansion of Competitive Funds

(2) Expansion of Priority Funds for Promoting Diverse R&D

(3) Increase of Basic Funds

IV. Upgrading Research at Private Universities

V. Promotion of R&D by the Private Sector; Application of R&D Achievements by the Public Sector

(1) Promotion of Private Sector R&D (tax incentive, subsidy, IP rights)

(2) Application of R&D Achievements of the Public Sector (information distribution, IP rights)

VI. Promotion of International Cooperation

VII. Promotion of Science and Technology in Regions

VIII. Promotion of Learning and Understandings of, and Interests in Science and Technology

(1) Improvement of Science and Technology Education in School Education

(2) Provision of Various Opportunities to be familiar with Science and Technology

(3) Promotion of Understandings of, and Interests in Science and Technology

Following is the overview of the policy measures in second term of the Science and Technology Basic Plan. It was established in 2001 and its planning horizon was between 2001 and 2005. The main change from the first term is the introduction of "Strategic priority setting in Science and Technology". In the plan, based on the importance for the nation and society, eight areas of technology (life sciences, information and telecommunications, environmental sciences, nanotechnology and materials science/technology for primary areas, and energy, manufacturing technology, infrastructure, and frontiers (outer space and oceans) for secondary areas) are defined as priority areas. Also, further Science and Technology system reforms to create and utilize excellent technology is another point.[*13]

Strategic Priority setting in Science and Technology
Promotion of basic researches, upgrading research quality by fair a
transparent evaluation
Prioritization of R&D on eight fields
Support for emerging fields with foresight and mobility
Internationalization of Science and Technology activities
Initiatives in international cooperation
Enhancement of dissemination of information to the world
Internationalization of domestic R&D environments
Science and Technology system reforms to create and utilize excellent resul
R&D system reforms
Doubling the amount of competitive funds and allocating funds for indire
expenses
Mobilizing human resources using the fixed-term appointment and t
apply-and-review basis recruit
Encouraging self-reliance of young researches (special funds, positionir
Reforming evaluation systems to secure fairness/transparency and to refle
evaluations into resource allocation
Reinforcement of industrial technology and reform
industry-academia-government collaboration
Science and Technology promotion in regions: establishment of "intellectu
clusters"
Science and Technology human resource development and Science and Technolo
educational reforms: education of researchers and engineers, and reform
universities
Promotion of Science and Technology learning and construction of channe
toward society
Ethics and responsibility on Science and Technology: bioethics, responsibili
of researchers and engineers, accountability and risk management
Maintenance of infrastructure for Science and Technology promotio
improvement of facilities in universities with top priority

The third term of the plan is just established in March 2006.

4.3. Local basic plan of Science and Technology policies

Today, all 47 prefectures have their own Science and Technology basic plan (Actual names of

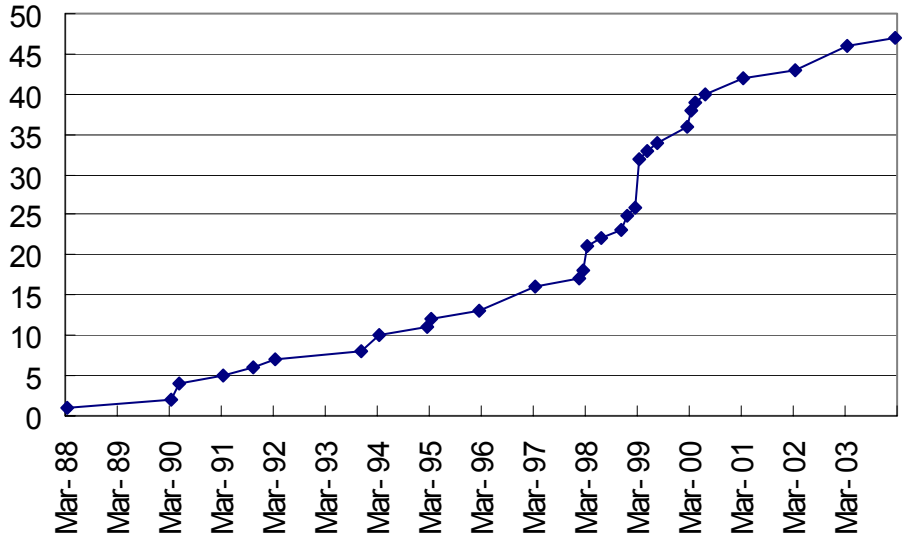
the plans vary among governments). Part of the direct reason is the definition in the Basic Law. In the law, "concerning promotion of Science and Technology, planning and executing policies according to the national policies, and autonomous policies that utilize the special characteristics of the area" is defined as the "local governments' responsibility".[*11] The law provides the juristic backbone for Science and Technology policy planning in prefectures and actually encourages the action of local governments.

Also, the national government's commitment for increasing their investment for Science and Technology may have encouraged the efforts of local governments. For example, when the national government committed to spend 17 trillion yen (US$148 billion) in five years in the first term of the Basic Plan, there was no concrete idea about how to use it. As I described above, the percentages of subsidies from the national government in the total Science and Technology expenditure of local governments are small on average. However, the percentages could contribute to a one-time (not stable) expenditure, such as an investment for facilities and ad-hoc projects that prefectures are relatively difficult to bear. In addition, though it is not included in the "expenditure of local government," funds for research in national universities in each region were also increased. So, it was a good opportunity to plan Science and Technology policies in each region to attract central money.

4.3.1. Timing

Figure 4.3.1 shows the timing of the first establishment of each prefecture's basic Science and Technology plan. The first plan of this kind was established in 1988 in the Osaka prefecture. Five prefectures established their plans between 1990 and 1992 (Tottori, Iwate, Kanagawa, Hyogo, Toyama and Yamanashi). However, until November 1995 when the Basic Law on Science and Technology was enacted, only 12 prefectures had this kind of basic plan. Many prefectures established their plans during 1997 and 1999. This timing, itself, shows the strong reliance of Science and Technology policies in prefectures on national policy.

Fig. 4.3.1 Timing of establishment of Science and Technology basic plans in prefectures.



Source: Science and Technology White Paper 2005

Further, in some prefectures, the establishment of the Science and Technology basic plans seems to be derived from the results of the national political mood, rather than by policy needs. Among 47 prefectures, 18 prefectures did not post their basic plan on their web sites. Not posting did not mean that they discarded the plans, but actually that the plans did not seem to have an active role now. Actually, most prefectures have a comprehensive basic plan for all areas of their policies. Also, some prefectures have more specific plans for industrial policies or environmental issues. For practical purposes, these plans can provide grounds for the policies in this area and they may ease the process for getting a budget and other support.

4.3.2. Affect of central policies into the substance of local basic plans

In 4.3.1 I discussed the effect of national government Science and Technology policies to the timing of the first establishment of each prefecture's basic Science and Technology plan. The next question is whether the national policies affect the substances of the prefectures' Science and Technology basic plans.

To address this question, I checked the changes of the Science and Technology plans in prefectures. For that purpose, the prefectures that have following characteristics are used as the samples:

- Established their basic Science and Technology plan before the Basic Law
- Renewed the plan after the establishment of the first term of the national Basic Plan

There are eight prefectures that meet these criteria, and I used three prefectures (Ibaraki, Kanagawa and Yamanashi) as the cases. The sample selection was based on the data availability.

4.3.2.1. Case of the Yamanashi prefecture[*14,*15]

In Yamanashi prefecture, the first basic plan was established in 1992 with the recognition that a

Science and Technology had a big role in the development of the industries and the improvement in quality of life. The basic concepts of the plan were as follows:

- Develop Science and Technology that is familiar for the residents, concerning unique climate of the prefecture
- Develop Science and Technology that suitable for the future vision, concerning social trends
- Develop Science and Technology from the international viewpoint
- Develop Science and Technology that is coupled with the residents

The goals of the plan were defined as follows:

- Realize innovative cultural environment
- Realize high quality of life
- Realize the comfortable region where human and nature are in harmony
- Realize the unique industrial structure
- Encourage international cross-fertilize and cooperation

The basic plan itself is a set of concepts rather than the actual policy measures. However, based on the plan, they set an action plan. The main policy measures in the action plan were as follows:

- Create an environment to facilitate residents' familiarity for Science and Technology
  - Museum of Science for children and youth, Events, Opportunity for lifelong learning, etc.
- Grow innovative human resources
  - Education in Science and Technology, International exchange for youth, etc.
- Establish the basis for R&D activities
  - Development of public research facilities, Improvement of research capacity
- Establish the system that facilitate R&D
  - Establishment of Yamanashi Science Academy, Increasing opportunity for cross-fertilize
- Develop the administrative system for Science and Technology policies

Among these policy measures, the establishment of the Yamanashi Science Academy is interesting. It is an incorporated association that; a) facilitates cross-fertilization of the researchers and the engineers by presenting the researches concerning the promotion of Science and Technology and the information provision/exchange; b) enlightens the residents on Science and Technology; to contribute the development of the researches and the technologies in Yamanashi.

The action plan was renewed in January 1999. Unlike other prefectures, the Yamanashi prefecture kept their basic plan itself, but made a new set of the actual policy measures as the new action plan. The reason of the renewal was stated as "increasing expectation for Science and Technology because of the changing environment for regions such as borderless economy, ageing society and elicitation of environmental problems".[*15] Also, the definition in the Basic Law that requires the active role of the prefectures in Science and Technology policies was stated as a reason for their renewal. In the action second plan, generally the policies in the first plan are taken over. In addition, the following measures were added.

- More measures that stimulate knowledge exchange among universities, research institutes and private companies (Establishment of Technology Licensing Offices, Facilitation of non-used patents, Settlement of coordinators for cooperation researches, and Information provision of research activities)
- More flexible research environment (Simplification of procedures to start cooperative researches, Increasing the mobility of researchers among public research institutes, Increasing visiting researchers, Reviewing the introduction of fixed term employment for researchers and admittance of dual employment)
- Adequate evaluation of research institutes and research projects

It is worth noting that the Yamanashi prefecture is planning the next renewal of their action plan in FY 2006, following the establishment of national new Basic Plan in March 2006. In their second action plan, they stated that they would review the action plan 5 years later, but actual interval between current action plan and the next one will be eight years. It shows that the prefecture feels that its basic plan must be consistent with the national plan. It seems irony that the basic law requires the local governments their initiatives and uniqueness in Science and Technology policies, but the national basic plan based on the same law stimulates the passive policy planning.

4.3.2.2. Case of the Kanagawa prefecture[*16,*17]

In the Kanagawa prefecture, first basic plan was established in 1990. The basic concept of the plan was the establishment of the basis for Science and Technology policies. The goals of the plan were defined as "Improvement of quality of life", "Upgrading of the local industries" and "Contribution for the knowledge creation and evolution". The main policy measures in the plan were stated as follows:

- Establish the basis to encourage Science and Technology
- Develop the centers for R&D
- Grow and settle the innovative human resources
- Facilitate the international collaboration
- Facilitate the R&D open to the public and strengthen administrative framework

And also they set the following fields as strategic fields in R&D to be facilitated.

- Human and social related Science and Technology
- Industrial Science and Technology
- Innovative Science and Technology

Their main direct policy measures were the reorganization and development of the prefecture's public research institutes and the establishment of the Kanagawa Academy for Science and Technology (KAST). KAST is a foundation linked with the prefecture, and has wide range of functions in education, research, diffusion and enlightenment for Science and Technology.

The plan was renewed in January 1997. They presented following reasons for their renewal.

- Dramatic change in economical and social circumstances such as hollowing out of manufacturing industries because of overseas transfer of the firms, aged society and residents' more awareness for environmental and safety issues
- Successful establishment of the prefecture's Science and Technology basis such as the reorganization and development of the prefecture's public research institutes and establishment of KAST
- Clearer legal definition of the prefectures' activities for Science and Technology based on the establishment of the Basic Law on Science and Technology and the Law for the Promotion of Decentralization in the nation

In the first plan, target period was not clear. For the second plan, they defined the plan as "guideline for the prefecture's Science and Technology policies in about next five years, with the vision of next 10 years". In the second plan, the basic concept was to facilitate the networking and the cross-fertilization. It meant the policies would change from the "hardware" policies into the "soft" policies. The basic goals for the second plan were defined as "Activation of local economy", "Improvement of residents' quality of life", and "establishment of innovative, attractive and cultural local society". The main policy measures in the plan were stated as follows:

- Develop the networks among research institutes
- Facilitate the cross-fertilization in R&D
- Actively utilize the research results
- Enrich the coordination activities to facilitate cooperative researches
- Grow and settle the human resources

And also they set the following researches as the strategic research fields.

- Researches that aim the activation of local economy
- Researches that aim the improvement of residents' quality of life
- Basic and innovative researches

The plan was renewed again in March 2003. One of the reasons for the renewal was that the target period of the second plan was five years. In addition, they presented following reasons for the second renewal.

- Increasing expectation for activation of industries based on Science and Technology against the background of continuing hollowing out industries because of long term economic depression
- Need of keeping the higher public awareness for Science and Technology achieved by the "Robot Fiesta Kanagawa 2001"
- Needs for utilization of the evaluations results of prefecture's public research institutes started in 2001
- The national 2nd term of the Science and Technology Basic Plan established for the period between FY2001 and FY 2005

In the third plan, the basic concept is to emphasize the researches more directly related to the residents' needs. Followings are the points of the renewal.

- More detailed description about policy measures
- Change the public research institutes into more needs (of the residents) oriented and more open to the residents
- Strategic planning of research agenda for the public research institutes and KAST
- Introduction of national competitive fund and various forms of employment for researchers
- Facilitate cooperation such as joint research, technical guidance and technology transfer, with systematic development and settlement of coordinators
- Introduction of evaluation and feedback at each institute level
- Improvement of public awareness, public relation activities

4.3.2.3. Case of the Ibaraki prefecture[*17,*18]

In the Ibaraki prefecture, they established their basic plan in 1994. The reason for the establishment was stated in the plan as "in the era where the residents' sensitivity and uniqueness are emphasized and the variety of the lifestyle is increasing, Science and Technology is expected to be actively used as an engine to respond the various needs in the local society and to realize the residents' comfortable life."

The goals of the plan were ambiguous.

- Realize the truly rich and comfortable living circumstance where the residents feel happy with being born in and living in
- Realize the swingy local/industrial society where there are active exchanges in human, knowledge and information
- Realize the basis for international collaboration networking with the whole world

Followings are the basic policy directions defined in the basic plan.

- Create an environment to facilitate residents' familiarity for Science and Technology
  - Development of facilities to improve the residents' familiarity for Science and Technology such as Museum of Nature, enlightenment in Science and Technology, etc.
- Grow innovative human resources
  - Establishment of a seminar in Science and Technology for children, Development of medical universities owned by the prefecture, development of human resources who can utilize information technology, etc..
- Establish the basis for R&D activities
  - Development of Hitachinaka Research Area, Holding Ibaraki Venture Technology Fare, Encouraging the technology distribution, development of the facilities for international conferences, etc.
- Establish the system that facilitate R&D
  - Invitation and support for international conferences, Support for academic conferences, Holding events for technology exchanges, Establishment of Ibaraki Science Academy, etc.

It is interesting that these basic policy directions were completely the same as those in the Yamanashi prefecture's main policies in its the action plan (precisely, Yamanashi prefecture had one more direction, "Develop the administrative system for Science and Technology policies").

Their uniqueness was that they distinguished the role of the prefectures, municipalities, companies and other organizations, and residents. As for the prefecture, followings were the defined as the roles of the prefecture:

- Development and capacity improvement of research institutes
- Development of education in Science and Technology
- Development of higher education system
- Enlightenment in Science and Technology
- Development of basis for R&D
- Facilitating of research corroboration
- Development and support of R&D firms.

The Ibaraki prefecture established the new basic plan in 2005. It is interesting that in the new plan, they don't describe about the old plan. Also as for the reason of the establishment of the new plan, they pointed out only the long-term problems such as the decreasing population from 2006, the globalizing economic competition and the environmental issues. So the direct reason for the establishment of the new basic plan is unclear.

The purpose of the new plan was defined as "Development of the industry and Improvement of the quality of life via utilizing Science and Technology."

The policy measures in the new plan are described in following structure:

- To improve the R&D activities and to encourage the utilization of the research results
  - To promote the cutting edge R&D
  - To establish the environment that facilitates the R&D activities
  - (Include encouraging researchers' interactions and improvement of living environment)
  - To attract and to grow the firms those perform R&D activities
  - To encourage the commercialization of research results
- To develop and to secure the talents that support Science and Technology
  - To enrich Science and Technology education
  - To foster undergraduate and graduate students and young researchers and engineers
  - To establish the system that gathers excellent talents
- To establish the society where residents support Science and Technology as one.
  - To provide opportunities to be familiar with Science and Technology for residents, to establish a society where residents trust and are proud of Science and Technology

4.3.2.4. Analysis

Figure 4.3.2 shows the correlation between the local plans and the national plan. The number shows that the term of the local plans that included the particular measures. For example, the top left "1,2" in the Yamanashi prefecture means that both the first and second term of the Yamanashi prefecture's basic plan included the policies

similar to “Securing and Training Researchers and Supporting Staffs”, that is also included in the first term of the national plan. This chart shows that the renewed plan in each prefecture includes more measures covered by the national basic plan. For example, in the Yamanashi prefecture, they established their first plan before the first term of the national plan. When they established the second plan, they can use the first term of the national plan as their example, and they added the measures such as “flexible organization management”, “evaluation” and “IT infrastructure” in their plan. So generally the national plans were a good example for the prefectures.

Fig. 4.3.2 The relationship between local Science and Technology plans and the national plan

	Yamanashi1	Kanagawa	Ibaraki
1st plan established in 1996			
I. Securing Researchers and Improvement of the R&D System			
(1) Securing and Training Researchers and Supporting Staffs	1,2	1,2	1,2
(2) Developing the R&D system			
Utilize manpower from outside			
Promote human exchange (joint research, granting priority rights on the achievement, permission of 'outside work', joint use of facilities)	1,2	1,2	1,2
Flexible organization management and effective use of funds	2	3	
(3) Various Evaluations (R&D subjects, R&D institutions and researchers)	2	3	2
II. Developing and Improving the R&D Infrastructure			
(1) Establishing and Improving R&D facilities and equipment	1,2	1	2
(2) Promotion of the Information Infrastructure for R&D (Network, Database)	2	3	
(3) Improvement of the Intellectual Infrastructure			
III. Expansion of Various Types of Funds			
(1) Expansion of Competitive Funds		3	
(2) Expansion of Priority Funds for Promoting Diverse R&D			
(3) Increase of Basic Funds			
IV. Upgrading Research at Private Universities			
V. Promotion of R&D by the Private Sector; Application of R&D Achievements of the Public Sector			
(1) Promotion of Private Sector R&D (tax incentive, subsidy, IP rights)			2
(2) Application of R&D Achievements of the Public Sector in private sector	1,2	1,2	2
VI. Promotion of International Cooperation		1	
VII. Promotion of Science and Technology in Regions	1,2	1,2	
VIII. Promotion of Learning and Understandings of, and Interests in Science and Technology			
(1) Improvement of Science and Technology Education in School Education	1,2	3	1,2
(2) Provision of Various Opportunities to be familiar with Science and Technology	1,2	3	1,2
(3) Promotion of Understandings of, and Interests in Science and Technology	1,2	3	1,2
2nd plan established in 2001			
Strategic Priority setting in S&T		1,2,3	2
Internationalization of S&T activities		1	
S&T system reforms to create and utilize excellent results			
R&D system reformsÚ J			
Doubling the amount of competitive funds and allocating funds for indirect expenses			
Mobilizing human resources using the fixed-term appointment and the apply-and-review basis recruit		3	
Encouraging self-reliance of young researches (special funds, positioning)			
Reforming evaluation systems to secure fairness/transparency and to reflect evaluations into resource allocation		3	
Reinforcement of industrial technology and reform of industry-academia-government collaboration	1,2	1,2	1,2
S&T promotion in regions: establishment of "intellectual clusters"			
S&T human resource development and S&T educational reforms: education of researchers and engineers, and reform of universities		1,2	1,2
Promotion of S&T learning and construction of channels toward society	1,2	3	1,2
Ethics and responsibility on S&T: bioethics, responsibility of researchers and engineers, accountability and risk management			
Maintenance of infrastructure for S&T promotion: improvement of facilities in universities with top priority			
Unique measures that is not included in the national plan			
people-oriented R&D activities		3	
Better living environment to attract talents			1,2

The sample prefectures didn't include some measures that are covered in the national plan in their plan even after they saw the national plan (yellow column in the chart). This shows the separation of the roles between the prefectures and the national government. For example, the improvement of the intellectual infrastructure such

as the measurement standards and the large databases seems the role for the national government; it is too costly for the local governments, and at the same time, local researchers can use standards and databases provided by the national institutes. As for the provision of the research funds and the improvement of facilities in the universities, local governments could declare the increase. But based on their budget constraint, they didn't declare. The local researchers can apply the national competitive funds.

On the other hand, there were some policy measures that the sample prefectures included in their plan and the national government didn't. Green column in the chart shows these policies. For example, the Ibaraki prefectures stated that the improved living circumstance is necessary for attracting talents. The Kanagawa prefecture emphasized the residents' point of view in establishing the R&D agenda

It is also worth noting that the national government emphasized technology diffusion, one-way technology transfer, from the research institutes and the universities, in the first term of the national basic plan, and included the promotion of industry-academia-government collaboration in the second term of the plan. In contrast, all prefectures emphasized the collaborating research activities from the beginning. It seems to show their different view of the own research institutions; in prefectures, technological services for the local companies are also an important mission of the public research institutions.

4.4. Councils that govern the local Science and Technology Policies

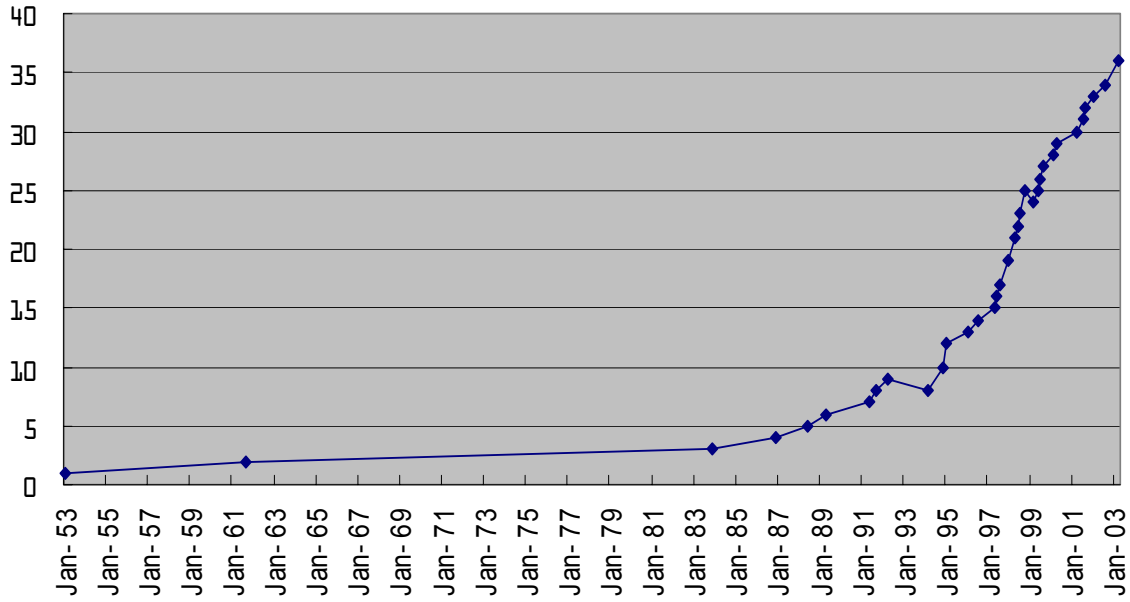
How do prefectures draft the basic plans? Generally, prefectures establish councils, or committees, (both permanent or ad hoc) to establish their basic plans. For example, in Kanagawa's prefectures, the Kanagawa Science and Technology Council drafted the plan and the government approved it. The council has 14 members, mainly consisting of high-level academic persons, including representatives from research institutes.[*20]

As of 2005, 36 prefectures have their own council for Science and Technology policies. These councils play a central role in the establishment of the prefectures' basic plans and also in the administration of Science and Technology policies, including evaluations.

As for the national government, it has a "Science and Technology Council" established in 1995, and it plays a significant role in the establishment of the first term of the basic plan. To encourage the policy coordination among ministries, the council was reorganized into the "General Council for Science and Technology" in 2001.[*24]

As for the prefectures, the pace of the establishment increased after the enactment of the Basic Law. The pace reflects that the need for these councils were linked with the Basic Law in 1995 and the consequent requirements for prefectures to establish their own basic Science and Technology policy plan and to implement it.

Fig. 4.4.1. Number of Councils concerning Science and Technology policies in prefectures



Source: Science and Technology White Paper 2005

4.5. Conclusion in this Section

As the data shows, most prefectures established their basic Science and Technology plans after the establishment of the Basic Plan in the national government. These phenomena show that for these prefectures, they feel less importance about establishing their basic Science and Technology plans, except for the requirement in the Basic Law. Also, some prefectures established their plan, but it is no longer posted on their web site. Again, not posting means that the basic plan has no function of guidance for concrete policies. In these prefectures, it is relatively difficult to expect them to establish unique basic policies that are suitable with the local needs so far. They do not have the awareness of the issue, or do not have adequate abilities.

Some prefectures established their basic plan before the Basic Law. They clearly have an awareness of the issue, as well as an ability to institute such a basic plan. However, after the establishment of the national plan, the prefectures' plans shifted towards the structure of the national plan. The national plan may provide good examples. However, as I mentioned earlier, they should establish policies unique and suitable for their needs and abilities. It is cynical that the prefectures that are supposed to be more independent from the national government and in the process of decentralization actually closely watch the national policies and follow them more uniformly.

5. Evaluation System

In the previous section, I discussed the prefectures' basic plans for Science and Technology. The

basic plan is important to guide long-term strategic development. However, the implementation of the basic plan is more important. And, for efficient and effective policy implementation, the adjustment of policies based on the fair evaluation is necessary.

Historically, evaluation was a weak point in the Japanese government system. As stated, "Historically, in the government system of our country, establishing laws and getting budgets are emphasized, and evaluation functions such as reviewing policies based on the effects of policies and the change of social circumstances after the policy implementation were considered less serious."[*21] There were some evaluations, but generally they were conducted inside each body without outside reviewers and the results were not open to the public. However, economic depression, increasing government debt, and anxiety for a future ageing society increased the pressure from the general public for the efficient policy administration. Now, both national and local governments have introduced broad policy evaluation system that use outside reviewers and whose results are disclosed.

In this section, I discussed the prefectures' evaluation system, both for research projects and for general policies, concerning the relationship with evaluation system in the national government.

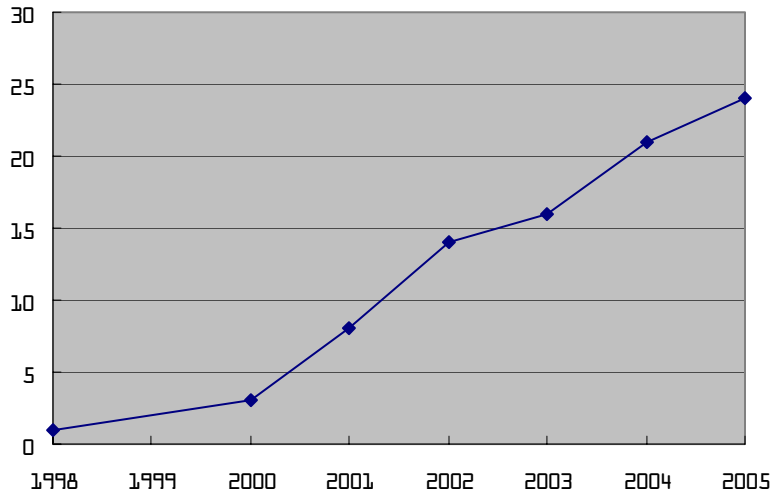
5.1. Research Projects Evaluation System

For efficient and effective research administration, an evaluation system for each research project is a key. As for the national government before the late 90s, some institutions, or departments, had their own evaluation system and some of them used outside reviewers (cf. academic researcher in the same research field) to get fair evaluations. However, there was no common evaluation method. The first term of the Basic Plan in 1997 emphasized the importance of the common evaluation method. Based on that, the national government established the "National Guideline on the Method of Evaluation for Government R&D" in 1997 and introduced the uniform evaluation system for all R&D projects funded by the national government.

Many prefectures also introduced the evaluation system for research projects. From my survey of prefectures' homepage, 24 of 47 prefectures have R&D project evaluation systems, or guidelines, that cover all research fields inside the government. Most of the remaining prefectures have project evaluation systems in department levels (cf. agriculture and fishery), or in research institution level. Also, in most cases, of the 24 prefectures, they were established by evaluation committee for the government level or for the institution level, and the evaluation results were disclosed to public.

Figure 5.1.1 shows the timing of the establishment of project evaluation systems, or guidelines, that cover the whole research field. Among the 24 prefectures, the first guideline common for all research institutes was established in 1998 in the Fukui prefecture and the peek of the establishment was after 2001. So, it means that even the earliest prefecture introduced the guideline after the introduction in the national government. It does not mean that these prefectures did not evaluate research projects at all before that time; some prefectures conducted project evaluations even before that. However, introducing the evaluation system common in all research fields is necessary for fair resource allocation. (It is the same for the national government.) This graph shows the characteristics of local governments' Science and Technology policy again; they mainly follow the policies of the national government again.

Figure 5.1.1 Timing of prefectures' evaluation system for R&D projects that cover the all research areas



The prefectures did introduce the evaluation system. The next question is whether these systems are effective. Do they screen good research projects from the bad research projects?

For example, figure 5.1.2 shows the results of the evaluations for research projects in the Akita prefecture in FY 2005. The evaluations were conducted by an evaluation team consisting of 3-17members (6.1 on average), including government officials in the administrative section for research institutes, an outside researcher in that research field, and other outside experts. The targeted research projects were those funded by the prefecture and conducted in the prefecture's own research institutes.

Figure.5.1.2 Results of research project evaluations in Akita prefecture in FY2005

Pre evaluation		A:Conduct with Priority	B:Conduct	C:Modify	D:Need further review
		0	24	0	1
Midterm evaluation		A:Continue with Priority	B:Continue	C:Modify	D:Need further review
		2	74	8	0
Post evaluation	S: Outstanding	A: Satisfactory	B:Appropreate	C:Low	D:Far below
	0	6	23	4	0
Following up evaluation	S: Outstanding	A: Satisfactory	B:Appropreate	C:Low	D:Far below
	1	1	5	1	0

Source: generated with the data in the Akita prefecture's homepage

From the viewpoint of an efficient investment in R&D, pre-evaluation and midterm evaluation are quite important. In their system, projects that get a B or above can be conducted, or be continued, without modification. And, even a C means the project will be conducted, or be continued, with some modification. As the table shows, more than 90% of the evaluations get a B or above and only one project

got a D. It means there is a quite limited screening function.

This characteristic seems not specific to the Akita prefecture. The following table shows the evaluation results by the Hokkaido prefecture in 2005. A and B are the positive results and only the projects that got a C needed modification. Here again, the percentage of C is less than 2% of all evaluations.

Figure.5.1.3 Results of research project evaluations in Hokkaido prefecture in FY2005

	A: Satisfactory	B:Appropreate	C:Low
Pre evaluation	54	48	0
Midterm evaluation	1	80	3
Post evaluation	66	47	4
Following up evaluation	25	45	0

Source: generated with the data in the Hokkaido prefecture's homepage

5.2. Policy Evaluation System

Not like the evaluation system for research projects, the policy evaluation system covers whole policies in the government uniformly. The effect of the policy evaluation system is significant, even for the Science and Technology field; it does not affect each research projects so much, but the other policies, such as those for technology diffusions and education are evaluated based on this evaluation system.

An adequate evaluation and feedback system is necessary for the adequate administration and planning of any policies. However, there was no systematic evaluation and feedback in the Japanese governments, both in the national government and prefectures before the late 90s.

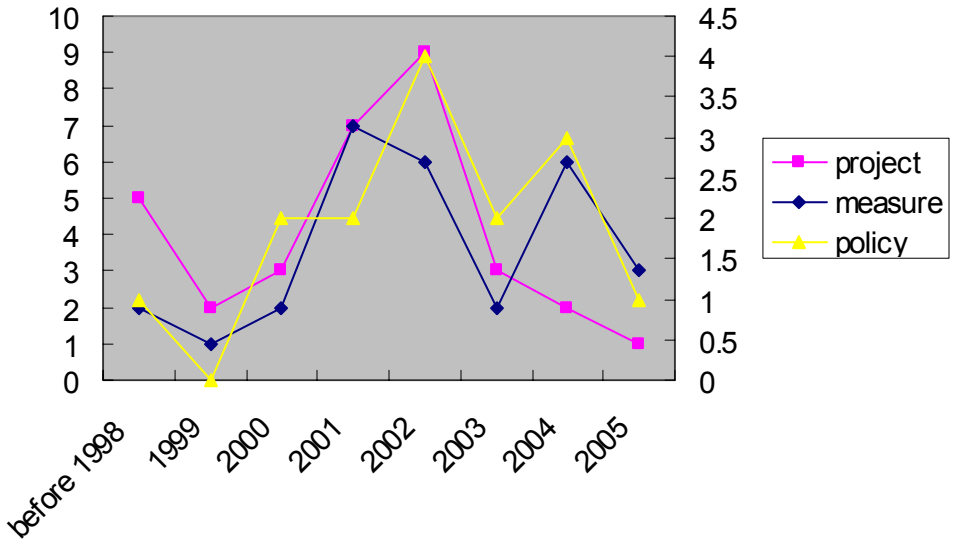
As for the national government, the movement to introduce a policy evaluation system started officially in 1997. In December of 1997, the final report of the Administrative Reform Council, a special council established by the order of the prime minister, stated the necessity of the policy evaluation system in ministries. The Basic Law for the Reorganization of National government Ministries in 1998 follows the movement and requires the national government to improve its evaluating function. After that, several stages of discussion were held to design an adequate evaluation system and many ministries started their trial of policy evaluations. Finally, the Standard Guideline for Policy Evaluations was established in 2001 in the joint meeting of related sections in all ministries. Also, following the guidelines and the actual evaluation activities in the ministries, the National Diet enacted the Law for Policy Evaluations Conducted in Government Institutions and provided legal basis for the evaluation activities. In the law, the purpose of the evaluation is stated as follows:

"To contribute to promote efficient and effective policies and to complete the accountability for various government activities to people by promoting objective and strict policy evaluation and to make efforts to reflect the results of evaluations in policies by defining the basic matters about the policy

evaluation conducted by government institutions, and publishing information about policy evaluations."[*23]

Unlike the Basic Law on Science and Technology, the Law for Policy Evaluation Conducted in Government Institutions does not include any obligation for prefectures. Prefectures, however, follow this trend. Before 1998, only five prefectures had introduced policy evaluations. The first attempt was in 1996 in the Mie prefecture. But, it did not diffuse other prefectures. As the graph shows, their peak of introduction was around 2001-2002. Today, 46 of 47 prefectures have introduced some kind of policy evaluation system.

Fig. 5.2 Timing of introduction of policy evaluation (ex post) system in prefectures



Note: in the survey, the evaluation systems are distinguished based on the target size (project < measure < policy).

Source: AFFPRI report 58, Agriculture, Forestry and Fisheries Policy Research Institute

Some prefectures stated on their homepages that one of the important reasons for their introduction of a policy evaluation system was the establishment of the Devolution of Power Law enacted in 2000. This law was based on the discussion of the Committee for the Promotion of Decentralization, which was a special committee established by the order of the prime minister and changed the relationship between the national government and the local governments from a hierarchy into equal footing. According to this law, 475 laws were amended and local governments got more rights and responsibilities.[*6] Consequently, the needs of local governments for more effective and efficient policy administration increased dramatically. The introduction of policy evaluation seems the symbol of the start of prefectures' true autonomy. Their financial difficulty based on economic depression and budget cuts of the national government for subsidies was for other reasons.

What are the results of the policy evaluations? For example, the Akita prefecture conducted more than 170 evaluations for new projects (the smallest unit of their policy) that will start in FY2006

with their regular budget. The concerned section inside the government conducts the evaluations and the results are disclosed to public. The projects are graded as A: favorable, B: almost favorable, and C: lagging. Surprisingly, in more than 170 evaluations, there was no project graded as C. There was, again, quite limited screening function.[*25]

5.3. Conclusion in This Section

Local governments have followed the national government and established their own evaluation system. Basically, they introduced it of their own initiative, based on their increasing needs for efficient policy administration. Concerning the importance of the evaluation system for efficient and effective policy administration, it seems like they just started autonomous administration.

The sample results of the evaluations show, however, that their evaluation system has quite limited screening and feedback effect. For effective feedback, more projects should be graded as problematic, so the project will be modified. It seems that the problems are not on the system itself, but on how to use it. It is a tough challenge for the prefectures because it requires the change of their culture that causes this too high average evaluation; they take into consideration too much about the others (in this case, those who conducted targeted projects) and give negative results only for the worst projects. One idea can be the introduction of a comparative evaluation among projects.

6. Conclusion

The overall trend of the decentralization gives local governments both direct revenue sources and responsibilities. It may encourage local governments to act as independent authorities, not as agents of national government. Along with the policy decentralization, many local governments introduced their policy evaluation system especially after 2000. Since the evaluation system is critical to their efficient and effective policy administration, this trend may be evidence that true autonomy of the local governments has just begun.

As I described earlier, local governments actively participate in the planning of a decentralization policy via an intensive exchange of ideas and opinions. How about the Science and Technology policies? Recently, as I introduced above, the prefectures conducted their own planning and implementation of Science and Technology policies; they established their own basic plans and also formed committees for Science and Technology policies. Also, they established an evaluation system. In this sense, there seemed significant improvement in the Science and Technology policies in local governments. However, data actually shows that the prefectures' actions in Science and Technology policy fields are strongly affected by the national government. Of course, there have been several leading prefectures that antedate the national action, but typically the national government implements new structures, or policies, first. The prefectures, then copy the national government's action. It is ironic from the decentralization point of view. The prefectures are expected to have unique policies that are suitable for the each of the prefecture's circumstance and the general decentralization trend helps the unique actions. But, the prefectures tend to have relatively passive action. What is the reason?

One can claim that there still can be policy interventions from the national governments. However,

it seems not the case. Actually, the Science and Technology policies are not the main topic in the current decentralization trend. During a recent exchange of opinions between local governments and national governments about concrete plans of decentralization, local governments have requested to eliminate subsidies in exchange with the transference of suitable tax revenue sources. Generally, subsidies are given with some restriction of usage, so this exchange increases the flexibility of policy implementation in local governments. However, there are few requests for the elimination of subsidies concerning Science and Technology policies from local governments, except for educations (salaries for teachers of junior high school). It may mean that, since the subsidy from the national government was only a small portion in the local governments' expenditure, there is no strong control from national government. Actually, most of the national investment in Science and Technology do not go through the local governments. Instead, they invest directly with the universities and the research institutes, especially those owned by the national government.

Is that because of conservatism? It may be possible that some of the prefectures have more conservative views than others. However, given the economic depression in the local economy, governors must show some plan to improve the situation. Under those circumstances, a broad Science and Technology plan seems preferable because it has a strong potential and no direct loser because of it. Also, since the national government has a preferable view for Science and Technology policies, the local government has no reason to be sensitive to the national government's mood when they try to establish their own Science and Technology Plan.

Rather, this reliance for the national government, or prefectures' characteristic as "follower," seems because of the local governments' capacity for planning broad Science and Technology policies.

In the past, they have been less aware of the necessity of the broad science and technology plan. As I described earlier, research institutes and universities owned by the local governments are only small portion of the national Science and Technology regime from a budgetary point of view. Several prefectures have national universities and national research institutes inside the region, but they are not under the local governments' control. Private companies are the biggest investors for Science and Technology, but they are concentrated in major cities and also not under the local governments' control. In short, it was natural that they were not aware of the necessity of the broad Science and Technology policy before the enactment of the Basic Law. Under such circumstances, it is relatively hard for prefectures to allocate valuable human resources to Science and Technology policies and to develop human capital that can deal with broad Science and Technology policies. However, the enactment of the Basic Law required local governments to change this circumstance. They felt an urgent need for establishing their own plan and for establishing their own research councils to establish their own plans. However, their lack of expertise and experience for investigating the Science and Technology policies led them to rely on the "example" from the national government.

Evaluation has the same problem. They just started systematic evaluations, so they are not used to evaluate the projects objectively. Actually, not only the prefectures, but also the national governments seem to have the same problem.

The cChance is that local governments have quite limited experience in the planning and administration of Science and Technology policies so far. After the enactment of the Basic Law, most of the prefectures have

changed their systems to fulfill the legal requirements from the Law. Many of the prefectures also established sections for general science and technology policies. Local governments must continue their efforts to build their own capacity in order to realize the Science and Technology policies that is are not only efficient and effective, but also uniquely suitable for each prefecture's resources and conditions. If they can grow their own capacity for building broad Science and Technology plans, they will have a more unique plan in future.

Not only the local governments, but also the national governments, should take a significant role to solve this problem. First, they should not control the local efforts in this decentralization trend, as it would spoil the local initiatives. Second, as I described earlier, the current distribution of research abilities among prefectures are far from equal, so the economic development based on Science and Technology is far beyond their reach for some lagging regions. The national governments are responsible for solving this inequality; it can't be solved just by decentralization. At the same time, however, it is unrealistic that every prefecture has top class research abilities. To realize efficient Science and Technology administration, a significant amount of research ability should be concentrated and should form a cluster. These two goals obviously incur contradiction. However, the national government is expected to find a balanced solution between them.

Related with the second point, the national government should give local governments the opportunity to exchange their ideas and opinions about the administration of national universities and research institutes inside their regions. Many of the prefectures have national universities and national research institutes inside their regions, but they have no control. From the viewpoint of the total economic development of each region, there should be a comprehensive strategy, including both national and local universities and research institutes.

The most important problem based on discussions in this paper is, however, the human capital development in local governments. Of course the local government itself should take primary action, but the national government can support it by providing adequate information about successful examples of policies on both national and local governments, or by providing them with the opportunity to exchange the opinion.

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