NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY POLICY

Digest of Survey Research for Follow-Up on Third Science and Technology Basic Plan

June 2010

Introduction

In order for Japan to achieve further economic growth and to contribute to international issues, including global environment, in the 21st century, it is indispensable to transform Japan into a powerhouse in science and technology. National Institute of Science and Technology Policy (NISTEP) was established on July 1, 1988, as the core research institute for studying basic issues related to science and technology policies. The Science and Technology Basic Law was enacted in 1995 based on which three Science and Technology Basic Plans were formulated.

The Third Science and Technology Basic Plan (for fiscal years 2006?2010, approved by Cabinet on March 28, 2006) sets out that the Council for Science and Technology Policy in the Cabinet Office will carry out detailed follow ups on the implementation in its 4th year of the plan. In order to prepare itself to conduct follow-up evaluations, the Council for Science and Technology Policy asked NISTEP in fiscal 2008 to conduct a survey and analysis necessary for such follow ups.

A report on the results of the follow-up survey research has been published in a set of total 19 booklets (available only in Japanese). However, since the report is rather large in its volume, this Digest of Survey Research for Follow-Up on Third Science and Technology Basic Plan has been produced to demonstrate a brief overview of the survey research as well as to summarize the results of the implementation of investments and measures undertaken.

I very much hope that this Digest will serve as a useful resource material for your research studies.

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Tomoaki Wada
Director General
National Institute of Science and Technology Policy
Ministry of Education, Culture, Sports, Science and Technology

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Summary

< Review of Policy Trends in Selected Countries/Areas >

- In depth coverage of financial and economic crisis, many countries have attached importance to science, technology, and innovation policies. The link between science and technology and innovation policies has been more and more consolidate, and this has been reflected in the policy formation and the organizational structure in many countries.
- Major countries have placed emphasis on measures dedicated to energy and environment issues, and “energy efficiency” and “low carbon” have become keywords in many countries. The underlying perspective that has been adopted by major countries in formulation of their science and technology policies is to make use of science and technology in order to not only deal with environmental and energy issues but also find solutions to social and economic problems.

< Assessment of General Condition in Japan >

- In the UK and the US, R&D expenditures in the higher education sector have grown rapidly. Although Japan has also made an increase, the size of its research and development funding is far smaller than that of the UK and the US.
- The productivity of scientific papers in Japan is not extremely low compared to the US, the UK, and Germany. However, the productivity of top 10% highly cited paper is a challenge.

Summary (cont'd)

< System Analysis of Research Environments in Higher Education in Japan >

- Comparing 2003 and 2007 as years before and after the introduction of the National University Corporation system, in spite of some differences depending on the field, it was reported that the percentage of "time in activities related to research" had decreased from 45% to 34%. On the other hand, in particular, the percentage of "time related to organizational activities" had increased in all fields, and total working time had also increased.
- A comprehensive comparative analysis between Tokyo Institute of Technology, Tokyo University of Science, and the California Institute of Technology was conducted. It was found that while new frontiers had been established out of a new research organization based on some infrastructure funds as a core in the former, new frontiers had been established out of a research project based on collaboration among researchers in the latter case.

< Analysis of S&T Human Resources >

- From a long-term standpoint (10-20 years), the mobility of researchers in Japan has increased. In particular, the mobility of the younger generation (age group of 35-44) is increasing.
- Researchers with full-time research experience in institutions overseas demonstrate high productivities in English papers, and research exchanges with other countries are active.
- Looking at occupations of doctoral graduates immediately after completion of doctoral courses, persons who became postdoctoral fellows accounted for 15% of the total (persons completing doctoral courses in FY2002-2006), while 19% were employed as university teachers. Persons employed in research and development-related occupations were approximately half of the total.

Summary (cont'd)

< Analysis of Status of the Innovation Systems >

- The industry-academia collaboration activities of universities, etc. and IAIs in Japan are progressing steadily. In other words, the number of joint research projects and the income from such projects has increased remarkably. The percentages of patent applications and joint applications, number of licenses and income from licensing are also increasing steadily. Public research expenditures related to industry-academia collaboration had the effect of providing opportunities for the industry-academia collaborative activities of researchers and practical application of research results.
- The program to make advanced research facilities, such as RIKEN SPring-8 (the largest synchrotron radiation facility), AIST (nano processing facility) and Nagoya University (high voltage electron microscope laboratory), available for outside uses has received a very positive response from business entities that have taken part of the program.
- In Japan, fund-raising in the private sector is limited in comparison with that in Europe and the US. However, in a recession, the funding problem becomes serious for start-ups, and public support becomes more important for them.

< Trends in Advanced Research >

- To extract new science and technology which should be the focus of the Fourth Science and Technology Basic Plan, not limited to existing fields.

Summary (cont'd)

< Outcome of Science and Technology >

- **A total of 1,052 examples of achievements were collected from 189 universities and public research institutes, and the following 39 examples were chosen as representative achievements.**
- **In manufacturing companies which conduct research and development, in a TFP growth ratio of 2.4%, the contribution of research and development is 0.67%; in other words, R&D made a significant contribution equivalent to 28% of TFP growth.**

< Collecting the Data Study for Evaluating the Achievement of the S&T Basic Plans >

- **With regard to specific targets set out in the Third Science and Technology Basic Plan, as much data as possible have been collected and collated in order to evaluate the achievement.**
  - **①Hiring targets for female researchers: 25% for all natural sciences (20% for physical sciences, 15% for engineering, 30% for agriculture, and 30% for healthcare)**
    - **➢The proportion of female researchers of the newly recruited university teachers in fiscal 2006: 24.6% for natural science as a whole (12.7% for physics, 5.9% for optics, 16.3% for agronomics, and 34.6% for healthcare).**
  - **②Competitive funds (budgets): 467.2 billion yen in fiscal 2005 (as at the end of the second quarter) and 481.3 billion yen in fiscal 2008**
    - **➢Since 2006, the number of systems with a budget of less than 2 billion yen and the number of innovation-oriented systems have increased.**
    - **➢Actual allocation: 8.6% in fiscal 2005 (as at the end of the second quarter), 17.9% in fiscal 2007.**
    - **➢The number of projects that have taken carry-over measures to account for research and development costs has increased: 55 projects in fiscal 2005 (as at the end of the second quarter); 1,297 projects in fiscal 2007.**