

Technology and Innovation Program

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The most fundamental solutions to the constraints on economic growth, such as the increasing scarcity of energy resources and global environment constraints, are the development of new technologies directly addressing these constraints and the innovations based on them. Furthermore, the development of new pharmaceuticals and diagnostic technologies is also the key for improving longevity and quality of life for humankind. The objectives of the Technology and Innovation program are to create an original database that is useful for identifying the process of the development of such new technologies as well as innovation, and to analyze the direction of policies and institutional developments in order to accelerate them. The following projects have already commenced:

(1) Research on Innovation Process and its Institutional Infrastructure based on Micro Data

Leader: Sadao Nagaoka, Faculty Fellow (Hitotsubashi University)

(2) Standard Policy for Innovation

Leader: Reiko Aoki, Faculty Fellow (Hitotsubashi University)

Sub-leader: Yoshiyuki Tamura (Hokkaido University)

(3) Empirical Study on the International Comparison of Open Innovation

Leader: Kazuyuki Motohashi, Faculty Fellow (University of Tokyo)

(4) International Comparison of Business Start-up Activities and Research of Entrepreneurial Activities Resulting in Job Growth

Leader: Noriyuki Takahashi, Faculty Fellow (Musashi University)

(5) Research on the Interactions Between the Business Strategies of Excellent Small and Medium Enterprises (SMEs) and their External Environment

Leader: Tatsuhiko Inoue, Faculty Fellow (Waseda University)

Sub-leader: Yuji Hosoya, Consulting Fellow

There are three features of this program. The first is the development of an original database that can identify the process of technology development and of innovation. In cases of technology development, as an example, it is

relatively easy to grasp statistically the gross expenditure for corporate research and development (R&D), but this only measures personnel expenses for researchers employed and other monetary expenditures such as purchasing research equipment. What is extremely important in technology development, however, is the knowledge itself, such as information from users and suppliers and the technology seeds obtained from scientific and technical literature and from university collaborations. The quality of the stock of such knowledge and the ability of a firm to absorb it as well as to integrate and combine acquired knowledge are what determine R&D performance. This program aims to develop, through a survey of inventors and other means, a micro database that is capable of systemically identifying the flow and the new combination of knowledge for innovation. The same applies to the process of development and dissemination of standards as well as to establishing business startups.

Second, this program intends to conduct original analysis and make proposals on improving the institutions that support technology development and innovation, such as the systems for patents, standards setting, start-ups, R&D assistance, and industry-academia collaboration. Historically, the continuous development of new technologies as seen today started only after the onset of the Industrial Revolution. The fact that only industrialized nations are undertaking full-fledged R&D also suggests the importance of institutions in technology development and innovation. The patent system, for instance, serves diverse functions such as increasing appropriability for knowledge production, promoting commercialization investments that exploit inventions, providing a mechanism of reputation establishment for inventors and firms, and expanding the stock of public knowledge through disclosure. Most research in the past targeted the effects of the patent system on appropriability. In this program, we will extend research to other functions, particularly the expansion of the stock of public knowledge through disclosure. According to the results of the survey of inventors conducted by RIETI under the program director, the importance of the information disclosed through the patent system differs greatly by technology field. Our research will thus aim at identifying the causes of such differences and the issues faced in improving them, among others.

The third feature of this program is the promotion of international collaboration in research on database development and analysis. When assessing Japanese innovation performance, the comparisons with the United States and Europe are crucial. In a project during the second medium-term plan in which the program director served as a leader, we undertook a large-scale survey of inventors in Japan and the United States, in collaboration with Professor John Walsh of the Georgia Institute of Technology. This was the first such survey in both countries, and we were able to provide interesting findings on the differences between the two countries in the invention and innovation process. Based on these experiences, in cooperation with Professor Dietmar Harhoff of the University of Munich and Professor Alfonso Gambardella of Bocconi University, we have been conducting a new survey on inventors in Japan, Europe, and the United States. With regard to the analysis of entrepreneurial activities, we plan to clarify the characteristics of start-up activities in Japan, using the Global Entrepreneurship Monitoring Database, an international database on this subject. Furthermore, in the area of standard policy, we plan to proceed in collaboration with Professor Nancy Gallini of the University of British Columbia and the other internationally renowned experts in the areas of theoretical analysis of standard and intellectual property.