

Abstract of the Patent Administration Annual Report

By Kobayashi Kazuaki

I. Introduction

The Patent Administration Annual Report is published by the Japan Patent Office (JPO) and contains a wide range of patent-related information, including analyses of domestic and international trends, JPO policies, and statistics. JPO began publishing the Japan Patent Office Annual Report in 1948, but this was redesigned and renamed the Patent Administration Annual Report in 1998. The new publication presents various information in graphs, and is now much more succinct and readable than before.

The report for the year 2000 was divided into three sections: (1) "Trends in Intellectual Property Rights (IPR)", (2) "Building an Environment for 'The Age of Knowledge'" and (3) "Statistics." This year, the report mainly puts an emphasis on the Section 1 analysis of IPR trends in a number of key fields, including: an analysis of applications in Japan, the United States

and Europe; a comparison of application strategies in Japan and the United States; the strategies of Japanese and overseas parties concerning patent applications in Japan; the rice genome project; and electronic authorization.

It is our hope at JPO that by providing this information we can help readers make strategic use and determine the direction of their technology development efforts.

The present is a synopsis of the annual report, and focuses primarily on the information presented in Section 1.

II. Industry Expansion and Technical Progress

(1) The expanding global economy and overseas patent applications

World trade has been growing continually since 1985. The number of overseas patent applications has also been rising over that same time period,

Figure II-1

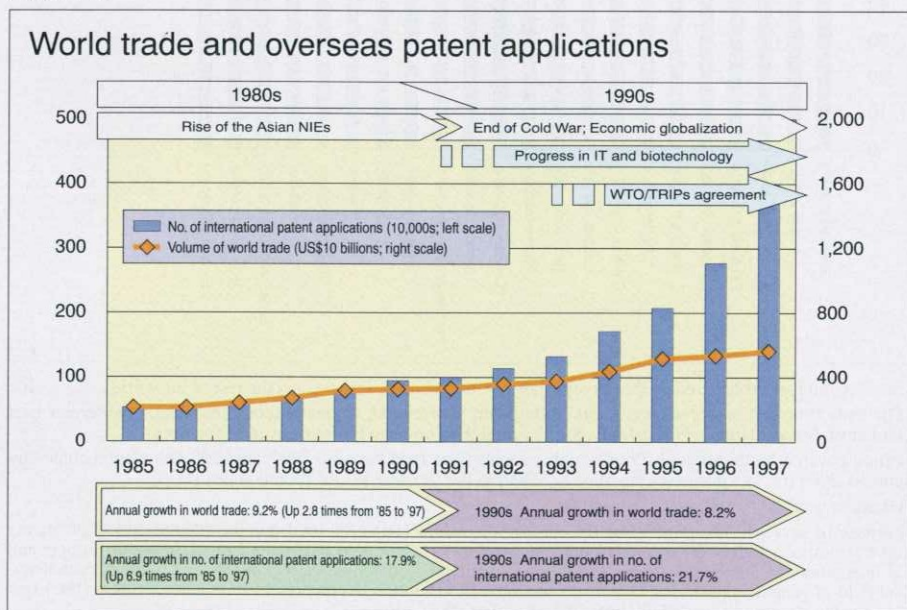


Figure II-2

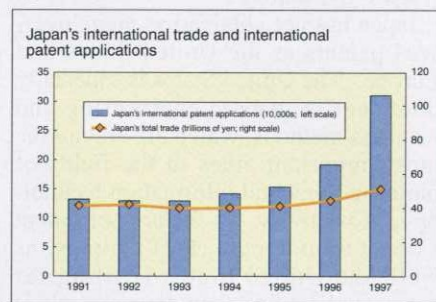
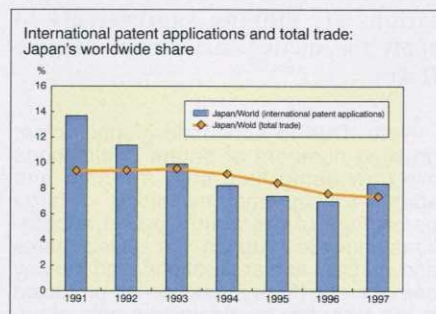


Figure II-3



Sources:

World trade figures: JETRO White Paper on International Trade; Trade between Japan and the World
Japanese trade figures: Bank of Japan, "Balance of Payments Monthly"

No. of overseas patent applications: Taken from World Intellectual Property Organization (WIPO) figures (figures include countries originally designated at time of PCT filings)

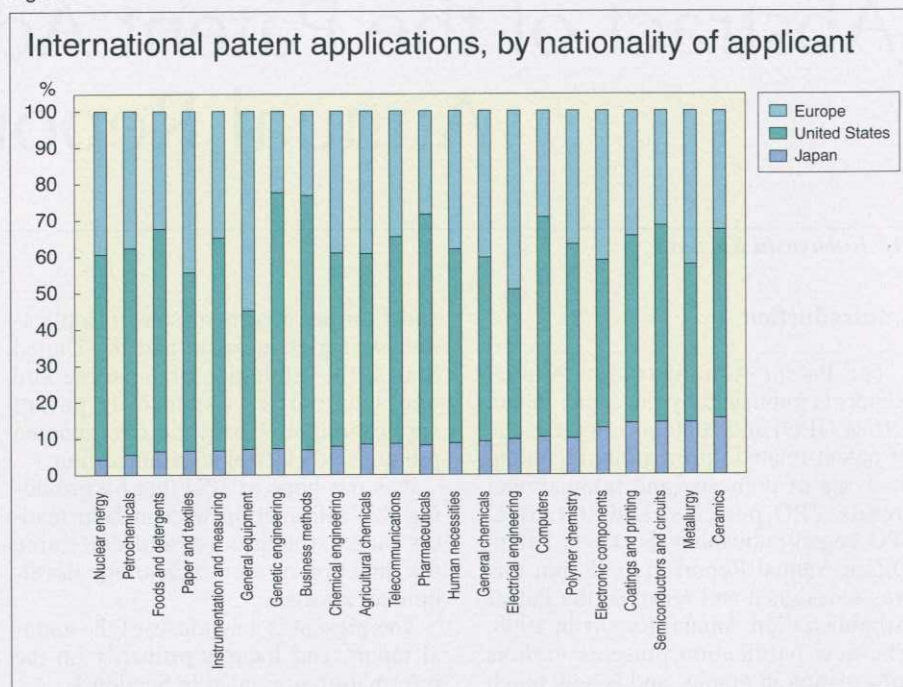
No. of worldwide patent applications: Sum total of all overseas patent applications filed by all countries.

Figures for world trade and Japanese trade indicate export amounts.

and at an even faster rate. Particularly in the 1990s, the growth rate for overseas patent applications has topped 20%, which is more than twice the growth rate for world trade. This trend appears to be a reflection of the growing importance of patents within the context of the economic globalization and technological advances of recent years. (Figure II-1)

The number of patent applications filed overseas by Japanese applicants has also been rising at an accelerating pace since the latter half of the 1990s,

Figure II-4



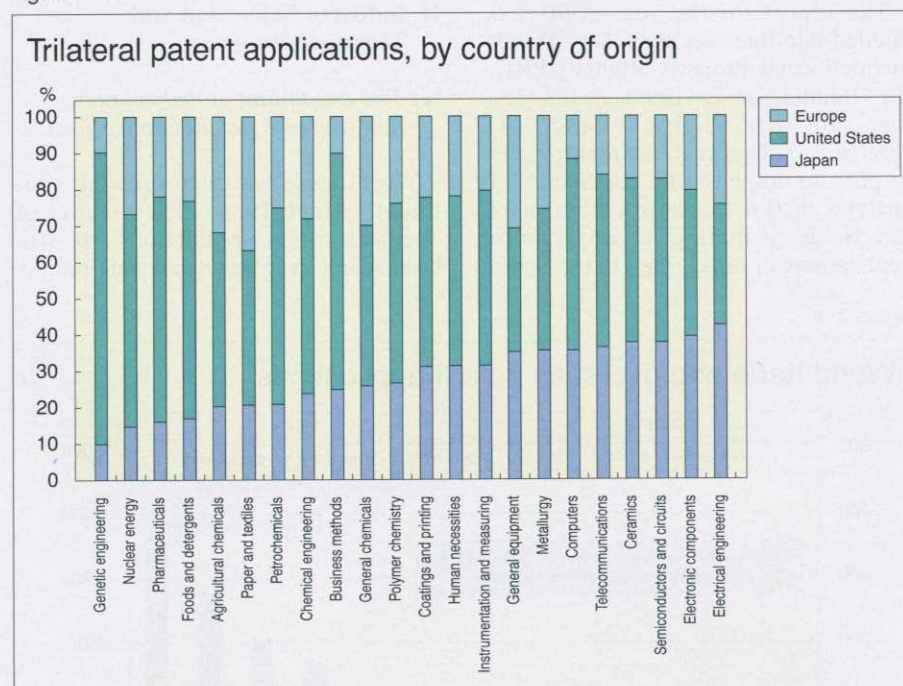
but although these applications accounted for 14% of the worldwide total in 1991, by five years later this figure had dropped to 8%. There is a need for Japan to strengthen the pace of its overseas patent applications. (Figure II-2 and 3)

Japan has not obtained as many overseas patents as the United States and Europe. The United States is especially dominant in genetic engineering and business methods, which are among the most important areas in the fields of biotechnology and information technology, respectively. In the area of Patent Cooperation Treaty (PCT) filings, as well, the United States is filing far more applications than Japan is. It is clear from the statistics that U.S. corporations are moving aggressively to apply for international patents. (Figure II-4)

Note: Due to economic globalization, growing numbers of patent applications are now being filed both at home and abroad for important inventions. A large percentage of the world's patent applications originate in Japan, the United States and Europe, and applications made in any one of these three areas can be protected in the other two by obtaining a right of priority under the terms of the Paris Convention for the Protection of Industrial Property (patent applications thus protected shall be referred to in this document as "trilateral patent applications") or by applying for protection under the Patent Cooperation Treaty (PCT). It herein provides an analysis of the distribution of technologies for which such patent applications have been filed, and also compares the percentages of original filings coming from Japan, the United States and Europe.

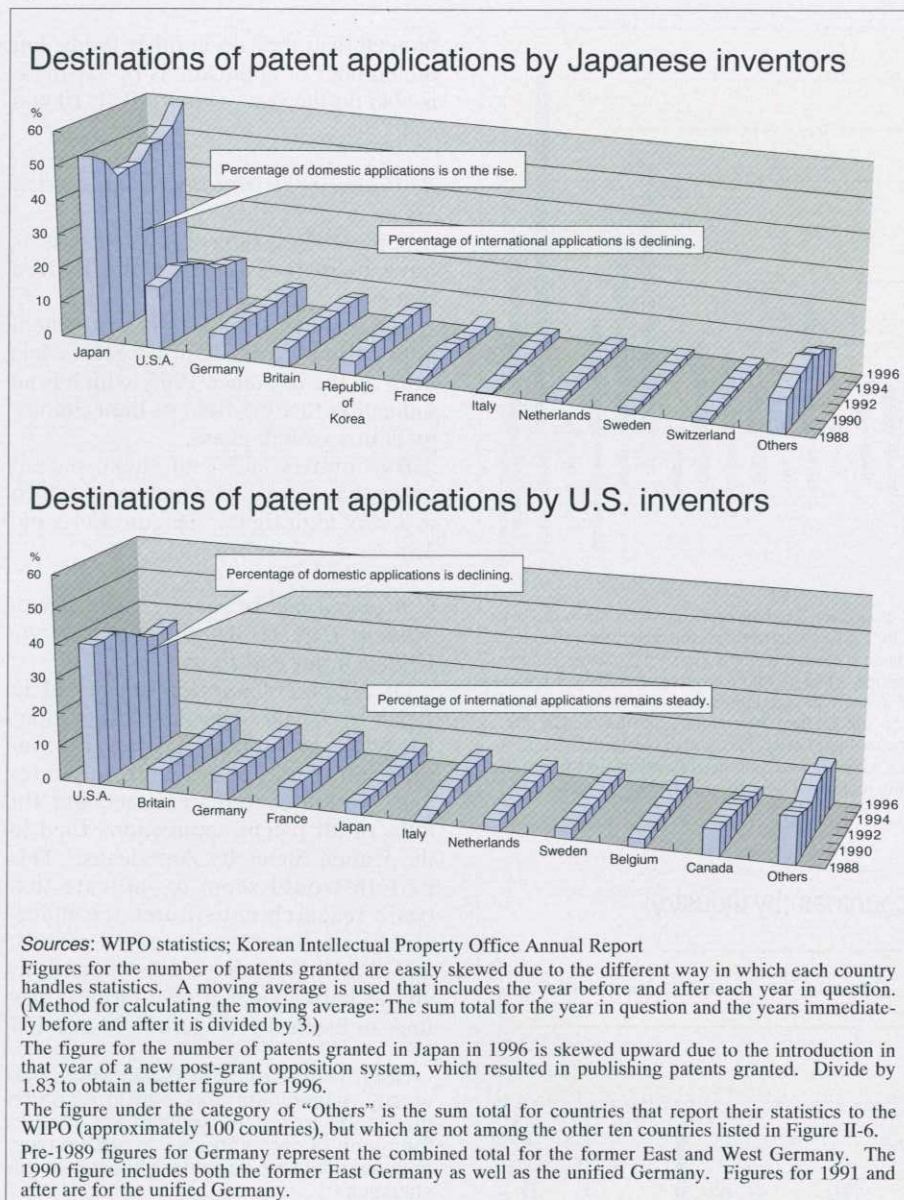
U.S. firms account for a solid percentage of trilateral patent applications across the entire spectrum of technologies, while Japanese firms are quite competitive in such fields as electrical engineering, electronic components, semiconductors and electronic circuitry, ceramics, and telecommunications, where they have filed a large number of patent applications. (Figure II-5)

Figure II-5



[Nations and regions covered by the survey]: Japan, United States, Europe, and the rest of the world
 [The term "Europe" in this context refers to Belgium, Switzerland, Germany (does not include the former East Germany), France, Britain, Netherlands, Sweden, and the European Patent Convention states.]
 [Period covered by the survey]: Priority rights applications filed between 1994 and 1998 that were included by June 30, 2000 (or, in some cases, by May 25, 2000) in the Derwent World Patents Index (WPI).
 [Database used for the survey]: Derwent WPI
 [Purpose of survey]: The purpose of the survey was to determine the total number (cumulative total for the entire period covered) of (1) trilateral patent applications originating in Japan, the United States, or Europe; and (2) international patent applications. These figures were then broken down by country and field of technology. The field of genetic engineering falls under section C12N15 in the International Patent Classification (IPC) system. Business method patents fall under IPC category G06F17/60.

Figure II-6



(2) Comparison of patent application strategies in Japan and the United States

In Japan, patent application strategies continue to focus primarily on domestic filings.

For U.S. inventors, on the other hand, overseas patent awards have been accounting for a growing percentage of total patent awards in recent years, and it appears that U.S. applicants have

identified overseas patents as a strategic objective. (Figure II-6)

(3) Strategies of Japanese and foreign applicants for Japanese patent applications

A. Trends among Japanese and U.S. applicants in Japan (comparison by field of technology)

Breaking down patent applications in Japan by field of technology, we find

an especially large number of applications in the IT sector, including areas related to electronics (such as electronic components, electronic circuitry and telecommunications), computers and memory devices. There have also been numerous applications in the fields of optics and construction. The United States, too, is strong in the IT sector (including electronics and computers), but has also originated many patent applications in the fields of biotechnology, medical devices and pharmaceuticals. This contrast can be seen as an indication that research and development in Japan is weighted a bit too much toward the IT sector, so there appears to be a need for more balanced investment in research and development. (Figure II-7)

B. Application trends of the major countries in Japan (comparison by field of technology)

Japan differs from other major patent nations in terms of patent application by field of technology.

In comparison with Japan, there are many more U.S. applications in the fields of biotechnology, pharmaceuticals, medical equipment and organic chemistry.

Biotechnology is also a major field in Germany, as are transporting and engines.

South Korea is strong in such IT-related fields as electronic circuitry, electronic components, and memory devices, and also in textiles and lighting. (Figure II-8)

(4) Trends in biotechnology-related inventions

A. Patent application trends in Japan

Patent applications are on the rise in the field of biotechnology, and more than half are being made by foreigners. Many of the biotech applications have been related to DNA sequencing and amino acid sequencing, where the number of patent applications has been rising very rapidly.

Foreigners, and especially Americans, account for a higher percentage of patent applications in

Figure II-7

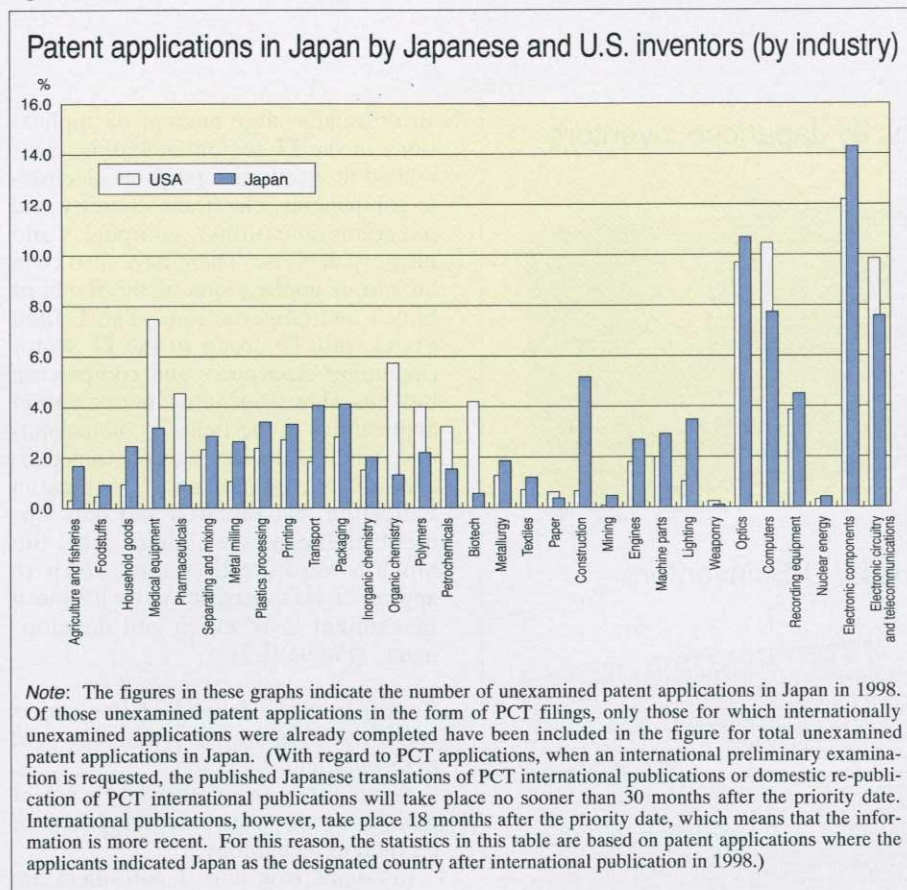
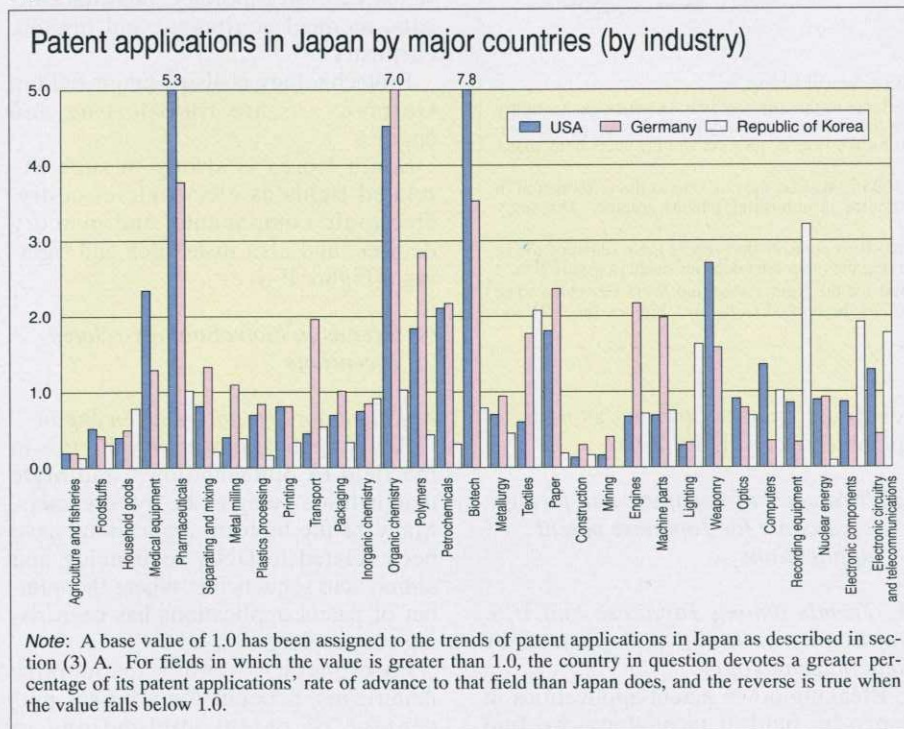


Figure II-8



biotech than they do in other fields, but the number of applications by Japanese is also on the rise. (Figure II-9, 10 and 11)

B. Patent registrations in the United States

Some 10,000 biotech-related patents have been registered in the United States.

The number of biotech-related patent applications in the United States has been on the rise since 1995, which is an indication that the field of biotechnology is in a growth phase.

By country, 73% of these patent grants have gone to Americans, which is a very high figure. (Figure II-12 and 13)

C. Comparison of research and development (R&D) organizations in the United States and Japan

Of all patent applications filed in Japan by Japanese parties, corporations file 86%. In the United States, by contrast, universities, research institutes and venture capital firms account for 84% of all patent applications filed in the United States by Americans. This pattern would seem to indicate that basic research constitutes the mainstream of American research efforts, and that this leads to new inventions and technologies that give birth to new lines of business. (Figure II-14 and 15)

Note: There are many cases where university researchers take part in research that leads to patent applications filed in the name of corporations. In such cases, their involvement does not show up in the statistics.

D. Outlook for the future

Now that human DNA has basically been sequenced, the focus of post-genome research has shifted toward analysis of the structure and function of various proteins. In particular, a lot of attention is being focused right now on bioinformatics, which combines the fields of molecular biology and IT into one. Key areas of research include new analytical methods such as bioinformatics, DNA chips, and SNPs (Single Nucleotide Polymorphisms) scoring.

Figure II-9

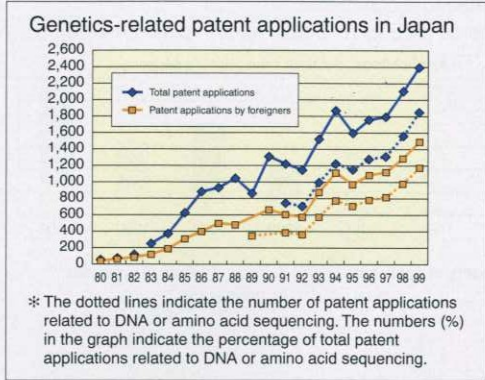


Figure II-10

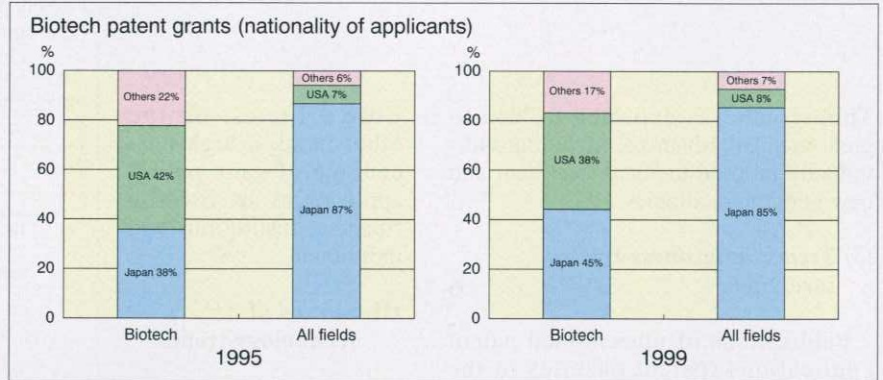


Figure II-11

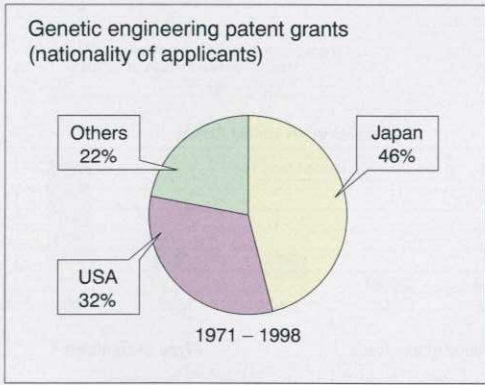


Figure II-12

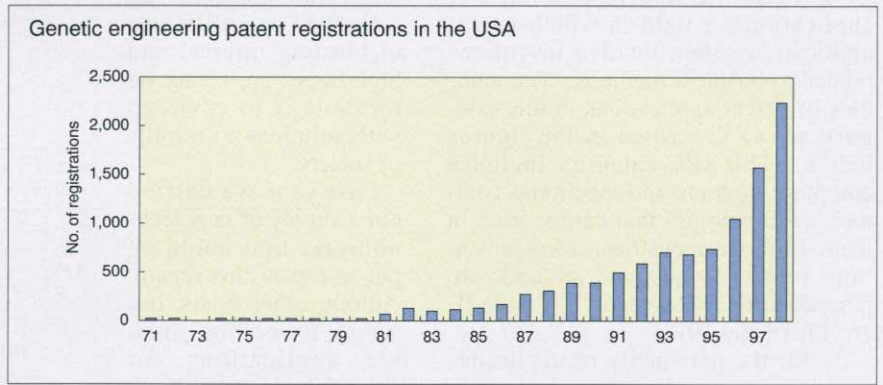


Figure II-13

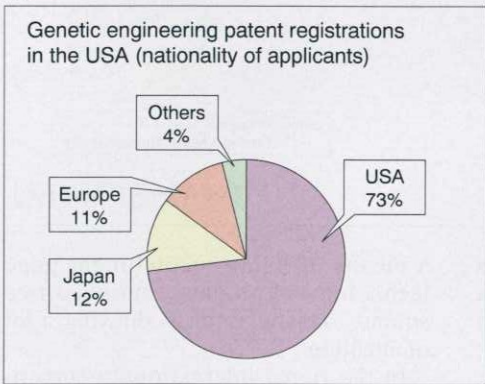


Figure II-14

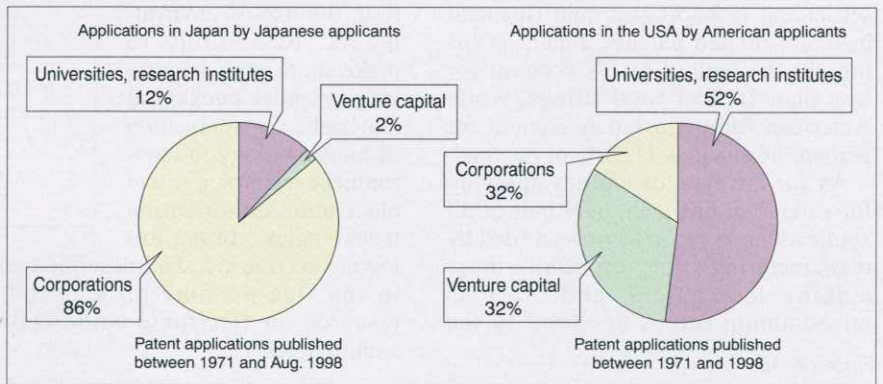


Figure II-15

Leading domestic applicants for patents related to genetic engineering				Ratio of major corporations to venture capital firms in Japan, the USA, and Europe			
Rank	Applicant	No. of applications	Type of organization		Japan	USA	Europe
1	Takeda Chemical Industries, Ltd.	305	Corporations	Major corporations	260	800	540
2	MITSUBISHI CHEMICAL CORPORATION	274	Corporations	Venture capital firms	60	130	700
3	AJINOMOTO CO., INC.	268	Corporations	No. of employees	30,000	150,000	28,000
4	Agency of Industrial Science and Technology	231	Universities, research institutes				
5	KYOWA HAKKO KOGYO Co., Ltd.	214	Corporations				
6	Teijin Limited	208	Corporations				
7	SHIMADZU CORPORATION	207	Corporations				
8	Asahi Kasei Corporation	201	Corporations				
9	Takara Shuzo Co., Ltd.	154	Corporations				
10	Hitachi, Ltd.	148	Corporations				

Between 1971 and 1998

Sources: Report from the Colloquium on Biotechnology as the Basis of National Strength in the 21st Century 1999-1998 BIO's Guide to Biotechnology EU industrial competitiveness reports

This research is expected to lead to great medical advances, including individually tailored medical treatment and new genome medicines.

(5) Trends in business-related inventions

Publications of unexamined patent applications (patent gazettes in the United States) that carry an IPC code of G06F17/60 are related to computer applications, a field in which patent applications often involve inventions related to business methods. The numbers of patent applications in this category are as described in the figures below. This IPC category includes computer systems and electronic commerce technologies that can be used in many different industries. Most inventions related to business methods are placed in this IPC category. (Figure II-16, 17, 18 and 19)

As for the nationality of applicants, in such areas as e-commerce intermediate processing, e-commerce transaction settlement technologies, and financial business-related patents, Japanese filings in the United States account for less than 10% of total filings, while American filings in Japan account for perhaps as much as 11-20% of the total.

As for the type of entities applying for patents in this area, over half of all applications in Japan have been filed by manufacturing firms, especially those making computers and various telecommunications devices. In the

United States, on the other hand, a high percentage of such patent applications are filed by financial institutions and individuals.

III. Survey of technology trends

Hunger, the environment and the growing role of IT are all issues of burning interest and high hopes are riding on technology to come up with solutions to the ills of society.

Last year we carried out a survey of new technologies that could be put to use in this regard. Among other items, our survey focused on possible applications for recombinant gene technology in rice cultivation, the use of environmental technology to make more environmentally friendly packaging materials, the application of biotechnology to environment technology, and electronic authorization technologies. In the following section we shall describe trends in the rice genome project and in research on electronic authorization technologies.

(1) Research on technology trends in the rice genome project

Rice is grown widely throughout Japan, China, India and Southeast Asia, and serves as a staple food for about 50% of the world's population. In an effort to ensure a stable supply of high-quality rice, scientists are working to develop

a means of using recombinant gene technology to produce improved rice strains. This research is drawing a lot of attention.

In the fierce international competition in the field of biotechnology, Japan maintains the status of a world leader in the quest to use recombinant gene technology to develop improved rice strains. We must continue working faster and more efficiently to analyze the rice genome and to develop improved rice strains using recombinant gene technology. And while doing so, we must almost be sure to obtain strong patent rights so that we can maintain our lead in this field.

The first patent application related to the application of recombinant gene technology to rice was filed in 1986,

Figure II-17

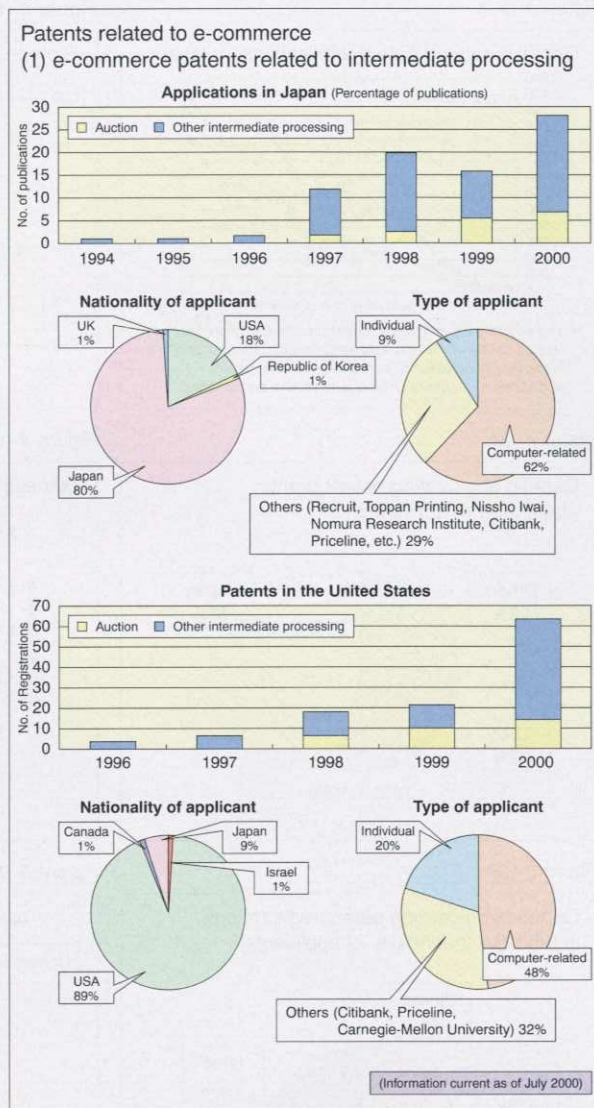


Figure II-16

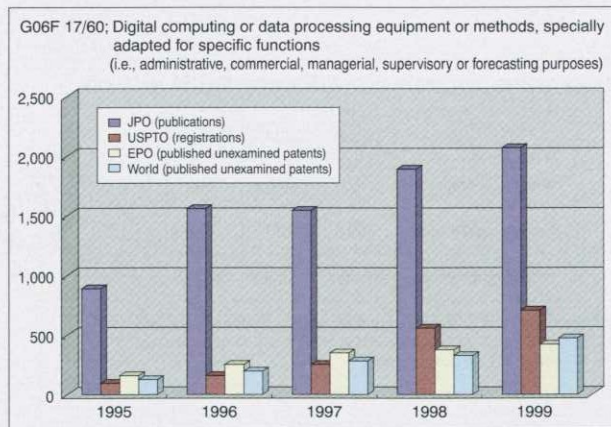


Figure II-18

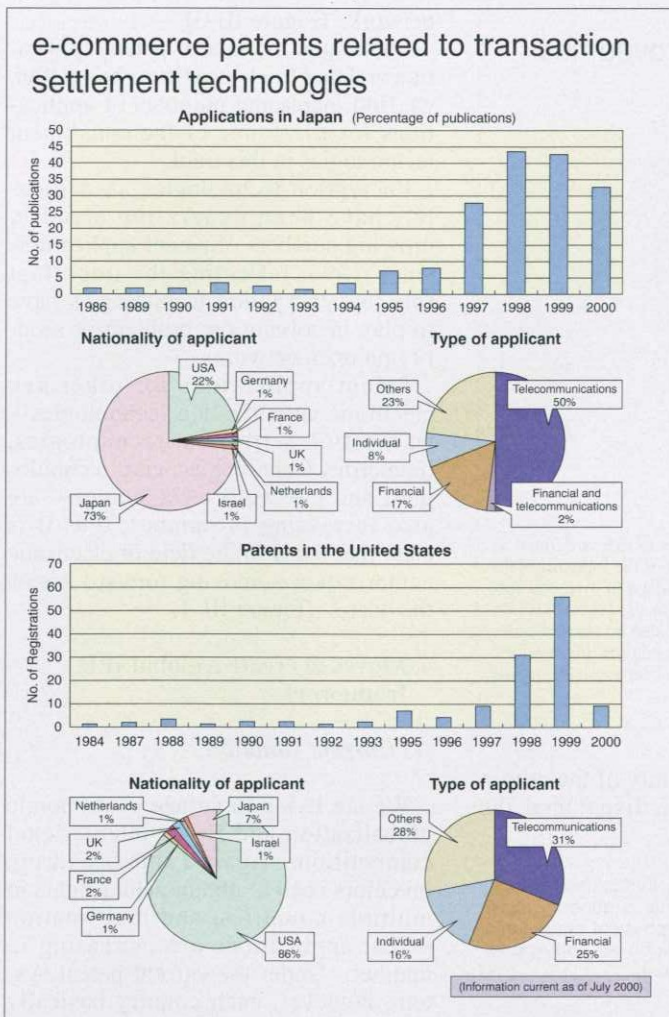
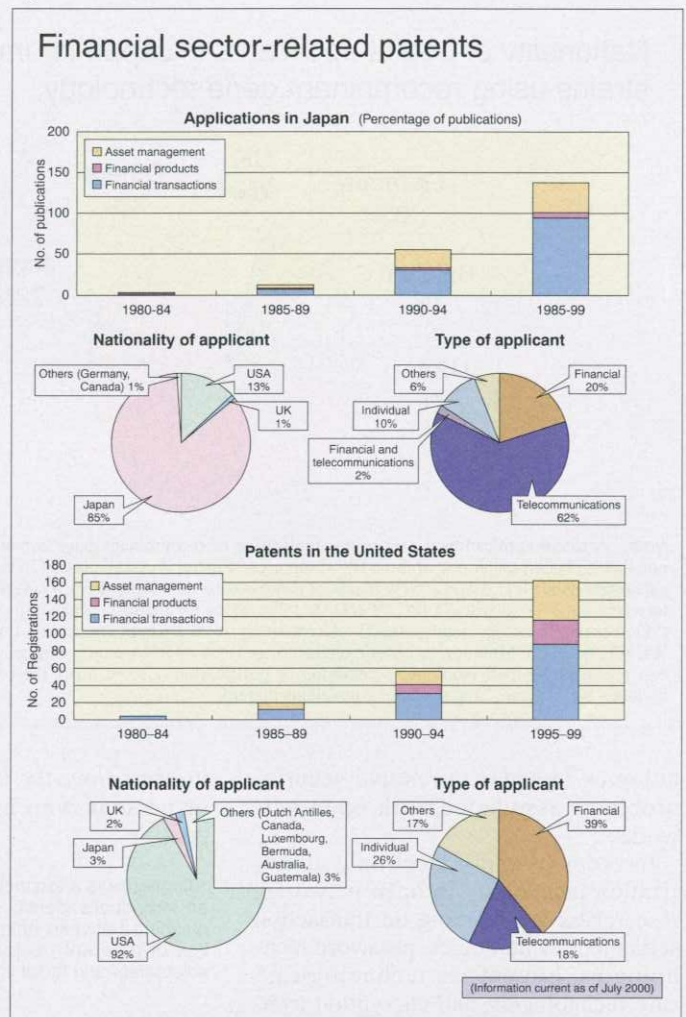


Figure II-19



and the data include a total of 98 publications from 1986 to 1999 concerning the application of recombinant gene technology to rice.

Japan has produced far more patent applications than any other countries related to the use of recombinant gene technology in developing improved strains of graminaceous plants. At the same time, however, it bears noting that the percentage of foreign patent applications in Japan in this field (28%) is well above the overall percentage of patent applications in Japan accounted for by foreign applicants (15%). This is a good indication of the intense international competition now taking place in this field. (Figure III-1)

In terms of trends, applications for patents related to the use of recombinant gene technology in rice improvement have been increasing both in number and variety of content since 1986.

The first patent applications related to gene transfer technology were filed between 1986 and 1988, and since 1989 there have been patent applications for genetically modified plants with improved resistance to herbicides and pests, improved taste, etc. Since 1995 there have also been patent applications for modifications to improve crop yields. (Figure III-2)

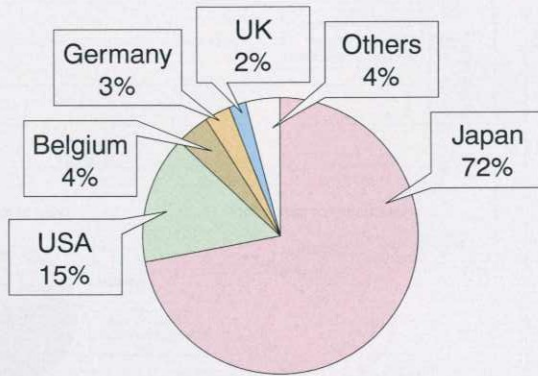
(2) Technology trends in electronic authorization

Efforts are now proceeding apace to develop open networks and a body of legislation that will pave the way for e-government and e-commerce. Open networks are advantageous because they can make it very easy for people to use mobile telecommunication devices to submit applications and send in payments, but security is crucially important because of the possibility of personal data being exposed to prying eyes when it is sent back and forth.

Against this backdrop, a lot of attention is now being focused on efforts to develop electronic authorization tech-

Figure III-1

Nationality of patent applicants in Japan for improved rice strains using recombinant gene technology



Note: A patent application related to the application of recombinant gene technology to rice is defined as one that is classed under one of three IPC categories. Firstly, it can be classed in either of the following sub-categories under IPC A01H ("New plants or processes for obtaining them; Plant reproduction by tissue culture techniques"), to wit: (1) IPC A01H1/00 ("Processes for modifying genotypes"); or (2) IPC A01H5/00 ("Flowering plants, i.e. angiosperms"). Alternatively, such a patent application might also be classed under IPC C12N15/00 ("Mutation or genetic engineering; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification; Use of hosts thereof"). Japanese keywords include "ine," "kome," and the *kanji* equivalents thereof.

nologies in order to resolve security problems associated with open networks.

In order to apply electronic authorization technology to open networks, researchers are working on transaction settlement technologies, password technologies, biometrics technologies,* card technologies, and encryption technologies. The idea is to use these technologies to send encrypted data back and forth, and to use the encrypted data

itself to prove the identity of the person or persons who have dispatched the data.

*Biometrics is a technology that is used to verify an individual's identity. This is done by distinguishing between unique physical characteristics of different people (such as fingerprints, voiceprints and facial images).

Electronic authorization technologies must be developed and related legislation must be enacted to prevent improper use of open networks, and once electronic authorization technologies have come into widespread use, they can also be utilized for the buying and selling of goods, and for the implementation of e-government.

The number of patent applications related to electronic authorization technologies has been on the rise since 1994, and this period coincides with the rise of the Internet, which is one type of open

network. (Figure III-3)

Looking at the mix of patent applications related to electronic authorization, we find increasing numbers of applications for every one of the constituent technologies in this field.

Encryption technologies, in particular, have been generating steadily growing numbers of patent applications since 1996, reflecting the important role that encryption technologies have to play in solving the problem of security on open networks.

Patent applications for other key electronic authorization technologies – transaction settlement technologies, biometrics technologies, card technologies, and password technologies – are also increasing in number; thus it is clear that R&D in the field of electronic authorization is moving forward across the board. (Figure III-4)

4. Moves to create a global IPR framework

(1) Current situation

We are living in an age of economic globalization and fierce international competition. Against this backdrop, inventors need to obtain patent rights in multiple countries, and multi-nation patent applications are increasing in number. Under the current patent system, however, each country basically establishes and runs its own system, and no two systems are completely alike. When inventors obtain patent rights in multiple countries, they must go through the application process many times over, but the procedures are different in each case, and the whole process is extremely burdensome and costly. For that reason, there is a need to build a stable patent system that allows inventors to file a quick, single, simple, low-cost patent application that simultaneously affords protection in multiple countries.

(2) Approaches to mutual recognition of patents

To facilitate mutual recognition, a first effective step would be to elimi-

Figure III-2

Patent applications in Japan for improved rice strains using recombinant gene technology, 1986-1997

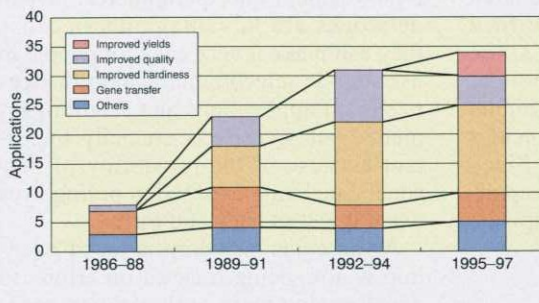
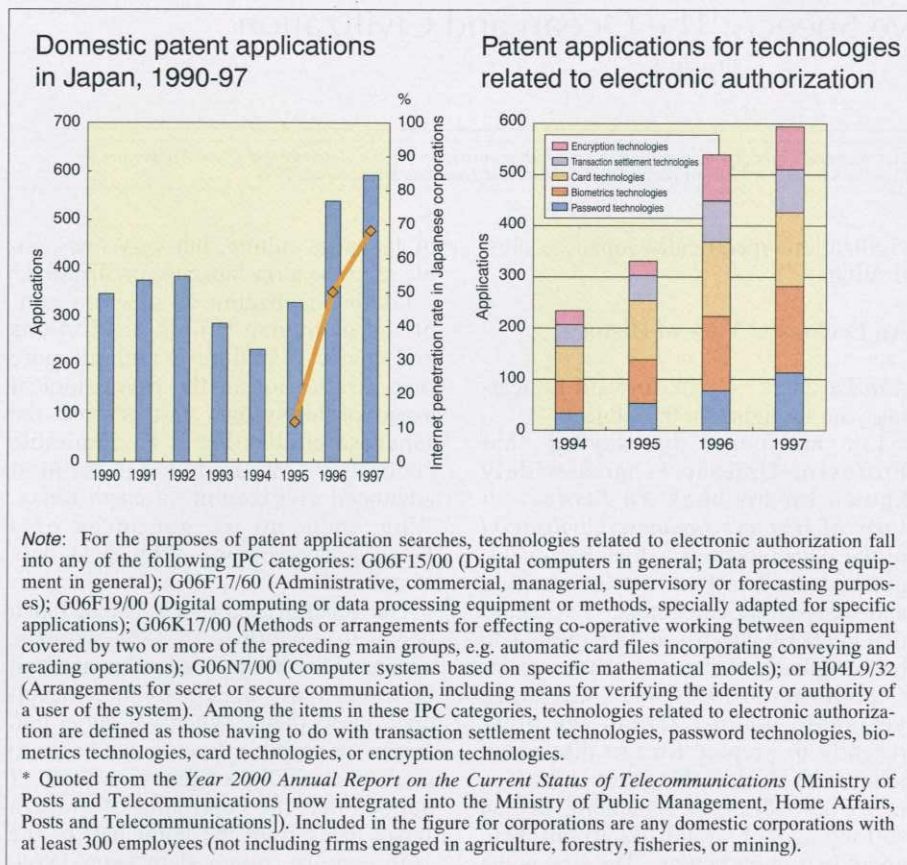


Figure III-3



nate duplication by each country's patent office of each other's patent search and review procedures. Toward this end, the Japan Patent Office has long been working to establish mutual patent recognition agreements with other countries. The idea is to get different countries' patent offices to recognize each other's patent search and review procedures, and then to keep expanding the scope of the agreement to include as many countries as possible.

A. Promoting mutual recognition of patent searches

In order to bring about mutual recognition of not only searches, but reviews as well, it will be necessary to bring different systems and review criteria in line with each other. With respect to mutual patent recognition, a first effective step in that direction would be to have patent offices with comparable

patent review capabilities recognize each other's patent searches.

B. Improving the PCT system

In order to ensure that mutual search recognition is implemented in the most effective possible manner, it will be necessary to have an efficient system in place. Although the current PCT system offers unified international procedures for part of the process, patent search and review procedures are still carried out separately in each country. As such, the system is amenable to decentralized handling of patent searches and reviews, and would thus make a very good platform upon which to build the type of international patent system that Japan is proposing.

The PCT system is not without its shortcomings, however. Procedures are time-consuming and complex, patent searches and reviews are duplicated by different patent offices, and there is a

lack of flexibility. A good way to achieve mutual recognition of patent searches, in our opinion, would be to address the aforementioned problems as a means of building a world patent system that allows for mutual recognition.

C. Exchanging patent examiners and carrying out joint searches

To implement mutual recognition of patent searches, patent examiners in different countries need to establish mutual trust, and they need to gain a better understanding of each other's systems. Toward that end, the Japan Patent Office engages in patent examiner exchanges with the European Patent Office (EPO) and the British patent office, German patent office, Sweden and South Korea. The JPO, the U.S. Patent and Trademark Office (USPTO), and EPO are engaged in a joint prior art search project, and are comparing search systems in the fields of business methods and genetics with an eye to achieving substantive harmonization in these categories.

(3) Harmonizing different systems

In order to build an international patent system based on a mutual recognition of the sort described above while ensuring reliable patent rights, we will need to harmonize different systems, with all parties moving toward adoption of a first-to-file system. Efforts toward this end ran into a brick wall in January 1994 due to American insistence on the first-to-invent system, but a breakthrough on this score was finally achieved when the Patent Law Treaty (PLT) was adopted and procedural harmonization of the patent laws were realized in June 2000. The task now is to begin actively discussing substantive harmonization of the patent laws of different countries.

UJTI

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