

Development of a Unique R&D Cycle with Positive Feedback

By Ogawa Katsuo

Revenues from technology licensing pays for R&D expenses

On August 29, 1997, the *Nikkei Sangyo Shimbun* newspaper listed a ranking of companies which are successful in disputes concerning their intellectual property (Table 1). According to this article, the ranking was based on the results of surveys conducted jointly with the *Nihon Keizai Shimbun, Inc.* and Nikkei Research Co., Ltd. IBM of the United States was ranked as the world's most successful, followed by Hitachi, Ltd., Canon Inc., both of Japan, and Texas Instruments of the U.S.

While Hitachi, unable to beat IBM, was ranked second, it won the highest

position among Japanese companies. The primary reason Hitachi was evaluated as the "most successful Japanese company in intellectual property disputes" can be attributed to its technological assets.

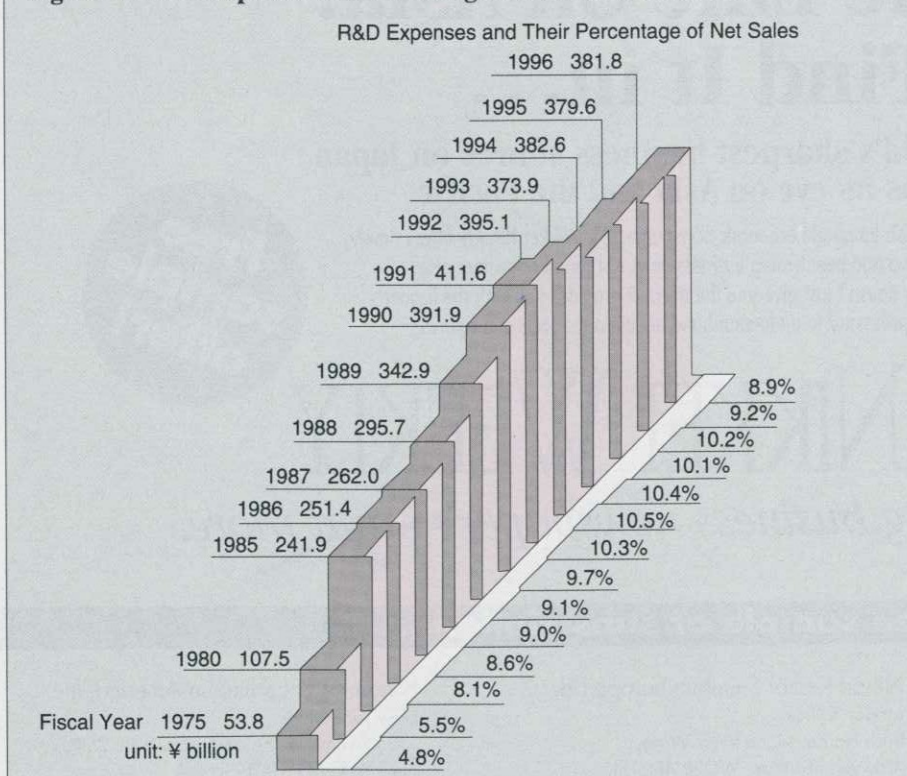
Hitachi has continuously devoted 9 to 10% of net sales to R&D investment (Figure 1). For fiscal 1997, Hitachi invested ¥380 billion in R&D activities. Since 1910, when it was founded, Hitachi has progressively encouraged its employees to be inventive, under the corporate mission of "Invention is the life of engineers," and believes that intellectual property is an important result of R&D activities. This is why I believe that Hitachi's emphasis on protecting its intellectual property was evaluated highly.

Hitachi generates profits not only by guarding its products through its intellectual property, but also receives revenues from licensing it to recoup its R&D expenses and contribute to its earnings.

Since 1970, Hitachi has had a program to actively license its intellectual property in exchange for an appropriate consideration. At first, expenses were substantially greater than revenues. However, revenues from technology licensing have improved considerably through implementation of the "Strategic Patents Doubling Campaign," which I will explain later.

Revenues from technology licensing reached about ¥50 billion in 1997, accounting for about 10% of R&D expenses. Expenditures for technology licensing totaled about ¥10 billion, leaving a net gain of ¥40 billion which represents 48% of ordinary income.

Figure 1: R&D Expenses and Percentage of Net Sales at Hitachi



Experience in patent disputes has toughened Hitachi

Texas Instruments demands a 10% patent use fee for its D-RAM (Dynamic Random Access Memory) technology

1985 was a memorable year for Hitachi, with its technology licensing revenues surpassing its technology licensing expenses for the first time. At the same time, however, patent-infringement lawsuits by U.S. companies have been frequent, reflecting the so-to-speak pro-patent policy of the U.S. Government. One representative case was the D-RAM suit initiated by Texas Instruments against nine Japanese and South Korean companies.

Japanese semiconductor manufacturers had been under patent license contracts with Texas Instruments since the 1970s. While they were engaged in contract renewal negotiations for a third term, Texas Instruments suddenly sued

Table 1: Ranking of Major Companies with regard to Success in Intellectual Property Disputes

Rank	Company	Score
1	IBM (U.S.)	136
2	Hitachi (Japan)	84
3	Canon (Japan)	74
4	Texas Instruments (U.S.)	53
5	Mitsubishi Electric (Japan)	41
6	Motorola (U.S.)	27
7	SONY (Japan)	25
8	3M (U.S.)	24
9	Fujitsu (Japan)	20
10	General Electric (U.S.A)	15
10	Intel (U.S.)	15
10	Honeywell (U.S.)	15

Source: *Nikkei Sangyo Shimbun* (August 29, 1997)

the nine companies at the International Trade Commission (ITC) and the Dallas Federal District Court in Texas in January 1986.

Texas Instruments argued that "Conventional fees are too cheap. Our D-RAM patent is a direct result of our R&D investment in advance. In this light, an appropriate license fee should be 10% of net sales." Against the backdrop of a sluggish semiconductor market, Texas Instruments demanded a higher licensing fee, which taught me the importance of intellectual property all over again.

Because the case involved a large number of companies and as many as

10 U.S. patents owned by Texas Instruments, the ITC hearing lasted for 3 months. Hitachi countered Texas Instruments by arguing at the U.S. Federal District Court and the Tokyo District Court that "Texas Instruments also infringed on Hitachi's patents." As a result, both parties reached a settlement in the form of a "mutual compromise" just before the ITC decision.

The patents which Hitachi actually used in its counter-suit became very instrumental in generating revenues from patent licensing in later years. At the same time, Hitachi also learned, through this case, what patents were effective in disputes. As a result, Hitachi became less concerned about the number of patents it owned, and instead placed emphasis on more effective "Strategic Patents," i.e. patents which other companies had to use in their products or processes.

Patent dispute with Motorola over micro computers

Lawsuit by Motorola threatens Hitachi's micro computer business

In 1989, a lawsuit was brought by Motorola of the U.S. against Hitachi in relation to patents for micro computers. Previously, Hitachi had an agreement

with Motorola under which Hitachi manufactured and sold Motorola's family micro computers.

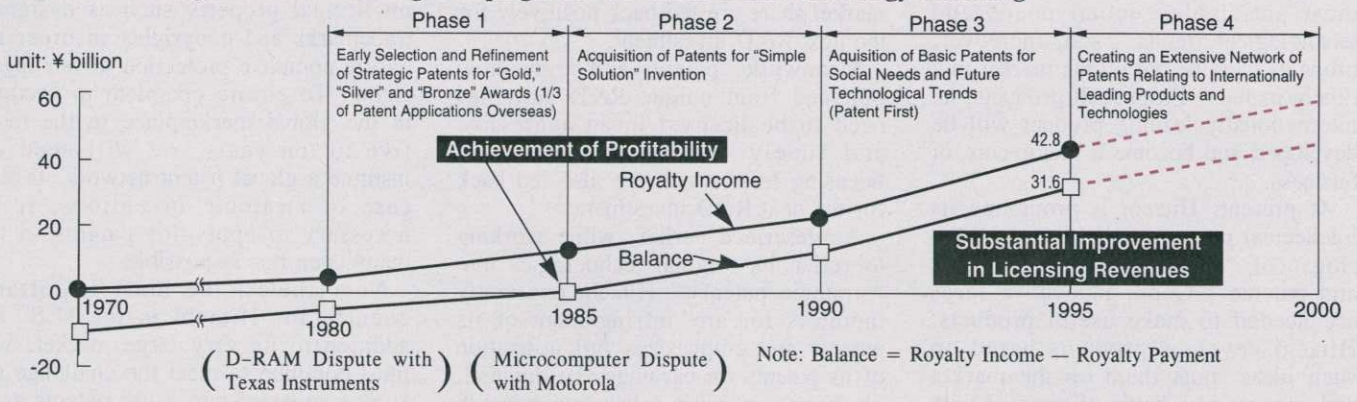
In the meantime, Hitachi had been developing its own micro computers, and its H8 micro computer became competitive with Motorola's micro computers. As a result, Motorola brought a lawsuit against Hitachi for infringement of four patents in order to remove Hitachi's micro computers from the market.

Hitachi immediately launched a counterclaim against Motorola for infringement of its patents. This counter-suit was critical to Hitachi's micro computer business. The litigation was very intense and was called the "Microcomputer Patent Wars" in the U.S. On March 29, 1990, the Texas District Court ruled that both parties had infringed on each other's patents. Based on this 50-50 decision, both parties reached a conciliation. If Hitachi hadn't had effective patents which Motorola needed to use, Hitachi might have been forced to withdraw from the micro computer business at that time.

"Strategic Patents Doubling Campaign" (Figure 2)

In 1981, Hitachi launched the "Strategic Patents Doubling Campaign" by consolidating the patent departments for each division. Under this campaign,

Figure 2: Strategic Patents Doubling Campaign and Revenues from Technology Licensing



Hitachi moved away from the "quantity" age of patents to the "quality" of patents which are honored internationally.

Promising inventions resulting from R&D activities for which patents are pending are classified into three levels of "Gold," "Silver" and "Bronze." When an invention is evaluated as "extremely difficult for other companies to get around and basic or necessary," Hitachi will approve it as a "Gold" invention based on objective facts and award the inventors as soon as possible after applying for a patent. Hitachi's Intellectual Property Office will then make concerted efforts to improve this "Strategic Patent" in cooperation with other business divisions.

As a result, Hitachi was able to use powerful patents which resulted from this campaign when it made counterclaims against Texas Instruments and Motorola. At the same time, Hitachi has conducted aggressive licensing activities in relation to its "Strategic Patents." As mentioned earlier, Hitachi was able to generate revenues of roughly ¥50 billion from patent licensing and pay for about 10% of R&D expenses.

Development of unique R&D cycle with positive feedback (Figure 3): winning both in products and patents

Unique R&D and product development must anticipate "social needs and technological trends," and, moreover, products must be put on the market in a timely manner. From such products, an internationally leading product will be developed and become a major core of business.

At present, Hitachi is promoting its intellectual property activities under the slogan of "Winning both in products and patents." Good, innovative ideas are needed to make useful products. Hitachi develops products based on such ideas, puts them on the market and engages in a battle of survival with

its competitors. The ideas from which products are developed and win this war do not result from adopting a "same as everyone else" approach. Rather, such ideas must be original and meet market needs. While laboratories and divisions provide the ideas, the role of the Intellectual Property Office is to translate the ideas into concrete intellectual property, thereby to ensure that products based on them become leaders internationally.

"Winning both in products and patents" means strong protection of useful products as intellectual property and making substantial profits from such products.

One such example of this philosophy in practice is the Hitachi-developed air flow sensor, an important automotive part. Developed jointly by the laboratory and business division, this product currently enjoys a large market share worldwide. Because this product is not too difficult to make once one understands the principle, Hitachi has rigorously protected it with a number of patents. The reason we have been able to take a large share of the market is because other companies were strongly aware that "Hitachi has the patent for this product" and didn't pursue us. Had we been careless in our patent application procedures, other companies would no doubt have copied this product straight away. As demonstrated by this example, only when R&D activities and patent protection are fully in gear can internationally leading products be assured. Profits generated from a large market share are fed back positively for the next R&D investment.

Meanwhile, patents and know-how obtained from unique R&D activities need to be licensed in an aggressive and timely fashion to others for licensing fees, which are also fed back for the next R&D investment.

As described earlier, while working to refine its original technologies into "strategic patents," Hitachi constantly monitors for any infringement of its patents and emphasizes full utilization of its patents for earnings. To this end, we have to conduct exhaustive research

on products by other companies and assess any potential relation with our patents. The Intellectual Property Office undertakes this task diligently with the business division, and patiently negotiates with other companies to obtain an appropriate consideration.

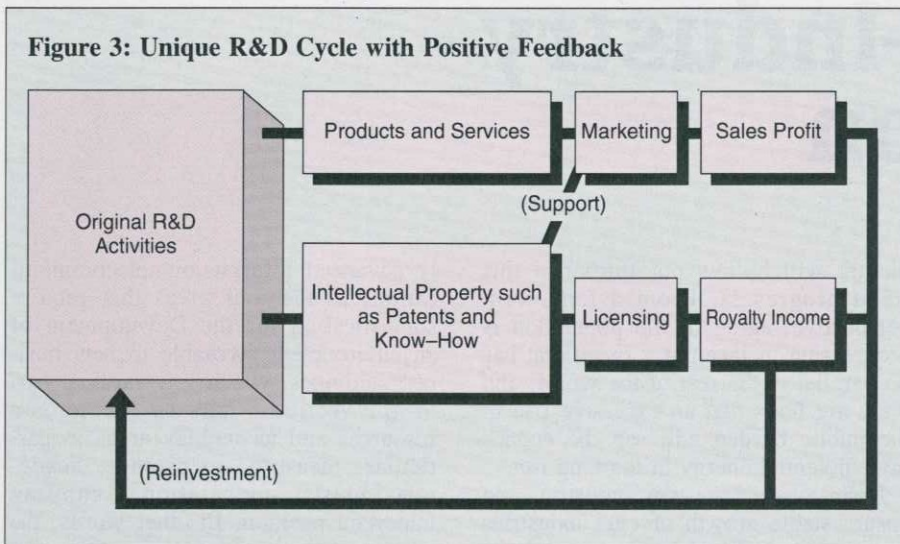
Global strategies regarding intellectual property

Hitachi currently owns about 53,000 patents in Japan and overseas, and applies for over 10,000 new patents annually. In the past, we implemented a strategy of applying for as many patents as possible and selecting those which best met the changing times. However, applying for and obtaining patents entails a considerable amount of work and expense. Since maintaining patents is also expensive, we therefore do not wish to increase the number of patent applications unnecessarily, but instead employ the more effective strategy of focussing on worthwhile patent applications.

Recently, changes in the market have been occurring very rapidly, so that only leading products can generate large profits. In such an environment, we are required to select, at an early stage, the themes which are likely to lead to leading products and/or technologies, apply for patents worldwide for selected themes, and establish an extensive network of patents so that others will not be able to follow us. In this regard, we also intend to make more effective use of intellectual property such as designs, trademarks and copyrights in order to ensure complete protection of our legal rights. To ensure complete protection in the global marketplace in the next five to ten years, we will need to institute a global patent network. In the case of strategic inventions, it is necessary to apply for patents in as many countries as possible.

Nevertheless, the most important country for Hitachi is the U.S. In addition to its very large market, we must continue to meet the challenge of U.S. companies which use patents as a

Figure 3: Unique R&D Cycle with Positive Feedback



weapon in this pro-patent age. We can also restrain manufacturers in newly industrialized countries by taking advantage of the U.S. court system, which is known for fast legal procedures and fair penalties imposed for violation of rights. Furthermore, we recognize that patent applications are becoming more important in other Asian countries, which are rapidly catching up with Western countries.

Improved patent acquisition capability

To obtain progressive, promising patents, i.e., "strategic patents," staff members of the Intellectual Property Office are first of all required to have the ability to recognize good inventions. It is said that it takes about five to ten years from patent application to actual merchandise. As the speed of technological innovation accelerates further, it is ever more necessary for us to anticipate the future when applying for patents.

Conditions for a good patent are "necessity of the issue and simplicity of the solution." "Necessity of the issue" means that the issue for which an invention provides a solution is necessary to meet market needs. "Simplicity and honesty of the solution" means that a solution is the

simplest among all possible solutions and that everyone, in hindsight, thinks "how simple that is!"

Researchers and design engineers are sometimes inclined to think that only difficult solutions are effective ones. However, it is inventions that are natural and very simple which are more likely to become strong patents which competitors cannot get around.

Secondly, staff members of the Intellectual Property Office must have the ability to refine effective patented inventions. This calls for a clear recognition of what inventions there are among research results from a diverse range of perspectives and defining such inventions as patent claims. All in all, it is the ability to draft claims which is crucial. This ability matters not only when we apply for patents, but also when our applications are being examined by the Patent Office. In other words, staff members must produce claims such that they cover all possibilities by considering product changes in our company and on the market. Such an ability cannot be acquired overnight. It takes actual experience in both successful and unsuccessful lawsuits and licensing negotiations. Thus, staff members of the Intellectual Property Office have a strong sense of pride as "patent specialists responsible for making inventions patentable."

Offensive patent strategies

Offensive patent management is required to maintain positive feedback for original R&D investment after promising patents are established. R&D themes are selected by each laboratory and division according to its respective strategy, and development proceeds under its responsibility. However, in the case of very important themes for our future strategies, we do not wait for R&D results. Instead, the staff members of the Intellectual Property Office are required to get involved at an early stage of development and exchange ideas with researchers and engineers in order to ensure more effective intellectual property.

The key to developing powerful patents is discussion over future market needs and technological issues. Once these matters are understood, solutions will naturally emerge and lead to useful inventions. To this end, it is important that laboratories, divisions and the Intellectual Property Office collaborate closely, and this is promoted using the top-down decision making procedure.

At the same time, an offensive licensing strategy is needed to expand the feedback through which revenues from licensing intellectual property deriving from R&D results are reinvested in future R&D activities. We simply cannot afford an unnecessarily long time period in which to conduct licensing negotiations concerning intellectual property. Recently, Hitachi has been justly evaluated for its intellectual property and its accomplishments in aggressively utilizing litigation as a fair means to facilitate negotiations.

What is expected from Hitachi today is internationally leading products. This also means internationally effective intellectual property. Development of a unique R&D cycle with positive feedback will be realized by driving the product and intellectual property in tandem.

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