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Author(s)	Koide, Minoru
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Intellectual Property Management Capability in Chemical Enterprise

Minoru Koide

†Graduate School of Knowledge Science,
Japan Advanced Institute of Science and Technology
koide@jaist.ac.jp

Abstract

Intellectual property management is more important in a company that has a high organizational ability than in other companies. In this paper, I present the concept of IP management capability in a chemical enterprise, and the foundational considerations for the framework concept of the efficiency of the activities related to IP.
In a chemical enterprise, proposing solutions to user industries and developing products to meet various needs in different fields of R&D are especially important issues. In what follows, I present the results an analysis of the Hitachi Chemical Co., Ltd., selected as a case study based on its IP management success.

Keywords: Intellectual Property Management Capability (IP Management Capability), Innovation, Intellectual Property Report, Intellectual Property Skill Standard

1. Introduction

From the viewpoint of investor relations, an IP report is available which is based on the disclosure requirement of IP information by the Ministry of Economy, Trade and Industry in January 2004, and which it addresses organizational ability in terms of IP management. This report discloses 10 items regarding IP information.
METI, the IP Policy Room reported the "IP Skill Standard", are indexes which clarify and systematize the individual ability of IP-related human resources. These are related to the appraisal of enterprises and persons in charge of IP. The patent is one of the most important IP's. I propose that IP management should be discussed from the viewpoint of the theory of organization.
I present here the results of an analysis of the Hitachi Chemical Co., Ltd., selected as a case study based on its IP management success.

2. Framework for the efficiency of IPMC

2.1 The Concept of the "Organizational Ability"

The capability or the competence refers here to the concept of "Organizational Ability". This term is defined as follows:
1. It is the system such as the management resource, the knowledge and the organizational routine that an economic subject has.
2. It is a unique ability in the enterprise.
3. It is not simple to imitate.
4. As a result, it can raise the competitiveness and the viability of the organization as a result.
The enterprise stores organizational ability in various aspects, such as engineering development, design, production, supply, sales and marketing, physical distribution, financial affairs, judicial affairs and strategic concepts, differently from other enterprises.
Surface competitiveness is the index by which a customer can directly observe and appraise the specified product. For example, a customer can perceive the product contents, price, and delivery date concretely.
On the other hand, deep competitiveness is an index by which a customer cannot observe directly, but which supports the surface competitiveness, and is also directly related to the organizational ability of the enterprise.
Concretely, deep competitiveness includes productivity, production lead time, development lead time, development time in man-hours, quality control (percentage of defects) and quality of design. Finally, it rivals in superiority or inferiority "the surface competitiveness", the support ratio of the customer (market share) rival, and it becomes profit performance (profitability) as a result. [1]

A patent is the expedient that guarantees the company profit, by preventing the imitation of technology. The IP management capability regarding patent is located as a component of or-

ganizational ability. [2]

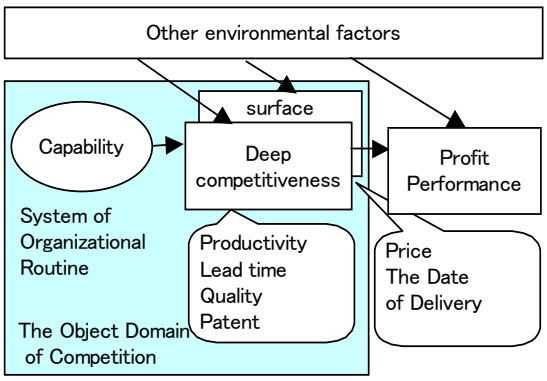

Figure 1. Organizational ability & performance, quoted from [1]

2.2 Strategies of IP management

IP management is recognized as one of the important business issues in Japanese enterprises. It contributes to the creation of innovation by which an IP department cooperates with other departments. And it becomes functional organically in all innovation process. The pattern of an IP strategy should be consistent with the pattern of business strategy. IP management needs to respond to the change of product life cycle by the degree of maturation in the product marketplace. [6]

2.3 IP Skill Standard

METI, the IP Policy Room reported the "IP Skill Standard", are indexes which clarify and systematize the individual specialist capabilities of IP-related human resources. There are 61 functions that belong to an enterprise in the framework of the "IP Skill Standard". The functions are as follows: for example, protection of IP, creation of IP, application of IP, information infrastructure of IP, arrangement disputes related to IP etc. [7]

2.4 Model of IP management capability

I propose that the conceptual model of IP management capability can be represented as in Figure 2. In this framework, the input consists of three variables, namely IP-related Human Resources, IP-related Capital, and IP-related Investment Capital. The output consists of one variable, which is the IP-related Profits for IP management capability.

IP-related Human Resources refers to specialist capabilities, know-how, etc. IP-related Capital refers to patents, brands, etc. IP-related Investment Capital refers to common registration fee, etc., and IP-related Profits refers mainly to licensing fees.

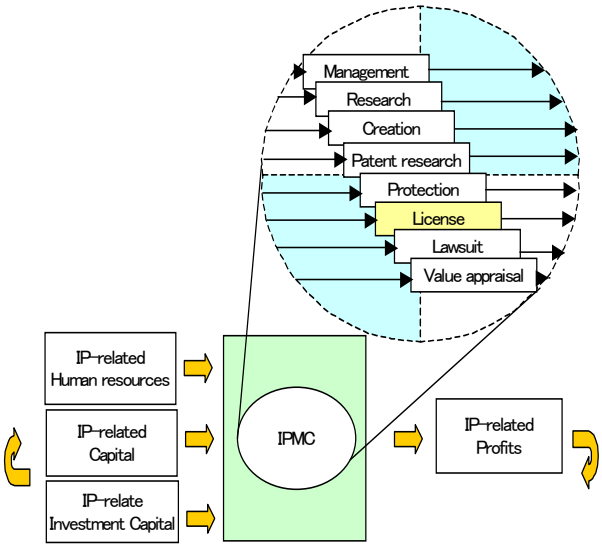

Figure 2. Model of IPMC

2.5 Efficiency of the IP management capability

In this framework for the model of IP management capability, an improvement of the efficiency of the intellectual property activity is important to keep IP-related profit targets.

However the efficiency of R&D is evaluated according to the degree of attainment of the targets, and needs many indicators. The selection of the subject of research and the speed of attainment of the targets have a large impact on the efficiency of the R&D. This is thought to be similar to the efficiency of IP management capability. [3]

3. A Success Case in A Chemical Enterprise

3.1 Features of Innovation in the Chemical Industry

The chemical industry produces various chemicals from many raw materials by chemical conversion. The market is spreading to a wide-ranging field that is rarely seen in other basic materials industries. In addition, the raw material always changes in accordance with changes in the energetic resources situation. The product or the market in the chemical industry changes with time. In addition, following a trend towards service economy, the chemical industry

shifts from a material and mass production age to a high functional material and high-tech chemical age. The chemical enterprise has to match R&D and its various needs, especially need for interdisciplinary fields. That has become an important factor that influences the future of a Chemical enterprise. [4]

3.2 A Business model in Hitachi Chemical Co., Ltd.

Hitachi Chemical Co., Ltd. contributes to the value creation of the customer based on basic technologies. Therefore, it satisfies all the needs of the customer quickly and has developed business by close communication with the customer. Especially, in order to answer demands of electronics manufacturers and semiconductor manufacturers for the development of electronics-related product by use of semiconductor materials. It enters into the product development and design process of the customer, and it understands technologies and usages that are required. Furthermore, after detecting latent needs, finally it offers a solution that is optimum to the customer and continues to answer various requests. This business model-based R&D rises to predominance. [5]

3.3 IP Management Activity in Hitachi Chemical Co., Ltd.

Hitachi Chemical Co., Ltd. endeavors to acquire patents which cover not only the material and the component, but also the process territory of the set manufacturers and the equipment manufacturers, which tackles the construction of the firm patent network which can contribute to the solution, and utilizes intellectual property strategically. Concretely, high profitability and the product technology whose promising future are defined "intellectual property strategic theme". It places a few intellectual property members in the full-time person, and does the excavation of invention and pursues patent intensively about the effective patent which can cover the product specification where the possibility other companies in the future commercializing is high. The minimum of 5 patents acquisition is designated as goal in every product technical field, "5FP (Fighting Patents) to promote activity," to endeavor to the construction of the firm patent network, "intellectual property strategic theme", for example 2005 first half has set 8 fields.

For example, there is a circuit connected film for the liquid crystal display with the material of the tape condition to be connected to the circuit of the liquid crystal panel and the circuit of the semiconductor chip for a liquid crystal drive. It makes the insulated adhesive disperse the conductive particles, and it is something coating in film condition. Therefore, it became possible recently that it turns on electricity between the circuit of the liquid crystal panel and the circuit of the semiconductor chip through the conductive particle, and the insulation between the adjoining circuits are maintained. This product played a big role in the development of the colorization and the finer liquid crystal by connecting the minute circuit that had been difficult.

This product was commercialized in 1984 for the first time in the world. It possessed as high market share in the world through the technical predominance that was cultivated. The patent "conductive anisotropic gluing seat" regarding the basic quality of the film of connecting circuit for liquid crystal display (the patent number1882895) was chosen as "The 2003 nationwide special prize of invention commendation (prime minister invention prize)" by the Japan Institute of Invention and Innovation. It is a component of a network of patents. The scope of claims covers all the manufacturing processes of the product such as from the synthesis of the insulated gluing resin and the production of the conductive particle, to the coating and reel of the insulated gluing resin to the based film. Therefore, it reaches to the process that connects with the circuit of the liquid crystal panel and the circuit of the semiconductor chip by the customer using the same product.

In addition, Hitachi Chemical Co., Ltd. looked extensively for the possession of domestic patent rights from 2001 up to 2003. It abandoned the patents that do not have any applications, and selected and held patents whose quality is high. It adopted a strategy that reinforces foreign application from the viewpoint of global competition.

Furthermore, the "intellectual property strategic system" makes it possible to match the patent problem in real time and to implement an intellectual property strategy. As mentioned above, the main features of the IP activity are as follows.

1. The business model and the 5FP activities increase the probability of success of selection of a theme.
2. Reexamining the domestic possession and acquisition of patents reinforces foreign applica-

tion and strengthens the global network of patents.
3. The Patent Information Network of the "intellectual property strategic system" enhances information sharing and achieves the velocity required to reach target.

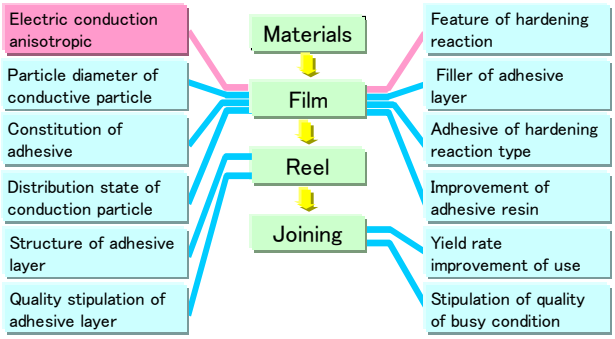

Figure 3. The Network of Patents

4. Patent investigation with IPDL

4.1 IP Activity Survey Report

The Intellectual Property Activity Survey Report, published in 2006 shows the own and average number of patent licenses for each company. The ranking of own average is as follows; "Steel and non-ferrous metal products industries", "transport equipment industry", "precision instrument industry" and "chemical industry". The ranking of others average is as follows, "Chemical industry", "electrical machinery industry" and "Steel and non-ferrous metal products industries". The average numbers of patent licenses for " the Chemical industry" is 30.8. [8]

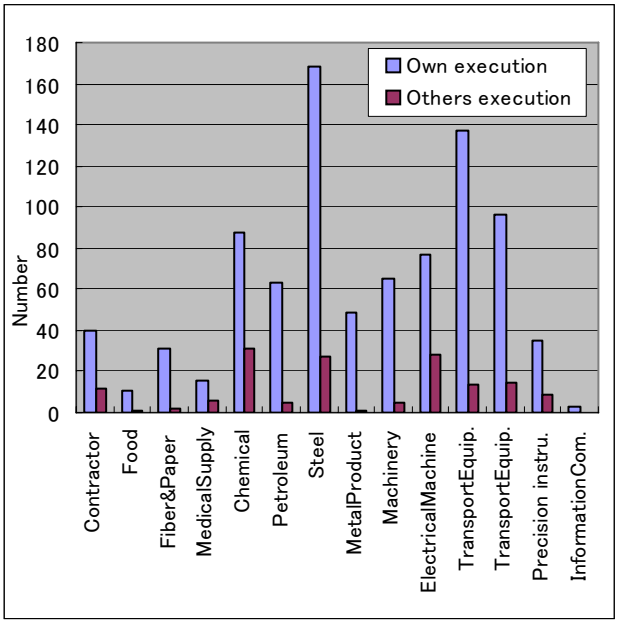

Figure 4. The own and others average number of patent licenses

4.2 Database Search

The Hitachi Chemical Co., Ltd. share of the world marketplace is approximately 70% at die bonding film business in gluing material field for semiconductor in the above-mentioned intellectual property.
I had patent information retrieval about laid-open disclosure public patent bulletin in gluing material field for semiconductor by IPDL (Industrial Property Digital Library). And I explain below about disclosure text search.
Figure 4 shows the results that I obtained from IPDL about the above-mentioned technical field. For example, the search criteria are [(Semiconductor & gluing)] (The parts of summary + claim) * {IPC [C09J163/00 (the adhesive which is based on the epoxy resin; The adhesive which is based on the derivative of the epoxy resin)] + IPC [C09J7/00 (adhesive of film condition or foil condition)]}. The horizontal axis of the graph is the registration year and the vertical axis is the number of registered patents of Hitachi Chemical Co., Ltd and the total number of registered patents.

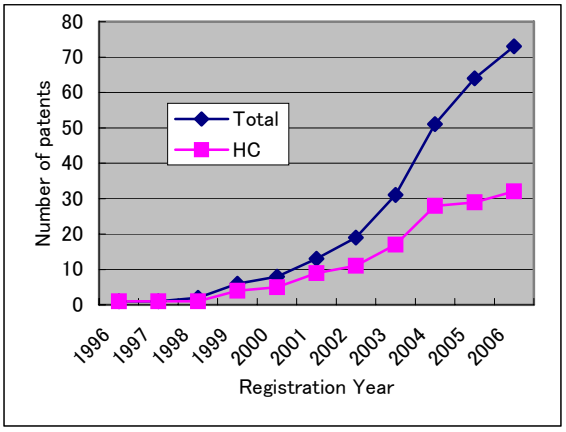

Figure 5. Number of registered patents versus the registration year

4.3 Analysis of the Search Results

However, by reexamining the domestic possession and acquisition of patents, the number of registered patents of Hitachi Chemical Co., Ltd. decreases. The company is fairly successful in expanding the total market share in the global network of patents.
In 2005, its IP-related Human Resources consisted of 24 persons, one of the main components of the IP-related Capital was the number of pat-

ents it held, and the number of domestic and foreign patents was 2112, the IP-related Investment Capital was about three million yen, and one of the main components of the IP-related profits was a balance of payments aiming at achieving a budget surplus. [5] [9] [11]

5. Consideration

The first phase of organizational knowledge creation starts with a combination of the tacit knowledge that also corresponds to socialization. It is expressed as the explicit knowledge type of a new concept with the following phase that corresponds to externalization. The 3rd phase, for the new concept to have worth and to be pursued, must be justified. The 4th phase, in case of a tangible product, is for the enterprise the idea that takes the shape of a prototype, and in case of a soft innovation, for the organizational structure, the management system and patents correspond in combination. In the last phase, for the knowledge, which was made, from each post is converted into another post, which is moved to the outside organization of the customer that corresponds to internalization.

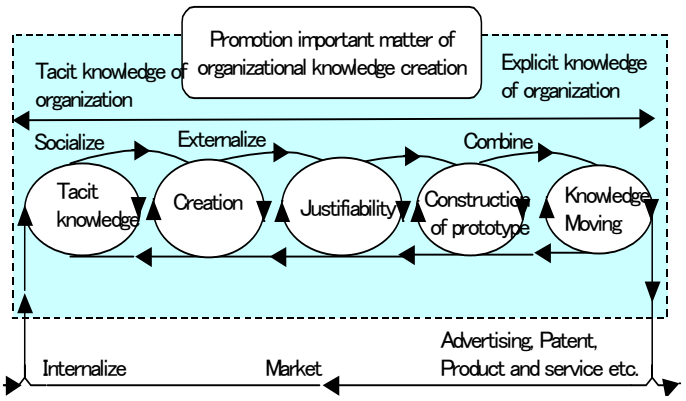

Figure 6. Five phase model of the knowledge creation process

As for the above-mentioned, I had patent information retrieval about laid-open disclosure public patent bulletin. It is the investigation of the technical field of specification about the IPC classification in the chemical enterprise.

At the beginning, the topic to research is screened carefully, and the technical problem to solve is discovered. Next, the concrete solution is set and it is corroborated that there are actions and advantageous effects based on this solution. If it is an unprecedented, new solution, it meets a patentability requirement and it can obtain a patent right. These processes have been synthesized repeatedly in communications between researchers, persons in charge of IP, manufacturers etc., for a long time. As a result, a patent leads to justify a true belief in the "Knowledge Creating Enterprise". [5] [10]

6. Conclusion

The improvement in the efficiency of the intellectual property activity in the case of Hitachi Chemical Co., Ltd. was shown in the framework of the conceptual model of the intellectual property management capability. In addition, an investigation and an analysis are needed regarding the intellectual property management capability in the future, as the organizational ability through the viewpoint of the "knowledge-based theory of the firm". [6] [10]

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