

Method of Providing SME-Friendly Patent Recommendation Service in Korea

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Abstract

Due to the interests of SMEs (Small and Medium-sized Enterprise) in identifying emerging items, there has been an increase in demand for information regarding markets and progress on current technology. However, it is not easy to obtain both necessary and valuable information in the sea of information. This is even more so for SMEs that do not have enough funds and human resources. This study aims to suggest an SME friendly patent recommendation service based on the result of R and D information demand analysis of technologically innovative enterprises in order to support SMEs for R and D. The mapping information between 'Commodity classification' and the 'National Science and Technology Standard Classification Systems', which is major product information of enterprises was used to design how to automatically find out patents matching with SMEs.

Keywords: Demand Analysis, National R&D Information, Patent Recommendation, SME

1. Introduction

It is a general consensus that information is an essential element for economic growth as well as resources. However, it is not easy to obtain necessary valuable information in the sea of information. This is even more so for SMEs that do not have enough funds and human resources have more difficulty in this context. An analysis of SME's information level¹ reveals that 29.2% of SMEs own their own information system and 54.9% of them do not have staff in charge of informationization resulting in difficulties in obtaining required information. Since 2009, funds were invested the most in national R&D projects by the Government-Funded Institutions (GFI), annually increasing by 8 percent for the latest 5 years². However, 24.6% of the technologies (49,004 in 2011) owned by GFIs were only transferred to public institutions³ and there is no database to identify technology transfer from GFIs and universities to SMEs.

In order to create new economic values, the Korean government is actively promoting the creative economy through R&D and innovation. The Korean government is emphasizing the promotion of SMEs and venture

enterprises with the ability of creative and technological innovation in order to realize the creative economy. The government⁴ plans to invest 18 percent of the government R&D budget towards technologically innovative SMEs that can effectively create more jobs until 2017.

KISTI (Korea Institute of Science and Technology Information) is responsible for collecting, analyzing and processing knowledge and information related to science, technology and national R&D projects and constructing databases to provide the best national R&D information, knowledge and other information required by SMEs to contribute to creating a creative economy system. The aim in this study is to layout the results from R&D information demand analysis of technologically innovative SMEs and propose an SME-friendly patent recommendation service.

2. Analysis of R&D Information Demand by SMEs

2.1 Survey Methods

We had planned a demand survey in order to make the supporting plan for the R&D activities of SMEs. We targeted

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ASTI (Association of Science and Technology Information), which encompasses the field of Industry, Academia, Institute with more than 10,000 employees. In order to select survey subject, we have extracted the candidate for enterprises that are (1) over a certain size, (2) holding affiliated institute and (3) technologically innovative. As a result, we chose 240 technologically innovative SMEs. We conducted a web survey on selected SMEs and interviewed a company that was recommended by an ASTI administrator.

NTIS (National Science and Technology Information Service)⁵ one of information services provided by KISTI, is a national R&D knowledge portal for providing R&D project information by the government including projects, human resources, outcomes, research facilities and equipment in cooperation with 17 ministries and administrations. The survey has questionnaire items of 'NTIS awareness', 'current information collection and use', 'information and service demand by R&D stage' in order to provide best national R&D and knowledge information required by SMEs. Some items allowed multiple answers.

2.2 Survey Result

The questionnaire response rate was 7 percent and NTIS members among the respondents showed a distribution of 61 percent. A 77.8% awareness of NTIS was shown, implying that the respondents are a part of the technologically innovative SMEs.

The difficulties of information collection were shown in the order of (1) we do not know what agencies (services) provide the required information (61.1%), (2) we can't easily find the necessary information on the information-providing site (33.3%), (3) we don't have enough time and personnel to collect information (5.6%). The survey showed that SMEs have taken advantage of collected information for 'Understanding Research Trends', 'Creating Research Plan', 'Technological Competitiveness Analysis' and 'Applying a Patent'⁶. The R&D information required in the planning stage of the national R&D projects (shown in decreasing demand) was previous R&D information (72.7%) and financial support program information (22.7%). In NTIS service information, the demand showed in the order of technology and industry information (42.9%), patent information (33.3%), program notice information (14.3%), researcher information (4.8%) . Among the R&D services offered, half of the respondents favored 'download analysis report', followed by 'search the site for service information' and 'download information packages'.

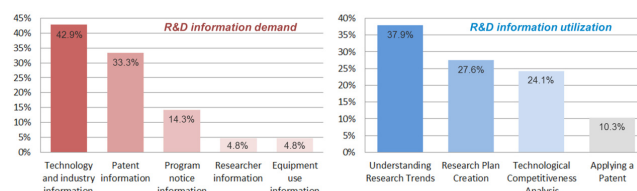


Figure 1. R&D information demand and utilization.

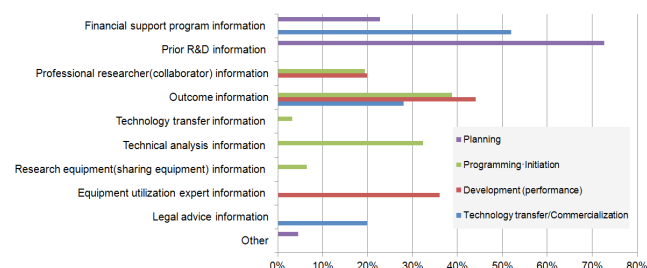


Figure 2. Information demand by R&D stage.

The SMEs visited for purposes of the survey had their own patent attorneys that investigated prior patents, in order to get R&D ideas. To identify progress on technology, they navigated the web, foreign catalogues and domestic exhibition information to investigate the levels of Korean enterprises and those on the global level. This implies the service for providing market information and technology level search information is in need. The respondents said that they conduct joint research with universities for technology transfer followed by commercialization because they had difficulties in identifying methods of technology transfer for technologies owned by GFIs and universities. They said dependence on the Internet in selecting cooperative partners for commercialization was the source of difficulty.

2.3 Implication

Generalizing the result of the demand survey, in order to support SMEs, it is necessary to support SMEs in each step of R&D as well as each step of growth, for example, Initial stage of business → SME → Backbone enterprise. SMEs that are not strong in theory and technical knowledge want technological support by GFIs. First of all, SMEs mentioned the need of business support and joint GFI support continuing for 3 to 5 years. If we were to provide a service (e.g. mailing service) with a focus on funding and technical human resource support information, which is a part of the R&D notice information service provided by NTIS of KISTI, it would be possible to alleviate some of the aforementioned difficulties. The issue of specialized human resources for obtaining technology and

poor commercialization platforms for using them can be addressed by connecting with the 'One to One Support' Program and the 'Self Technology Diagnosis' service of KISTI. The demand for automatically finding out matching patents suggested in this study can be improved by using the 'main product information' of enterprises and the 'National science and technology standard classification system'.

3. Service for Automatically Finding Out Matching Patents with SME

For an SME, the step of commercialization is important after stabilization of its business. SMEs' increasing demand is for market information and technology level information to identify emerging items. This study suggests the aforementioned method of automatically finding out matching patents in order to support SMEs.

The user usually performs repetitive searches in order to obtain optimal patent search results. SMEs with insufficient human resources and time want a simpler way to search patent. Therefore, we propose an approach that provides matching information based on the institution information used in the member registration of information service.

Automatically identifying patents matching with SMEs requires a link among patent information, project information for patent application and relevant enterprise information. The classification system should be considered for the organic link between different pieces of information. In this study, we used the 'National Science and Technology Standard Classification Systems' (NSTC) and 'Commodity Classification' (CC). Although NSTC is a different system from CC in terms of its purpose, both systems are based on technology.

The NSTC was established in 2002 for the purpose of effectively designing and managing R&D managing and distributing science and technology information and managing human resources for science and technology and has been revised every 5 years to consider the emergence of appearance of new technologies. The NSTC is composed of 2 fields (research, application) and a 3-stage structure (2 digits for categories, divisions, sections, respectively). It is defined as an item essential for project information to manage national R&D information.

The 'commodity list' means a list in which names and group classification of commodities are standardized in order to establish a unified classification system

and continuously acquire information on commodity lists and in which characteristics of commodities are stated for distinguishing one from another⁷. 'CC' is a system to numerate items by classifying them into categories, divisions and sections depending on their functions, use and properties and changes depending on commodity list information upgrade. This classification is closely related to the business including bidding and contracts of the 'Korea ON-line E-Procurement System' and is used as major product information which is a part of the enterprise information.

The Korean government conducts investigation, analysis and assessment of national R&D projects every year in order to examine current national R&D process. When a staff member or a head in charge of a project or business

Table 1. Comparison of NSTC and CC

Category	NSTC	CC
structure	3-stage	4-stage
the number of division	374	353
revision cycle	five year	three year
Purpose	- Research planning, evaluation and management of national R&D projects - Forecast of science and technology, and assessment of technology level - Management and distribution of knowledge and information on S&T	- Establishment a unified classification system

Table 2. Exemplary mapping between NSTC and CC

NSTC	CC
EC11. Inorganic CBRN weapon/ammunition	1213. Explosive and other device
EB01. Metallic material EB02. Ceramic material	1214. Element and gas
EC05. Precision chemistry	1216. Additive
EB02. Ceramic material EB99. Other materials	1217. Coloring agent
ED04. Semiconductor element/system	1218. Wax and oil
ED04. Semiconductor element/system	1219. Solvent
EC05. Precision chemistry	1235. Compound and mixture

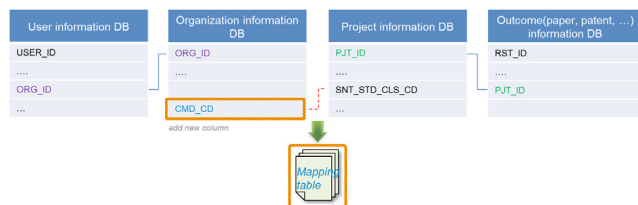


Figure 3. New model for patent recommendation service.

submits R&D project and research outcome information conducted in the relevant year, the NSTC should submit the division information. Therefore, mapping between the NSTC and the CC is examined in the division classification. Table 2 shows an exemplary NSTC mapping with the division of ‘chemical products’ which is one of categories of CC.

The database of NTIS, which provides R&D project and patent information, currently only manages information such as institution name, project registration number and address. Therefore, it is necessary to add CC items to the institution information DB to identify patents matching with SMEs.

When the mapping information and institution information DB are expanded (CC items added) and completed between the NSTC and the CC, the patent information of the same kind of enterprises and subcontractors or competitors can be provided on the basis of interested information entered by SMEs. If a link among the Public Procurement Service, the Small and Medium Business Administration, factory registration number and GS certification institution information is established, the candidate list can be provided for facilitating selection of cooperative partners of SMEs.

4. Conclusion

It is essential to analyze users’ demand for successfully developing and innovating information service. It is because it can affect service sustainability. The result of this study suggests what the information service of GFIs should improve through an analysis of R&D information demand from SMEs.

We suggested an SME-friendly patent recommendation service based on the result of R&D information

demand analysis of technologically innovative enterprises in order to support SMEs in R&D. The mapping information between ‘Commodity Classification’ and the ‘National Science and Technology Classification System’, which is major product information of enterprises, was used to design how to automatically find out patents matching with institution of SMEs.

The service for automatically identifying patents matching with SMEs suggested in this study can be implemented by expanding mapping information between NSTC and CC and institution information (adding CC). A remaining issue to be solved is how to update institution information because changing CC classification and item name change is flexible in comparison with NSTC.

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