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## Technological Forecasting &amp; Social Change



# Identifying new business opportunities from competitor intelligence: An integrated use of patent and trademark databases

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## ARTICLE INFO

## Article history:

Received 10 August 2016

Received in revised form 17 March 2017

Accepted 20 March 2017

Available online xxxxx

## Keywords:

Business opportunity

Patent

Trademark

Competitor intelligence

Technology-based

## ABSTRACT

This study aims to analyze the position of technology-centered companies in complex market dynamics and discover new business opportunities from competitor intelligence. For this, we consider both technology and market characteristics in providing competitor intelligence by utilizing patent data as a representative proxy for a firm's technology, and trademark data as an information source for the firm's target goods and services. To analyze the two types of data, a collaborative filtering approach together with portfolio analyses and association mining techniques were adopted. Theoretically, this is one of the earliest attempts to combine patent data and trademark data to investigate corporate strategies. In practice, the research results are expected to be used as a decision criterion to diagnose the economic value that companies can obtain by entering the market, as well as the technological value to be passed onto their customers. Thus, the proposed approach can be useful to support effective technology and business strategies in a firm.

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## 1. Introduction

With the increased development of technology and accelerated globalization, companies are encountering fierce competition (Archibugi and Iammarino, 2002). For these companies to not only survive but also thrive in a market, they need to continue to capture new business opportunities (Stevenson et al., 1989). Accordingly, discovering new business opportunities has attracted a great deal of interest in academia and industry (Venkataraman, 1997). It is a creative activity that involves combining various resources to offer superior value to a market (Casson, 1982; Schumpeter, 1994), which requires considering various factors and, accordingly, has been driven mainly by qualitative processes greatly affected by entrepreneurial alertness or prior knowledge (Ardichvili et al., 2003). However, there also exists a quantitative approach to identify new business opportunities, recognizing the value of information available to investigate the market, technology, and competitor trends. Among various sources of information used for this purpose, patent documents have been regarded as one of the most significant sources due to their amount and diversity of information. Related studies have tried to identify emerging technology (Daim et al., 2006) or vacant technology (Choi and Jun, 2014) from patent information, on which further R&D with business development is likely to take place. Other studies proposed benchmarking business areas by

comparing corporate patent portfolios (Fabry et al., 2006). These approaches are valuable particularly for technology-based products and services.

Despite meaningful contributions, however, existing studies have two limitations. First, they tend to rely mostly on patent information, which restricts their ability to suggest new business opportunities directly. How to link new technology opportunities to new business opportunities has seldom been discussed in the literature. Second, most existing studies have concentrated on new technology-based, rather than application-based, business opportunities; few efforts have been made to find a way to apply existing technologies to new application areas. Business opportunities can result from applying existing technologies to new markets as well as identifying and developing new technologies, which is especially important for small and medium-sized enterprises (SMEs).

Of course, there exist some exceptions. For example, Lee et al. (2009a, 2009b) proposed a technology-based roadmap in which business opportunities are identified and linked to technology planning; they developed an algorithm to identify competitors having similar patent portfolios to a focal firm and argued that the business areas of these competitors can be a new business opportunity worth benchmarking. However, their study is limited in suggesting a new business opportunity directly. Yoon et al. (in press) suggested a method to identify new product opportunities using a collaborative filtering-based patent analysis. Though this is a meaningful attempt to directly guide product items, the study only investigates a particular technology; a new business opportunity may come from a combination of technologies rather

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than a single technology. Further analysis is therefore needed to search for new business areas that are suited to corporate technology capabilities, which should be evaluated on the basis of corporate technology portfolios.

Therefore, this study aims to propose a novel approach to identifying new business opportunities based on corporate technology capabilities, for which a collaborative filtering-based competitor analysis is adopted. Collaborative filtering is a process of finding items or users with similar information or patterns and is frequently used for making recommendations. In this study, collaborative filtering is applied to patent information for identifying firms having similar technology characteristics, with a focal firm among those with superior technology capabilities in the business field of interest. Then, association mining and text mining are applied to trademark information in order to analyze competitors with similar technology portfolios and furthermore to identify promising new business areas systematically. This is one of the earliest attempts to combine patent and trademark information for extracting meaningful business intelligence. Patent information has long been the focus of competitor analysis, while trademark information has gained little interest despite its potential advantages of revealing corporate ongoing business areas or business areas of interest. If patent information showing technological characteristics and trademark information indicating business characteristics are combined and well analyzed, they can be valuable sources of competitor intelligence.

The remainder of this paper is structured as follows. Section 2 introduces the existing studies and the characteristics of patent and trademark data. Section 3 explains the approach to identifying new business opportunities suggested in this study. The approach is applied to the cloud computing industry, which is a representative technology-based service industry, to illustrate how the approach can be used to create value; these case study results are described in Section 4. Finally, Section 5 discusses limitations and future research directions.

## 2. Relevant studies

### 2.1. New business opportunities

Studies on new business opportunities have been conducted mainly in two streams. The first is opportunity identification and exploitation in the context of *startups*. The focus of this stream has been on opportunity recognition capabilities; a number of researchers have identified the factors affecting those capabilities, which include creativity (Shane and Nicolaou, 2015), cross-cultural experience (Vandor and Franke, 2016), prior business ownership experience (Ucbasaran et al., 2009), diversity of information (Gielnik et al., 2012), and gender differences (Gupta et al., 2014). Other studies have emphasized the possibility of creating opportunities in the network of firms, addressing the importance of the ecosystem in business opportunities (Nordman and Tolstoy, 2016; Overholm, 2015; Palo and Tähtinen, 2013). The second stream investigates new business opportunities in the context of *established firms*, where a framework to analyze business opportunities or a supporting system to identify such opportunities has been proposed. This study is in line with the second research stream because established firms are more likely to benefit from the competitor intelligence approach suggested in this study.

In general, market-oriented management was regarded as a core driver of corporate performance. Hence, most existing frameworks for analyzing business opportunities have been based on market orientation. According to Narver and Slater (1990), market orientation perspectives consist of customer orientation, competitor orientation, and interfunctional coordination; companies can obtain long-term benefits from considering each of the three perspectives. Among them, this study takes the competitor orientation perspective. Competitor orientation highlights the activities of collecting information to understand and analyze the products and strategies of competitors and benchmarking

them (Armstrong and Collopy, 1996). Awareness of competitor market strategies enables the effective management of target markets (Fahey, 2001; Peyrot et al., 2002; Wu and Oik, 2014). For this purpose, previous studies have developed an analytic framework for investigating competitor products and strategies (Porter, 1980), or a method of presenting a competitor landscape to be used for market segmentation (Söllner and Rese, 2001). These competitive intelligence approaches are regarded as a useful tool for finding new business opportunities under the circumstances of blurring industry boundaries (Bröring et al., 2006) and broadening the range of competitors (Hoopes et al., 2003).

The approaches to identifying new business opportunities from competitive intelligence can be divided largely into two categories – technology-based and market-based – according to the type of information used for intelligence activities. One of the most representative approaches to technology-based competitive intelligence is patent analysis (Ashton and Sen, 1988; Lee et al., 2009a, 2009b). It strives to open new business opportunities via technology, as technology-based companies dominate market and R&D capabilities that determine corporate competitiveness. In addition, innovative technology leads product development, which justifies the use of technology information for identifying business opportunities. Sometimes, patent data is used together with other types of data to gain a deeper understanding of technologies that may influence business decisions. For example, Geum et al. (2010) used both patents and publications to identify and evaluate strategic partners for collaborative R&D. Taking a holistic approach, Lee et al. (2012) analyzed the techniques and tools available for discovering competitive intelligence from various types of technical documents. At the same time, patent analysis methods have been diversified and used for technology opportunity analysis. For example, Seol et al. (2011) adopted two techniques – data envelop analysis and text mining – to search and evaluate new business areas. Lee et al. (2015) suggested novelty-focused patent mapping for investigating technology opportunities. Indeed, patent analysis is an asset to competitive intelligence. However, technology information is limited because the real situation of competition in a market regarding actual products and services – business areas – is rarely captured within technology information. Technology can be applied to multiple products and services, which are determined by commercialization environments as a collection of the microeconomic and strategic conditions a company encounters (Gans and Stern, 2003).

On the other hand, one of the most basic approaches to market-based competitive intelligence is to identify types of products and services and to analyze the market share of competitors and its trends (Hanssens, 1980). This information has been commonly used to understand the competitive position in a market and establish a resource management strategy, which can be achieved not only from quantitative analysis but also from the evaluation of customers or experts, and thus risks subjectivity. To mitigate the possible bias from such subjectivity, recent efforts have been made to use a large set of customer data available online for competitor analysis. For example, Jin et al. (2016) used product online reviews to analyze customer requirements for competitive products when implementing a new product design. Similarly, He et al. (2013) collected social media data and applied a text-mining technique for competitive analysis. Some researchers have addressed the significance of a dynamic framework for competitor analysis; Peng and Liang (2016) described the competitive dynamics of interfirm rivalry based on the framework they proposed to identify competitors.

Recognizing the value of technology-based and market-based intelligence, we suggest the use of both patent and trademark data – the former is for technology-based competitive intelligence while the latter is for market-based competitive intelligence – and develop a novel approach to identify business opportunities by investigating a company's technology characteristics, as well as the market characteristics of the products and services the company offers.

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