

# SELECTED ASPECTS OF PATENT PROTECTION IN SMALL AND MEDIUM-SIZED ENTERPRISES: A LITERATURE REVIEW

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**Abstract:** The aim of this paper is to show the importance of patent protection in small and medium-sized enterprises and to identify the major challenges for intellectual property management faced by this group of companies. The study provides a literature review on patent activity in small and medium-sized enterprises. On this basis, it can be concluded that small firms may be disadvantaged by their size in the use of patent protection. Consequently, most companies prefer informal appropriation mechanisms, such as secrecy, lead time advantage or complexity of product design. The reasons for the relatively low patent activity of small and medium-sized enterprises is the lack of sufficient funds and knowledge on the management, as well as the limited capacity of exercising their intellectual property. The article also identifies the most promising directions of further research and articulates a number of recommendations both for managers as well as for policy makers.

**Keywords:** INNOVATION, INTELLECTUAL PROPERTY, PATENT PROTECTION, SMALL AND MEDIUM-SIZED ENTERPRISES

## 1. Introduction

There is no doubt that small and medium-sized enterprises (SMEs) play an important role in the European economy. As shown by Eurostat data, they constitute the overwhelming majority (99.8%) among all business entities. SMEs also provide around two thirds of jobs and account for nearly 60% of value added (Key figures on European business, 2011).

The primary advantage of SMEs is their high flexibility, which allows - to a greater extent than large corporations - the identification of changes in the environment and the use of emerging opportunities. Therefore, innovation seem to be the best way to build competitive advantage for this group enterprises. Innovation activity, however, is very expensive and risky. Moreover, even in a case of successful implementation, there is a real danger of imitation by competitors. Companies wishing to succeed must, therefore, not only to innovate, but also effectively protect their innovation.

The most obvious way of protecting the innovation are legal instruments, in particular patents. Patents give exclusive right to use the invention for commercial purposes, which means that patented invention cannot be made, used, distributed, or sold by others without the patent owner's permission. Such inventions, however, have to meet a number of rigorous criteria: to have novelty in worldwide domain, to embody a significant inventive step (be nonobvious, even to experts in the field), and be capable of industrial application (Greenhalgh and Rogers, 2010).

The aim of this paper is to show the importance of patent protection in small and medium-sized enterprises and to identify the major challenges for intellectual property management faced by this group of companies. There is a fairly broad consensus among scholars, policy makers as well as business practitioners that the modern patent system meets the needs of small and medium-sized enterprises only to a small degree. The study provides a literature review on patent activity in small and medium-sized enterprises. In the following section the most important barriers to the patent activity of SMEs have been identified. Subsequently, the possibility of using patents for strategic purposes (ie. not related to the protection against imitation) has also been indicated. In conclusion, the most promising directions of further research and a number of recommendations both for managers as well as for policy makers have been indicated.

## 2. Firm size and patent propensity

A number of studies have shown that the patent propensity in SMEs is lower than in large companies. For example, Mol and Masurel (2012) based on the data from Dutch 2006 Community Innovation Survey (CIS) found that the firm size positively influences the use of patents. Interestingly, a similar relationship has not been confirmed for other forms of legal protection like registered designs or copyright.

A study of 211 innovative Argentinian companies belonging to five industries (apparel, boats, agricultural machinery, oil services, and vehicle parts) also showed that firms with more than 90 employees use patents as a means of appropriation in a much more extent than firms with fewer number of employees (Milesi, Petelski, and Verre, 2013).

Furthermore, a detailed analysis of nearly 1.2 milion patent applications revealed that SMEs patent less at the international level than their larger counterparts. SME patent applications also cover a smaller number of patent offices on average (Frietsch, Neuhausler, and Rothengatter, 2013).

On the other hand, Jensen and Webster (2006) based on a sample of Australian enterprises demonstrated that SMEs file more patents, trade marks, and design usages per 1000 employees than large firms. In turn, a study carried out on a sample of 534 German manufacturing firms showed positive and statistically significant correlation between firm size and the number of patent applications. However, a deeper analysis proved a U-shaped relationship between firm size and the patent output of a company. This means that the large as well as small companies apply for more patents per employee than medium-sized firms (Neuhausler, 2012). SMEs are also more active in patenting in emerging fields like nanotechnology, biotechnology or renewable energy (Frietsch, Neuhausler, and Rothengatter, 2013).

Many authors investigated the use of a wide range of informal protection instruments as an alternative to patents. For example, Galie and Legros (2012) concluded that firm size affects the type of IP protection. Large firms prefer formal methods like patents and trademarks whereas small firms prefer rather informal means like complexity of design or lead-time advantage over the competitors.

The majority of existing works have confirmed that small and medium-sized firms do not consider patents as the most important appropriation mechanism. In addition, a study conducted on a sample of 559 Italian companies showed that a greater number of patents is not associated with higher profitability of SMEs (Agostini, Nosella, and Soranzo, 2015). In contrast to these findings, however, Andries and Faems (2013) provided evidence that not only large companies, but also SMEs can benefit from patent protection. Moreover, their study based on the data from 526 Flemish manufacturing firms showed that patent activity increase

the ability of SMEs to license out knowledge assets to external partners. These activities, however, do not generate short-term financial profits.

Many authors have noted that SMEs are not a homogeneous group and individual companies can implement entirely different patent strategies (Thoma and Bizer, 2013; Hsueh and Chen, 2015). Especially, patents seem to be highly useful for research-oriented firms (Gans and Stern, 2003; Leiponen and Byma, 2009). Other studies have shown that appropriation strategy depend on such factors as industry sector (Brouwer and Kleinknecht, 1999; Galie and Legros, 2012), type of innovation (Arundel and Kabla, 1998; Cohen et al., 2000), cooperation with external entities (Olander, Vanhala, and Hurmelinna-Laukkanen, 2014) or export activity (Mol and Masurel, 2012).

It is believed that lower patent propensity among SMEs are caused by presence of numerous obstacles which particularly affect on smaller firms (see next paragraph). Kitching and Blackburn (1998) argued that small business owners prefer informal ways of appropriation, because these methods are more familiar, cheaper, less time-consuming and frequently as effective as more formal rights. Another explanation to this phenomenon could be incremental character of innovation introduced by a significant part of SMEs (Thoma and Bizer, 2013).

### 3. Obstacles to patenting

The basic problem encountered by firms applying for patents is associated with the high cost of such form of protection. The total costs of patenting include, among others, a number of procedural fees, patent attorney remuneration, translation costs (while patenting abroad) and maintaining costs (fees paid to the patent offices at regular intervals to maintain patent). It is not surprising that this factor particularly affects smaller firms due to their limited financial resources needed to protect patents (Galie and Legros, 2012; Neuhausler, 2012).

Another well-known problem is a very long period (in some cases reaching up to five years) of pending application by the Patent Office. This puts into question the desirability of requesting such form of protection for products and technologies with a relatively short life cycle. Lengthiness of patent procedures, coupled with uncertainty about their final result is certainly a big disadvantage especially for companies planning to license their intellectual property or using them to strengthen the bargaining power in negotiations with business partners (Gans, Hsu, and Stern, 2008).

Moreover, small and medium-sized enterprises may not be able to detect and fight against infringements their intellectual property rights. Davis and Kjaer (2003) indicated several reasons of such situation:

- in the cases of patented processes it may be impossible to check whether the patent has been infringed (eg. when imitator restricts access to its plant);
- it may be too costly to detect infringements on foreign markets, even for product innovations;
- the patent holder may be afraid to enter into litigation with firm committing infringement due to the enormous expenses arising from lawsuits.

Patent protection also requires to disclosure a number of detailed information about the innovation (Holgersson, 2013). Through patent databases (also available via the Internet), the information can reach out to practically all interested parties. Especially competitors might take advantage of this to "invent around" or to identify strategic directions of the inventor's activities. On the other hand, small and medium-sized enterprises do not use the existing patent information to a sufficient extent, which may lead to a severe loss to compete in the future (Hall, Oppenheim, and Sheen, 2003).

## 4. Motives to patent

Apart from the most obvious reason (ie. protection against imitation) companies might apply for patents from various strategic motives. It is worth noting that previous studies have indicated that the importance of particular motives varies significantly depending on such factors as firm size or sector of activity (Blind et. al., 2006). The data from a survey among applicants at the European Patent Office (EPO) confirmed significant differences in patenting motives among particular applicant types: individual inventors, small firms, universities, and large companies (Veer and Jell, 2013).

Many authors have indicated that patents may be used not only to protect innovation but also to block competitors in their development activities. This motive is potentially more beneficial for large companies as they have sufficient financial resources needed to maintain an extensive patent portfolio and to patent broadly. Similarly, large companies more often use patents for cross-licensing negotiations or trade with other firms (Neuhausler, 2012). Patents may also be useful as an internal performance indicator and instrument for encouraging the creativeness of employees (Gilardoni, 2007).

Although patents may reveal important information to competitors, however, in many cases inventors can reap a number of benefits through such disclosure. This means that patents may also be used for strategic signalling (Gick, 2008). It seems to be particularly important for smaller firms which very often use patents for improvement technological image or attract the attention of potential customers as well as co-workers (Holgersson, 2013).

SMEs can leverage their intellectual property rights to obtain investors, such as business angels and venture capital funds. For such investors patent may be a sign of firm's technological advancement and innovation capability. Patent disclosures also facilitate the assessment of the quality of the project and estimate it's business risk (de Rasenfosse, 2012; Haeussler, Harhoff, and Mueller, 2014). Moreover, Fischer and Ringler (2014) indicated that patent may facilitate access to debt financing, serving as the required collateral. This concerns especially new ventures, which usually lack substantial tangible assets.

Patents establish the legal basis for obtaining royalties through licensing intellectual property to other parties. This reason might be particularly applicable to small firms, which often suffer the lack of resources needed for independent commercialization of new goods (Davis and Kjaer, 2003). Patents and other formal means of protection can also act as one of mechanisms for coordinating innovation-oriented inter-firm cooperation. This reduces the fear of opportunistic behavior and encourages partners to share knowledge. Moreover, patent protection helps to identify which rights belong to each of the parties. This should prevent problematic situations, unwanted conflicts and thereby reduce time-consuming negotiations (Olander, Vanhala, and Hurmelinna-Laukkanen, 2014).

## 5. Conclusion

The study provides a literature review on patent activity in small and medium-sized enterprises. On this basis, it can be concluded that small firms may be disadvantaged by their size in the use of patent protection. Consequently, most companies prefer informal appropriation mechanisms, such as secrecy, lead time advantage or complexity of product design. The reasons for the relatively low patent activity of small and medium-sized enterprises is the lack of sufficient funds and knowledge on the management, as well as the limited capacity of exercising their intellectual property.

Due to the existing barriers in the access to patent protection, policymakers should pay more attention to provide public support for small and medium-sized enterprises. Such support, however, should include not only grants (especially for patenting abroad) but also professional services to obtain, defend, and enforce intellectual property rights.

From the practical point of view, managers of small and medium-sized enterprises should be very cautious when choosing the best form of protection innovation. As patents are very expensive and time-consuming form of protection, SMEs need to use their intellectual property rights more actively than larger firms (including strategic goals, eg. for improvement technological image or obtaining external funds).

Although the patent activity of SMEs has already been the subject of numerous papers there are still a number of under-recognized areas. As the most promising directions for further research should be pointed following:

- intentional patent strategies of SMEs,
- the most effective forms of public support for SME patent activity,
- interaction between formal (legal) and informal (strategic) means of protection,
- the role of patent protection in boosting innovation-oriented cooperation of SMEs.

Such studies cannot be limited to firms from developed countries (eg. USA, Japan, United Kingdom or Germany), but to a greater extent should also include enterprises from developing and transforming economies.

## 5. Literature

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