



Paper to be presented at the DRUID Academy conference in Rebild, Aalborg, Denmark on January

21-23, 2015

Patent attorneys and their influence on patent quality

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Abstract

PATENT ATTORNEYS AND THEIR INFLUENCE ON PATENT QUALITY

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Year of enrolment: 2011

Expected final date: 06/2015

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STATE OF THE ART

The granting of and the speed in which patents are granted has proven to be crucial for companies in terms of value generation (Guellec & Van Pottelsberghe de la Potterie, 2002; Harhoff & Wagner, 2009).

RESEARCH GAP

Patents have repeatedly been used as measures for innovation or technological progress with one underlying assumption that is not spelt out explicitly, which is that inventions rather automatically transfer into patents and patent applications (Somaya, Williamson, & Zhang, 2007). This, however, neglects the crucial role the patent attorney plays in the patenting process (Macdonald, 2004; Somaya et al., 2007). Even though the importance of patent attorneys cannot be neglected, their contribution is not yet highly recognized (e.g., Reitzig, 2004; Reitzig & Puranam, 2009; Somaya et al., 2007). The intention of this research is to close this gap.

THEORETICAL ARGUMENTS

The application for and granting of a patent can be interpreted as a communication and negotiation process (Cockburn,

Kortum, & Stern, 2002; Harhoff & Reitzig, 2001; Harhoff & Wagner, 2009; Quillen & Webster, 2001). Personal characteristics of the communication and negotiation partners affect the outcome of this process. Consequently, this paper concentrates on the experience (e.g., Barry & Friedman, 1998; O'Connor, Arnold, & Burris, 2005; Thompson, 1990) of the patent attorney as one of the determining factors to influence the grant (lag) of a patent.

DATA AND METHOD

The empirical analysis bases on cross-sectional data of EPO (European Patent Office) patent applications extracted from the OECD REGPAT (July 2014). We supplement this data source with information about patent attorneys extracted from Espace Bulletin, from the EPO register of representatives, and from the EPO register of successful candidates. Additionally, the OECD patent quality indicators (July 2014) complete the overall dataset. Regressions are run for 902,386 patents from 1978 to 2010 filed by about 6,700 patent attorneys. It is controlled for the filing year, technology field, gender and country of the attorney, whether the attorney has taken the EPO exam or not, patent scope and backward citations.

RESULTS

The results clearly show that experience significantly reduces the time in which a patent is granted, i.e. each additional patent application the attorney gets granted reduces the grant lag of subsequent patents. We observe a non-linear relationship of experience.

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PATENT ATTORNEYS AND THEIR INFLUENCE ON PATENT QUALITY

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Version: December, 2014

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Even though patent attorneys play a significant role in the patenting process and IP value chain their contribution has only recently been recognized. We, however, assume that personal characteristics of the patent attorney as a key actor in the process significantly affect the outcome of the patent application process. Therefore, this paper focuses on the influence of the experience of the patent attorney on the quality of patents (i.e, grant lag). Regression results show a non-linear relationship (U-shape) of experience.

I. Introduction

Patents are property rights that provide the holder with a temporary monopoly in exchange for a detailed description of the invention. As innovation output patents (amongst others) are one of the most often applied measures in order to determine technological progress (e.g., Acs, Anselin, & Varga, 2002; Czarnitzki, Ebersberger, & Fier, 2007; Ebersberger & Becke, 2010; Ethiraj, 2007; Makri, Hitt, & Lane, 2010; Nesta & Patel, 2004). For a comprehensive picture it has to be considered that patent based measures do not only vary due to differences in the analyzed unit's performance but are also affected by sectoral and technological (Arundel, van de Paal, & Soete, 1995; Scherer, 1983), regional and national (de Rassenfosse & van Pottelsberghe de la Potterie, 2009), and inter-temporal (van Zeebroeck, van Pottelsberghe de la Potterie, & Guellec, 2009) differences in firms' patenting behavior.

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Even though there is a variety of different research conducted based on patent-based measures, there is one common underlying assumption to be identified that is not spelt out explicitly: It is usually assumed that inventions are rather automatically transferred into patents or patent applications (Somaya, Williamson, & Zhang, 2007). It was, however, proven that exactly the speed in which an invention is transferred into a patent (i.e., the grant of a patent) is a crucial aspects to be considered by companies (Guellec & Van Pottelsberghe de la Potterie, 2002; Harhoff & Wagner, 2009). This research is based on the assumption that in this process – from invention to patent application to patent grant – the patent attorney plays a key role (e.g., Reitzig, 2004; Reitzig & Puranam, 2009; Somaya et al., 2007). Therefore, the characteristics of the patent attorney and how they influence the application of the patent is at the centre of this analysis.

II. Literature and Hypothesis

In order to file and prosecute successful patent applications and optimize the patenting process it is essential for firms to access the specialized legal resources and expertise that often resides in the knowledge and capabilities of patent attorneys (Macdonald, 2004; Somaya et al., 2007).

The following elaborations further underpin the importance of the patent attorney regarding their ability to shape the patenting process:

Firstly, their importance is further increasing due to the growing relevance of strategic decisions related to patenting activities (Blind, Edler, Frietsch, & Schmoch 2006; Lang, 2001; Macdonald, 2004; Macdonald & Lefang, 1997, 1998; Hufker & Alpert, 1994). It might, for example, be considered to postpone the grant of a patent because of strategic reasons (Harhoff, Scherer, & Vopel, 2003) or to prolong the grant of patent to avoid costs that are bound to the grant of a patent (Harhoff & Wagner, 2009). Furthermore, mistakes in the complex and costly patenting process may have devastating effects on the protection of

intellectual assets and on the corporate image of a firm (Dodgson, Gann, & Salter, 2008; Lipscomb, 1986; Vecht et al., 2009).

Additionally, using the notion of an IP value chain three main, highly specialized, and complementary functions can be identified, which are IP generation, IP protection, and IP utilization (Reitzig & Puranam, 2009). In order to gain advantage from complementarities of activities between these functions generally strong coordination of the intensity and the direction of the involved activities is required (Siggelkow, 2002). This might also require the competencies and knowledge of patent attorneys.

Finally, the patenting process can be interpreted as a negotiation process. This is mainly the case as patent applications are very often based on incremental progress, which further fosters negotiations with the patent examiner in order to prove the novelty and inventive step of the underlying invention (Cockburn, Kortum, & Stern, 2002; Harhoff & Reitzig, 2001; Harhoff & Wagner, 2009; Quillen & Webster, 2001; Quillen, Webster, & Eichmann, 2002).

The previous elaborations lead to the conclusion that certain characteristics of patent attorneys exert an influence on the value of patents. One criterion to determine the value of patents is the grant and grant lag of patents. There are several reasons identified that underpin the importance of grant and grant lag of patents:

First of all, from a strategic perspective a quick and early grant of a patent provides its holder with some certainty regarding decisions about the development and position of the patent portfolio of a company. Furthermore, the patent provides the holder with a temporary monopoly. Therefore, as soon as the patent is granted this enables the owner to take advantage of this position and encounter possible infringement (Harhoff & Wagner, 2009).

Summarizing, a (quickly) granted patent clearly supports the generation of value for the company (Guellec & Van Pottelsberghe de la Potterie, 2002).

In addition, Guellec & Van Pottelsberghe de la Potterie (2002) have the basic starting point in their research that already the grant as such gives a clear signal about the underlying value of the invention. Patents that are granted – and therefore passed the evaluation at the patent office regarding the respective criteria – are found to have higher quality compared to those patents that are refused or even rejected. Quality indicators like forward citation, renewal or family size often do not consider that circumstance but take the grant as given.

It has to be stressed that it is not only the grant as such that is of importance but also the time it takes until the patent is granted. Research has proven that those patents with a higher quality usually have shorter pendency times and are granted significantly earlier, as well as the withdrawal of such patents will be delayed (Harhoff & Wagner, 2009).

As a consequence, this paper looks at the experience of the patent attorney as one of the determining factors to influence the grant (lag) of a patent. As outlined above the application for and granting of a patent can be interpreted as a communication and negotiation process (Cockburn et al., 2002; Harhoff & Reitzig, 2001; Harhoff & Wagner, 2009; Quillen & Webster, 2001). Personal characteristics – and especially experience – of the communication and negotiation partners affect the outcome of this process (e.g., Barry & Friedman, 1998; Moran & Ritov, 2007; Murnighan, Babcock, Thompson, & Pillutla, 1993; O'Connor, Arnold, & Burris, 2005; Thompson, 1990; Thompson, Wang, & Gunia, 2010). Hence, it can be assumed that personal characteristics of the patent attorney as a key actor in the process affect the outcome and time of the patent application process as well.

This leads to the following hypothesis:

There is a relationship between the experience of the patent attorney and the grant (lag) of a patent.

II. Data and Method

Overall we base our empirical analysis on data of about 6,700 patent attorneys accredited with the EPO (exam between 1979 and 2010). The analysis bases on the EPO (European Patent Office) patent applications extracted from the OECD REGPAT database (July 2014). We supplement this data source with information about patent attorneys extracted from Espace Bulletin, from the EPO register of representatives, and from the EPO register of successful candidates. Additionally, the OECD patent quality indicators database (July 2014) completes the overall dataset. Our analysis focuses on those patent attorneys that have not more than 200 patent applications filed a year in order to account for the fact that discussions with patent attorneys have revealed that there are patent attorneys hiring anonymous subcontractors in order to generate and write their applications.

Dependent variable: Grant lag

As a dependent variable we will consider the time it takes for the patent to be granted. The grant lag is given in days from the application. In addition, it is also accounted for whether the patent is granted at all.

Independent variables: experience of the patent attorney

In this paper we capture experience by the cumulative number of patent applications for each patent attorney.

Additionally, in the model we include the technology field of the patent, the country of the patent attorney, gender of the patent attorney, the filing year of the patent, whether the patent attorney has taken the EPO exam, patent scope, and backward citations as control variables.

An overview on the variables used in the analysis is given in Table 1.

Table 1. Descriptive statistics

	All patents (N=902,386)				Granted patents (N=410,782)			
	mean	sd	min	max	mean	sd	min	max
Grant lag					1901.72	857.45	84	7999
Grant	0.46	0.50	0	1				
Experience	299.81	411.33	0.5	4627.50	245.19	341.75	0.50	4627.50
Gender	0.15	0.36	0	1	0.14	0.35	0	1
Exam	0.72	0.45	0	1	0.69	0.46	0	1
Patent Scope	1.93	1.21	1	20	1.99	1.25	1	19
Backward Citations	5.22	5.30	0	142	4.96	4.28	0	129

A two-step selection model (Heckman, 1979) is applied in order to estimate the relationship between grant lag and the experience of the patent attorney.

III. Findings

In the following regression Table 2 the relationship between the experience of the patent attorney and grant is visualized. It is clearly visible that experience exerts a positive effect on the grant, i.e. the time it takes for the patent to be granted is reduced. For a more detailed elaboration on the correlation coefficients refer to Appendix A.

Table 2. Regression table

	Grant lag		Grant	
	b	se	b	se
Experience				
Experience Attorney	-0.157***	0.007	-0.00003***	0.000
Experience Attorney (squared)	0.00005***	0.000		
Gender (Dummy)	3.333	3.414	-0.031***	0.004
Exam (Dummy)	84.484***	2.661	0.010**	0.003
Patent Scope	71.048***	0.993	0.016***	0.001
Backward Citations	22.615***	0.274	-0.007***	0.000
Technology Field (35 Dummies)	YES		YES	
Country Attorney (42 Dummies)	YES		YES	
Filing Year (32 Dummies)	YES		YES	
Inverted Mills	-41.449***	1.263		
Constant	899.877***	60.974	-0.025	0.072
N	410,782			902,386
F	1,390.54***			
LR chi2				143,612.14***

Note: *** (**, *, +) indicate significance at the 0.1% (1%, 5%, 10%) level.

IV. Discussion

The results clearly show that experience significantly reduces the time in which a patent is granted (i.e., each additional patent application the attorney gets granted reduces the grant lag of subsequent patents). Additionally, we observe a non-linear relationship of experience.

That implies that the more experience patent attorneys have the less time it takes them to get the patent granted. Basically that can have two causes. First, more experienced attorney write more convincing patent applications and hence achieve a faster grant. Second, more experienced attorneys select the projects and application assignments which have a higher likelihood of being granted or of being granted faster or being granted at all.

Additionally, it is found that the larger the scope of the patent the more time it takes for the patent to be granted. The patent scope, however, has a significant positive influence on the grant of the patent, which fits with the findings by Lerner (1994), who argues that a broader

scope of the patent implies more value (i.e., the broader the patent the more likely it is to be granted).

Furthermore, we can observe that backward citations exert a negative influence on the grant of the patent (i.e., the higher the number of backward citations the less likely it is for the patent to be granted). This nicely builds on previous research that backward citations may be a sign for incremental innovation, which are less likely to pass the application process (Lanjouw & Schankerman, 2001).

So far, we did not yet find a suitable explanation why patent attorneys who took the EPO exam need more time until the patent is granted compared to attorneys who have not taken the exam.

The research, however, has a number of limitations up until now. Due to the large variety of aspects exposing an influence on patent quality, the experience of the patent attorney is only one minor aspect. Therefore, a more comprehensive and concise indicator for experience has to be aimed at.

It can be concluded that this clearly supports and adds an important aspect to the discussion about the significance of patent attorneys in the patenting process. Furthermore, it provides the groundwork for future research, in which the analysis regarding the importance and influence of the patent attorney will not only be explained by experience of the patent attorney but also by criteria like whether there is in-house legal expertise or patent attorneys have to be hired. Furthermore, the effect of the specialization of the patent attorney (Somaya et al., 2007) as well as the distance between the patent attorney and patent office/key actors in the IP value chain will be considered.

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APPENDIX A: Correlation Table

	Grant lag	Experience	Experience squared	Gender	Exam	Patent Scope	Backward citations
Grant lag	1.0000						
Experience	-0.0995	1.0000					
Experience squared	-0.0739	0.8466	1.0000				
Gender (Dummy)	0.0292	-0.0567	-0.0373	1.0000			
Exam (Dummy)	0.0514	-0.0604	-0.0610	0.0840	1.0000		
Patent Scope	0.2176	-0.0445	-0.0339	0.0479	0.0245	1.0000	
Backward citations	0.0823	0.0285	0.0178	0.0176	0.0257	0.0448	1.0000