

The Anti-Patent Movement Revisited: Institutional Change and Cognitive Frames in Nineteenth-Century Germany

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Abstract

This paper examines the development of patent legislation which favored the centralization of economic decision-making in nineteenth-century Germany. Since the passing of a patent law in 1877 became possible only after the financial crisis and the weakening of the anti-patent movement, I suggest that changes in network structures and cognitive frameworks influenced the institution-building process. More specifically, I find that the reception of conflicting evaluative frameworks by dominant actors led to cognitive dissonance which could be exploited by the industrialist lobby within the pro-patent movement.

Keywords: patent law, evaluative principles, financial crisis, fields

1 Introduction

The present paper explores the struggle for the protection of inventions in nineteenth-century Germany. By examining the controversies, I try to explain how legal concepts which favored the centralization of economic decision-making¹ became part of the 1877 Patent Act. I also seek to understand why the anti-patent movement lost its influence in the years following the foundation of the German Empire. The answers to these questions bear a long line of inquiry into the role of "political forces and ideological currents" (Landes and Posner 2004: 25) in patent policy that was taken up by Fritz Machlup

¹The effects of "intellectual property" assignments on the decision architectures of industries are the subject of a growing body of scholarship (Sah and Stiglitz 1986; Garciano 2000; Wu 2005). An example for problems discussed in the literature could come from Germany's patent legislation which on the one hand forced rapid dissemination and spurred investment in technological innovation, but on the other hand created significant barriers to the market entry of small businesses (see Gispén 2007: 62).

and Edith Penrose (1950) in their historical account of the debates between 1850 and 1875². Machlup and Penrose concluded that the best explanation for the simultaneous weakening of the anti-patent movement in Europe³ was the financial crisis in 1873 and the following depression. According to this view, the opponents of patents who were above all supporters of free trade were no longer able or willing to defend their cause against the protectionists who raised the public appeal of patent protection. Therefore, a reversal of opinions in European legislatures and government agencies was possible (Machlup and Penrose 1950: 6).

Even though I agree with this basic assessment, it is not obvious why the economic crisis should have had an influence on the process by which patent law became institutionalized. And it is not clear either how regulatory agencies, lobbying groups and other actors were involved in this process. My thesis is that the development of Germany's patent system cannot be explained independent of profound changes in the network structures and cognitive frameworks of dominant actors (Beckert 2010; Djelic and Quack 2005). These changes can be related to a period of upheaval following the foundation of the German Empire and the economic crisis, during which actors in positions for institution-building became receptive to conflicting frameworks for organizing economic activity (Fligstein 2001). The resulting cognitive dissonance could be exploited by entrepreneurial actors who pursued their own goals within the pro-patent movement. More specifically, these actors were able to ease the demanding evaluative process (Stark 2009) through the dissemination of detailed regulatory models (Braithwaite and Drahos 2000: 539ff.) which shaped public, academic and parliamentary debates over the long term.

By outlining this explanatory approach, I aim to make a small contribution to the growing body of scholarship that deals with the development of law in an empirical and sociological manner (Swedberg 2003; Zafirovski 2000). Since the situational structures now and then seem to be at least vaguely similar, the results of this study could also be of interest to lawmakers and activists who want to reflect upon the complex mechanisms of building and extending patent protection throughout history.

The paper is organized as follows: I will lay out a theoretical framework in part II showing that dealing with cognitive dissonance can be central to the process of institution building. This framework is illustrated in part III

²Patent controversies were not unique to Germany. Similar debates took place in the Netherlands, England, France and Switzerland at the time (Johns 2009: 247-250; Kaufer 1989; Penrose 1951).

³The anti-patent movement was successful in the Netherlands where the campaign led to the abolition of the entire patent rights regime. And in Switzerland which for a long time did not establish a patent system at all (Johns 2009: 248).

by using the insights of historical studies and a simple content analysis of Reichstag debates over patent protection before and after the financial crisis.

2 Theoretical Perspectives

The historical investigation reopens the history of legal concepts relating to patents and by so doing potentially uncovers dynamics in the institutional field. The notion of fields is a vital concept in new institutional theories. It can be understood as a local social order "where organized groups of actors gather and frame their actions vis a vis one another" (Fligstein 2001: 108). A field is in this sense not only a space where actors with contending frameworks meet; rather, it is itself powerfully structured by institutions and social networks (Beckert 2010; Bourdieu 1996). These social forces not only shape the actors, but are also shaped by them in ways favorable to their goals.

Taking this into account, we are able to understand the positioning of actors in the field "as the historical result of struggles in which they attempt to defend or improve their position [...] by both defending existing structures and changing these structures to realize new opportunities" (Beckert 2010: 620). However, the actors in a field see the opportunities and risks of a patent system in different ways and act according to these understandings of the value they perceive patents could have. Since there is not only one way of making value (as in \$), scholars tend to make a distinction between economic value and social values (see, for example, Landes and Posner 2004; Lessig 2008). According to Landes and Posner (2004: 16), there is, for instance, a need to differentiate between the private value ascribed by intellectual property rights and the social value of the public domain. Based on this principle, Landes and Posner argue that the suggestion "the public domain really is not worth much" (2004: 16) confuses both value spheres.

In contrast to this view, Luc Boltanski and Laurent Thévenot (2006) refuse a simple dichotomy of economic value and social values. Instead, they have developed a sociological theory of value which suggests that multiple 'orders of worth' are constitutive of value. The market order can therefore operate in the public domain as well as civic duty, attainment of fame or demonstration of creativity (Stark 2009: 11). Besides, each order of worth is coherent within its own logic and entails metrics, standards and proofs of the value of material objects and ideas (Callon and Muniesa 2005). Since specific logics can provide a basis of legitimizing support for or against the assignment of patent rights, they will also be subject to tests of justification (Kaplan and Murray 2008: 6). An example would be the discussion of the case of a brilliant inventor who could not afford to give up his day job because he could not obtain patent protection.

Of course the validity of this test would be challenged by patent opponents who could claim that he in fact earned a lot of money and spent everything or would have only obstructed competition by exercising his monopoly rights.

To be clear, Boltanski and Thévenot (2006) do not claim that moral judgement or justifications are somehow more important than rational calculation; their idea is rather that "rationality works within orders of worth"⁴ (Stark 2009: 13). In this view, orders of worth enable action because they resolve uncertainty concerning the situational structure (Knight 2002 [1921]). They also make it possible to identify a variety of tensions between different evaluative principles and not only between social groups and strategic individuals. Thus, scholars are able to investigate lower-level evaluative principles which are based on more limited formats of the common good (Thévenot 2006: 111). Drawing on the insights of his French colleagues, David Stark makes a similar, yet different argument. From his point of view, a plurality of orders of worth creates dissonance of evaluative principles. And it is precisely this dissonance that can be exploited by entrepreneurial actors (Stark 2009: 13ff.).

Following Stark, I will show that "institutional entrepreneurship"⁵ in fields as described above becomes likely because of periods of upheaval which favor the confrontation of actors in central network positions with alternative frameworks of value (or 'orders of worth'). This is the case because economic crises seem to compel actors to search for value while questioning the modes of coordination which are embodied in the practices of market actors and regulatory agencies. The underlying reason is this: because past actions led to outcomes that could no longer justify subjectively constructed tests, actors search for alternative conceptions of value that help them to coordinate their actions.

This insight relates to patent legislation because actors value patents not only because they grant an exclusive right for a limited period of time, but also as a signal of technical ability, creativity or commitment. Therefore, the exclusive right as well as the signal can be valuable according to diverse performance criteria. But exactly this kind of variety of evaluative principles is a problem for actors in positions for institution-building since they have to find at least some common ground.

My argument is that this demanding process can lead to cognitive dissonance that can be exploited by institutional entrepreneurs who ease the evaluative process by providing detailed regulatory models. They are able to do

⁴In a sense, there many different rationalities like market rationality, technical rationality or civic rationality. A similar approach has been used implicitly by Steven Weber (2004; chapter 6) to explain the "success of open source".

⁵My understanding of an "institutional entrepreneur" differs from the concepts of Fligstein (1997) or DiMaggio (1988). The idea is that an institutional entrepreneur tries to get an idealized institutional setup by "benefiting from the friction between multiple, incompatible principles" (Stark 2009: 16) in a particular field.

so because institutional entrepreneurs are usually personal professionals and lawyers who "rely on their legitimated claim to authoritative knowledge or particular issue domains" (Hwang and Powell 2005: 202). Their regulatory models become relevant for institution-building because they channel cognitive dissonance in new and often unforeseen ways. As institutional blueprints they provide a set of logics, practices and exchanges of a moral order of the market (Friedland and Alford 1991) that cannot yet be maintained through rewards and sanctions (Jepperson 1991).

This is not to say that politicians and top-level civil servants will be influenced by every written legislative proposal which has been submitted by powerful lobbying groups or social movement organisations. Instead, it is likely that new regulatory concepts will only be transferred through institutional channels (Djelic 2004) if there are personal connections and overlapping evaluative principles.

3 Germany before 1877: a fragmented patent system

Before the passing of a uniform patent law for the German Empire in 1877, there was not one, but many different patent laws within the German territories. Therefore the nature of protection differed from state to state. While some states registered and approved every claimed patent without examination, other states had very strict examination procedures in place. The patent system in Prussia, the largest state, provided patent protection for fifteen years, but only for high publication costs and in an arbitrary manner. Due to these reasons, not many patents were taken out and those which were granted did rarely last longer than three years. The situation in the territories following the French practice was also problematic since their laws did not call for public disclosure thereby increasing the possibility of patent infringement (Beier 1978: 126-129; Heggen 1975: 19-68). It was likely in that context that the abolition of patents would be considered as possible alternative at least by those on the national scene who also favored the removal of regulations on the movement of labor, capital and goods inside the German territories.

3.1 The Beginnings of the Anti-Patent Movement

There are many reasons for the emergence of the anti-patent movement given in the literature. The most promising approach focuses on the increasing hostility towards monopoly privileges which were widely seen as misuses of royal prerogative. Especially in nineteenth-century Germany, the roots of patent privileges could easily be traced back to the Ancien Régime. Thus, it seemed

obvious for patent opponents to link patent laws with monopoly privileges since both could be seen as barriers to free trade and holdovers from an old legal regime. The growing opposition against patents formed as a part of the free trade movement that came into existence because of liberal reforms in Prussia which enabled the rise of a new generation of economists and economically trained civil servants. They saw patents as tariffs which were perceived to be responsible for the gridlock that burdened the German economy (Kaufer 1989: 8). This view of things was shared by most patent opponents although many were followers of the ideas of Adam Smith (1776 [1909]: 119) who himself at least accepted patents.

This disagreement with "Smithianism" suggests that the evaluative frameworks of the movement went beyond the principles of the Classical English political economy. John Prince-Smith, who was one of the leading figures of the German anti-patent movement, did not only argue against "intellectual monopoly", but also envisioned a world where all inventions would be in the public domain. According to Prince-Smith "[m]en with inventive minds would hasten to publish their happy ideas in order to secure recognition of their priority" and "[t]echnicians [...] would listen to them more willingly than now when they are inclined to see in each would-be inventor a visionary blinded by the gold mine expected from a patent" (Prince-Smith 1863: 160). Not surprisingly, proponents of patent laws rejected his notion that nonpecuniary incentives could achieve the same or even more than pecuniary incentives, and accused Prince-Smith and other free traders of endorsing a socialist view of property (Barthel 1863: 58). From their perspective, the free traders were prejudiced against patents because they had only little industrial experience (Fischer 1922: 57).

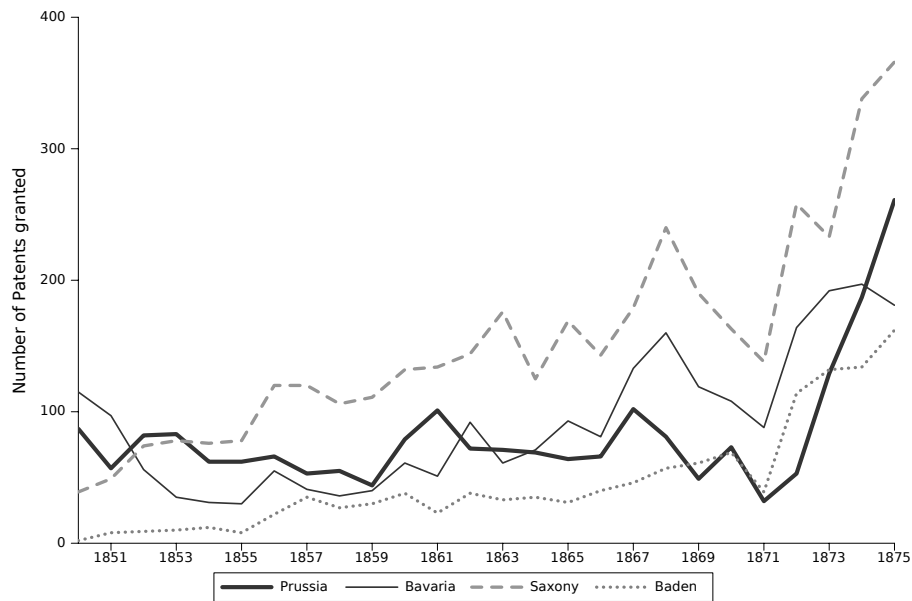
The arguments of advocates and opponents of patent protection were brought forward in the Reichstag as well as in public and academic debates. Nonetheless, the anti-patent movement was neither a party nor a social movement. It can be described as a discourse community of liberal businessmen, journalists, and statesmen who were affiliated with the Congress of German Economists⁶. Some of its members were also in responsible positions for institution-building in Prussia; such as John Prince-Smith who was the head of German free traders and representative in the Reichstag; or Otto Michaelis who was the political adviser of Rudolph von Delbrück, the head of the chancellery (Heggen 1975: 70).

⁶The Congress was a major voice in economic debates and contributed to the liberal policies of the German Customs Union (von Philippovitch 1891; Cohn 1905).

The connections and links between individuals turned out to be the basis for attempts to abolish patents in the Northern German Federation. An important example are the activities of Delbrück who not only sympathized with free trade views but was determined to implement the ideas of the movement in political practice. He did so by further restricting the granting of patents in Prussia. Figure 1 shows that Bavaria which had less industry than Prussia granted more patents from 1850 till 1875. Saxony even granted twice as many patents. It is also striking that the number of Prussian patents was very low in 1869 when Chancellor Otto von Bismarck requested the Bundesrat to report on the question of patent protection. However, after the instructed committee hesitated to recommend the abolition of patent protection, Bismarck suddenly also wanted to await the public opinion-forming process (Heggen 1975: 76-82).

These events illustrate the uncertainty among politicians concerning patent protection. Even though the members of the anti-patent movement had formed a dense network (including whole government circles), they could not influence the Northern German Federation substantially. Instead, by writing several petitions, patent advocates were able to maintain the existing patent systems (Heggen 1975: 103).

Figure 1: Number of Patents granted in Germany between 1850-1875



Source: Erfindungsschutz und Industrialisierung in Preußen 1793-1877
by Alfred Heggen (1975: 78)

3.2 The Beginnings of the Pro-Patent Movement

The main advocates of patent protection were technical associations which were formed by graduates of technical schools in nineteenth-century Germany. They were not only active in the German territories, but also established transnational expert networks. The most active group was the Association of German Engineers which was founded in 1856. It was modelled on the English Civil Engineers of the Kingdom and campaigned for the unification of German economic laws. One of its goals was the protection of patents. Like the Congress of German Economists, the Association of German Engineers met only once a year and can be described as an organisation which represented civil engineers who mostly have also been active as entrepreneurs (Seckelmann 2006: 144). A pro-patent movement in a narrower sense did not yet exist in the 1860s since there were too many conflicting views and presumably only few personal connections between patent advocates (Heggen 1975: 98).

Therefore, it is not surprising that the protection of patents gained importance only after the Congress of German Economists had passed a resolution in 1863 suggesting the abolition of all patent laws. To counteract these efforts, several papers were published whose authors found different justifications for the value of patents. The arguments which were brought forward ranged from political reasons like the 'just reward for the inventor' to economic reasons like 'investment security' (Seckelmann 2006: 148f.). Among these papers, there was also a memorandum by the inventor-entrepreneur Werner Siemens who became a leading patent advocate and was also the head of the Siemens electrical company. Contrary to inventor groups who supported the theory of intellectual property, Siemens argued that patent legislation which did not require disclosure and entitled inventors to secrecy could stifle economic growth. From the perspective of Siemens, the main justification for patent laws was the need to make sure that new ideas would be disseminated in the national economy and investments by companies would be made. This should be attained by implementing an obligation to publish the invention as well as the possibility of acquiring a license (Fischer 1922: 31; Heggen 1975: 92f.).

Nonetheless, the first attempts to initiate the development of a new patent system did not achieve influence in the Northern German Federation. However, the pro-patent movement successfully intervened in the review process that had been started after Bismarck's initiative in 1869 (see above). By writing petitions, patent advocates were able to secure the maintenance of existing patent laws in the Northern German Federation. One consequence of this achievement was the beginning of a discourse among members of the Association about the impact of different justifications for patent protection. Especially the theory

of intellectual property became more and more contested. As an alternative, a growing industrialist lobby within the organisation constructed economic logics which relied on grammars of the "national and the common good". Besides, the increasing influence of industrialists could also be seen in the composition of a commission that was formed to submit a legislative proposal. Almost all members of the commission were manufacturers or technical directors. But the industrialists did not only strengthen their efforts within the pro-patent movement, they also tried to mobilize public support for their goals. For example, the manufacturer C. Schlickeysen argued that economic growth and the reduction of social tensions would only become possible if German products would be competitive in the global market. Similar arguments to justify patent protection were also used by Siemens who wrote a petition for the Association of German Engineers in 1872 based on his memorandum from 1863. The new aspect there was that Siemens suggested the abolition of patents would damage the reputation of the recently founded German Empire since the theft of foreign inventions would be legitimized (Heggen 1975: 106ff.). This kind of reasoning was typical for Siemens who did not endorse the theory of intellectual property, but still used its rhetoric in public debates.

In contrast to previous attempts of patent advocates, Siemens and André, a lawyer from Osnabrück, also worked out a detailed legislative proposal containing numerous industry-friendly provisions. Among the provisions, there was the first-to-file principle. According to this principle, the patent would not go necessarily to the inventor, but simply to the first person to file. Another provision would even force inventors to execute their inventions within two years while they also had to pay annually rising fees for their patents. The broad support for this proposal within the Association of German Engineers shows that Siemens and his followers had taken the initiative while inventors groups in the pro-patent movement were unable to influence the regulatory modelling (Heggen 1975: 120f.).

3.3 The Reichstag Debate of 1872

The first time the Reichstag debated over patent protection was in 1872 when a merchant from Berlin had submitted a petition that suggested the passing of a uniform patent law in the German Empire. While all representatives agreed that the present situation was unacceptable, there was no agreement as to what should exactly be done. The proposal of the commission for petitions was nonetheless adopted by a large majority because it only stated that a uniform solution should be found, while leaving open if all patent laws should be abolished or a new patent system established (Seckelmann 2006: 154f.).

As the results of the content analysis⁷ in table 1 show, only four speakers participated in the debate. The first speaker, John Prince-Smith, who was also the leader of the anti-patent movement, justified the abolition of patent laws with the promotion of work sharing that would become easier because inventors would trust each other more. Since patents were also used in order to stifle competition, he claimed that only the abolition of patent law could prevent the usage of blocking patents. He further argued that the possibility for inventors to get patents would assign different values to the work of scientists and inventors although they should be treated equally since both groups contribute to the inventive process.

According to Prince-Smith, the incentives to disclose secrets were also problematic since individuals and firms value patents so highly that they would take part in a kind of patent lottery thereby harming themselves. By making this point, Prince-Smith anticipated the insights of today's behavioral economics (Crouch 2008; Heller and Eisenberg 1998). However, the patent supporter von Hennig did not follow this argumentation. From his perspective, the economic benefits of incentivizing outweighed the potential costs. Besides, von Hennig argued that the negative phenomena from other countries which Prince-Smith had cited could not be observed in Prussia. The remarkable thing is that von Hennig was the only representative who spoke in favor of a patent system. And he did neither justify patents by referring to the natural property right in ideas nor by mentioning any of the nationalist arguments that were used in the parliamentary debates over patents in 1877.

3.4 The International Congress for the Protection of Patents in Vienna

According to economic historians, the first International Congress for the Protection of Patents was of great importance to patent advocates since this event enabled them to reach a wide public. The initiative had come from the chairman of the Universal Exhibition of 1873 after American manufacturers had refused to present their products in Vienna. Their concern was imitation by other exhibitors as well as the insufficient patent protection in Germany. The congress became part of the supporting programme of the Universal Exhibition

⁷The data for this study come from stenographic records of Reichstag debates between 1872 and 1877. Following historical source analyses (Heggen 1975; Machlup and Penrose 1950; Seckelmann 2006), I located all speeches about patent protection. After reading through the full text of these speeches, I determined that only 48 speeches were related to the question of introducing a patent system. The study did not include the remaining speeches who were about the details of the new patent law. I coded the speeches in chronological order for the reasons offered in support or opposition to a patent system. Therefore statements are the unit of analysis, not the speech in which they appeared.

Table 1: Reichstag Debate, 1872: Reasons Offered by Speakers in Support of or Opposition to a Patent System

	In favor of a patent system	Opposed to a patent system
Promotion of work sharing		Prince-Smith
Prevention of blocking		Prince-Smith
Equal treatment of inventors and scientists		Prince-Smith
Incentive to disclose secrets	von Hennig	Prince-Smith
Reference to legal practice in other countries	von Hennig	Prince-Smith
Necessity of uniform standards in the german empire		Banks
Dealing with industrial growth		von Patow

The debate took place on 10 May 1872; a total of four speakers participated (Prince-Smith: National-Liberale Partei; von Hennig: National-Liberale Partei; von Patow: National-Liberale Partei; Banks: Deutsche Fortschrittspartei).

Source: http://www.reichstagsprotokolle.de/Blatt3_k1_bsb00018359_00335.html

and was also co-organized by the Siemens brothers⁸ who became members of the steering committee. The largest group among the 160 participants were civil engineers, but also factory directors, civil servants and lawyers attended the conference. It is important to mention that even members of the anti-patent movement had been in Vienna although they were in the minority. (Heggen 1975: 112f.).

On the conference agenda was the international harmonization of regulations as well as the need of patent protection and the balancing of individual and collective interests in patent legislation. The latter two issues were of major interest to the many German participants but also to French and English participants who struggled with anti-patent movements. One of the most hotly debated issues was the idea of compulsory licensing which was brought forward by English participants (Seckelmann 2006: 162).

⁸Wilhelm Siemens was an important figure in the British engineering industries. Like his brother he was also very active in the pro-patent movement who testified to the importance of the patent system in attracting people like him into Britain (Johns 2009: 282).

Especially the group of civil engineers feared that they would not be able to compete against manufacturers who could simply pay for a license to use their inventions. Therefore, they did not follow the reasoning of Siemens who defended compulsory licensing as a means to delegitimize the accusations of patent opponents who argued that patents would grant monopolies (Heggen 1975: 115). All in all, this makes clear that the inventors had no illusions about the ambiguity of Siemens' logic, but were nonetheless unable to prevent the centralisation of economic decision-making in the following years.

Another important outcome of the debates was the recommendation to found societies for the protection of patents at the national level - a plan that was put into action by Siemens and other patent advocates in the following year (Heggen 1975: 116).

Altogether, the congress can be interpreted as a "field configuring event" (Lampel and Mayer 2008) which marked a turnaround in the public opinion in favor of the pro-patent movement (Heggen 1975: 112f.; Seckelmann 2006: 163).

3.5 The Society for the Protection of Patents

The initiative for the foundation of the German Society for the Protection of Patents in 1874 came from Siemens and the civil engineer Carl Pieper. Originally, the society was thought to be the German section of the steering committee of the International Patent Congress for the Protection of Patents. But under the influence of Siemens the focus of the organisation became more and more national. According to his logic, the international harmonisation was not relevant as long as the German Empire did not have a uniform patent law (Fischer 1922: 48f.). The society should therefore try to connect with top-level civil servants for a new attempt to get patent legislation passed (Seckelmann 2006: 166f.).

Due to this national orientation, a commission started to work on a new legislative proposal based on the draft of the Association of German Engineers (Seckelmann 2006: 166). But while the civil engineer Pieper wanted to strengthen the rights of individual inventors, Siemens was not willing to deviate from his 1872 proposal. What he did was to finish and submit the proposal to the Bundesrat in 1875 without informing Pieper. In contrast to his 1872 proposal, he also added the licensing principle that he had defended in Vienna on the grounds of the public interest. Because of this confrontation, Pieper and numerous other engineers left the society. Nonetheless, Siemens and his followers were successful since a revised proposal that was submitted to the Bundesrat in 1876 was supported by the German Chancellery. The first draft of the ins-

trusted commission was published in 1876 and even revised after complaints from Siemens (Heggen 1975: 117f.).

4 The Patent Act of 1877: Charta Siemens

The debate over patents in the Reichstag became possible because more and more actors in positions for institution-building became receptive to alternative principles for organizing economic activity. Those principles were provided by the Society for the Protection of Patents and especially by Werner Siemens whose activities were so influential that the 1877 patent law was also known as the "Charta Siemens" (Gispen 2007: 62).

Siemens argued in a memorandum from 1876 that the German economy had grown so fast because foreign inventions could simply be imitated without having to invest in research and development. The problem after 1873 was that German products had a bad reputation on the global market which led to significant export losses. In order to regain market share on foreign markets, it was necessary to develop not only quality products based on foreign inventions but completely new products which had a higher quality than the products of foreign competitors. These products would also be preferred by German customers who till then primarily bought American or English originals but would be willing to buy German products which could be advertised by appealing to the national consciousness. To be able to achieve all that, it was necessary to make sure that the value of technical work would be socially recognized in the German Empire. The best way to accomplish this goal that would lead the way out of the crisis was a new patent system (Heggen 1975: 128). In contrast, according to Siemens, the German Empire would not be able to restore its honor compared to nations like England, France and America without patents. Besides, their protection would only be a sacrifice of some economic freedom for the significant improvement of social conditions. Finally, a good patent system would bind important sections of the society to the Empire and its institutions (Fischer 1922: 60).

This line of argumentation contributed essentially to cognitive change among interested parties and had also an impact on the network structures within German government agencies. The first important change in network positions was the resignation of Delbrück which had been the head of the chancellery. One reason for this development were differences of opinion with Bismarck who seemed to be convinced by the justifications for patents which Siemens had brought forward (Fischer 1922: 60f.). Another reason was that his reputation was tarnished since the economic crisis could successfully be presented as a failed test of free trade views by protectionist politicians. The consequences of his

resignation can be seen in the number of patents which were granted in Prussia because the patent advocate Jacobi, who was the Ministerial Director of the Department of Commerce, released the restrictions which had been introduced by Delbrück. Apart of Jacobi also the head of the Department of Commerce Achenbach supported a patent reform. This cognitive and structural change within the government was noticed by Siemens who used his connections to Jacobi to transfer his own regulatory recommendations through institutional channels. Since the successor of Delbrück received the board of the Society for the Protection of Patents and instructed a commission to work out draft legislation, the resistance to patent legislation within the government had largely faded (Heggen 1975: 129f.).

Table 2: Reichstag Debate, 1877 (Referral to a Parliamentary Commission): Reasons Offered by Speakers in Support of or Opposition to a Patent System

	In favor of a patent system	Opposed to a patent system
Public interest in access to inventions		Richter
The just reward for the inventor		Richter
Experiences with trademark law	Braun; von Kardoff	Richter
Moderating influence on workers	von Kardoff	
England, France and North America are successful with a patent system	von Kardoff	
Recover from depression	Ackermann	
Stop brain drain of engineers	Ackermann	
Moral standing of a nation of imitators	Ackermann	
The natural property right in ideas	Ackermann	

The debate took place on 2 March 1877; a total of four speakers participated (Ackermann: Deutschkonservative Partei; Braun: National Liberale Partei; von Kardoff: Deutsche Reichspartei; Richter: Fortschrittliche Volkspartei).

Source: http://www.reichstagsprotokolle.de/Blatt3_k3_b.sb00018387_0055.html

The perceived change was also addressed by the conservative representative Ackermann who opened the first reading of the patent bill in the Reichstag in 1877 by stating that "thanks to the bad crisis" the public opinion had turned away from the "intellectual communism" of the free trade school. As table 2 shows, Ackermann justified the protection of patents on the basis of the natural property right in ideas and the moral standing of Germany as a nation of imitators. He also suggested that a new patent law could stop the brain drain of German engineers to countries which guaranteed patent protection.

In his reaction to Ackermann, Braun spoke also out in favor of a patent system even though he was a supporter of free trade views. The only reason he mentioned for his position were the experiences with trademark law. The representative von Kardoff justified a patent system on the grounds of social reasons because patents offered a chance for workers to escape from poverty and thereby would have a moderating influence on them. Only Richter spoke out against patents contesting the claims of Braun and von Kardorff with regard to trademark law. After the debate the Reichstag decided to instruct a commission which should report to the Reichstag in the second reading. The commission itself described the view of free traders as historic and full of prejudices (Heggen 1975: 134).

In the second reading of the patent bill the Reichstag debated over the proposals of the commission. As table 3 shows, only the representative Reichensperger still doubted the value of a patent system. One of his main arguments was the incomplete and asymmetric information which officials of a patent office would necessarily have. Another reason he gave for his opposition was the example of the Netherlands and Switzerland which were successful without patent protection. This test of his logic was contested by von Kleist-Retzow who stated that the German Empire should compare itself with economic powers like England, France and North America which had patent protection and not with small imitator nations. He also justified the protection of patents as support for the value of knowledge work that was often contested by workers.

Table 3: Reichstag Debate, 1877 (§ 1 Draft Legislation): Reasons Offered by Speakers in Support of or Opposition to a Patent System

	In favor of a patent system	Opposed to a patent system
Balancing of the interests of first and second inventors		Reichensperger
Incomplete and assymmetric information (patent office)		Reichensperger
Prevention of blocking	Hammacher	Reichensperger
Promotion of German qualities	von Kleist-Retzow	Reichensperger
England, France and North America are successful with a patent system	von Kleist-Retzow	Reichensperger
Netherlands and Switzerland are successful without patent protection	von Kleist-Retzow	Reichensperger
Stop brain drain of engineers	von Kleist-Retzow; Hammacher	
Recover from depression	von Kleist-Retzow	
Moderating influence on workers	von Kleist-Retzow	
Supporting knowledge work	von Kleist-Retzow	
Public interest in access to inventions	von Kleist-Retzow	
Protecting the investment of small businesses	Lasker	
Necessity of uniform standards in the german empire	Jacobi	
Legal coherence	Jacobi	
References to legal practice in other countries	Jacobi	

The debate took place on 1 May 1877; a total of five speakers participated (Reichensperger: Zentrum; von Kleist-Retzow: Deutschkonservative Partei; Hammacher: National Liberale Partei; Jacobi: Department of Commerce); Lasker: National Liberale Partei)
Source: http://www.reichstagsprotokolle.de/Blatt3_k3_bsb00018388_00325.html

The reasoning of Lasker is also of interest since he had requested Siemens and André to inform him about the issues before the debate (Seckelmann 2006). According to his position, a patent law would protect the "national work" and therefore the investment of small businesses which should be enabled to compensate for their losses compared with big business. Hence, Lasker presented a specific theory concerning the loss of value in the crisis and how this problem should be institutionally resolved. In contrast to the other speakers, Jacobi tried to justify the uniform patent law on the grounds of legal coherence and practices in other countries thereby expressing the logic of a path in the law that should be followed.

Finally, the draft bill was accepted in a slightly altered version by the Reichstag in May 1877. There were 138 votes in favor and 90 against it. It was enacted on 1st July 1877. The success of the industrial lobby within the pro-patent movement was clear to see, especially in paragraph 3 (first-to-file principle), paragraph 8 (high and steeply rising annual fees) and paragraph 11 (obligation to execute inventions; compulsory licensing). None of these provisions were supported by small inventors and civil engineers, but nevertheless became part of the new patent law (Heggen 1875: 135).

5 The Effects of the New Patent System

Significant changes in patent law are studied by economists because they provide a set of "natural experiments" (Bessen and Meurer 2008; Jaffe 2000) which could help to understand how different legal regimes effect economic behaviour. This is of importance since the results of today's cross-country studies show that intellectual-property rights appear to have only a weak and indirect relationship to economic growth. Moreover, the coefficients seem to be significant only for certain countries and sectors. And inverse causality cannot be excluded which is the possibility that intellectual property rights institutions were improved because of economic growth instead of the other way around (Bessen and Meurer 2008: 81f.).

In order to untangle the direction of causality it could be helpful to take a closer look at the consequences of the German experiment in the nineteenth century. But unfortunately, it is not possible to make many robust statements about the effects of the 1877 patent law on the innovation process. The reason for this is that it is difficult to measure the parameters of patent policy when many things have been changing at the same time (see, for example, Jaffe 2000). And, of course, the data availability is not as good as in the twentieth century.

While figure 2 shows a growing number of granted patents between 1875 and 1900 it is not possible to determine how many patents were actually used in industrial production. Furthermore, the effective use of patents should not be over-estimated since of all patents which were granted between 1877 and 1894, already 22,53% expired in second year and 24,53% in the third year. The percentage of patents which were maintained over the whole term of protection (15 years) reached only 0,07% (Heggen 1975: 136f.).

Not surprisingly, patent advocates were not so cautious about concluding that the new law had positive effects on economic growth. Josef Kohler, who was a well-known patent expert, stated in 1900 that the protection of patents was solely responsible for the rapid growth of the German economy (1900: 15). Even though this claim was probably not shared by all his contemporaries it points to the importance of perceived causal relationships in the long-term process of institutionalization.

Especially economists were no longer interested in the effects of patents and therefore not present at hearings anymore. Machlup and Penrose (1950: 29) noted ironically that their place was taken by engineers and lawyers who appeared as "experts" on the economic effects of patent protection.

Figure 2: Number of Patents granted in the United Kingdom and the German Empire 1875-1900



Source: *Erfindungsschutz und Industrialisierung in Preußen 1793-1877* by Alfred Heggen (1975: 137); Patent applications filed and patents granted each year 1852 to 1915 by the *Intellectual Property Office* (2010)

6 Concluding remarks

In this paper I have tried to understand how changes in network structures and evaluative frameworks influenced the development of the German patent system. I have been particularly interested in the weakening of the anti-patent movement which had almost succeeded in abolishing patents in the Northern German Federation. My evidence tends to show that a key condition for the process of institution building was a period of upheaval following the foundation of the German Empire and the financial crisis of 1873 which generated uncertainty "of a type that is not simply a problem of risk or incomplete information" (Blyth 2007: 774).

During that period, actors in central network positions became receptive to justifications offered for patent protection by members of the nascent pro-patent movement. This was the case because moments of upheaval seem to compel actors to search for value while questioning the economic logics which are embodied in the practices of market actors and regulatory agencies. In other words, actors may try to find new investment strategies, but also ways to be more creative or even more responsible, whatever that means from their point of view. The problem is that modified conceptions of value have to be translated into legal concepts. Drawing on the work of David Stark (2009), I have argued that this process can lead to cognitive dissonance that can be exploited by "institutional entrepreneurs" who ease the evaluative process by providing detailed regulatory models. Therefore, the mechanism of modelling (Braithwaite and Drahos 2000) can be used in "inter-elite attempts at persuasion as to what a crisis means, and how it should be institutionally resolved" (Blyth 2007: 761).

I find that precisely this happened in nineteenth-century Germany since Siemens was able to influence the decision-making process by having close ties to actors in responsible positions for institution building. This became only possible because the pro-patent movement he helped to build, gained increasing influence on the national and transnational level following the first international congress on the protection of patents. In contrast to this, free traders who had built the anti-patent movement lost their influence after their major goals were attained, such as the removal of archaic regulations on the movement of capital and goods inside the German Confederation. Furthermore, the economic crisis could successfully be presented as a failed test of their economic logics by their protectionist rivals.

It becomes clear that the pro-patent movement only leveled the playing field while the industrialist lobby within the movement powerfully shaped the game with the help of personal connections and detailed regulatory concepts. On

the one hand Siemens and his followers were comfortable with keeping multiple evaluative principles in play - thereby making use of the efforts of small inventors and engineers in public debates (see Stark 2009: 15). On the other hand they relied on institutional blueprints which provided a set of logics, practices and exchanges of a new "moral order" of the market. These blueprints could be transferred through institutional channels since the industrialist lobby was able to establish personal connections on the grounds of overlapping evaluative principles.

My findings, I propose, have wide applicability that goes well beyond the historical case detailed here. In particular, they could be helpful to understand the activities of today's institutional entrepreneurs who exploit the cognitive dissonance resulting from the friction between different evaluative frameworks and technological possibilities. It is important to understand that the term "exploit" has no negative connotation in this framework since an institutional blueprint can also be formulated on the grounds of higher-level evaluative principles.

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