

The use of trademarks in empirical research: Towards an integrated framework

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ABSTRACT

This paper represents an early attempt to develop an integrated framework linking empirical studies that make use of trademark statistics. Despite its youth, this field of scholarly activity has already accumulated a critical mass of papers that allow us to draw first general conclusions about the trademark lifecycle and its impact on organisational functioning. Based on a systematic review of 64 articles with some elements of empirical trademark analysis, five broad research areas have been identified, namely: the determinants of trademark deposits; the relationship between trademarks and innovation processes; the role of trademarks in differentiating product offerings; the strategic use of trademarks; and the impact of trademarks on firm performance. Within each category, a more detailed aggregation of articles has also been proposed. Overall, the analysis has shown that the performance-based perspective currently dominates the research landscape, with studies on trademark deposits and the trademark-innovation link to follow. At the same time, there is still little known about micro-foundations of a company's trademarking behaviour; the use of trademarks and other intellectual property rights in a complementary way and its effect on value transference; as well as the performance implications of differentiation strategy. This paper considers these and other findings to outline directions for future research.

KEYWORDS: intellectual property right; trademark; empirical study; literature review.

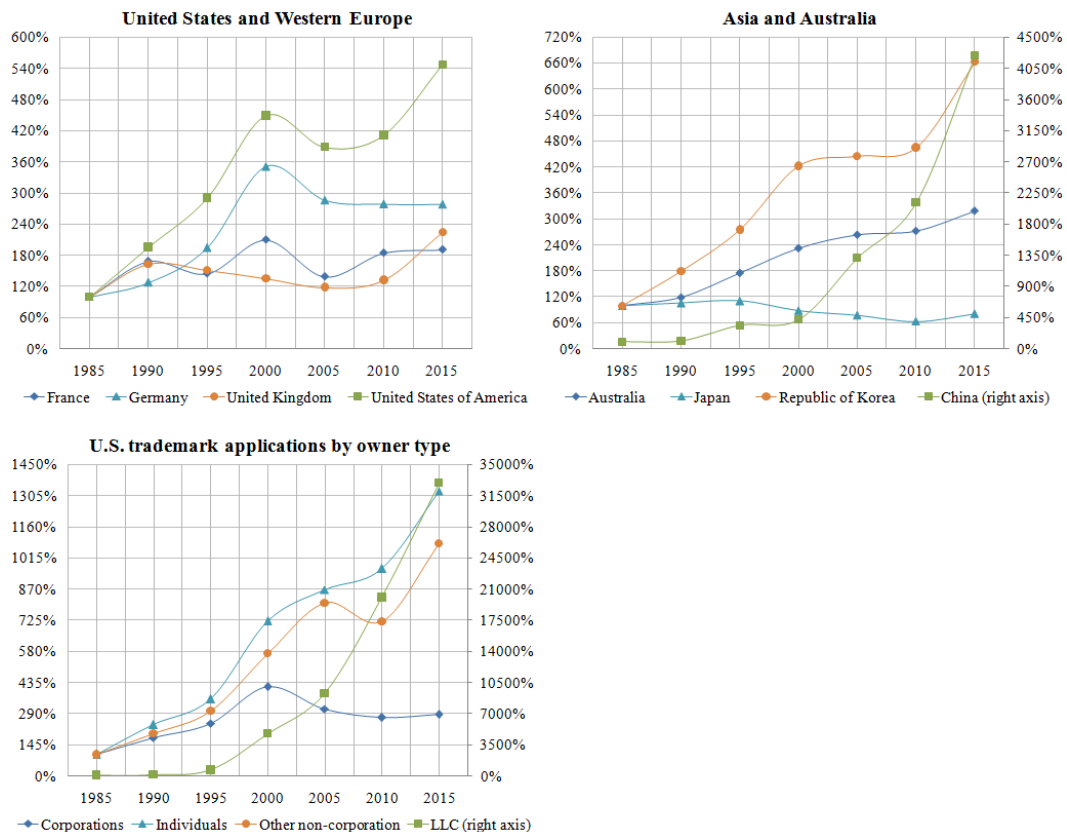
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1. INTRODUCTION

Over the last several decades, the empirical analysis of intellectual property has been a thriving area, although the focus has almost exclusively been on patents and their impact on technological progress. At the same time, recent changes in the economic structure have led both academics and policymakers to revisit the toolbox of indicators they are currently using and look for new measures that would allow them to identify, monitor, and evaluate previously neglected processes and practices. A good example in this regard is the growing importance of services in the modern productive system and, thus, the need to have a more accurate account of innovation activities taking place there (see Gallouj and Weinstein, 1997; Hipp and Grupp, 2005). Since service sectors are usually associated with a weaker flow of R&D investment and patent applications, if at all, conventional methods have a limited explanatory power and are likely to underestimate the extent of their innovativeness. Among the available alternatives, the choice has been made in favour of trademarks due to their widespread use across various industries, relevance to different organisational types, and close association with new product development (see Schmoch, 2003; Mendonça *et al.*, 2004). In fact, this interest has been further reinforced by an increasing popularity of trademark protection in different countries and among a variety of organisations (see Figure 1.1).

Figure 1.1. The dynamics of trademark applications for the period 1985-2015



Sources: WIPO; USPTO. Note that: 1985 is set to 100%; for China, 2015 is set to equal to 2014.

Although the field of empirical trademark research is at its early stage of development, a critical mass of papers have already been accumulated that can be used to draw some initial conclusions about trademark activities and their effect on organisational functioning. As such, the purpose of this work is to identify the core empirical trademark literature, systematically review it, and design an integrated framework that brings together different research streams. This paper thus broadens the analysis presented in prior reviews (e.g., [Mendonça *et al.*, 2004](#); [Schautschick and Greenhalgh, 2016](#)) by looking at the fields that are adjacent to economics, including marketing and management. This approach enables us to offer a holistic perspective on trademark activities in organisations, including the stimulation of cross-disciplinary learning. Next, this work contributes to the existing reviews on intellectual property rights (e.g., [Hanel, 2006](#); [Candelin-Palmqvist *et al.*, 2013](#)) by placing specific focus on trademarks. Finally, along with reviewing the empirical literature on trademarks, this paper also summarises theoretical underpinnings behind each phenomenon associated with or reflected in trademark statistics, thereby making it easier to reconcile theoretical propositions and empirical observations.

To anticipate the results of our analysis, we have found that all empirical research on trademarks can be grouped into five broad categories, namely: the determinants of trademark filings; the role of trademarks in product differentiation; the relationship between trademarks and innovation activities; the strategic use of trademarks; and the influence of trademarking on organisational performance. To date, considerable attention has been paid to the evaluation of whether trademarks have an impact on firm value, productivity, and profitability. In line with the aforementioned need for new innovation measures, the association of trademarking with innovation processes has been carefully scrutinised as well. However, there are also areas that deserve further exploration. For example, little is known about intraorganisational factors governing trademark activities; studies that look at trademarking in developing countries are fairly rare; and more work should be done to address methodological inconsistencies to ensure a better comparability and validity of empirical results.

The remainder of the paper is organised as follows. Section 2 outlines the method used to identify the core trademark literature, as well as determines and explains the bibliographical patterns observed in the selected publications. Section 3 presents a detailed analysis of each paper and links it to the broader stream of research. Section 4 concludes with a discussion of implications for future studies.

2. THE IDENTIFICATION OF THE CORE LITERATURE

2.1. Methodology

The principal objective of this work is to develop an integrated framework that brings together different streams of the empirical trademark literature. In order to do this, we first identified a broad sample of studies that examine trademark-related issues. Using the Business Source Premier database, we searched for such terms as "trademark" and "service mark" in the title, abstract, and key words of all indexed papers. We then limited the number of papers for review by excluding non-empirical research as well as articles published in law journals because it is highly unlikely that they would employ statistical analysis.² Finally, we retained only those studies that were published as full-length articles in peer-reviewed journals in English. The above procedure left us with a superset of 566 papers explicitly referring to trademarks (see [Table 2.1](#)). Unlike previous reviews on a similar topic (e.g., [Candelin-Palmqvist et al., 2012](#)), we were unable to rely on a journal's impact factor or quality to narrow down the search because the empirical analysis of trademark data is still in its infancy, so even significant contributions can appear in relatively low ranked outlets.

Table 2.1. The selection of articles for review

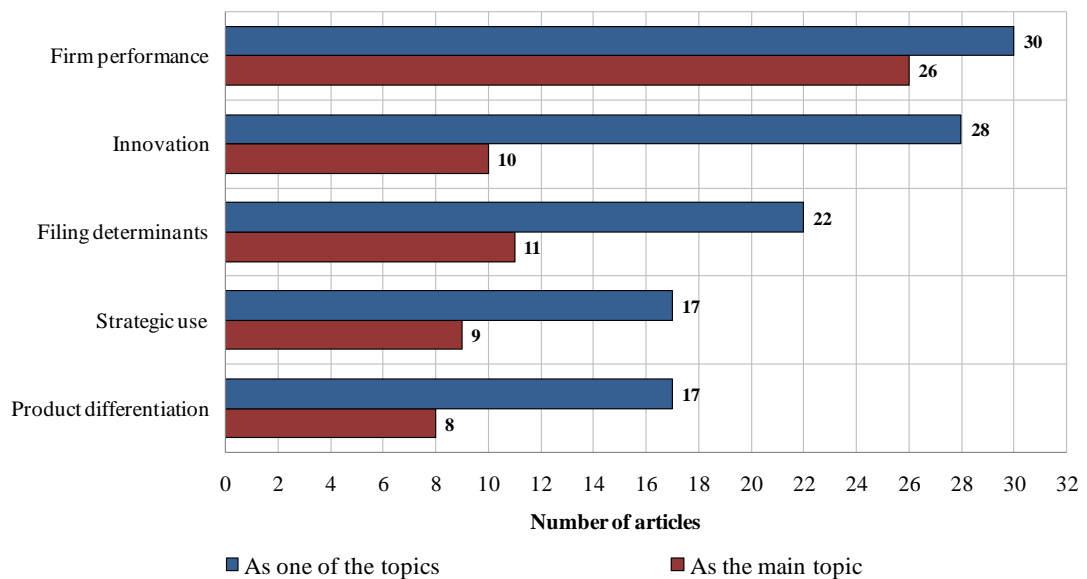
Stage no.	Key word(s)	Operation	Search field(s)	Result
1	trade mark; trademark; service mark	Contain either of these words	TI: title AB: abstract SU: subject terms	25,675
2	law; legal; legislation; tax	Exclude either of these words	SO: publication name	24,126
3	empirical; model; statistics; survey	Contain either of these words	TX: all text	4,035
4	academic journals	-	Source types	586
5	English	-	Language	566

Every article was subsequently reviewed to establish whether it met the inclusion criteria or not. First of all, we filtered out a significant number of papers that appeared in the original list because of the expression "United States Patent and Trademark Office" being present in the abstract or among the subject terms, whereas the papers per se were on topics

² A notable exception is [Heald and Brauneis's \(2011\)](#) study of trademark dilution.

unrelated to trademark analysis. Some studies pointed to trademarks while talking about the concepts of dilution, infringement, and licensing, as well as assessing a company's brand strategy; since the absolute majority of them were not empirical, they were excluded from our review, too. With our initial search, we also retrieved several conceptual papers that focused primarily on classification issues, intellectual property management, or presented a new dataset (e.g., Hipp and Grupp, 2005; Conley *et al.*, 2013) – these papers were dropped, although we still referred to them and elaborated on their ideas in corresponding sections. To make sure that all valuable contributions were accounted for, we supplemented the search results with articles identified in other review papers (e.g., Mendonça *et al.*, 2004; Schautschick and Greenhalgh, 2016) and in the reference lists of the already selected empirical trademark studies. Overall, our screening generated a sample of 64 papers, which were used as a basis for this review. One of the major drawbacks of our approach, however, is that it largely misses out government reports, book chapters, working papers, and conference proceedings. This concern was addressed, to an extent, of course, by adding a table that briefly summarises some of such contributions, with the most critical ones being further mentioned in the review part.

Figure 2.2. A summary of research streams in the empirical trademark literature



It needs to be noted that one paper can contribute to multiple research streams. Recognising that, we propose to look at two indicators: (i) *blue bars* show the number of articles in a field for which this field is one of the discussed topics; and (ii) *red bars* show the number of articles in a field for which this field is the main topic of discussion. Clearly, "firm performance" is likely to be a research topic on its own, while the remaining areas are mostly discussed along with some other topics.

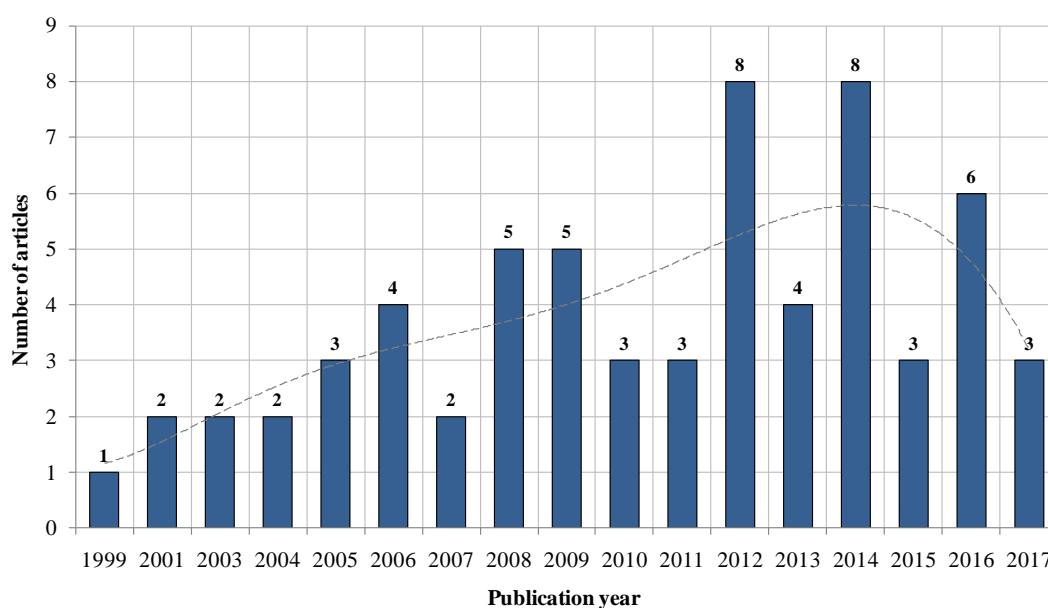
We completed the literature identification stage by classifying each article into one or more groups, depending on the perspective taken towards trademarks. Overall, five major groups were identified, namely: 30 articles assess performance implications of trademarking;

28 studies exploit the link between trademark and innovation activities; 22 papers attempt to identify the determinants of trademark deposits; 17 works explore the strategic use of trademarks; and in 17 publications, the authors refer to trademarks in the context of product differentiation (see [Figure 2.2](#)). Before proceeding to an in-depth analysis of each category, we should consider some stylised facts about publishing empirical trademark research.

2.2. A descriptive analysis of the empirical trademark literature

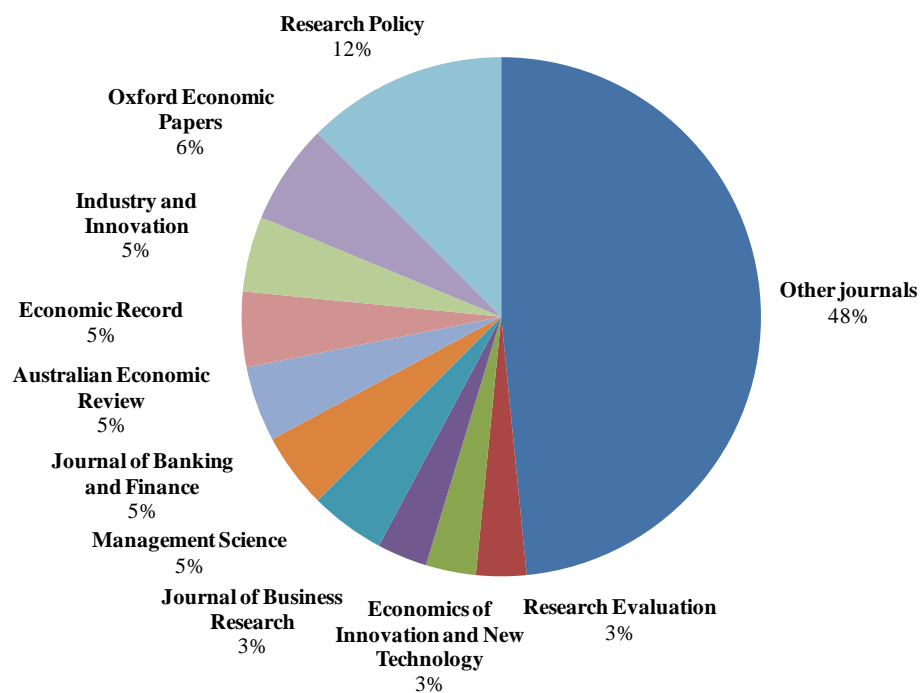
[Figure 2.3](#) indicates that scholars had shown little interest in empirical trademark research before 2000s. Arguably, the earliest known study that utilised trademark statistics in a systematic way was the paper by [Allegrezza and Guarda-Rauchs \(1999\)](#), which attempted to identify the determinants of trademark filings and also explored a potential link between trademark activities and corporate innovation. Since then, there has been continuous growth in the use of trademark data that reached its maximum in 2012 when eight papers were published. There are many reasons behind this, including a significant effort directed by policymakers towards a better understanding of the impact that intellectual property has on economy and society ([WIPO, 2013](#)). The validity of this argument can be supported by looking at the recent proliferation of policy documents and reports touching upon trademark issues (see [Table A.6](#)). Trademark analysis also seems to be a useful tool for studying non-technological innovation, such as business model innovation, marketing innovation, and innovation in services ([Mendonça et al., 2004](#); [Hipp and Grupp, 2005](#)). Finally, the greater attractiveness of trademarks for empirical researchers can further be attributed to substantial improvements in the availability of trademark statistics achieved by removing certain barriers previously limiting access to this type of information ([Graham et al., 2013](#)).

Figure 2.3. The number of articles per publication year



Evidently, *Research Policy* comes out as the most popular outlet for academic studies that make use of trademark data (see [Figure 2.4](#)). This journal was, in fact, among the first leading social science journals that pointed to the value of trademark statistics for improving our knowledge of corporate innovation and intellectual property strategies. *Oxford Economic Papers* is the second most popular outlet, although this result is mainly due to a special issue published in 2013 and entirely dedicated to innovation and intellectual property topics. Other named journals have a fairly equal percentage share, having two-to-three trademark-related papers accepted for publication over the last two decades. In total, 41 journals have published at least one empirical trademark paper – such journal diversity may reflect the broader appeal of trademark statistics, including its general applicability to research in economics, business, and management. Moreover, the recent tendency among top-tier outlets across all major fields to accept articles utilising trademark analysis is likely to indicate that this empirical perspective has gained academic credibility, which is necessary to ensure and maintain a high quality of research.

Figure 2.4. The composition of articles by publishing journal



A number of useful insights can be drawn from the country emphasis in the selected publications. As it can be seen from [Figure 2.5](#), the vast majority of the empirical trademark literature concentrates on developed economies, with studies confined to the U.S. institutional context currently dominating the research landscape. The fact that the U.S. has attracted so much scholarly attention is hardly surprising, given the size and importance of its market to the world economy, as well as the long and rich history of intellectual property

protection in this country (Candelin-Palmqvist *et al.*, 2012). It should further be noted that the geographical dimension warrants special consideration because of its close relationship with the way in which intellectual property systems are governed. Our analysis particularly suggests that most of these works revolve around countries with the common law system (e.g., the U.S., the U.K., and Australia), while continental law countries (e.g., Germany, Benelux states, and Spain) tend to have a fairly small share. Finally, cross-country comparisons are also popular in trademark analysis – they are often related to an attempt to identify the determinants of trademark filings in different countries and examine the role of trademark protection in international trade.

Figure 2.5. The geographical scope of empirical trademark research

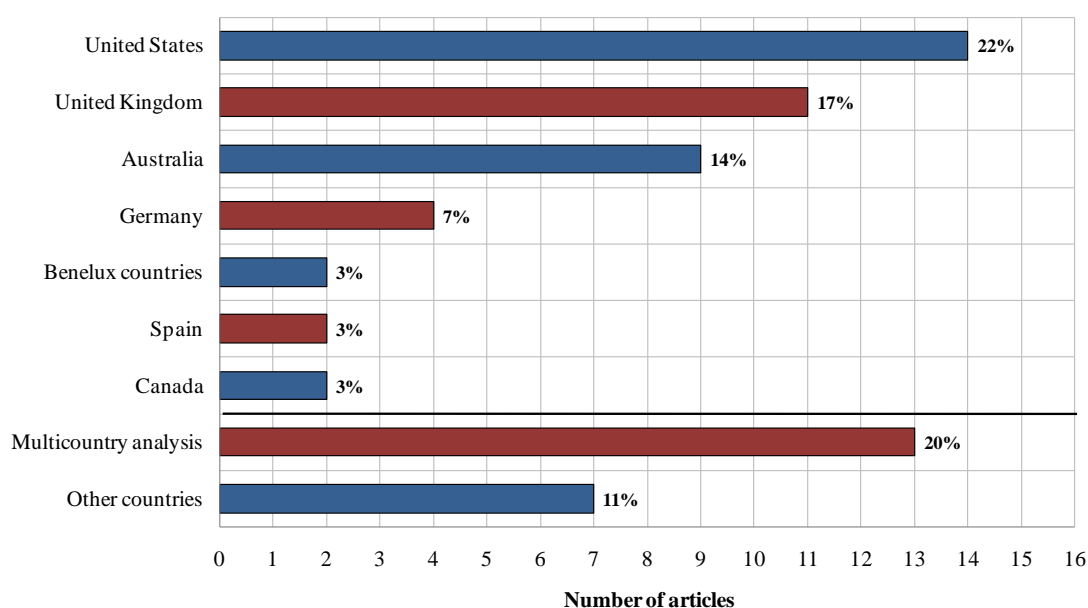
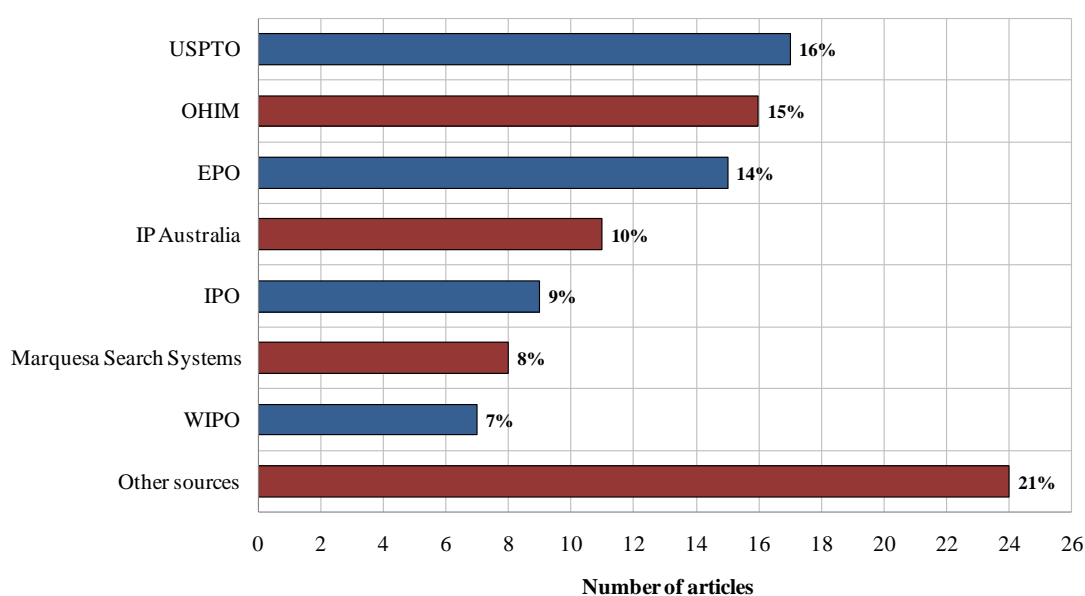


Figure 2.6 presents the key sources of trademark statistics. The results are largely consistent with what we have already observed for the geographical distribution of trademark studies, with the USPTO being the most popular provider of such information. Furthermore, there is a good reason to believe that the Office will maintain its leading position in the future, in part owing to the ongoing plan to continue disclosing intellectual property data in a form convenient for public access and academic research.³ Another important supplier of trademark statistics to mention is IP Australia – the Australian government agency responsible for administering intellectual property rights. In this case, we

³ It should be noted that the USPTO is legally responsible for the dissemination of intellectual property information to the general public (35 U.S.C. §2). In order to keep up with this task, the Office has recently introduced a new research agenda that aims to unveil the relationship between intellectual property and economic growth. As such, for the first time they have disclosed detailed administrative data regarding trademark examination, registration, and assignment processes (see Graham *et al.*, 2013; Marco *et al.*, 2014).

have a fine example of a productive collaboration between academia and the government sector because at least one of the authors of each paper that utilised trademark statistics from IP Australia pointed to their affiliation with the University of Melbourne, where the Agency established the Intellectual Property Research Institute of Australia in 2002. Finally, the need for cross-country comparisons has resulted in the use of the trademark statistics collected by supranational institutions, including the World Intellectual Property Organisation, the European Patent Office, and the Office for Harmonisation in the Internal Market. When taken together, their share in providing statistical information for empirical trademark research far exceeds 30%.

Figure 2.6. Major sources of trademark statistics



Note that since one article can draw on multiple sources of trademark information, the total number of articles here is higher than the total number of reviewed articles.

To date, the most cited article that employs trademark statistics is the work by [Bosworth and Rogers \(2001\)](#), which estimates the private returns from investing in intangible assets in Australia (see [Table 2.2](#)). Moreover, the performance perspective that includes such topics as market value, profitability, and firm survival, tends to be the most popular area in the empirical trademark literature, with six out of the top 10 publications addressing it in one or another way. Other highly cited articles make use of trademark statistics to capture corporate innovation and strategic activities. As for publishing journals, *Research Policy* clearly dominates the top 10 list, thus once again establishing itself as a major outlet for this type of work. And to conclude, we can also point to Australia as the most popular setting among the top cited papers; however, the time factor should be taken into account here because these are also one of the oldest papers in our sample.

Table 2.2. Top 10 most cited articles that use trademark statistics

Number of citations	Author(s)	Article name	Journal	Year
290	Bosworth, D.; Rogers, M.	Market value, R&D and intellectual property: An empirical analysis of large Australian firms	Economic Record	2001
251	Mendonça, S.; Pereira, T.S.; Godinho, M.M.	Trademarks as an indicator of innovation and industrial change	Research Policy	2004
204	Greenhalgh, C.; Rogers, M.	The value of innovation: The interaction of competition, R&D and IP	Research Policy	2006
202	Amara, N.; Landry, R.; Traoré, N.	Managing the protection of innovations in knowledge-intensive business services	Research Policy	2008
137	Sandner, P.G.; Block, J.	The market value of R&D, patents, and trademarks	Research Policy	2011
113	Krasnikov, A.; Mishra, S.; Orozco, D.	Evaluating the financial impact of branding using trademarks: A framework and empirical evidence	Journal of Marketing	2009
110	Schmoch, U.	Service marks as novel innovation indicator	Research Evaluation	2003
101	Feeny, S.; Rogers, M.	Innovation and performance: Benchmarking Australian firms	Australian Economic Review	2003
101	Buddelmeyer, H.; Jensen, P.H.; Webster, E.	Innovation and the determinants of company survival	Oxford Economic Papers	2010
96	Semadeni, M.; Anderson, B.S.	The follower's dilemma: Innovation and imitation in the professional services industry	Academy of Management Journal	2010

The number of citations for each article was retrieved from Google Scholar on September 15, 2017.

3. A REVIEW OF EMPIRICAL TRADEMARK RESEARCH

3.1. The determinants of trademark deposits

General background. In economic theory, a company's decision to file a trademark application is usually explained by referring to the cost-benefit analysis. That is, a trademark should be registered only if the expected value of its registration exceeds the opportunity cost of the registration procedure (Economides, 1988; Mendonça *et al.*, 2004). However, empirical trademark research suggests that such a decision goes far beyond mere cost-benefit considerations and largely depends on the interaction between external and internal environments. *External environment* is determined by different forces acting outside the company and their influence on the company's adaptation process. Its structure is complex and consists of several interrelated layers, including the industries and region in which the company operates; it may also extend across national borders and multiple jurisdictions. A practical impact of external environment on the company's propensity to trademark is likely to manifest itself in substantial discrepancies in trademark deposits among economic sectors, countries, and agglomerations of states. As for *internal environment*, it denotes the composition of managerial, organisational, and work practices that affect organisational functioning. A detailed analysis of these practices aims at revealing critical dimensions along which companies, even from the same industry, may still differ with respect to trademark activities they pursue. For example, the availability of financial resources can impose a constraint on the intensity of trademark applications, whereas the internal policy to ensure full-fledged protection of intangible capital – facilitate them.

The effect of external environment on trademark deposits

Literature review. According to Baroncelli *et al.* (2005), the distribution of trademark ownership among countries is uneven and tends to be highly skewed towards companies from advanced, market-based economies, which altogether account for the great majority of trademark registrations. To explain these disparities, the authors suggest considering the link between brand reputation and trademarking behaviour. As the argument goes, companies from developing countries are much more constrained in the ability to export products to foreign markets because their brands have not gained enough recognition among potential customers, mainly owing to the lack of information regarding product quality, past business practices, and commercial performance. This eventually leads to a poor visibility of such companies in international trade, with a negative effect on the number of trademarks they have to first introduce and then formally protect. Developing countries, in turn, may impose discriminatory measures against overseas applicants to reduce the competitive pressure foreign producers put on domestic companies, especially when the

quality of products manufactured by local companies is similar to that of outsiders (Baroncelli *et al.*, 2007).

Mangàni (2006) extends the above findings by showing that recently, there has been a noticeable increase in the use of service marks. He argues that multiple factors can contribute to this dynamics, among which "[t]he structural change of economies, higher tradability of services, technological evolution, greater attention to product differentiation and processes of market liberalization and privatisation" are perceived to be the most relevant ones (Mangàni, 2006:257). His particular attention, however, is directed to the reduction of personal contacts between producers and consumers in the provision of services caused by technological developments: in this case, the heavy reliance on service marks may reflect an additional need for signalling the origin and quality to remote customers. Jensen and Webster (2004) make a similar observation about the growth of trademark activities in service sectors when analysing the recent trademark boom in Australia; yet, the authors are more inclined to associate it with substantial changes in the legislation, eventually permitting the registration of service marks. Furthermore, such factors as a shift in consumer demand for greater variety and quality, and the introduction of the Madrid Protocol that has affected trademarking in companies involved in international trade also deserve a special mention.

In contrast to some of the above findings, Herz and Mejer (2016) offer a much simpler explanation of the significant increase in national trademark applications observed over the past decades, at least when it comes to developed countries. Their analysis departs from the basic fact that "trademark filing fees have been steadily decreasing and converging across countries in Europe" (Herz and Mejer, 2016:1039). Using econometric techniques, they then calculate the sensitivity of trademarking behaviour to fee changes, which is equal to a 10.45% decrease in trademark applications following a 10% increase in the filing fee. Based on these estimations, they decompose the dynamics of trademark applications at 20 European offices over the last 20 years and conclude that it is largely driven by the fee adjustment process. It is worth additionally noting that their highest point estimate is potentially able to fully explain all the recently recorded increases in the number of trademark deposits.

Turning to the forces acting within an industry, Allegrrezza and Guarda-Rauchs (1999) suggest that a company's propensity to trademark depends on market characteristics, such as the level of competitiveness, which effect is channelled via the monitoring of rivals' behaviour and especially of their ability to engage in product imitation. Similarly, Gallié and Legros (2012) demonstrate that the probability of using a trademark for the sake of protection varies and is greater for larger companies operating in more competitive markets. As for industry affiliation, their study indicates that companies in the manufacturing sector

apply for fewer trademarks, unless they produce consumer goods. Based on an analysis of start-ups' decision on whether to file their initial intellectual property right in the form of a patent or trademark, [De Vries et al. \(2017\)](#) also come to the conclusion that industry factors matter. In particular, companies prioritise trademark protection when they face intense market competition or directly interact with final consumers. For such companies securing a unique selling position through trademark registration becomes part of the strategy for accessing the target market. The authors further report that receiving venture capital investment before the application date represents yet another reason for the decision to give preference to trademarks. Their interpretation of this association relies on the supposed willingness of venture capitalists to introduce a product in the marketplace as early as possible; hence, having a brand name legally protected seems to be essential before proceeding to the commercialisation stage.

The effect of internal environment on trademark deposits

Literature review. There are also a number of papers that attempt to detail intra-organisational factors influencing the extent of trademark activities. For example, [Allegrezza and Guarda-Rauchs \(1999\)](#) point to firm size, export orientation, and the attention of decision makers paid to trademark protection as one of the key factors that have a positive impact on trademark deposits. [Jensen and Webster \(2006\)](#), in turn, argue that firm size can well predict the intensity with which companies utilise various appropriability regimes. Among other things, their analysis shows that due to stronger innovation performance, small companies are more likely to apply for trademark protection than large corporations. Moreover, such companies tend to place a greater emphasis on intellectual property protection, including through trademark registrations, frequently owing to a lack of trust they have when transacting with external parties. To assess the extent to which the production process affects a firm's trademarking behaviour, [Gao and Hitt \(2012\)](#) propose to look at investments in information technologies. The conceptual framework they have developed is based on the assumption that technological advances can substantially lower the cost of offering greater product variety, with a corresponding effect on trademark applications and holdings. Their empirical analysis supports the idea that the amount of capital invested in information technologies has a positive relationship with the size of a firm's trademark portfolio; as for its relationship with trademark filings, it is also positive and potentially reflects an increased rate of new product introduction. To address the need for accurate accounting of intangibles, [de Rassenfosse \(2017\)](#) seeks to understand whether the level of investments in brand equity can be seen as a valid input measure of the demand for trademark rights. His analysis of 32 mostly developed countries reveals that advertising and market research expenditures have a significantly positive impact on trademark production.

Finally, a study by [Block et al. \(2015\)](#) is particularly interesting in this literature stream because it makes an early attempt to capture the complexity of motives behind a firm's decision to apply for a trademark. In doing so, the authors draw on survey data from 600 small and medium enterprises in innovative industries and derive three major trademarking motives – protection, marketing, and exchange. By using cluster analysis, these motives are then combined into four groups, depending on which one the firm chooses to prioritise: trademark sceptics; marketing-focused trademarking companies; marketing and protection-focused trademarking companies; and trademark advocates. Along with visible differences in trademarking behaviour existing across these groups, the authors also acknowledge the company's affiliation with the service sector, its reliance on innovation activities, external knowledge, and financial capital as further sources of group idiosyncrasies.

Other determinants of trademark deposits

Literature review. In addition to examining the determinants of trademark deposits in the private sector, there is new research entirely dedicated to trademark protection in academic institutions (see [Squicciarini et al., 2012](#)). Focusing on 621 U.S. universities, this research demonstrates that the number of enrolled students, the share of graduate students, the presence of a medical school, the amount of federal funding, the private status, and the intensity of patent activities – all this is positively associated with the number of trademark applications; at the same time, higher concentration of universities in the state reduces the propensity of a focal university to register a trademark. In fact, it may well be that networking with academic institutions also facilitates trademark activities undertaken by private companies. According to [Doh and Kim \(2014\)](#), small and medium enterprises in South Korea tend to apply for more trademarks if they have an established relationship with universities, which may reflect, among other things, the importance of technological and financial support available to regional companies through this particular channel. Their analysis additionally suggests that the number of R&D personnel negatively affects trademark registrations, although the authors do not elaborate on this finding.

3.2. Trademarks and product differentiation

General background. The predominant function of a trademark is to distinguish goods and services of one party from those of another. In order to avoid consumer confusion, formal protection can thus be afforded only to those marks that efficiently perform the differentiation function. An important issue here refers to the extent to which trademark data capture, for example, the *quality dimension of product differentiation*. According to [Landes and Posner \(1987:270\)](#), "[t]he value of a trademark is the saving in [consumer] search costs made possible by the information or reputation that the trademark conveys or embodies

about the brand". However, companies would have little incentive to invest in activities related to brand promotion, unless there was a legal guarantee that a third party would be limited in its ability to imitate the brand and, as such, free-ride on the brand owner's reputation, thereby destroying the informational capital carried by a trademark. So, formal protection coupled with significant reputation-building expenditures is likely to lead the producer to maintain the quality level of products because the alternative is to incur reputational damage. It can then be deduced that the higher is the value of a trademark, the stronger will be the company's incentive to protect it so as to avoid financial losses associated with its infringement. Against this background, one can predict that "high quality producers have greater incentives to deposit their trademarks in several markets, both at a national and international level" (Mangàni, 2007:618).

Product differentiation in international trade

Literature review. A few studies have utilised trademark statistics to analyse variety and quality patterns in international trade. Fink *et al.* (2005:96), for example, examine data on trademark activities in more than one hundred countries and reveal that "the number of newly registered trademarks depends on the worldwide volume of exports from the source country in a particular industry". Other factors that can potentially influence trademark filings include economic and linguistic proximities between countries participating in international trade as well as their membership in the Madrid Protocol. Overall, the authors conclude that "richer countries tend to import products of higher quality and greater brand differentiation", with the effect being more pronounced in consumer goods and trademark-intensive industries (Fink *et al.*, 2005:100). It should also be noted that the empirical strategy in this work is based on the assumption that a company's propensity to protect a trademark is associated with both product quality and the extent of brand differentiation. Fairly similar results were obtained by Mangàni (2007), who shows that trademark deposits are positively correlated with the size and wealth of an economy. Moreover, after decomposing the overall trademark entries into extensive, intensive, quantity, and quality margins, he reveals that country variations in trademark applications are mainly driven by differences in quantity within markets, while the quality effect turns out to be fairly negligible. Finally, a work by Baroncelli *et al.* (2007) looks at the discrimination against foreign trademark applicants as a potential barrier to imports. The starting point of this study is the observation that there are developing countries where the ratio of trademark registrations to applications is much higher for national applicants compared to foreigners. They then derive a theoretical model that attempts to explain these discrepancies by focusing on the product quality competition between domestic and foreign companies. Using the statistical analysis of trademark activities in China, Hong Kong, India, and South Africa, they find some signs of

protectionist behaviour, especially in the situations when imported products are of similar quality to the ones produced locally.

Competitive positioning

Literature review. Several empirical papers have studied a company's competitive positioning vis-à-vis its rivals. More specifically, [Semadeni \(2006\)](#) focuses on service mark applications filed by management consulting companies in order to examine the competitive positioning of themselves as well as their service offerings. He reads through the description of each mark to determine its specialisation and innovation characteristics, which information is then used to calculate dyadic distances between mark pairs. His results suggest that companies attempt to differentiate themselves away from their immediate competitors, while still locating their services closer to similar services of other companies. Furthermore, positioning preferences very much depend on the age and size of a focal company: that is, older companies tend to reduce the competitive overlap with younger companies, which is in stark contrast to larger companies that prefer to enhance it. Another interesting observation this study has to offer is related to the positioning of prospective services – upon their introduction, all market players seek to establish an association with them. In a subsequent study, [Semadeni and Anderson \(2010\)](#) employ a similar analytical framework to assess a company's decision on whether to imitate or not a new offering, given environmental uncertainty and information asymmetries. Among multiple findings they present in this study, two are worth a special mention: on the one hand, the probability of imitation increases when the company perceives the innovating competitor as having the superior knowledge of the market; on the other hand, a highly innovative offering is less likely to be imitated because of the uncertainty and risks it is surrounded with. In turn, [Crass and Schwiebacher \(2017\)](#) argue that companies value trademark protection for its ability to reduce the likelihood of product substitution. Based on an analysis of the 2011 German Innovation Survey, they conclude that for service sector companies, the use of trademark protection per se is positively associated with a more product-differentiated environment. However, this effect is observed only when a company introduces product innovations which are new to the market, otherwise it fades away. The authors interpret these results in favour of the role of trademark protection in ensuring horizontal differentiation and enhancing the company's ability to appropriate rents from innovation activities. As for service sector companies that adopt imitation strategy, the portfolios of trademarks they have accumulated have a positive impact on the extent of product differentiation, thus suggesting differentiation through brand proliferation.

Historical studies of product differentiation

Literature review. There are a couple of works that employ trademark statistics to explore differentiation issues in a historical context. One of them is a paper by [Llonch-Casanovas \(2012\)](#) that examines the development of the Catalan knitwear industry over a period of 100 years. It particularly demonstrates that business location was among the most significant factors influencing a company's differentiation activities. When companies operated within industrial districts, with their atmosphere of rivalry and imitation, they had to facilitate differentiation by creating new brands and, hence, registering more trademarks. However, the survival of these brands very much depended on district characteristics, including the industrial structure and product specialisation as its key determinants. In turn, [da Silva Lopes and Guimaraes \(2014\)](#) look at the development of British dominance in light consumer goods industries over the period 1876-1914. Their analysis shows that technological and marketing innovations – originated either in the U.K. or abroad – laid a basis for the creation of sustained competitiveness in the selected industries; and the existence of intellectual property protection ensured that entrepreneurs were able to keep monopoly rents for subsequent years. Moreover, investing in new product development and branding allowed companies to expand their market share and to enjoy economies of scale, with trademark protection as a principal element in making this happen.

3.3. Trademarks as an indicator of innovation activities

General background. Unlike patents, trademarks should not necessarily be associated with a new good or service to warrant a registration, let alone to be introduced in the marketplace. Hence, the question arises: to what extent does trademarking behaviour correspond to innovation activities? To date, the literature has come up with two broad approaches to justifying the existence of the trademark-innovation link. The *theoretical method* appeals to the signalling function of a trademark ([Landes and Posner, 1987](#)) to argue that companies introduce new trademarks in order to increase consumer awareness of a new product variety in the marketplace. Following changes in consumer tastes, the producer may, for example, choose to design a new trademark for a newly developed product "that comes closer to the new tastes, while continuing to produce the old product" ([Economides, 1988:530](#)). However, with this argument alone, it is difficult to accurately assess the actual extent of the relationship in question, especially considering that companies may decide to leverage their existing brands – and, as such, acquired reputation – even for newly developed goods and services, thus causing fluctuations in the trademark flow regardless of innovation activities.

So, a possible alternative is to rely on the *empirical method* that employs correlation analysis and uses it along with widely accepted indicators of innovation, such as R&D expenditure or patenting, to see whether trademark statistics behave in a similar manner or not. The intuition here is that trademarks represent an output of the new product development process, which typically consists of research, development, and commercialisation phases (Jensen and Webster, 2009). Therefore, with an appropriate lag structure, the flow of trademarks is likely to match the level of preceding innovative activities in a company. Another variant of this method is to employ surveys and other available means to first distinguish innovative companies from the rest and then see if, on average, they introduce more trademarks. There are certain limitations associated with this method as well, including the fact that the actual introduction of a new trademark may not always coincide in time with filing a trademark application; and in services, companies rarely engage in patenting or extensive research activities, hence affording fewer opportunities for using correlation analysis.

The use of service marks and innovation in the service sector

Literature review. Allegrezza and Guarda-Rauchs (1999) are among the first who have presented empirical evidence regarding a potential link between innovation and trademark activities. They examine more than 2,500 small and medium enterprises in Benelux countries and come to a conclusion that a company's R&D expenditures are positively related to trademark deposits. Since then, considerable effort has been directed towards testing and verifying this link, especially in service sectors where the need to assess the extent of innovation activities seems to be particularly acute. For example, Schmoch (2003) places a special focus on service marks and shows that their use is significantly correlated with the share of turnover due to sales of new goods and services; as it turns out, the observed effect is much more pronounced in knowledge-intensive services. In another study, Schmoch and Gauch (2009) adopt an international perspective into the quantitative analysis of innovation activities by using trademark statistics. Among other things, they suggest that "the use of community trademarks proves to be insufficient for valid statistical analyses; international registrations combined with community trademarks should be used instead" (Schmoch and Gauch, 2009:323). In turn, Gotsch and Hipp (2012) demonstrate that although trademarks are generally a suitable indicator of innovation in knowledge-intensive services at large, their explanatory power is considerably greater for product innovations. This is broadly consistent with their subsequent study reporting that the protection of new goods and services is the most important motive for filing a trademark application (see Gotsch and Hipp, 2014).

Links to other indicators of innovation

Literature review. An analysis of trademark use by Portuguese companies performed by [Mendonça et al. \(2004:1401\)](#) extends the above findings further by revealing that "high-technology sectors, which use more patents, also make a more intensive use of trademarks", thereby pointing to an association between the two and, as such, the link of trademark filings to innovation activities. Similarly, [Hall et al. \(2013\)](#) demonstrate that a company's trademark activities are closely associated with patenting. Based on this and other results, they conclude that companies which are active in formal intellectual property protection attempt to exploit all the mechanisms available to ensure its full integrity. In addition, [Hanel \(2008\)](#) demonstrates that companies that have received R&D subsidies from the government are associated with more trademark applications; moreover, the use of patents and also trademarks seems to be mandatory for a successful innovation strategy. At the same time, after examining individual trademarks and their correspondence to new product launches, [Malmberg \(2005\)](#) shows that unlike the pharmaceutical industry where trademarks are tied to the number of new products, electromechanical and automotive sectors seem to be far less reliant on trademark activities when marketing innovative output. In turn, [Gallié and Legros \(2012\)](#) suggest that trademark applications are more likely in companies which are involved in the development of new production or distribution methods. To evaluate the relationship between innovation proxies, [Jensen and Webster \(2009\)](#) use both statistical and survey-based measures of innovation. Similar to other studies, they have identified a positive relationship between R&D expenditures and trademark filings, with the effect being especially pronounced in service sectors. What is perhaps more interesting is that trademarks perform well when it comes to capturing innovation activities in the manufacturing industry. This conclusion is based on the fact that companies directly classifying themselves as innovative are associated with more trademark deposits. Their analysis additionally suggests that trademarks are particularly better at capturing product and marketing innovations. By combining information on trademark registrations and new products announcements, [Flikkema et al. \(2014\)](#) also confirm that most trademarks refer to innovation activities. According to their results, of two trademark categories – related to service delivery innovation and to innovative offering, the latter group is likely to be combined with other intellectual property rights.

Overall, we can conclude that the absolute majority of studies have generally agreed on that trademark statistics should be seen as a valuable source of information about a company's innovation activities. However, the efficiency of this indicator very much depends on a number of different factors, among which industry characteristics tend to prevail. Another point to make regarding the measure efficiency is related to innovation

type: being a predominantly consumer-directed instrument, trademarks therefore have a significantly higher potential for capturing the extent of product and marketing innovations than other types of innovation.

3.4. Trademarks and their strategic use

General background. When introducing a new trademark, the company usually attempts to address two sorts of issues. On the one hand, different trademarks owned by the same company can be somehow interrelated. This interrelation is likely to be rooted in the company's brand strategy, which has three generic types – corporate branding, a house of brands, and mixed branding (Rao *et al.*, 2004). Clearly, given the strategy type the company adopts, there will be variations not only in the number of newly introduced trademarks, but also in the potential costs and benefits that the chosen strategy brings to the company. On the other hand, trademark activities, especially when they follow the appropriation motive, can have a close association with other intellectual property rights. As Teece (1986) once famously suggested, a company's ability to profit from innovation over time largely depends on whether it can establish a prior position in complementarity assets as well as the characteristics of the appropriability regime in which it operates. From this perspective, the strategic use of trademarks may consist in pursuing value transference, with shifting "the advantages of technical or performance-based customer benefits (originally reserved in patents or copyrights) to trademarks" (Conley *et al.*, 2013).

Trademarks in relation to each other

Literature review. A pioneering, albeit not well cited, study by Sandner (2009:1257) argues that "[c]ompany trademark portfolios are not loose agglomerations of trademarks but, instead, contain complex structures that coherently protect a company's brand, which may extend across multiple products, product categories, and services". To identify these structures, which are referred to as trademark families, the author decomposes trademark portfolios of 2,289 companies by examining the characters, words, and syllables contained in each trademark. Overall, he reveals two strategic options a brand manager faces when introducing a new trademark – either to start a new brand or to continue developing the existing brand. Should the latter option be selected, there are further alternatives to decide on, including whether to cover a different facet of the existing brand (hedging); to update the existing brand so that it still maintains its differentiation potential (modernising); or to leverage information capital embodied in the existing brand (extending). In a subsequent work, Block *et al.* (2014b) use the above classification to assess financial implications of trademarking strategies. Their results suggest that there are clear differences in the valuation of trademark families by financial markets, namely: "[w]hile financial markets place

a premium on brand-developing trademarks [...], they do not value brand-creating trademarks and hedging trademarking strategies" (Block *et al.*, 2014b:167). Furthermore, trademarking strategies that are based on brand modernisation or extension tend to have a positive impact on firm value, too. As the authors put it, advertising efficiency associated with brand extension increases the chances of a company to succeed with launching a new product or entering a new market; yet, brand modernisation is valued because of its role in maintaining the strength and attractiveness to consumers of the company's existing brands.

Another aspect of strategic trademarking refers to so-called trademark cluttering. According to von Graevenitz *et al.* (2012:5), "cluttered trade mark registers [... are] registers containing such a large number of unused or overly broad trade marks, that the costs of creating and registering new marks substantially increase for other applicants". It should be noted that there are many reasons, and they are not necessarily related to fraudulent or deceptive practices, why certain trademarking strategies cause the cluttering effect. For example, trademark applications may be filed in more product classes than needed; companies applying for more trademarks genuinely anticipate an extension of their product lines and, therefore, attempt to secure certain names associated with existing brands beforehand; as well as multiple trademark applications can also be due to name regulation in such industries as pharmaceuticals. As for the latter, von Graevenitz (2013) gives a detailed account of this phenomenon by using enlargement of the European Union as a natural experiment to examine the effect of cluttering on trademarking in the pharmaceutical sector. His results demonstrate that regulatory uncertainty may provoke a significant increase in companies' propensity to trademark invented names which they will unlikely to use. This behaviour is largely caused by the fear that some of these names may be rejected by the regulator to prevent medication error due to confusing or overly similar names in other jurisdictions, thus leaving companies with no registered trademarks at all. Additionally, he provides monetary estimates of the cost effect stemming from the surplus of invented names: his conservative assumption for the lower bound lies in the range between USD 21m and USD 49m per year. In turn, Fink *et al.* (2014:3) consider a sister concept to trademark cluttering – trademark squatting, which "describes a situation in which a company or individual registers a trademark that protects a good, service, or trading name of another company". This strategy is likely to be especially harmful for companies that operate across national borders because squatters can substantially delay their foreign market entry. What is perhaps more insightful in this respect is the strategic response companies develop to minimise or even avoid trademark squatting. Using data on trademark oppositions, Fink *et al.* (2014) show that, once having experienced squatting, brand owners inflate trademark

filings by registering a disproportionately large number of new trademarks in areas which are not directly related to their current business activities.

Trademarks in relation to other intellectual property rights

Literature review. There are also several papers that point to the complementarity existing between trademarks and other appropriability regimes. Unlike prior research that pointed to the substitutability aspect of some protection mechanisms, [Graham and Somaya \(2006\)](#) attempt to verify the hypothesis that intellectual property rights actually complement each other. After examining patent, copyright, and trademark litigation statistics on the top 100 U.S. packaged software companies, they confirm that companies use trademarks and copyrights as complements. Furthermore, they also show that this effect is mainly driven by the attention paid by top managers to intellectual property issues as well as by organisational resources that can be utilised across different protection areas. A work by [Munari and Santoni \(2009\)](#) provides additional empirical evidence to support the complementarity hypothesis. Their analysis of 425 small and medium enterprises in Italy shows that companies tend to favour a joint use of patents and trademarks; moreover, those companies that complement patents with trademarks perform better than those without intellectual property rights. [Amara et al. \(2008\)](#) extend these findings further to the case of the joint use of formal and informal protection methods. Their analysis of 2,625 innovative service establishments in Canada demonstrates that "trademarks are complementary to patents, copyrights, and confidentiality agreements [..., while being] independent from secrecy, complexity of designs, and lead-time advantages" ([Amara et al., 2008:1541](#)). They conclude that companies do not perceive intellectual property protection as a collection of isolated instruments; instead, corporate managers attempt to exploit synergies stemming from different protection methods to secure innovative output. [Gallié and Legros \(2012\)](#), in turn, demonstrate that trademark protection is negatively correlated with – or is a substitute to – each non-statutory method and especially with lead-time advantages. But what can influence the company's decision to complement one protection method with another? Using data on patent and trademark activities in French companies, a study by [Llerena and Millot \(2013\)](#) attempts to provide an answer. It identifies significant differences across economic sectors, namely: patents and trademarks complement each other in chemical and pharmaceutical sectors, while acting as substitutes in high-tech business sectors. The joint use of patents and trademarks is largely due to the advertising factor, with high advertising spillovers and a low advertising depreciation rate leading to patents and trademarks being used as complements.

Trademarks and entrepreneurial activities

Literature review. The use of trademarks is sometimes considered in relation to entrepreneurial activities. For example, a work by [Lechner et al. \(2016\)](#) suggests that vertical disintegration is likely to result in the separation of brands from upstream activities. As such, this may create entrepreneurial opportunities in terms of selling, acquiring, and reselling brands via market transactions. By looking at trademark assignments in the U.S. manufacturing sector, the authors confirm the above hypothesis as well as point to the positive relationship between the degree of vertical disintegration and the size of the market for brands. In turn, [Goel et al. \(2016\)](#) argue that formal and informal entrepreneurs can benefit from knowledge spillovers associated with intellectual property rights. Using trademarks to capture the flows of innovative, yet non-patentable knowledge, the authors demonstrate that an increase in trademark applications has a positive and statistically significant effect on formal entrepreneurship; however, the effect turns insignificant when informal entrepreneurs are focused on. It is also found that the spatial effect of trademark applications is negative, thus indicating that "neighboring trademarks are based on country-specific norms and traditions that generally do not transfer well across borders" ([Goel et al., 2016:306](#)).

Trademark lifecycle

Literature review. There are studies that look at the trademark lifecycle and its determinants. By employing U.S. trademark statistics, [Milot \(2009\)](#) shows that the absolute majority of marks die six-to-seven years after the registration date simply because the owner fails to confirm that the trademark is still in commercial use. A large share of marks is then unable to survive the ten-to-eleven-year period when the owner is legally obliged to renew the mark registration. Against this background, [Gao and Hitt \(2012\)](#) argue that significant improvements in information technologies have resulted in more frequent updates in product lines. Therefore, companies with higher information technologies capital may actually be associated with a shorter trademark lifecycle. Using the Australia retail grocery industry as an exemplary setting, [Jensen and Webster \(2008\)](#), in turn, demonstrate that trademark age is positively related to consumer demand. However, this is effective only up to a point – if the company fails to keep up with investment in branding activities to match ever changing consumer preferences, a decline in consumer loyalty will result in inability to leverage it. A work by [Melnyk et al. \(2014\)](#) provides insights into what affects trademark prolongations. They examine 2,911 trademarks in the U.S. software security industry and come to a conclusion that larger and more innovative companies often terminate their trademarks earlier; at the same time, older companies are more likely to opt for the prolongation of

a trademark. As for trademark characteristics, trademark age and the number of product classes in which it is registered both increase the probability of prolongation.

3.5. Trademarks and organisational performance

Market value gains from trademarking

General background. The strategic value of intangible resources consists in their ability to contribute towards sustaining a company's competitive position; given that, it needs to be accounted for and, ideally, also included in shareholders' funds (Hall, 1992). However, the question arises: what exactly can the source of such value be? As far as trademarks are concerned, their close association with the reputation of the underlying product or producer – and, as such, a significant power to influence consumer choice – seems to be a plausible answer (Landes and Posner, 1987). This power can be gained through advertising, product quality, servicing, and other methods which aim to first induce consumer loyalty and then transform it into higher sales and the willingness to pay a premium for the branded product, thereby allowing the company to obtain greater profits (Chamberlin, 1933). Although most of the mark's value is inseparable from the product to which it is affixed, some trademarks can have value of their own and, hence, should themselves be seen as a legitimate good (Landes and Posner, 1987; Economides, 1988). It is also true that the value of a trademark exists as long as there is some sort of formal protection; if not, competitors will have a strong incentive to imitate the trademark and, by deliberately provoking consumer confusion, appropriate some of the benefits associated with it (Landes and Posner, 1987).

A commonly used approach to estimating the private returns to trademark activities is based on linking the valuation placed by the financial market on a company's total assets to its trademark applications or holdings (Hall, 1999; Bosworth and Rogers, 2001). As the argument goes, when determining the company's value, financial markets consider not only the tangible assets that appear on its balance sheet, but also intangible assets, such as R&D expenditures, patents, and trademarks. Therefore, the following valuation function can be specified (Griliches, 1981):

$$V = q \cdot (A + K)^\sigma,$$

where V is the current market value of the company; A is the current value of tangible assets (on the balance sheet); K is the current value of intangible, or knowledge, assets (off the balance sheet); q is the current market valuation coefficient of the company's assets that reflects its differential risk and monopoly position; and σ is a coefficient that reflects the possibility of non-constant returns to scale. If trademarks are treated as an asset that is

symmetrical to other knowledge assets then their value can be incorporated in the formula simply by augmenting K with it (Sandner and Block, 2011).

Literature review (see Table 3.1 for a summary of the results). In the paper by Bosworth and Rogers (2001), the authors apply the above method to estimate returns to innovation activities in large Australian companies. This work is among the first that looks beyond R&D spending and patents, and also points to trademarks and designs as an additional source of the company's market value. Despite a solid theoretical grounding, the results obtained by the authors are fairly ambiguous: that is, they are unable to find any statistically significant evidence to support the argument that the intensity of trademark applications influences market value if the full sample is considered. At the same time, a positive association between trademark activities and market value emerges when the sample is limited to non-manufacturing companies. Furthermore, the authors' estimates suggest that "a trade mark application has a private value of less than half that of a patent application" (Bosworth and Rogers, 2001:331), but without knowing the cost structure on which each of these instruments relies, no definitive conclusion can be made regarding their overall value efficiency. Similar findings are demonstrated by Feeny and Rogers (2003) when they construct an index to compare the innovation potential of Australian companies. In order to obtain the weight for each intangible asset and then use it to aggregate the assets into a single index, the authors measure the average impact of R&D expenditures, patents, trademarks, and designs, on the company's market value. As before, they reveal that the economic effect of trademark intensity is not statistically different from zero.

Greenhalgh and Rogers (2006a) conduct a more detail investigation of sectoral disparities observed in the market valuation of trademark activities. Using U.K. intellectual property statistics, they come to a conclusion that a more intensive use of trademarks in service sectors yields a higher stock market premium. And this result stands in stark contrast to transport, communication, utilities, and manufacturing industries – even though the popularity of trademarks there is still high, they have no sizable impact on the value that the financial market places on companies in these sectors. In turn, a study by Greenhalgh and Rogers (2006b) examines returns to innovation activities in U.K. companies that belong to Pavitt technological sectors. Their findings indicate that the intensity of trademark applications positively affects market valuation across all Pavitt sectors, except for the information intensive sector where this effect turns out to be negative. They also mention that for the full sample, "higher market share boosts the stock market's valuation of trade marking, but within the Pavitt sectors there are some that follow this result [...], whereas others have the converse relationship" (Greenhalgh and Rogers, 2006b:576-577). Finally, Greenhalgh and Rogers (2012) corroborate these results by revealing a greater influence that

trademark activities in the past period have on the current market value, with service sector companies enjoying a much larger effect than those operating in the manufacturing sector. As for trademark intensity in a given year, its relationship with market value is curvilinear, which effectively implies diminishing returns from adding an extra trademark to the existing portfolio. The authors additionally report that a higher level of trademark intensity in the industry tends to boost the focal company's market value, albeit this rule does not apply to service sectors. It seems that such an industry effect is associated with both an increasing pressure for laggards to innovate, as they face a significant risk of losing their market share, and the optimism with which investors evaluate the ability of those companies to close the gap with more innovative competitors.

A more careful explication of how a rival's product innovation and new advertising may affect the focal company's market value is offered by Fosfuri and Giarratana (2009). Their research is particularly concerned with the competition between Pepsi and Coca-Cola in the carbonated soft drink market over the period 1999-2003. They rely on new product announcements to measure product innovation, whereas new advertising is proxied by the number of trademark filings. First of all, their results are generally in line with past findings pointing to the positive impact a company's innovation and trademark activities have on its valuation by the financial market. What is perhaps more interesting is that a new trademark filed by a rival also increases the capitalisation of the focal company. As the authors put it, new advertising tends to attract new customers and, as such, boosts total demand, whereas the distribution of market shares stays unaffected. By contrast, a new product released by a rival reduces the market value of the focal company because product innovation triggers the reallocation of market shares in favour of the innovator.

In turn, Sandner and Block (2011) approach the valuation problem from a slightly different end. They particularly argue that trademarks are not homogeneous and can be distinguished with respect to their own value; as such, these differences have to be accounted for when assessing returns to trademark activities. The authors come up with four indicators that are potentially capable of capturing trademark value, namely: (1) trademark breadth, or the number of product classes covered by a mark; (2) trademark seniority, or the number of marks registered in other jurisdictions; (3) trademark oppositions brought by an applicant; and (4) trademark oppositions received by an applicant. Overall, their multi-country analysis reveals that financial markets assign a higher value to companies with larger trademark portfolios. However, when a trademark's own value is considered, higher returns are associated with more senior trademarks as well as those trademarks for which the owner filed an opposition against another company. The authors thus conclude that "[b]y filing an own trademark or an opposition against a rival's trademark, firms show to the financial

markets that they are eager to protect their marketing investments [..., and stock] markets seem to value such activity" (Sandner and Block, 2011:983).

Another research that deserves a special mention is a study by Krasnikov *et al.* (2009), where the authors make an early attempt to understand the extent to which financial returns to trademark activities may depend on the brand strategy associated with each trademark. The authors come up with a classification according to which trademarks are different in their aim to enhance either consumer awareness of or association with the underlying brand. As the argument goes, the former group of trademarks is valued because it enables the company to distinguish itself from other competing brands, whereas the latter – because it helps the company to manipulate its consumers' brand-related attitudes. Their analysis of 108 U.S. companies from 14 industries suggests that the existing stock of brand-association trademarks increases the company's future Tobin's q and stock returns. At the same time, the stock of brand-identification trademarks built up by the company during the previous period is found to significantly reduce the current positive impact of brand-association trademarks on Tobin's q and stock returns. According to the authors, a possible explanation for such a negative effect is that "the brand-awareness efforts of firms attract more individual investors to their stocks, thereby attenuating the stock returns and Tobin's q value of such firms" (Krasnikov *et al.*, 2009:163).

Trademarks are also shown to be a useful signalling mechanism that companies can employ in their communication with potential investors, especially in situations with high uncertainty and large information asymmetries. For example, Block *et al.* (2014a:540) examine trademark activities in U.S. start-up companies and come to a conclusion that "[t]he number of trademarks and the breadth of their applications [...] provide additional information regarding the scope and direction of start-ups' marketing strategies". So, when making their investment decisions, venture capitalists include this information into the final valuation of a start-up. However, the strength of the signalling effect declines over the venture cycle: as soon as more tangible information about the start-up's operation becomes available, venture capitalists prefer instead to rely on it for guiding their further investment strategy. In a subsequent work, Zhou *et al.* (2016) demonstrate that combining trademarks with patents can help start-ups to attract a larger amount of venture capital than when just one of these instruments is used. The reason behind such a synergistic effect is that along with the enhanced protection of intellectual property, having both patents and trademarks registered also indicates the start-up's innovation potential and its firm intention to proceed with the commercialisation of a new product. As in the prior study, the signalling effect appears to influence venture capitalists' decision making inasmuch as no other valuable information is available, and tends to fade away in later funding rounds.

Finally, there are two studies that provide insights into the market valuation of trademark activities in specific industries. To start with, there is a work by [González-Pedraz and Mayordomo \(2012\)](#) that makes an attempt to estimate financial returns to trademarking in the U.S. commercial banking sector. Among other things, the authors report a lower value assigned by the financial market to banks with a diverse trademark portfolio. Moreover, banks that maintain a stock of relatively young trademarks tend to be valued higher and are likely to improve their valuation further if decide to substitute older trademarks with younger ones. The event analysis they also conducted reveals abnormal returns or losses around the date when a trademark is introduced or cancelled, respectively. In turn, [Aksoy-Yurdagul \(2015\)](#) addresses the problem of value appropriation existing in the open-source software sector. He points out that a company's ability to reap financial benefits associated with commercialising open-source products very much depends on its stock of software patents and trademarks. Using data on 70 largest software producers, he shows that a larger stock of software trademarks has a negative effect on the relationship between the company's open-source product portfolio and market value. This outcome is consistent with his initial hypothesis that developing a strong software brand may not be fully compatible with the open-source business model because investing in related marketing activities is unlikely to result in higher cash flows in the future and, if pursued, will be viewed by the financial market in negative light.

Productivity gains from trademarking

General background. Another commonly used approach to quantifying economic returns to trademark activities is by linking them to total factor productivity ([Hall, 1999](#)). According to [Duygun et al. \(2016\)](#), the rationale behind this relationship is largely based on the ability of a trademark to stimulate consumer demand. In turn, the company can respond to an increase in demand by selecting one of the following options: first of all, it may choose to use up some of its excess capacity and, by doing this, improve operational efficiency. If there is no spare capacity left, the company may decide to expand inputs – this is likely to increase the scale of production, with a corresponding effect on the returns to scale. Finally, the company may also adopt a new technology that enables it to produce more output, while keeping inputs at the same or even lower level. [Duygun et al. \(2016:S71\)](#) note that the "relationship between trademarking activity, technical change and eventually TFP growth can be particularly relevant to firms which tend to invest more in the development of innovative production technologies and therefore tend to be the technological leaders in their industry". Overall, these actions will ultimately lead to the growth in total factor productivity.

Table 3.1. A summary of the results on market value gains from trademarking

Paper	Country	Dependent variable	Trademark-based measure	Effect range	Significance level
Bosworth and Rogers (2001)	Australia	Log of market value	Trademarks/tangible assets	0.605-0.786	N.S.
Feeny and Rogers (2003)	Australia	Log of market value	Trademarks/tangible assets	0.942-1.132	N.S.
Greenhalgh and Rogers (2006b)	U.K.	Log of market value	Trademarks/total assets	0.073 (for full sample)	N.S.
Fosfuri and Giarratana (2009)	U.S.	Tobin's q	Number of trademarks	Rival: 0.576 Firm: 3.244	Rival: 5% Firm: 5%
		Market share	Number of trademarks	Rival: 0.726 Firm: 0.614	Rival: N.S. Firm: N.S.
		Total demand	Number of trademarks	Rival: 0.015-0.022 Firm: 0.064-1.783	Rival: 5% Firm: 5%
Krasnikov <i>et al.</i> (2009)*	U.S.	Tobin's q	Stock of trademarks	BI: 0.007 BI*BA: -0.0001	BI: 5% BI*BA: 5%
		Stock returns	Stock of trademarks	BI: 0.003 BI*BA: -0.0001	BI: 5% BI*BA: 5%
Sandner and Block (2011)	Multiple countries	Tobin's q	Trademark stock/marketing assets	11.368-13.504	1%
González-Pedraz and Mayordomo (2012)	U.S.	Tobin's q	Trademark stock/total employees	Linear: -10.417 Quad.: 627.764	Linear: 1% Quad.: 10%
Greenhalgh and Rogers (2012)**	U.K.	Log of market value/tangible assets	Trademark dummy	UM: 0.221 CM: 0.316 UM+CM: 0.396 (for full sample)	UM: 1% CM: 1% UM+CM: 1%
			Trademarks/tangible assets	UM: 0.049 CM: 0.006 (for full sample)	UM: N.S. CM: N.S.
Block <i>et al.</i> (2014a)	U.S.	Log of start-up valuation	Number of trademarks	Dummy: 0.223 Linear: 0.033 Quad.: -0.0001	Dummy: 1% Linear: 1% Quad.: 1%
			Number of trademark classes	Linear: 0.165 Quad.: -0.015	Linear: 1% Quad.: 1%
Aksoy-Yurdagul (2015)	Fortune Global 500	Tobin's q	Stock of trademarks	0.027	N.S.
Zhou <i>et al.</i> (2016)***	U.S.	Log of amount of VC funding	Trademark dummy	AR: 0.238 IR: 0.118 LR: 0.413	AR: 5% IR: N.S. LR: 10%

* BI refers to brand-identification trademarks; BA refers to brand-awareness trademarks. ** UM refers to UK trademarks; CM refers to community trademarks. *** AR refers to all funding rounds; IR refers to the initial funding round; LR refers to the later funding round. N.S. stands for "not significant".

In order to estimate the effect of productivity gains due to trademarking on the company's total output, the Cobb-Douglas production function can be utilised (see [Greenhalgh and Rogers, 2012](#)):

$$Y = A \cdot L^{\alpha} \cdot K^{\beta},$$

where Y is total output; L is the stock of labour; K is the stock of tangible capital; A is total factor productivity; and α and β are the output elasticities of labour and capital, respectively. Then the effect of trademarks as well as other intangible assets can be incorporated as follows:

$$A = f(R, P, HK, IT, TM),$$

where A is total factor productivity; R is the stock of R&D expenditures; P is the stock of patents; HK is the stock of human capital; IT is the stock of information technology; and TM is the stock of trademarks. [Greenhalgh and Longland \(2005\)](#) show that the stock measures of R&D expenditures, patents, and trademarks can be replaced with flow measures when the rate of depreciation is very high.

Literature review (see [Table 3.2](#) for a summary of the results). Turning to empirical studies, a work by [Greenhalgh and Longland \(2005\)](#) demonstrates that the intensity of trademark applications has a positive effect on the company's net output. However, this effect is mainly driven by low-tech companies, whereas there is no direct evidence of productivity gains from trademark activities in the high-tech sector. Along with short-lived benefits of intellectual property protection, this may also indicate that "firms, especially those in the most dynamic sectors, have to keep innovating in order to preserve their productivity ranking in relation to their competitors" ([Greenhalgh and Longland, 2005:308](#)). Similarly, a study by [Greenhalgh and Rogers \(2012\)](#) reveals that companies can enjoy a large value-added premium at present if they applied for a trademark in the past period, with the effect being generally higher for companies in the service sector. Moreover, the authors also report a strongly non-linear effect of trademark intensity on value added; taking into account a similar pattern for market value, they conclude that "stock markets are well informed about the gains to firms from their trade mark activity" ([Greenhalgh and Rogers, 2012:65](#)). Finally, it appears that the dynamism of trademark activities in an industry has a detrimental impact on the focal company's value added, which may be associated with a Schumpeterian competition through innovation.

Unlike the above cross-sectoral studies, [Duygun et al. \(2016\)](#) focus on the effect of trademark activities on the productivity of commercial banks in the U.K. Their analysis is based on a metafrontier framework that, among other things, allows the authors to decompose total factor productivity growth into "changes of efficiency, technical change and

scale change for each group of commercial banks as well as the whole sector" (Duygun *et al.*, 2016:S78). Their results reveal substantial differences between trademarking and non-trademarking banks in terms of their overall productivity and the factors that underpin it. That is, before the 2007-2009 financial crisis the productivity growth in trademarking banks was mainly supported by changes in technical efficiency; however, the technological progress took place only in a small number of such banks, while other trademarking banks were unable to catch up with the metafrontier. At the same time, the trend clearly reversed in 2009, with the productivity growth in trademarking banks being now negative. The authors explain the observed effect by a dramatic reduction in lending, which has also pushed some banks to revisit their scale efficiency. By contrast, the productivity of non-trademarking banks showed no signs of significant growth in the pre-crisis period and started improving just after the crisis' most acute phase. It seems that having exploited the major gains associated with the scale efficiency model, these banks have eventually turned their attention to new technologies as a source of productivity growth.

Table 3.2. A summary of the results on productivity gains from trademarking

Paper	Country	Dependent variable	Trademark-based measure	Effect range	Significance level
Greenhalgh and Longland (2005)	U.K.	Log of added value	Trademark stock/total employees	2.540-4.200 (for full sample)	10%
Greenhalgh and Rogers (2012)*	U.K.	Log of added value	Trademark dummy	UM: 0.107 CM: 0.083 UM+CM: 0.274 (for full sample)	UM: 1% CM: 5% UM+CM: 1%
			Trademarks/tangible assets	UM: 0.246 CM: -0.009 (for full sample)	UM: N.S. CM: N.S.

* UM refers to UK trademarks; CM refers to community trademarks. N.S. stands for "not significant".

Profitability gains from trademarking

General background. There are three perspectives from which the association of trademark activities with a company's profitability can be considered. First of all, by differentiating its product offering from that of competitors, a company may induce brand loyalty and, under certain conditions, charge customers a price premium for its goods and services (Chamberlin, 1933; Landes and Posner, 1987). Along with customer-related effects, trademark activities are also likely to influence the competitive regime existing in the marketplace: for example, they are often used to create barriers to market entry, which, in turn, are expected to lead to higher industry concentration (Bain, 1956). And as practice shows, the chances are that in more concentrated industries, incumbents will eventually

adhere to collusive behaviour, with collusive prices and abnormal profits as its most notable manifestations (Griffith *et al.*, 2011). Finally, there is a perspective that looks at trademarks in terms of their presumed link to the new product development process (Greenhalgh and Rogers, 2012; Duygun *et al.*, 2013). Provided that the link holds, trademarks can then be employed to measure the effect of the Schumpeterian competition on a company's cost and profit efficiency because it is believed that such a competitive regime facilitates constant revisions of production methods in order to improve the overall firm performance.

Literature review (see Table 3.3 for a summary of the results). While trying to understand what may cause abnormal profits to emerge and persist over time, Griffith *et al.* (2011) suggest focusing on intangible resources: they particularly argue that along with tangible capital, these resources should also be accounted for to obtain more accurate profit estimates. The analysis they conducted by using Australian intellectual property statistics indicates that patent and trademark stocks have a positive and significant impact on a company's profit earning potential, thus supporting the authors' original idea regarding the need for the intangible capital-adjusted measure of profits. At the same time, neither patents nor marketing practices and branding seem to be important for explaining abnormal profits as those are mainly driven by industry collusion and a company's abuse of its market power. Similarly, Krasnikov *et al.* (2009) demonstrate that the existing stock of brand-association trademarks has a positive effect on future return on assets. Future cash flows are also shown to be positively influenced, including a substantial reduction in their variability. In turn, a study by Marco-Lajara *et al.* (2016:4560) draws specific attention to the role of trademarks in ensuring profitability in the hotel industry, which is largely due to their tight association with hotel reputation.

Additionally, there is a series of studies that evaluate profitability gains from trademark activities in the banking sector. In their first work, Duygun *et al.* (2013) approach the profit efficiency problem by looking at how banks compete through product innovation, which, as they argue, has been of not lesser importance for bank profitability than price competition. Their results generally confirm the idea that trademarking banks are more profit efficient compared to non-trademarking ones. However, the relationship between the industry-wide trademark intensity and a bank's profit efficiency is shown to be curvilinear. That is, launching a new product by one bank is likely to increase cost inefficiencies in the sector as it challenges the market shares of other banks. The downward pressure on profit efficiency caused by cost revisions will, in turn, subside only with an increase in industry competition. In a subsequent study, Duygun *et al.* (2014:507) reveal that trademarking and non-trademarking banks share the same cost and profit frontier, "although there exists some circumstantial evidence that the assumption of a common alternative profit frontier may be

rejected for the period before 2008". They also re-confirm that trademarking banks are more profit efficient, although there is a group of banks that have a potential to benefit from trademark activities but cannot do it, presumably due to a lack of innovation activities.

Table 3.3. A summary of the results on profitability gains from trademarking

Paper	Country	Dependent variable	Trademark-based measure	Effect range	Significance level
Krasnikov <i>et al.</i> (2009)*	U.S.	Cash flows	Stock of trademarks	BI: 7.820 BI*BA: 0.019	BI: 5% BI*BA: 5%
		Cash flow variability	Stock of trademarks	BI: -0.044 BI*BA: 0.001	BI: 5% BI*BA: N.S.
		Return on assets	Stock of trademarks	BI: 0.051 BI*BA: -0.0004	BI: 5% BI*BA: N.S.
Griffiths <i>et al.</i> (2011)	Australia	Gross profit	Stock of trademarks (days)	0.070	10%
Marco-Lajara <i>et al.</i> (2016)	Spain	Operating income/room	Trademark dummy	0.005	1%

* BI denotes brand-identification trademarks; BA denotes brand-awareness trademarks. N.S. stands for "not significant".

The impact of trademark activities on firm survival

General background. According to Schumpeter (1943:84), innovation is among the chief reasons for why companies survive as it "strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives". An economic explanation for the existence of the exposed relationship often refers to the fact that in order to survive, a company needs to achieve the minimum efficiency scale, of course, provided that scale economies play a crucial role in the company's ability to compete in the market (Audretsch, 1991). One way to do this is by fostering innovative activities that stimulate company growth and, eventually, result in attaining the necessary level of production. As Audretsch (1991:444) puts it, "[t]hose firms which successfully innovate can expect future sales growth, while those that face only dim prospects of innovating are more likely to exit from the industry". Incumbent companies, in turn, have to continuously innovate because it reduces the threat of disruption emerging technologies may bring about (Cefis and Marsili, 2005). However, it needs to be remembered that innovation activities are inherently risky and may themselves become a source of financial distress and then market exit (Buddelmeyer *et al.*, 2010). The diversification of product-market portfolio is another way for the company to increase its chances of survival (Srinivasan *et al.*, 2008). When serving several industries, the company may not only hedge its exposure to demand shocks in a particular product market, but also benefit from economies of scale in marketing activities.

At the same time, [Srinivasan et al. \(2008\)](#) continue, lower riskiness and the existing access to multiple markets can increase the company's visibility to potential acquirers.

Literature review. To investigate differences in survival patterns between new and incumbent companies in Australia, [Jensen et al. \(2008\)](#) choose to concentrate on patent and trademark applications – these are used to proxy high and low-risk innovation, respectively. As expected, the analysis largely supports the proposition that innovation activities can significantly increase the probability of firm survival. In more specific terms, trademark applications are shown to be positively associated with the likelihood that the company stays in the market, regardless of whether a new or incumbent company is being considered. A similar effect is observed for trademark holdings; yet, its magnitude for new firms is twice as large, thereby suggesting that "low-risk innovation capital is more important for new firms than incumbents" ([Jensen et al., 2008:443](#)). In a subsequent work, [Buddelmeyer et al. \(2010\)](#) argue that failing to account for the degree of uncertainty pertaining to each innovation measure is likely to preclude researchers from fully capturing firm survival patterns. Having this in mind, their results are still highly consistent with what was discussed before and demonstrate that the hazard rate is significantly lower for companies that file more trademark applications as well as hold larger trademark portfolios. Recognising that trademarking mainly reflects new-to-the-company innovations, the authors conclude that "the innovative activity associated with the launch of a trade mark is less risky than radically innovative activity" captured by a patent ([Buddelmeyer et al., 2010:281](#)). Finally, [Helmers and Rogers \(2010\)](#) generally confirm prior findings when looking at a cohort of almost 162,000 British companies. Their study reveals that patent and trademark activities increase the chances of a new company to survive in the market. They also show that survival is more difficult for companies that operate in trademark-intensive industries, which may indicate the importance of product differentiation for maintaining the competitive edge in such sectors.

In turn, [Srinivasan et al. \(2008\)](#) make an attempt to relate the survival chances of new companies in the U.S. high-tech industry to the diversity of their product-market portfolios. Unlike previous research, these authors focus on different options a company may face when leaving the market, including dissolution or acquisition. Furthermore, they also examine if the use of strategic resources – in this case, patents and trademarks – together with product-market diversification can enhance the company's fit with the external environment and, as such, affect its survival. The general conclusion to draw from their analysis is that "the diversity of product-market portfolio, itself, confers no advantage or disadvantage to a new high tech firm. Rather, it is important for the firm to align its product-market strategies with the appropriate assets [...] to improve its chances of survival or acquisition" ([Srinivasan et al., 2008](#)). For example, no matter what exit option the company

is subject to, having more trademarks enables it to survive for a longer period. This outcome supports the role of trademarks, and marketing assets in general, in improving the level and speed of cash flows, as well as highlights their potential ability to signal the company's growth strategy and, therefore, attitude towards acquisition. When a diverse product-market portfolio is matched by a larger number of trademarks, the company's exit by dissolution tends to be still delayed, while its exit by acquisition – hastened. The latter effect may suggest that such companies are perceived by rivals as a desirable target to take over.

Finally, [Huang et al. \(2013\)](#) look at the survival problem from a somewhat different perspective. More specifically, the authors try to understand how companies that decide to enter markets complementary to a proprietary platform can keep their returns to innovation from being appropriated by the platform owner. They focus on two types of protection mechanisms: on the one hand, intellectual property rights, such as patents and copyrights; and on the other hand, downstream capabilities – those are proxied by trademarks and consulting services. The results of their analysis suggest that an independent software vendor with a larger stock of intellectual property rights as well as with stronger downstream capabilities is more likely to join the partnership with a software platform provider. Furthermore, weaker the vendor's downstream capabilities are, stronger the influence of intellectual property rights on the probability of partnership is. Overall, the authors conclude that "[p]latforms will be less likely to grow in settings with little formal means of IP protection and, in particular, where patent and copyright protection is weak. They will be relatively more successful when [... independent vendors] are more effectively able to secure returns from their innovations through patents, copyrights, and downstream capabilities" ([Huang et al., 2013:119](#)).

Other performance-related implications of trademarking

Literature review. In addition, a few studies were identified that did not fully fit any of the above categories but still contained some valuable insights regarding performance implications of trademark activities. For example, [Helmets and Rogers \(2011\)](#) examine high- and medium-tech start-ups in the U.K. and report that the decision to apply for a trademark is associated with subsequent asset growth. They interpret this finding as evidence that "trademarking firms are better at marketing their innovations which directly translates into higher growth" ([Helmets and Rogers, 2011:1024](#)). An analysis of small and medium enterprises operating in the Italian fashion industry conducted by [Agostini et al. \(2015\)](#), in turn, reveals that corporate trademarks have a positive and significant effect on sales performance. This effect tends to be persistent over time, with the benefits of trademark activities lasting for up to three years from the moment of registration. Interestingly, they find no contribution of product trademarks to the sales performance of a company. Such result seems to be

consistent with the idea of a shorter product lifecycle in the fashion industry and, hence, a greater effort that needs to be directed at building a strong corporate brand rather than many product brands.

Trademarks are also found to have a strong impact on wages and income. [Greenhalgh and Longland \(2001\)](#) demonstrate that registering a new trademark is one of the key determinants of wage rises; however, there is a three-year lag before the actual effect can be observed. The authors argue that improvements in long-term profitability largely depend on the ability of a company to innovate and capture the resulting returns. So, upon the successful market introduction of a new product, which can be deduced by scrutinising trademark activities, some excess profit stemming from its sales is expected to be shared with employees through the process of wage bargaining. A work by [Azomahou and Diene \(2012\)](#) considers trademarks in terms of their potential to capture certain types of innovation, especially in developing countries where other intellectual property instruments can be less accessible. Among other things, their findings show that income polarisation in African countries is significantly affected by innovation activities, but the effect very much depends on innovation origin and type. That is, they report a stronger impact on income polarisation of trademarks compared to patents when innovation is originated in the home country, while the opposite is true for non-resident innovation.

4. DIRECTIONS FOR FUTURE RESEARCH

The purpose of this work has been to review the empirical literature relying on trademark statistics in order to develop a conceptual framework that brings together different research streams. First, we identified a sample of core papers that used trademark analysis while examining certain economic or business issues. Each of these papers was then classified into one of five categories, including filing determinants, product differentiation, innovation, strategic use, and firm performance. Finally, we conducted a detailed review of the selected papers and also made an attempt to position each of them with respect to other studies in the same literature stream. As a result, we have created an integrated framework that provides scholars with a better understanding of the current scope of empirical trademark research as well as helps them navigate themselves through its different areas (see [Figure 4.1](#)). In what follows, we will highlight several topics which, in our opinion, are worth further exploration.

The determinants of trademark activities

Our review suggests that when examining trademark activities, the absolute majority of authors choose to focus on either macro, country-wide factors or on industry and firm-specific aspects. At the same time, there has been growing evidence, especially in the context of the business and management literature, that intraorganisational forces also have a strong impact on how intellectual property is developed, protected, and deployed. For example, the review paper by [Becheikh et al. \(2006\)](#) points to the managerial perspective as being potentially useful to evaluate a company's intellectual property activities. Similarly, [Hanel \(2006:895\)](#) argues that intellectual property issues become "a daily preoccupation of CEOs in many industries". Other works have also emphasised the leading role of senior executives in facilitating the integrated management of intellectual property, its contribution towards forming and sustaining a company's competitive position (e.g., [Reitzig, 2007](#); [Al-Aali and Teece, 2013](#); [Fisher and Oberholzer-Gee, 2013](#)). Despite all these clues, there has been a general lack of research that would move the field from discussing anecdotal evidence about managerial engagement in patent and trademark activities to a systematic empirical analysis of the presumed relationship, including its effects on organisational functioning.⁴ This observation is particularly relevant to trademark studies: to our knowledge, there are only two empirical papers that have explicitly explored the managerial side of trademarking (see [Graham and Somaya, 2006](#); [Faurel et al., 2016](#)). Thus, more research should be carried out to investigate the role of corporate leaders and other internal factors, such as structure and culture, in determining a company's trademarking behaviour.

⁴ Some notable exceptions include [Wu et al. \(2005\)](#), [Galasso and Simcoe \(2011\)](#), [Hirshleifer et al. \(2012\)](#), and [Balsmeier and Buchwald \(2014\)](#).

The heterogeneity of trademark types

One of the advantages of looking at different scientific fields within a single review paper is that this approach enables us to identify opportunities for cross-disciplinary learning. From what we have seen so far, it is clear that economic studies largely ignore the fact that the trademark flow tends to be heterogeneous. A rare exception to this rule is the work by [Sandner and Block \(2011\)](#), who hold that trademarks differ in terms of their internal value and propose a range of indicators capturing these differences. At the same time, marketing scholars are generally more aware of various trademark types and actively exploit them to examine brand strategy issues. [Krasnikov et al. \(2009\)](#), for example, suggest classifying all trademarks into two broad categories – trademarks that reflect a company's efforts to build brand awareness among consumers and trademarks that favour brand associations. In turn, [Agostini et al. \(2015\)](#) distinguish between corporate and product-related trademarks, with the former group aiming to induce customer loyalty towards the whole company. Finally, [Block et al. \(2014b\)](#) show that trademarks can be either independent or belong to a trademark family. What all this evidence suggests is that in order to obtain more robust results that also better match real life situations, researchers should, when it is possible, account for potential irregularities in the trademark flow, let alone try to incorporate them in hypothesis testing.

The link between advertising and trademark activities

Despite [de Rassenfosse's \(2017\)](#) work, systematic empirical studies that would focus on the link between a company's advertising and trademark activities are still relatively rare, especially when it comes to firm-level analysis. Meanwhile, as [Fosfuri and Giarratana \(2009\)](#) suggest, trademarks represent an important step in new advertising campaigns and, as such, should be regarded as a valid indicator of new advertising output. As their argument goes, by intensifying advertising activities, companies can enhance the ability of a trademark to attract new customers, with a corresponding positive effect on the company's market share. In mature product markets, advertising can assist companies with maintaining brand loyalty, which, in turn, is associated with a more inelastic demand. Overall, it appears that when advertising and trademark activities are coordinated, companies are likely to enjoy greater power in creating a differentiation advantage. Therefore, future empirical research should examine advertising in relation to a company's trademarking (or, broadly speaking, branding) strategy, including their combined effect on consumer behaviour across different markets.

A wider geographical coverage

To date, only a handful of empirical trademark studies have been devoted to developing countries, which is fairly surprising given the growing importance of their economic activities to the rest of the world. This tendency, however, is not new to

intellectual property research, where just a quarter of all publications are concerned with a non-U.S. or Europe context (see [Candelin-Palmqvist et al., 2012](#)). Such a profound interest in developed countries may in part be justified by the greater availability and quality of their trademark data. So, once there are any breakthroughs on this front, it would be useful to gather more information about, for example, the perception of trademark protection by companies in those countries, with corresponding implications for their strategic behaviour; whether trademark valuation is significantly affected by a weaker regime of intellectual property protection pertaining to developing economies; and also what policy changes are necessary to ease the access to the protection system for different companies. Furthermore, as we have already mentioned, the geographical dimension often serves as a reliable proxy for a country's legal system. To clarify why it is so important to pay attention to the country-specific institutional context, we should refer to the U.S. trademark system, which is jointly governed by common law, the federal legislation, and other legal acts established by the states ([Cohen, 1986](#)). With that in mind, a number of questions may arise, including how strong would the incentive for a company to apply for and maintain a trademark registration be, given that all marks are still protected under common law? What is the extent to which registration costs affect a company's trademarking behaviour in this case? Do these costs impact on the incentive to trademark for small companies compared to their larger rivals?

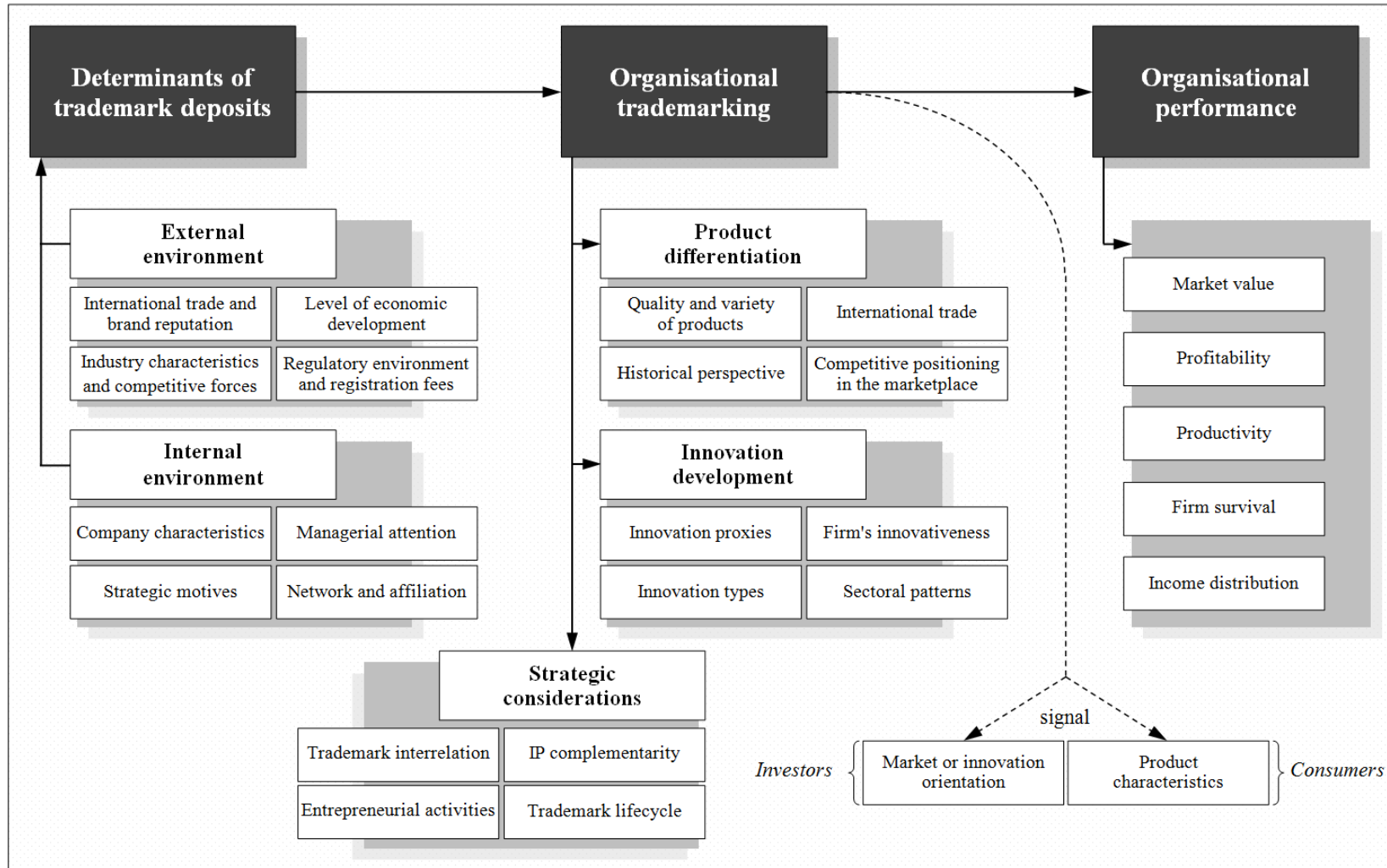
Methodological inconsistencies

Our review suggests that scholars tend to examine trademarks at different points of their lifecycle. For example, it has been argued that trademark applications can accurately capture new product launches, thus making them a suitable instrument for studying the Schumpeterian process of competition through innovation ([Greenhalgh and Rogers, 2012](#)). Yet, not all authors actually clarify whether those applications were eventually successful or rejected due to an invalid claim, opposition, or any other procedural reason. There are also works that do not draw a clear distinction between trademark applications and registrations, simply assuming that the lag between filing for trademark protection and its actual granting is insignificant. Meanwhile, as [Graham et al. \(2013\)](#) report, the average time to issuance for different U.S. trademark types can range from 0.5 to 2.5 years; but when the registration is not mandatory for legal protection, it may take more than five years for a company to have its trademark registered after the introduction in the marketplace. As for trademark stocks, there are scholars who view them as an indicator of product differentiation ([Greenhalgh and Rogers, 2012](#)). At the same time, stock and flow measures can be interchangeable when intangible assets are depreciated at a high rate ([Greenhalgh and Longland, 2005](#)). Given these inconsistencies, more research is needed to revise the existing methodology in order to enhance the validity and comparability of findings derived from trademark statistics.

Access to trademark data

It has already been noted that one of the reasons for why empirical trademark studies are still in their infancy is because detailed trademark data are relatively difficult to obtain, unlike, for example, patents, which have been in the extensive scientific use for several decades. Moreover, a meaningful analysis of trademarks is further complicated by the need to link them to company-level financial information – and this is not a trivial task, given that there is no unique identifier to combine different datasets together (see [Helmerts *et al.*, 2011](#)). At the same time, certain improvements have recently been made that have increased the attractiveness of trademark statistics for empirical analysis. First of all, detailed trademark administrative data in the format convenient for scientific research have been released in the public domain by the USPTO (see [Graham *et al.*, 2013](#)). The data provide a detailed account of trademark activities in the U.S. for more than a century, including useful insights into the prosecution process. Future studies should utilise these data to examine, among other things, a company's intentions when filing a new trademark application; some critical points of the registration process and their role in estimating trademark value; the trademark lifecycle and its relationship with the underlying business strategies; and the extent of a company's diversification activities. Another source of relevant statistics is the USPTO's dataset on trademark assignments, which "contains detailed information on 786,931 assignments and other transactions recorded at the USPTO between 1952 and 2013" ([Marco *et al.*, 2014:4](#)). Researchers using this dataset may find it appealing to address the topics that are related to trademark valuation, including monetary benefits stemming from a company's reputation; the dynamics of the market for brands and its determinants; and the use of trademarks as a collateral asset. Finally, there is also an initiative to produce intellectual property statistics jointly pursued by the European Commission's Joint Research Centre and the Organisation for Economic Co-operation and Development (see [Dernis *et al.*, 2015](#)). Their database containing intellectual property bundles for the top 2,000 corporate R&D performers worldwide can facilitate research activities on such topics as trademark filing strategies; the complementarity between patents and trademarks; and the transfer of the value originated in patents to trademarks (for the latter, see [Conley *et al.*, 2013](#)).

Figure 4.1. An integrated framework that brings together different streams of the empirical trademark literature



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APPENDIX A. SUMMARY TABLES

Table A.1. Papers on the determinants of trademark deposits

Paper	Geographical scope	Period	Sample description	Sources of IP statistics
<i>The effect of external environment on trademark deposits</i>				
Jensen and Webster (2004)	Australia	1906-2002	Australian firms	IP Australia
Baroncelli <i>et al.</i> (2005)	Multi-country analysis	1994-1998	~100 countries	WIPO
Mangàni (2006)	Multi-country analysis	1995-2006	110 countries	OHIM, IP Australia, Italian PTO
Herz and Mejer (2016)	Multi-country analysis	1993-2011	22 EU countries	OHIM
De Vries <i>et al.</i> (2017)	U.S.	1998-2007	4,703 companies	USPTO
<i>The effect of internal environment on trademark deposits</i>				
Allegrezza and Guarda-Rauchs (1999)	Benelux countries	1999	~2,500 firms	Benelux Office for IP
Jensen and Webster (2006)	Australia	1989-2001	490 observations	IP Australia
Gao and Hitt (2012)	Fortune 1000 manufact. firms	1987-1997	116 firms	USPTO
Block <i>et al.</i> (2015)	U.S.	2012	600 firms	Online Survey
de Rassenfosse (2017)	Multi-country analysis	1980-2010	32 countries	WIPO, Benelux Office for IP
<i>Other determinants of trademark deposits</i>				
Squicciarini <i>et al.</i> (2012)	U.S.	1997-2007	621 universities	USPTO, EPO
Doh and Kim (2014)	South Korea	2004-2009	47 firms	Korea IPR Information Service

Note that one article can take more than one perspective. To avoid repetitions, this table presents only the articles for which the aforementioned perspective is deemed to be central.

Table A.2. Papers on the use of trademarks as an indicator of product differentiation

Paper	Geographical scope	Period	Sample description	Sources of IP statistics
<i>Product differentiation in international trade</i>				
Fink <i>et al.</i> (2005)	Multi-country analysis	1994-1998	~100 countries	WIPO
Baroncelli <i>et al.</i> (2007)	Multi-country analysis	1994-1998	4 countries	WIPO
Mangàni (2007)	Multi-country analysis	2003	~120 countries	OHIM
<i>Competitive positioning</i>				
Semadeni (2006)	U.S.	1989-1999	50 consulting firms	USPTO
Semadeni and Anderson (2010)	U.S.	1989-1999	50 consulting firms	USPTO
Crass and Schwiebacher (2017)	Germany	2011	4,453 firms	German Innovation Survey
<i>Historical studies of product differentiation</i>				
Llonch-Casanovas (2012)	Spain	1865-1996	Knitwear industry	Spanish PTO
da Silva Lopes and Guimaraes (2014)	U.K.	1876-1914	Light consumer goods industries	IPO

Note that one article can take more than one perspective. To avoid repetitions, this table presents only the articles for which the aforementioned perspective is deemed to be central.

Table A.3. Papers on the use of trademarks as an indicator of innovation

Paper	Geographical scope	Period	Sample description	Sources of IP statistics
<i>The use of service marks and innovation in the service sector</i>				
Schmoch (2003)	Germany	2001	377 firms	Centre of EU Economic Research
Schmoch and Gauch (2009)	Multi-country analysis	1990-2008	12 countries	Questel Orbit
Gotsch and Hipp (2012)	Germany	2009	278 firms	Online Survey
Gotsch and Hipp (2014)	Germany	2009	278 firms	Online Survey
<i>Links to other indicators of innovation</i>				
Mendonça <i>et al.</i> (2004)	Multi-country analysis	1996-2002	15 EU countries, incl. Portugal	OHIM, INPI
Hanel (2008)	Canada	1997-1999	5,220 firms	Statistics Canada Innovation Survey
Jensen and Webster (2009)	Australia	2001-2007	1,400 firm-level observations	IP Australia
Hall <i>et al.</i> (2013)	U.K.	1998-2006	8,577 firms	IPO, EPO, OHIM
Flikkema <i>et al.</i> (2014)	Benelux countries	2007-2008	660 firms	Benelux Office for IP

Note that one article can take more than one perspective. To avoid repetitions, this table presents only the articles for which the aforementioned perspective is deemed to be central.

Table A.4. Papers on trademark-based strategies

Paper	Geographical scope	Period	Sample description	Sources of IP statistics
<i>Trademarks in relation to each other</i>				
Sandner (2009)	Multi-country analysis	1996-2004	2,289 firms	OHIM
von Graevenitz (2013)	E.U.	1997-2010	597,450 application events	OHIM
Block <i>et al.</i> (2014b)	Multi-country analysis	2004	1,735 firms	OHIM
<i>Trademarks in relation to other intellectual property rights</i>				
Amara <i>et al.</i> (2008)	Canada	2003	2,625 establishments	Statistics Canada Innovation Survey
Gallié and Legros (2012)	France	2001-2004	3,547 firms with IPRs	Community Innovation Survey
<i>Trademarks and entrepreneurial activities</i>				
Goel <i>et al.</i> (2016)	Multicountry analysis	2001-2010	52 countries	World Development Indicators
Lechner <i>et al.</i> (2016)	U.S.	1975-2005	Manufacturing industry	USPTO
<i>Trademark lifecycle</i>				
Jensen and Webster (2008)	Australia	2002-2005	92 brands	IP Australia
Melnyk <i>et al.</i> (2014)	U.S.	1993-2000	87 software firms	USPTO

Note that one article can take more than one perspective. To avoid repetitions, this table presents only the articles for which the aforementioned perspective is deemed to be central.

Table A.5. Papers on performance implications of trademark activities

Paper	Geographical scope	Period	Sample description	Sources of IP statistics
<i>Market value gains from trademarking</i>				
Bosworth and Rogers (2001)	Australia	1994-1996	60-120 firms	IP Australia
Feeny and Rogers (2003)	Australia	1995-1998	249-369 firms	IP Australia
Greenhalgh and Rogers (2006b)	U.K.	1989-2002	619 firms	IPO, EPO, Marquesa Search Systems
Fosfuri and Giarratana (2009)	U.S.	1999-2003	Coca-Cola and Pepsi	USPTO
Krasnikov <i>et al.</i> (2009)	U.S.	1995-2005	108 firms	USPTO
Sandner and Block (2011)	Multicountry analysis	1996-2002	1,216 firms	EPO, OHIM
González-Pedraz and Mayordomo (2012)	U.S.	1996-2006	16 commercial banks	USPTO
Greenhalgh and Rogers (2012)	U.K.	1996-2000	1,600 firms	Oxford IP Research Centre
Block <i>et al.</i> (2014a)	U.S.	1998-2007	2,341 firms	USPTO, EPO
Aksoy-Yurdagul (2015)	Fortune Global 500 List	2003-2009	70 firms	USPTO
Zhou <i>et al.</i> (2016)	U.S.	2000-2012	299 firms	USPTO, EPO
<i>Productivity gains from trademarking</i>				
Greenhalgh and Longland (2005)	U.K.	1988-1994	740 firms	Marquesa Search Systems
Duygun <i>et al.</i> (2016)	U.K.	2005-2013	330 banks	IPO, OHIM
<i>Profitability gains from trademarking</i>				
Griffiths <i>et al.</i> (2011)	Australia	1990-2006	2,689 firms	IP Australia
Duygun <i>et al.</i> (2013)	U.K.	2001-2012	20 banks	IPO, Marquesa Search Systems

Duygun <i>et al.</i> (2014)	U.K.	2001-2013	213 observations	IPO, OHIM
Marco-Lajara <i>et al.</i> (2016)	Spain	2009-2013	2,003 firms in the hotel industry	SdA Balances Ibéricos
<i>The impact of trademark activities on firm survival</i>				
Jensen <i>et al.</i> (2008)	Australia	1997-2005	261,510 firms	IP Australia
Srinivasan <i>et al.</i> (2008)	U.S.	1993-2002	1,435 high-tech firms	USPTO
Buddelmeyer <i>et al.</i> (2010)	Australia	1997-2003	299,038 firms	IP Australia
Helmets and Rogers (2010)	U.K.	2001-2005	161,857 firms	IPO, EPO, Marquesa Search Systems
Huang <i>et al.</i> (2013)	U.S.	1996-2004	1,220 software firms	USPTO
<i>Other performance-related implications of trademarking</i>				
Greenhalgh and Longland (2001)	U.K.	1986-1995	~700 firms	IPO, EPO, USPTO, WIPO
Helmets and Rogers (2011)	U.K.	2000-2005	7,038 firms	IPO, EPO, Marquesa Search Systems
Azomahoua and Diene (2012)	Multicountry analysis	1960-2008	34 countries	World Bank Africa Database
Agostini <i>et al.</i> (2015)	Italy	2008-2012	133 firms in the fashion industry	Italian PTO

Note that one article can take more than one perspective. To avoid repetitions, this table presents only the articles for which the aforementioned perspective is deemed to be central.

Table A.6. An overview of other contributions to the empirical trademark literature

Paper	Brief description	Geographical scope	Period	Source of IP data
<i>Working papers and conference proceedings</i>				
Mainwaring <i>et al.</i> (2004)	Determinants of trademark deposits and regional disparities	UK, Ireland	1983-2001	IPO
Malmberg (2005)	The use of trademark statistics as an indicator of new-to-the-firm innovations	Sweden	1935-2000	PRV Svensk Varumärkestidning
Gambardella and Giarratana (2006)	The effect of downstream assets on new product launches	U.S.	1993-2000	USPTO
Graham and Somaya (2006)	The complementarity between different intellectual property rights	U.S.	1985-1999	Federal Judicial Centre
Millot (2009)	Statistical properties of trademarks and a potential link to innovations	Multi-country analysis	1884-2007	USPTO, OHIM, JPO
Munari and Santoni (2009)	The complementarity between patents, trademarks, and designs	Italy	2004-2007	EPO, OHIM, Italian PTO
von Graevenitz (2009)	The defence of trademarks through opposition at a trademark office	Multi-country analysis	1996-2004	OHIM
Flikkema <i>et al.</i> (2010)	The extent to which new trademarks refer to innovations	Benelux countries	2007-2008	Benelux Office for IP
Castaldi and Giarratana (2011)	The determinants of firm performance in professional services	U.S.	2000-2009	USPTO
Millot (2011)	Companies' trademarking behaviour, a link to innovation	France, Germany	1999-2006	INPI France, DPMA, OHIM, EPO
Crass and Schwiebacher (2013)	The effect of trademarks on product substitutability and imitability	Germany	2010	Mannheim Innovation Panel
Llerena and Millot (2013)	The complementarity between patents and trademarks	France	1998-2007	OHIM, INPI France
Crass (2014a)	Firm characteristics and their role in driving trademark registrations	Germany	2010	OHIM, DPMA
Crass (2014b)	The role of brand use in the commercial success of product innovations	Germany	2010	OHIM, DPMA
Fink <i>et al.</i> (2014)	Trademark squatting and its effect on a company's strategic behaviour	Chile	1991-2010	INAPI

de Rassenfosse (2015)	The fee elasticity of demand for international trademarks	Multi-country analysis	2004-2013	WIPO
Flikkema <i>et al.</i> (2015)	The link between trademarks and innovations, filing strategies	Benelux countries	2009	OHIM, EPO, Benelux Office for IP
Castaldi (2016)	The relationship between trademark portfolios and economic performance	Multi-country analysis	2005-2012	USPTO, OHIM
Crass <i>et al.</i> (2016)	The effect of investment in brand equity on firm financial performance	Germany	2010	OHIM, EPO, DPMA
Faurel <i>et al.</i> (2016)	The impact of CEO pay incentives on new product development	U.S.	1993-2011	USPTO
Heath and Mace (2017)	The effect of trademark protection on firm profits and strategy	U.S.	1982-2005	USPTO
<i>Book chapters</i>				
Greenhalgh and Rogers (2006a)	The market value of trademarks	U.K.	1996-2000	IPO, OHIM
Griffiths and Webster (2006)	The market value of trademarks	Australia	1989-2002	IP Australia
Greenhalgh and Rogers (2008)	Determinants of trademark deposits	U.K.	1996-2000	Marquesa Search Systems
Duguid <i>et al.</i> (2010)	The role of trademarks in economic development and international trade	France, U.K, U.S.	1870-1970	Various historical sources
<i>Reports</i>				
Farooqui <i>et al.</i> (2011)	Market sector investments in knowledge capital and their contribution to growth	U.K.	1990-2008	Community Innovation Survey
Greenhalgh <i>et al.</i> (2011)	A link between trademark activities and firm performance	U.K.	2000-2006	IPO, OHIM
von Graevenitz <i>et al.</i> (2012)	The problem of “cluttering” of trademark registers	U.K.	2000-2007	IPO, OHIM, WIPO
Helmers and Schautschick (2013)	The use of different types of intellectual property rights for the same product	U.K.	2002-2009	IPO, EPO, OHIM
Helmers <i>et al.</i> (2013)	The relationship between intellectual property rights and firm performance	U.K.	2002-2009	IPO, EPO, OHIM
WIPO (2013)	The role of trademarks in protecting brands and brand strategy	Multi-country analysis	1974-2011	WIPO

Dataset descriptions

<i>Graham et al.</i> (2013)	Trademark case files dataset	U.S.	1870-2012	USPTO
<i>Marco et al.</i> (2014)	Trademark assignment dataset	U.S.	1952-2013	USPTO
<i>Dernis et al.</i> (2015)	Intellectual property bundles of world top 2,000 corporate R&D investors	Multi-country analysis	2010-2012	EC JRC, OECD
