

Regions and trademarks: Research opportunities and policy insights from leveraging trademarks in regional innovation studies

Carolina Castaldi & Sandro Mendonça

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Carolina Castaldi

Department of Human Geography and Spatial Planning, Utrecht University, NL

Sandro Mendonça

Instituto Universitário de Lisboa (ISCTE-IUL). Business Research Unit (BRU-IUL).
UECE/REM - ISEG/University of Lisbon, Portugal and SPRU, University of Sussex, UK.

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Abstract

At the intersection of regional and innovation studies, trademark research is producing stylized facts, methodological lessons and policy insights underlining the importance of softer intangible assets for regional resilience and growth. Despite all the recent attention, there are still several opportunities that the present agenda-framing piece tries to canvas, identifying at least two directions for further research: the geography of innovation/entrepreneurship and regional specialization/diversification. Not only do these emerge from a dedicated special issue in *Regional Studies* (to which this paper also serves as an Editorial), they also unfold in emerging research and policy trajectories.

Keywords: trademarks, regions, geography, intangibles, innovation, specialization, diversification

JEL codes: O3, L5, R1

Introduction

The modern economy is a sign-rich reality and trademarks are intangible assets that economic actors can mobilize to differentiate themselves and their offerings in the marketplace. Trademarks are unfolding as a source of empirical material to understand innovation, industrial dynamics and entrepreneurial change (Schmoch, 2003; Mendonça et al., 2004; Castaldi et al., 2020). Globalization and digitization have only increased the strategic importance of trademarks as firms' reputational resources (WIPO, 2013), which underscores the need to use them both creatively and accurately as indicators and intelligence material. This paper argues this is the case from a regional perspective as well.

So far, trademark evidence has remained underexploited at the intersection of regional studies and innovation studies¹. Trademark filings can be traced back to territorial units and deployed to analyze regions' trademark intensity as well as the qualities of their trademark portfolios. The increasing availability of regionalized or even geo-coded trademark data will elicit many more opportunities, but trademark-based indicators are still much less known and used than the more conventional science and technology (S&T) ones.

In this positioning piece we aim at inspiring regional studies scholars to consider the analytical value of trademarks, both at the conceptual and empirical level. We also see important connections to policy, as regions are pushed to discover their own strengths and develop place-sensitive interventions within trajectories of "smart specialization" (Foray et al., 2009) and transformative change (Wanzenböck & Frenken, 2020). Such policies can only but benefit from broader approaches to capture differential diversification patterns and evolving regional specializations.

While this paper serves as an editorial introduction to our special issue, the scope of our discussion is much broader. We wish to give credit to all the seminal works that have experimented with

trademarks, in regional studies and related fields. We will take stock of existing studies and sketch several unexploited avenues for further research and salient policy implications.

Trademarks at the intersection of regional and innovation studies

We wish to start with a brief introduction on what trademarks are. We will then place the emerging interest in trademarks as novel data at the crossroad of innovation and regional studies.

The specific characteristics of trademarks

A trademark is an intellectual property right (IPR) that can be filed by individuals, firms or other actors and granted by official specialized authorities. This legal document gives the exclusive right to use or let others use a distinctive sign (any identifier, including words, images or other), for the purpose of signaling the source or origin of a good or service. Trademarks fulfill an informational role but also represent assets that allow for differentiation strategies (Ramello and Silva, 2006). For consumers, brands (a representation which can be underpinned by one or more trademarks) bring about an assurance concerning the attributes of the offerings and the entities behind them. The main economic rationale behind trademarks is to ensure the well-functioning of markets and minimize failures or inefficiencies due to information asymmetries. Relatedly, the main requirements for trademark registration are: first, that the sign is distinctive enough to avoid consumer confusion; second, that the sign is actually used in the market (or intended to be used within a time frame specified by trademark offices) (see Graham et al., 2013). Differently from patents, trademark registration does not require proving novelty. Another difference is that trademarks can be renewed indefinitely upon payment of renewal fees, which can make them attractive intellectual property assets to invest in the long term.

Trademark records constitute valuable sources as they provide evidence regarding the specifics of time and territory. For instance, in aggregate terms trademark registrations historically surged ahead of patents in advanced economies. This trend is seen to point to the introduction of higher quality offerings and the founding of more dynamic firms, while presenting a broad correspondence with business cycles (Jensen and Webster, 2004; Schautschick and Greenhalgh, 2016; deGrazia et al., 2020). Trademarks also inform about product markets where commercial initiative is taking place: they are extensively deployed (including in developing countries, see Zolas et al., 2017), available as statistics subject to objective standards, they are the outcome of decisions by actors of all sorts (including small and medium-sized firms i.e. SMEs, see Castaldi et al., 2020), and they are related to phenomena that are critical to understand turbulent markets and challenging agendas (like competitiveness, regional resilience and renewal, sustainable transitions, etc.). The opportunities for analysis are by no means automatically free of methodological problems. Similarly to patent proxies, trademark indicators have instructions for use too, as researchers must carefully explain and motivate what the role of this data in their toolbox is.

Trademarks and the analytical road so far

In innovation studies, a field that has been increasingly active in using such materials, trademarks-based analysis has developed hand in hand with the gradual broadening of the notion of innovation in at least two ways. Firstly, research has expanded to include innovation in sectors traditionally viewed as innovation laggards, in particular service activities and traditional industries (Miles, 1993; Mendonça, 2009; Delgado and Mills, 2020). Service innovation might have a technological dimension (often digital), but also entails novelty in dimensions like new business models, adaptive customer interfaces, and novel governance practices (den Hertog, 2000, Janssen et al., 2016). Low-tech manufacturing like textiles or food-processing can also absorb high-end science while sporting

strong capabilities regarding customer research and marketing innovation (von Tunzelmann and Acha, 2005; Robertson et al., 2009; Grashuis and Dary, 2017; see also Campi and Nuvolari, 2021).

The early interest in trademark evidence was very much related to the need to develop systematic innovation output indicators for these less well covered sectors (Schmoch, 2003; Mendonça et al., 2004). Indeed, trademarks can provide visibility on service and non-high-tech innovation (Flikkema et al., 2014, 2019), and can help to generate composite indicators (Ferreira and Godinho, 2011). Relatedly, one has witnessed an expansion of the notion of innovation towards ‘soft innovation’, i.e. non-functional forms of innovation that typically include those strategies involving aesthetics and design to shape a persuasive product that users wish to adopt (Stoneman, 2010; Filitz et al., 2015). This type of innovation often develops in differentiated markets and creative industries (Millot, 2009; Castaldi, 2018a; Forti et al., 2020), but can also be seen as crucial downstream activity in technologically-driven processes, including in intermediate good sectors (Mendonça et al., 2019). Branding is pervasive, but the role (persuasion, information) and impact (meaning, welfare) that signs can exert at the regional level constitute a research (and policy) direction that can be further explored (Ramello and Silva, 2006).

These expanding notions of innovation have been a defining feature of innovation studies at least since the turn of the century (Martin, 2016). The evolving ways in which innovation has been conceptualized, defined, and operationalized can also be recognized in regional studies, in particular with regard to the thinking around regional innovation systems (Asheim et al., 2011a). A key message from this literature is that regions are characterized by specific combinations of knowledge bases which can be broadly characterized as being of three main types: analytical, synthetic and symbolic (Asheim and Coenen, 2005). The three knowledge bases broadly relate to the main phases of the innovation process: research, development and marketing. Large firms might well possess and develop all three types of expertise when controlling the whole innovation process (Davids and Frenken, 2018). At the regional level, however, the three types of knowledge

might explain differential specialization patterns of local firms and a specific geography of the skills and industries mostly associated with each knowledge base (Asheim et al., 2011b).

Increasingly, the understanding is that a viable regional innovation system is one that can leverage the synergies of different knowledge bases (Rodríguez-Pose and Lee, 2020). Research has convincingly argued that geographical concentrations of economic activity can also thrive on the basis of vibrant creative activities where symbolic knowledge bases constitute the main asset (Weller, 2007). Symbolic capabilities, that is to say those commercial “rhetoric” and context-sensitive communication activities that are behind the introduction of soft innovation, matter in local contexts, and especially so for contested industries and open economies.

New synergies for regional (innovation) studies

Putting the two literatures above together, one sees an emerging understanding that regions can specialize in several directions and that a S&T pathway only fits a few regions (Breznitz, 2021). At the same time, quantitative studies at the regional level have tended to perceive innovation through classic invention and engineering indicators, implying a bias towards high-tech manufacturing clusters (Clark et al., 2010). As summarized in Table 1, S&T indicators focus on upstream phases of the innovation process, i.e. the analytical (e.g. publications) and synthetic (e.g. patents) dimensions. Instead, trademarks have the potential to provide a more complete and holistic picture by allowing for the apprehension of symbolic (soft, non-functional) knowledge bases and thus the more downstream phases of innovation processes. These are exactly the phases where informational and persuasive activities become crucial. Trademarks can fulfill this yardstick role while stretching back in history since records exist for a long time and time series may be reconstituted to great effect (Lopes 2005, 2016). What Table 1 suggests is that trademark indicators can be a missing piece in the puzzle of finding research inputs for mapping and tracking the whole variety of knowledge bases behind regional innovation, specialization and diversificationⁱⁱ.

In this sense, there is a high degree of complementarity between the three types of indicators and much to be gained from combining them. Each source also captures specific sectors and organizations. Science indicators mostly focus on knowledge institutions and firms in science-based industries, patents are mostly about industrial invention by large outward-oriented corporations, trademarks are widely used across economic sectors and by firms of all sizes, including SMEs and peripheral economies. Some regionally-oriented studies have combined publication and patent data (Catalán et al., 2020; Balland and Boschma, 2021), others have combined patents and trademarks (Drivas, 2021a) but the synergies of combining all three have not been fully exploited yet (for an exception, see Capello and Lenzi, 2018). We will discuss this and other opportunities in the remainder of this paper.

Table 1 displays the role of trademarks in the broader portfolio of indicators available for regional and innovation studies. Of course, even more data is available, including primary survey data and recent big data indicators (Kinne and Lenz, 2021; Nathan and Rosso, 2022). In the next section, our focus will be on further highlighting emerging research trajectories in regional studies that have already embraced the opportunity of capitalizing on trademark data.

Insert Table 1 here

Emerging research trajectories in regional trademark-based studies

Based on the contributions collected in our special issue and other relevant studies, we can identify two main domains within regional studies, where most research efforts leveraging trademarks are converging. These are: (i) geography of innovation and entrepreneurship; and (ii) regional paths of specialization and diversification.

Trademarks and the geography of innovation and entrepreneurship

A first research trajectory leverages trademark-based measurements to understand regional innovation. These studies investigate the relation between regional innovation and performance including economic growth, resilience and entrepreneurial dynamism.

These studies acknowledge that trademarks complement patents as innovation indicators, yet the key arguments supporting this complementarity differ. For instance, Filippetti et al. (2020) combine patents and trademarks because they wish to address innovation in both manufacturing and services. Instead, Piergiovanni et al. (2012) and Mendonça (2014) push through the argument that trademarks capture soft innovation (Millot, 2009), in and outside manufacturing, in frontier economies and catching-up territories, while patent-based indicators are more confined to hard or functional forms of innovation (see Stoneman, 2010; Lhuillery et al., 2017). Block et al. (2021) combine the two above arguments and stress how trademarks both allow to pick up innovation in sectors where patents are not applicable and the downstream phases of the innovation process, often involving softer activities like marketing, design and business development. An additional reason to include trademarks is that small and/or young firms might be underrepresented in patent statistics, where a strong bias towards large and established companies operating in high-tech domains exists (Seip, 2021). In fact, Guzman and Stern (2015) included trademarks to capture entrepreneurship quality and to identify innovation clusters across the US. Their index aimed at offering a timely ('nowcasting') and geographically granular ('place-casting') specification of clusters expected to display significant growth. Their approach is in line with results at the firm level showing the start-ups filing trademarks are more likely to attract venture capital funding (Zhou et al., 2016), display high growth (EPO/EUIPO, 2019) and turn into 'scale-ups' (Seip, 2021). The study by Belderbos et al. (2021) also links to entrepreneurship, by claiming that regional trademarks capture knowledge fueling new venture formation.

von Graevenitz et al. (2021) offer a different take: they are using trademarks to track the emergence and subsequent spatial diffusion of new ideas. A similar approach was pioneered by Semadeni and Anderson (2010) to understand innovation and imitation strategies of companies. When one company comes up with a new idea, i.e. product or service innovation, other companies can absorb that idea and incorporate it in subsequent innovations. von Graevenitz et al. (2021) bring geography to this diffusion story and model the extent to which proximate regions are faster at adopting new ideas. They find that distance still matters, as ideas for commercial applications also tend to diffuse first nearby the place where they were first developed.

An overview of the “geography of innovation/entrepreneurship” approaches enabled by trademark statistics is displayed in Table 2.

Insert Table 2 here

Trademarks and regional paths of specialization/diversification

A second set of studies aims at understanding regional patterns of trademarks as a way to map and measure how regions diversify or rather specialize in specific markets. Sáiz and Zofío (2021) offer an original historical perspective, built from archival resources, as they reconstruct the making and consolidation of the Spanish trademark system. They are able to track the diffusion of trademark specialization across provinces, tracing the emergence of the next new specialization in relation to already existing ones and to geographical distance (measured by generalized transport costs). Their analysis has a strong evolutionary economic flavor and is able to disentangle the specific role of demand/supply forces and of geography. Drivas (2021a) is also looking at the emergence of new trademark specializations, which he investigates through the lens of the principle of relatedness (Hidalgo et al., 2018). This approach incorporates the evolutionary insight that new activities tend

to emerge from existing ones and has been applied to all kinds of evidence, from patents to skills and trade data. The application to trademark data is new and reveals branching dynamics into alternative and/or complementary specializations to technological ones. Capello and Lenzi (2018) was a first step in this direction: they used trademarks to capture the upgrade of regional industrial specializations from an imitation paradigm to an ‘application’ paradigm based on high-quality differentiation.

Iversen and Herstad (2021) decompose regional intensities of trademark activity into different drivers. By doing so, they provide a methodological reference for developing informed regional comparisons. One should factor in elements ranging from supply to demand factors and territorial taxonomies (urban/rural/peripheral) to make sense of trademark patterns.

Before this recent crop of research Gambardella and Giarratana (2010) had used the concentration of trademarks in specific market classes to analyze the market specialization of firms in a given city as a proxy of the competitive pressure. This kind of work shows that trademarks can indeed add to the modelling of industrial agglomeration and contribute to test how knowledge cluster characteristics relate to outcomes and rewards.

Regional applications notwithstanding, trademark specializations had been studied at the national level, mostly because trademarks could be easily assigned to countries. These country-level studies, reviewed in detail in Schautschick and Greenhalgh (2016), often had a focus on international trade or international competitiveness questions. The interest in trademarks was largely driven by the recognition that trademarks are the type of IPR most pervasive globally (Zolas et al., 2017) and that, especially in developing and middle-income countries, companies rely more on trademarks than patents (Azomahou and Diene, 2012; Kang et al., 2020; Lee et al., 2021). In a number of history-oriented and geography-sensitive work, Lopes (2005, 2016), Lopes and Tomita (2021), and Castro and Sáiz (2020) have also shown how multinational business success can be derived from locally developed trademark-intensive strategies in a variety of sectors.

Until very recently it was much harder to assign trademarks to regions. As such, the regional perspective is quite novel. Yet, we suspect that data availability is not the only reason why regional specialization has not been revealed with trademarks. The persistent S&T/manufacturing & high-tech bias in innovation studies which we discussed above has surely played its role as well. Table 3 gives an overview of regional and national specialization/diversification studies that are afforded through trademark data.

Insert Table 3 here

Emerging trademark empirics: opportunities and challenges

In this section we wish to provide a hands-on overview of the indicators that one can construct using trademark data. Table 4 summarizes the original measures so far: some of them already applied at regional level, other only applied at the firm or country level but which are straightforward to extend to the regional level.

Insert Table 4 here

Opportunities: the many trademark indicators already developed

Many studies include simple regional trademark measures, like counts of new trademark applications or registrations, relative to population or employment, or trademark stocks. These studies exploit the aggregation of trademark records to regional units starting from the address of the trademark owners and the year of filing or granting. Two remarks should be made here. Firstly, not all studies are equally accurate in using and interpreting trademark statistics. For instance, regional trademark counts depend significantly upon regional characteristics, like their sectoral structure but also their level of economic development, as carefully explained in Iversen and

Herstad (2021). Moreover, the validity of trademarks as regional innovation proxies critically depends upon the type of firms and industries most active in a region, as trademark propensities significantly vary along the firm life cycle (Castaldi et al., 2020) and between industries (Malmberg, 2005; Flikkema et al., 2019). Secondly, studies using counts only leverage a fraction of trademarks' potential, while a handful of studies already started to make use of the full range of information embedded in trademark records.

To start with, trademarks are associated with one or more Nice classes that designate the actual markets (offering categories) where trademark owners claim exclusive use of their marks. The Nice classification includes 45 classes, of which 1 to 34 are goods markets and 35 to 45 are service markets. A first use is to calculate concentration measures to harness evidence on competition intensity at the regional level (Gambardella and Giarratana, 2010). Another use is to capture regional specialization (Drivas, 2021a; Sáiz and Zofío 2021). Herein, studies have exploited the goods/services distinction to capture specialization in service markets (Block et al., 2021), inspired by firm-level studies using trademarks to build measures of firm diversification (Castaldi and Giarratana, 2018; Mendonça et al., 2019). The attractive feature of a regional trademark-based measure of product or service diversification is that it is a measure that is not based on standard industrial classifications. It complements measures of territorial servitization that only count service firms whose main industry falls into services, while disregarding servitization stemming from firms classified in manufacturing industries. A more advanced use of trademark classes is to categorize them in meta-classifications of product/service types, for instance in knowledge-intensive or high-tech ones, like Mendonça and Fontana (2011) also did at the country and firm levels. Finally, a recent use of classes is to calculate measures of relatedness for trademarks (Drivas, 2021a), similar to technological or industrial relatedness measures that have played a key role in evolutionary economic geography (Boschma, 2017).

Next to Nice classes, trademark records also include a description of the goods and services covered by the trademark: this is a text including descriptors that are often standardized keywords. von Graevenitz et al. (2021) offer the very first geographical application of the use of these text-based descriptors, inspired by earlier work at the firm level by Semadeni and Anderson (2010). The main idea is that through big data content analysis the first use of a descriptor signals an innovation, while its use in subsequent trademark filings signals imitation and diffusion of the initial innovation. More in general, text analysis of trademark descriptions can be used to identify specific types of trademarks in emerging fields that cannot be identified simply with reference to Nice classes, like ICT or AI trademarks (Dernis et al. 2019) or green trademarks (Ghisetti et al., 2021; EUIPO, 2021) akin to what has been done with technology driven approximations (see Rotolo et al., 2015, Petralia, 2020). Alternatively, trademarks can also be studied based on properties of the actual names filed: applications along these lines include checking similarity/dissimilarity to prior filings of the same owner to categorize new trademark registrations as brand creations or brand extensions (Block et al., 2014; Flikkema et al., 2019), the combinations of graphic and word elements as a proxy for distinctiveness and trademark transaction value (Kong, 2017), references to local/regional/national history (Miranda and Ruiz-Moreno, 2020), or classifying them as eco-marks (Lane, 2009).

Another feature of trademark filings is that they can be linked to similar filings at other national offices: they represent applications of the same or similar product name by a company active internationally and flag entry and presence in foreign markets (Giarratana and Torrisi, 2010). Linking trademark filings internationally is not trivial and Petrie et al. (2020) present a novel database including international trademark families. Such data can be deployed to derive the global footprint of companies.

Trademarks can attract oppositions and trademark owners can file oppositions themselves, for different reasons (von Graevenitz, 2009). This can reveal rivalry between companies, but also

between regions (Drivas, 2021b). Moreover, trademarks that attract more oppositions or that are more strongly defended with oppositions are taken to be of higher value for companies (Sandner and Block, 2011).

Finally, while most trademarks are filed by private companies, they are also increasingly filed by public and not-for-profit entities, including universities (Squicciarini et al., 2012), cooperatives (Grashuis, 2017), and city authorities (Lindsay, 1999). This raises questions on the commercialization of public goods that are only starting to be tackled.

Challenges: methodological issues and data wish lists

Engaging with trademark data comes with methodological challenges that are partly specific to these data and partly resonates with the difficulties associated to patent data. We discuss here three main ones.

A first issue is that trademarks can only be assigned to the location of the owner. This makes it somewhat tricky to compare them meaningfully with patents at the regional level, since patent studies mostly focus on the location of the inventor. The inventor location is most meaningful when considering technological activities, yet the activities most related to trademark filing (marketing, business development) do tend to concentrate at the headquarter level of companies. Still, an important empirical question is the extent to which multinational companies, which do account for a large share of IPR filings in general, tend to concentrate their ownership rights in specific locations, possibly because of lenient fiscal regimes around intangibles. This would of course strongly bias results at the regional level.

A second issue is that analysis of regional portfolios of trademarks could greatly benefit from the possibility to match trademark to firm-level data. As Belderbos et al. (2021) show, whether trademarks are owned by large incumbent firms or by new firms matters for the role they play in

regional dynamism. Unfortunately, linked trademark-firm data are not publicly available yet, though studies have relied on ad-hoc databases (Dernis et al., 2015, 2019; Dinlersoz et al., 2017; Grazzi et al., 2020). We expect more data initiatives to emerge (for instance the ones within the RISIS initiative, <https://rcf.risis2.eu/datasets>) and hopefully also efforts toward linked trademark-firm-patent data. Complementary efforts are directed towards linking the underlying market, industrial and patent classifications (Zolas et al., 2017). Parallel work by Abbasiharofteh et al. (2021) and Neuhäusler et al. (2021) will deliver more fine-grained Nice-based classifications, also allowing a more salient linkage to patent classifications. This will be a key step towards understanding the relation between regional portfolios of patents and trademarks.

A final issue concerns the challenge of accounting for the skewness in the value of trademarks. Not all trademarks are equally valuable and some have ‘superstar’ attributes, something which resonates with those found in income distributions and patent value, among many other economic phenomena. Unfortunately, trademark data do not come with citations to other trademarksⁱⁱⁱ. Yet, there are ways to account for the value of trademarks, which include considering their breadth or ‘stretchability’, i.e. the number of Nice classes they cover, or the number of oppositions they attract (Sandner and Block, 2011; Nasirov, 2020; Hsu et al., 2021). Measures not based on the information in trademark records themselves are online search hits (von Graevenitz et al., 2016) or position of brands in rankings by market research companies. It might be the case that highly valuable trademarks disproportionately drive the fates of regions, for instance by attracting investors but also by functioning as a disincentive for local firms to develop new specializations thereby entrenching path dependence. In any case, future indicators at the regional level could try to account for the quality of regional trademark portfolios as well.

Conclusions: towards a research agenda with policy relevance

Taking stock of trademarks: a regional perspective

Trademarks and similar types of evidence offer the material for a research program at the intersection of regional and innovation studies. Amidst an increasing discontent with an S&T-driven innovation and specialization paradigm often associated to increasing regional inequality (Iammarino et al. 2019), trademarks might offer the opportunity to uncover and illuminate alternative paths of regional development. As Graham and colleagues (2013, p. 669) have argued, trademark datasets are valuable to “researchers and the general public”.

Indeed, the emerging work agenda that we outlined here comes with a strong policy relevance. Many more directions of further research can be envisaged. A first step would be to reassess what we know about the geography of innovation by embracing this new empirical lens. The many stylized facts that have emerged in the last decades of research (Feldman, 1994, Feldman and Kogler, 2010) should be held against the light of the broader take of innovation that we have suggested here. Also, a report such as WIPO (2019) could be extended to include trademarks next to the standard S&T indicators. A second step, would be to include trademarks in policy evaluation exercises inspired by the smart specialization approach. Surely many regions can uncover strengths and capabilities that go beyond S&T and leverage them further in a process of entrepreneurial discovery. This might be particularly relevant for peripheral regions (Eder and Trippel, 2019). At the same time, those same regions can gauge their fit to specific trajectories that go beyond short-term and narrow economic goals, such as societal challenges. Measures of trademark specialization at the regional level can complement more common measures of technological specialization in green patents (van den Berge et al., 2018) or industry 4.0 patents (Balland and Boschma, 2021).

Trademarks as a proxy of progress

In this sense, an original and daring approach to capitalize on trademarks as metrics to compare regions would be to explicitly define teleological targets, that is, a set of objective criteria that are indicative of alignment with societally-themed/normative challenges. This would be in line with the recent ‘normative’/‘transformative’ turn that is both challenging and providing new opportunities to regional innovation policy (Uyarra et al., 2019). One area of great potential here could be to relate trademark indicators to the United Nations Sustainable Development Goals (SDGs). By nature, trademark data could seem not amenable to translate progress towards non-commercial ends (e.g. Grashuis, 2017). However, we contend that indeed these data may serve to echo such stakeholder demands and transformative agendas (see de Jesus and Mendonça, 2018; Costa and Mendonça, 2019). A number of Nice classes can reveal a SDG orientation: for instance, class 41 (education) can be related to SDG 4 (quality education) and class 44 (medical services) to SDG 3 (good health and well-being). Methods can be developed to extend the applications of trademark data beyond market horizons and into systemic change challenges so as to realize its potential in a full range of policy development, evaluation and monitoring tasks. Similar efforts are recently taking place with other research and innovation indicators, including patents (Ribeiro and Shapira, 2020; Biggi et al., 2022) and scientific publications (Rafols et al., 2021; Romero-Goyeneche et al., 2021).

Trademarks as pointers of societal problems and policy puzzles

Exercises like those we propose should not allow scholars and policymakers to turn a blind eye to the negative social returns of (irresponsible) use of trademarks, as IPRs have a “dark side” too (Castaldi et al., 2021). Pro-trademark legal shocks may lead to lower R&D investment, less product quality, smaller industrial reshuffling and supra-normal profits among incumbents (Heath and Mace, 2020). In fact, an exciting area of investigation is to better understand the extent and mechanisms of trademarks’ social returns (see Castaldi, 2018b, for an outline of this perspective).

Positive social returns at the regional level might include knowledge spillovers (Greenhalgh and Rogers, 2012) and the role of trademark strategies for climbing up value chains in the world economic arena (for the Asian case see, e.g., Setiawan et al., 2017; Deng et al., 2020; Nguyen, 2020), but negative returns associated with barriers to entry erected by local incumbents are also a reality (Belderbos et al., 2021). Even less known and understood are the implications of trademark strategies by foreign firms entering regions in emerging economies (for an exception: Nguyen, 2020) and possibly unleashing the predation of indigenous knowledge, culture, traditions and language (Orozco and Poonamallee, 2014). Disputes on ‘cultural appropriation’ are increasingly emerging around trademarks. An important lesson for regional policymakers is to devise strategies to keep prosperity at home, also through shrewd IPR strategies (Breznitz, 2021). In some countries, trademarks are used as safeguards, and even diplomacy tools, against dilution and opportunistic misappropriation, through regulations that defend domestic intangibles against invasive applicants (Baroncelli et al., 2007) or so-called trademark squatters (Fink et al., 2018). How to balance positive and social returns of trademark strategies at the regional level is surely an important area of further investigation.

Let us conclude by acknowledging that the relation between geography and trademarks is much more complex than what we could discuss here. Trademarks can be associated to names of places that allow territorial branding strategies and collective trademarks (i.e. territorial certifications, geographical indications), which can help communities and regionally rooted stakeholders to leverage all kinds of place-based intangibles, including heritage, indigenous claims and other assets. Yet, strategies of propertization and monetization of intangibles have their downsides too. Part of these topics will be the focus of a next special issue that we will also guest edit (Castaldi and Mendonça, 2021).

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Table 1: Overview of complementarities between science, technology and trademark indicators.

Analytical dimensions	Scientific publications	Patents	Trademarks
Knowledge base	Analytical ('know-why')	Synthetic ('know-how')	Symbolic (meanings and categories)
Innovation type	Scientific invention 'BlueSky' innovation	Technological invention Functional innovation	Commercialized innovation Soft innovation
Innovation phase	Research	Development	Marketing Business model innovation
Specialization/ Diversification	Scientific specialization/ diversification	Technological specialization/ diversification	Market specialization/diversification, Product differentiation/ diversification
Sectoral focus	Higher education, Public labs, Science-based industries	High-tech manufacturing	All sectors, including the public sector
Organizational focus	Public and private knowledge institutes	Large corporations	All firms, including not-for-profit entities

Table 2: Overview of geography of innovation/entrepreneurship leveraging trademark data.

Geography of innovation studies	Focus	Geography
In this special issue		
Block et al. (2021)	Regional economic growth	Japanese prefectures
Belderbos et al. (2021)	Regional entrepreneurial formation	EU NUTS-3 regions
von Graevenitz et al. (2021)	Diffusion of innovation	US metropolitan areas
Other studies		
Piergiovanni et al. (2012)	Regional economic growth	Italian provinces
Mendonça (2014)	Economic recovery	Europe, Asia
Guzman and Stern (2015)	Entrepreneurial clusters	US cities
Filippetti et al. (2020)	Regional resilience	EU NUTS-2 regions

Table 3: Overview of regional and national specialization/diversification studies leveraging trademark data.

Regional specialization studies	Focus	Geography
In this special issue:		
Drivas (2021a)	Patterns of trademark specialization and their relation to technology	EU NUTS-2 regions
Saiz and Zofio (2021)	Historical emergence and diffusion of the trademark system	Spanish provinces
Iversen et al. (2021)	Growth and demand effects in regional trademarking intensity	Norwegian counties and centralities
Other regional studies:		
Capello and Lenzi, 2018	Upgrading of regional industrial specializations	EU NUTS-2 regions
Urban studies:		
Gambardella and Giarratana (2010)	Knowledge spillovers related to urban specialization in specific markets	US cities
National studies:		
Fink et al. (2005)	High-quality and differentiated products as drivers of trade flows	Global
Mangani (2007)	Variety and quality of international trademark specializations	Global
Azomahou and Diene (2012)	Specialization in resident vs non-resident innovation	Africa
Mendonça (2014)	National specialization in high and low sophistication product classes	Europe, Asia
Kang et al. (2020)	Trademark-based path of technological development of latecomer countries	Korea
Lee et al. (2021)	Capturing specific national innovation system types	Global

Table 4: Overview of empirical indicators built from the different elements of trademark records (special issue papers flagged with [SI]).

Elements of trademark records	TM-based indicator	Regional studies	Firm-level studies	Country-level studies
Owner address and year of filing/registration Nice classes	Regional counts by year	many	many	many
	Concentration/competition intensity Specialization	Gambardella and Giarratana (2010) Drivas (2021a) [SI], Sáiz and Zofío (2021) [SI] Block et al. (2021) [SI]		
	Knowledge-intensity of specialization		Mendonça et al. (2019)	Mendonça and Fontana (2011)
	Product/service diversification		Castaldi and Giarratana (2018)	
Goods and service description	Trademark relatedness	Drivas (2021a)		
	First-time tokens and recurring tokens as measures of innovation and diffusion Keyword-based identification of specific innovations (green, ICT)	von Graevenitz et al. (2021) [SI]	Semadeni and Anderson (2010) Ghisetti et al. (2021), EUIPO (2021)	Dernis et al. (2019)
Trademark name/graphics	Brand creation vs brand extension Historical brands Eco-marks		Block et al. (2014), Kong (2017), Flikkema et al. (2019) Miranda and Ruiz-Moreno (2020) Lane (2009)	
Trademark office	Foreign applicants (trade) First filing at office (foreign market entry)	Iversen and Herstad (2021) [SI]		Fink et al. (2005)
Oppositions	Market rivalry	Drivas (2021b)		
	Trademark value		Sandner and Block (2011), Nasirov (2020)	
Applicant type	University trademarks City trademarks		Squicciarini et al. (2012), Lindsey (1999)	

ⁱ For reviews of empirical trademark research see Schautschick and Greenhalgh (2016) and Castaldi (2020). See also surveys on innovation indicators, which refer to trademarks as empirical evidence closer to product launches (Nathan and Rosso, 2022) and, more generally, to the commercialization of science, technology and innovation (Lhuillery et al., 2017; Hall and Jaffe, 2018).

ⁱⁱ Another data for soft innovation that is being explored is design rights, but their validity as innovation indicator remains contested (Ferreira, 2012; Filitz et al., 2015; Hernández et al., 2018).

ⁱⁱⁱ At least not in the same sense as patent citations. At the USPTO companies may voluntarily add citations to refer to prior registrations in their portfolios (Chiu et al., 2021).