Patent data - Characteristics of innovative activities

Patent databases are important sources for statistical information on multiple characteristics of innovative activities, allowing identifying evidence on the following:

- **The performance of firms, regions and countries.** (see Patent data - The performance of firms, regions and countries [1]). Patents are used to monitor the technological performance of firms, regions and countries. Compared to other output indicators, such as publications, patents are indicators of activities that are closer to technology development. Matching patent information with other information at the firm level enables an analysis relating the technology or patenting strategy of companies to other characteristics. Patent data may also help track technological leadership in a given technology field or area (e.g. indexes of revealed technological advantages). However, the attribution of a patent to a particular entity is not simple: it will have impacts on the quality of the indicators obtained.

- **Emerging technologies.** (see Patent data - Emerging technologies [2]). Particular technical fields can be built up by using keywords or abstracts and patent descriptions. Patent-based indicators constitute a unique means—sometimes the only one available—to track the rise of emerging technologies (e.g. nanotechnology, biotechnology). Business surveys usually come at a later stage of development as they require precise advance knowledge of the field (notably of the active entities). This requires matching IPC codes to relevant technology fields of interest and/or industry classifications.

- **The role of universities in technological development.** (see Patent data - The role of universities in technological development [3]). Patents can be linked to universities and public research institutions by using algorithms designed to identify relevant information from the name field of the patents. They can then help provide statistics regarding the role of universities in technological development (e.g. by compiling counts of the patents universities were granted, their forward citations). Yet, the quality of such indicators depends on how well the algorithms reduce challenges of coverage (e.g. inventions from university researchers may be patented by the researcher or by a company that funded the researcher).

- **The performance and mobility of researchers.** (see Patent data - The performance and mobility of researchers [4]). Patent information can be used to track the career and performance of individual inventors and to analyse networks of inventors. This information can be used to investigate issues such as researcher mobility (across companies or countries), differences in researcher profiles across fields, and linkages across researchers and others, particularly if matched to complementary data). (Trajtenberg, Shiff and Melamed 2006). However, such use of patent information involves a great deal of data cleaning, as identifying the same individuals in databases with millions of names is not straightforward.

- **The geography of invention** (see Patent data - The geography of invention [5]). As patents contain the addresses of the inventor and applicant, patents filed can be allocated across regions at any degree of detail (e.g. city, region, country) although raw data have to be formatted first. Hence patent data can be used to study the geographical properties of inventive processes—e.g. the role of local actors in regional or national innovation (universities, small companies, large companies, etc.), their interactions and the profile and impact of regional technological specialisation.

- **Knowledge diffusion and technological change** (see Knowledge diffusion and technological change [6]). Patents are a direct measure of knowledge transfer because they provide a detailed description of how the inventions have been made and the prior art. Patent citations point to the use of previous inventions in new inventions, which makes it possible to identify the influence of particular inventions or particular sets of inventions and

map their diffusion in the economy. Citations are also useful in quantifying knowledge transfers across organisations, geographical regions and/or technology fields, as well as knowledge spillovers from specific inventing entities (e.g. multinational to domestic firms or from public research centres to industry). Yet citations can be a “noisy signal” of knowledge flows (e.g. differences among patent offices in terms of examination procedures may influence the number and type of references cited).

- **Globalisation of research** (see Patent data - Globalisation of research [7]). Patents include information on the inventive performance and activities of multinational firms. The advantages of using patent indicators for tracking the internationalisation of technology are numerous. However, the most important difficulties in measuring the internationalisation of technology with patent information arise from the complexity of information, and lack thereof, on a company’s ownership structure and strategy. Through the applicants’ and inventors’ addresses, it is possible to track the patterns and the intensity of international co-invention (the measure of research collaboration between inventors located in different countries)and foreign ownership of domestic inventions, and vice versa.

- **Patenting strategies of firms** (see Patent data - Patenting strategies of firms [8]). The history of the patent application is available in the patent document. It reveals the timeline of the invention, the application’s passage through the patent office’s workflow and the applicant’s strategies (designated states, patent equivalents and priority dates, etc). This information may be helpful in identifying the market strategy of the patent owner, notably the countries for which protection is being sought and their order of importance.

Reference

- Trajtenberg, M., G. Shiff and R. Melamed (2006), “The ‘Names Game’: Harnessing inventors’ patent data for economic research”, NBER Working Paper 12479, National Bureau of Economic Research, Cambridge, Mass.

Links
[1] https://www.innovationpolicyplatform.org/content/patent-data-performance-firms-regions-and-countries?topic-filters=12243
[2] https://www.innovationpolicyplatform.org/content/patent-data-emerging-technologies?topic-filters=12284
[3] https://www.innovationpolicyplatform.org/content/patent-data-role-universities-technological-development?topic-filters=12289
[4] https://www.innovationpolicyplatform.org/content/patent-data-performance-and-mobility-researchers?topic-filters=12091
[5] https://www.innovationpolicyplatform.org/content/patent-data-geography-invention?topic-filters=12202
[6] https://www.innovationpolicyplatform.org/content/patent-data-knowledge-diffusion-and-technological-change?topic-filters=12294
[7] https://www.innovationpolicyplatform.org/content/patent-data-globalisation-research?topic-

filters=12069
[8] https://www.innovationpolicyplatform.org/content/patent-data-patenting-strategies-firms?topic-filters=12267