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Inventors and invention processes in Europe: Results from the PatVal-EU survey

Paola Giuri [a,*], Myriam Mariani [b], Stefano Brusoni [b], Gustavo Crespi [c,1], Dominique Francoz [d], Alfonso Gambardella [e], Walter Garcia-Fontes [f], Aldo Geuna [c], Raul Gonzales [f], Dietmar Harhoff [g], Karin Hoisl [g], Christian Le Bas [h], Alessandra Luzzi [i], Laura Magazzini [a], Lionel Nesta [c,2], Önder Nomaler [j], Neus Palomeras [i], Pari Patel [c], Marzia Romanelli [k], Bart Verspagen [j]

[a] *Scuola Superiore Sant'Anna, P. za Martiri della Libertà 33, 56127 Pisa, Italy*
[b] *IEP and CESPRI, Bocconi University, Via Sarfatti 25, 20136 Milan, Italy*
[c] *SPRU, The Freeman Centre, University of Sussex, Brighton, East Sussex BN1 9QE, United Kingdom*
[d] *Ministère de l'Education Nationale et de la Recherche DPD-C3, 3-5, Boulevard Pasteur, 75015 Paris, France*
[e] *IEGI and CESPRI, Bocconi University, Via Filippetti 9, 20136 Milan, Italy*
[f] *Departament d'Economia, Universitat Pompeu Fabra, Ramon Trias Fargas 25-27, 08005 Barcelona, Spain*
[g] *Institute for Innovation Research, Technology Management and Entrepreneurship (INNO-tec), LMU Munich School of Management, University of Munich, Kaulbachstraße 45, D-80539 Munich, Germany*
[h] *LEFI, Université Lyons 2, 14 Avenue Berthelot, 69363 Lyon Cédex 07, France*
[i] *Department of Business Administration, Universidad Carlos III Madrid, Calle Madrid 126, 28903 Getafe, Madrid, Spain*
[j] *Eindhoven University of Technology, PO Box 513, 5600 MB Eindhoven, The Netherlands*
[k] *University of Pisa, via Ridolfi 8, 56100 Pisa, Italy*

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Abstract

Based on a survey of the inventors of 9017 European patented inventions, this paper provides new information about the characteristics of European inventors, the sources of their knowledge, the importance of formal and informal collaborations, the motivations to invent, and the actual use and economic value of the patents.

Keywords: Patent; Inventor; Collaboration; Licensing; Invention process

1. Introduction

This paper provides new information, not available from other sources, on the characteristics of the invention processes in Europe, and on the economic use and value of European patents. Our data are drawn from a survey (PatVal-EU, or PatVal for short) of 9017 patents granted by the European Patent Office (EPO) between 1993 and 1997, located in France, Germany, Italy, the

* Corresponding author. Tel.: +39 050 883 359; fax: +39 050 883 344.
E-mail address: giuri@sssup.it (P. Giuri).
[1] Present address: International Development Research Centre, 250 Albert Street, PO Box 8500, Ottawa, Ontario Canada K1G 3H9.
[2] Present address: OFCE, Department of Research on Innovation and Competition, 250, rue Albert Einstein, Valbonne, Sophia Antipolis 06560, France.

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Netherlands, Spain and the United Kingdom (hereafter "EU6").

There is a rich literature on the measurement of innovation (for surveys see Griliches, 1990; Patel and Pavitt, 1995). Along with input data such as R&D expenditures and the human capital employed in research, patents have become the most common measure of innovation output (see Hall et al., 2001, for a survey). A convenient feature of patents is that they resemble invention counts.[3] Moreover, they have been well documented, especially in recent years thanks to the extensive on-line information that can be conveniently organized into databases. Another advantage of patents is that they can combine different indicators. For example, patent citations have been used to measure their importance and economic value (Trajtenberg, 1990; Hall et al., 2005; Harhoff et al., 1999), or to describe the direction and geographical extent of knowledge flows among inventors and patent holders (Jaffe et al., 1993; Verspagen, 1997). Similarly, patent claims have been used to account for the scope of patent protection (Lerner, 1994).

However, patents also have shortcomings. They relate only to certain types of inventions, and there are vast differences across firms, industries and countries in the precision with which patents measure innovation output. Moreover, there is still ambiguity about what exactly patent indicators measure. For example, some studies have shown that patent citations are a noisy measure of information flows (Almeida and Kogut, 1999; Singh, 2005), particularly because many citations are added not by applicants, but by the patent examiners or just to avoid infringements (e.g. Harhoff et al., 2006; Alcacer and Gittleman, 2006). Also, Lanjouw and Schankerman (2004) show that it is hard to distinguish whether patent claims are a measure of patent scope, degree of protection or of value. Similarly, citations are correlated with several aspects of the patent, e.g. its legal robustness and not just with its value.

The patent data and indicators presently employed in the literature are drawn largely from patent documents. As a result, information not in the patent files is mostly unavailable. This implies that while certain aspects about patents or underlying invention processes have been studied extensively, we have little or practically no information for others. For example, we do not know much about the inventors, or the nature of the research or other processes that gave rise to the invention; we typically have no measures of the value of the patent other than the proxies that we can retrieve from the patent document; and we know very little about whether the patent is used or not, whether it is licensed, or whether it is further developed into a new product by the applicant.

The most natural way of collecting this information is through surveys. Griliches (1990) himself noted that patent surveys had not been undertaken for a long time. Since then, Scherer, Harhoff and Vopel conducted a patent survey in the US and Germany to explore the distribution of the economic value of patents (Scherer and Harhoff, 2000; Harhoff et al., 2003b). The Yale survey (Levin et al., 1987) and the CMU survey (Cohen et al., 2000) investigated the motivations for patenting of US firms. Cohen et al. (2002) presented survey evidence on the role of patents for diffusing information in Japan relative to the US. Arundel and Steinmueller (1998) used the Community Innovation Survey to look at patents as information channels in Europe. Meyer (2000) interviewed a group of European inventors of nanotechnology patents to understand the connection between their invention and the scientific research that they cite. Tijssen (2002) performed a mail survey amongst Dutch inventors to understand the contribution of science to successful technical inventions, and to test the validity of patent citations to scientific literature as indicators of science dependency. While these surveys provide new data, they have limited European coverage and are mostly biased towards large companies.

In order to overcome some of the weaknesses implicit in earlier studies, PatVal is a large-scale survey designed to be representative of the universe of patents in our EU6 countries. It covers all technological fields, deals with both for-profit and non-profit applicants, and collects information on small, medium and large business companies. In 2003, patents with the first inventor located in one of our EU6 represented 42.2% of all EPO patents, and 88% of the EPO patents whose first inventor was in one of the EU-15 countries. PatVal's main objective is to collect information about patents and the underlying invention process on issues that had not previously been explored in depth because of lack of information in the patent documents. It also provides new proxies for variables like knowledge flows or patent value for which the present measures are subject to the discussions noted earlier.

This paper is the first of a series of contributions based on the PatVal survey that explore these issues. It focuses

[3] It is worth to recall the difference between the concepts of invention and innovation. We refer to inventions as novel ideas, processes, methods, objects that result from R&D activities. Inventions may (or may not) be patented. Inventions become innovations when they are transformed into commercialisable products or technologies, by means of investments in complementary manufacturing, technological and marketing assets. As a market of fact, not all inventions turn into innovations and reach the market.