PERCENTAGE PATENT REPRESENTATION (PPR)
BILATERAL PATENT BALANCE (BPB) AND PATENT
DOMINANCY (PD) INDICATORS CHARACTERIZING
INTERNATIONAL PATENTING RELATIONS

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(Received September 16, 1992)

In order to characterize the integration of countries into the world intellectual property
network some indicators are offered. Percentage Patent Representation (PPR) gives the
percentage share of patents granted to the inventors of a given country in the total number of
patents granted to all foreign patentees. The ratio of PPR indices for two countries yields the
Bilateral Patent Balance (BPB) indicator, which is characteristic of a mutual patent
representation. Patent Dominancy (PD) index is the number of BPB indices higher than unity
for a set of countries. PD indices can be related to GDP and growth of export values.

Introduction

Papers in natural science contain original scientific information, published
preferably in international periodicals mostly according to norms formed by
tradition. Patents contain both scientific and technical information disclosed
according to legal rules. Patent statistics are widely used for investigating economic
development.

Frame\(^1\) revealed relationships between the inventivity of countries (expressed by
the number of domestic patent applications) and their GNP, number of scientific
papers and number of US patents issued to inventors of the countries.

Surveying the literature on foreign patenting\(^2-4\) the conclusion drawn by
Basberg\(^5,6\) can be accepted, namely that the main reason for applying for a patent in
a foreign country could be the protection of an export product. Consequently, the
volume, direction and composition of foreign trade are the most important factors in
explaining foreign patenting activity. The number of patents granted to a given
country in another country, however, also depends on several other factors, like the
respective rules of intellectual property law, social, political and economic conditions, internationalization of the R and D network and business strategy of companies, etc.

Foreign patenting was used by Soete and Wyatt as an internationally comparable indicator of science and technology output. The authors found relationship between foreign patent intensity in a given country (e.g. Japan, Great Britain, Germany) and the national R and D intensity (i.e. expenditures on R and D) of the patenting country.

Results and discussion

Percentage representations of countries in the patent market-place of a developed country are widely used for characterizing various economic factors. The percentage share in patents of a patenting country can, however, be related to the total number of non-resident patents in a given country [Eq. (1)] instead of the sum of non-resident and resident patents. The so obtained index can be coined as Percentage Patent Representation (PPR):

\[ PPR = 100 \cdot \frac{p_{ij}}{P_i} \]  

where \( p_{ij} \) is the number of patents registered in the i-th country for the j-th country and \( P_i \) is the total number of non-resident patents in the i-th country. PPR indices allow comparisons also between countries with very different domestic patenting activities.

By selecting arbitrary groups of countries, a Percentage Patent Representation Matrix (Percentage PATRIX) can be formed which contains PPR values for patenting (columns) and patent granting (rows) countries (Table 1).

Table 1 shows the PATRIX (i.e. PPR data) calculated for some selected developed countries and Hungary. The data reveal, for example that US has 27.58% of the non-resident patents in GB, while GB occupies only 7.05% of the US foreign patent-market. It is worth mentioning that, for instance, US occupies 46% of the foreign patent market in Japan, while it is represented in Switzerland and Italy only by 19.17 and 23.02%, respectively. France is present on the Japan and US market only by 7.30% and 7.29%, respectively. Hungary is preferred by German inventors (21.13%), whereas the greatest foreign patent market share of Hungary is in Switzerland (0.93%).