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Research and patenting in Indian universities and technical institutes: An exploratory study

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ABSTRACT

This study uses data on publication, and patents, of 347 universities and technical institutes of India from 1970 to 2010, to understand their current research status. We find that though the total number of patents and publications has been increasing gradually, the contribution of Indian academic institutions in patenting is still low and needs to be incentivized.

1. Introduction

This paper presents an analysis of the research output of universities and technical institutions in India and a comparison of their publications and patenting activities.

In India, the issue of intellectual property rights based on research carried out in Indian universities and other academic institutions is being addressed in recent times. Ray and Saha [1] presented data on drivers of patenting in the premier technical and research institutions. Their study does not take into consideration contributions from the central and state universities which are a substantial part of Indian educational and university system. Naik conducted a primary data analysis [2] of patents filed, granted and maintained from the premier technical academic institutions such as the Indian Institute of Technologies (IITs). The Kakodkar Committee report that was presented in 2011 to Ministry of Human Resource Development (MHRD) recommends autonomy measures for IITs and stresses the need for patent generation and management in these institutions. The report however, does not mention the current research output of these institutions (except mentioning about the royalties earned by IIT Madras) [3]. We present a comparative analysis of research output based on the patents and publication of Indian central and state universities and technical institutions (six old Indian Institutes of Technology).

2. Methodology

For the purpose of this research we have taken into account all central universities (43 in number), state universities (298 in number) and 6 old IITs.[2] Patent data was collected in March–April, 2013 from IPINDIA – an online search engine of the Indian Patent Office under the office of the Controller General of Patents Designs and Trademarks. We put the search query "name of grantee" containing "institute" (for IITs) in the first phase and "name of grantee" containing "university" in the second phase. We kept our key words broad so as to include all possible results for the patent applications filed in India (national filing). We obtained 796 records for IITs and more than a thousand records for universities that are further screened to include only relevant data for the analysis. With the suggestion of two experts (having more than a decade of experience in prior art searches) we approached the online search engines of United States Patent and Trademark Office (USPTO) and European Patent Office (ESPACE-NET). On the USPTO, we have conducted assignment on web search with assignor/assignee name: Indian Institute of

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[2] IIT Guwahati was set up in 1994 and seven more IITs were established in 2008 followed by two IITs in 2009. Since they have not been in existence for a sufficiently long time, we have focused on 6 old IITs along with other universities.

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0172-2190/

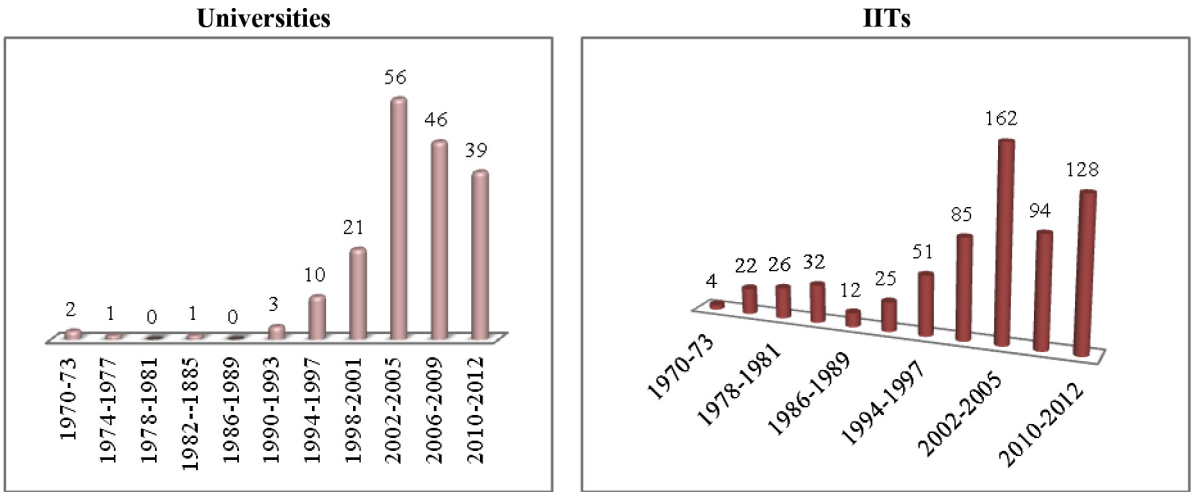

Fig. 1. Patent applications filed by universities (central and state universities taken together) and IITs (1970–2012).

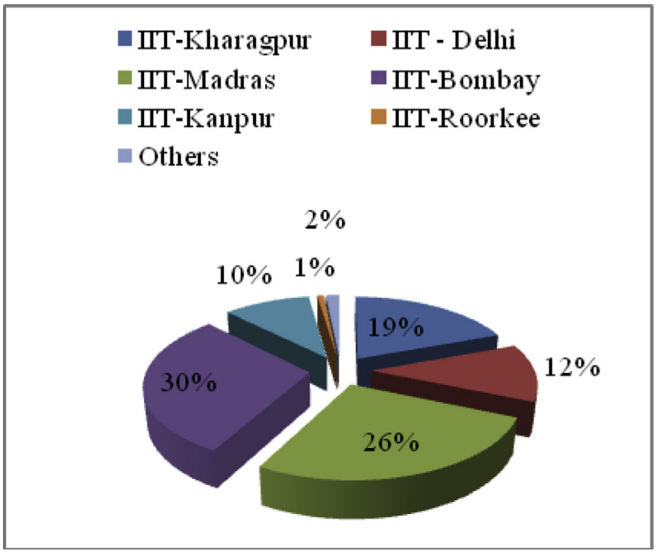

Fig. 2. Share of patent filing by IITs (1970–2012).

Technology, and quick search ACN/(IN) i.e. Applicant Country India and AN/(technology AND India) i.e. Applicant Name containing technology and India.

Another set of data consists of publication records of all state, central universities and IITs covering the period of 2000–2012 based on the SCOPUS database. It is an international multidisciplinary database indexing more than 20,500 international peer-reviewed titles from more than 5000 international publishers[3]. So far, SCOPUS is the single largest international multidisciplinary database in the world. Considering its wider exposure of journals and conference proceedings we were expecting to generate a better picture of the research output of Indian universities and IITs. In SCOPUS we have conducted affiliation searches with the name of the respective university to collect publication record from 2000 to 2012 for 42 central universities and 298 state universities along with 6 IITs.

[3] See http://www.elsevier.com/online-tools/scopus/content-overview for detailed information.

3. Analysis and discussion

3.1. Patenting trend in India and abroad

IITs have filed a total of 642 patent applications (in India and abroad) in the last 42 years i.e. from 1970 to 2012 while only 185 patent applications have been filed by all state and central universities (in India and abroad) in the last 72 years i.e. from 1940 to 2012. Figure 1 shows year wise trend of patent applications filed by Indian universities and IITs.

There is a sudden rise in the patents filed in the period 2002–05 which may be attributed to the policy initiatives taken by the Indian government in 2003 with its Science and Technology (S&T) Policy-2003. The government of India after its Technology Policy Statement-1983 announced S&T policy-2003 to create a national innovation system, setting up technology transfer offices in universities and to encourage investment by industries in education and R&D.

All six IITs in India were actively patenting their inventions while only 18% central universities (9 out of 42) and 11% state universities (35 out of 298) were patenting their inventions. This further strengthens the argument given by Ganguli that the concept of IPR policy in Indian universities is still at a nucleating state which needs more years to mature [4].

Figure 2 shows that of the six old IITs in India, IIT-Bombay tops the list with 30% of the total patents filed, followed by IIT-Madras with 26% patent applications, IIT-Kharagpur (19%) and IIT-Delhi (12%).

Figure 3 depicts the share of patent applications filed by top six central universities and state universities respectively. Among the central universities, Delhi University tops the list with 63% of total patent filings (34). Calcutta University tops the group of the State universities with about 28% of the total applications filed.

Figure 4 presents data on patent applications filed in different countries like USA, EU, Denmark, Brazil, Canada, Hong-Kong, Korea and China. For IITs 61% of the applications have been filed only in India (393 patent applications) and 19% of the applications have been filed in the USA (121 patents). Only 17% applications of IITs have been filed through the PCT route.

For universities, 47% patent applications (85 in number) were filed in India and 24% patent applications were made in US with only 4% European patent applications.

Figure 5 shows that IITs started filing PCT applications after 2000 as India became a member of the PCT in 1998. Starting with 3 PCT