

HOW INDIAN SCIENTISTS COLLABORATE IN PATENTING?

V K Gupta

National Institute of Science, Technology and
Development Studies
New Delhi 110012
E-mail: vkgupta@nistads.res.in

There are very few studies on collaboration in patenting in India. The understanding of collaboration in patenting is important for R&D managers in order to effectively organize R&D teams and distribute the benefits that may result from such collaborations. The paper looks into the nature of international collaboration in patenting, specially, the contributions by scientists from India. It also indicates the pattern of collaboration while patenting in India, particularly, reflecting upon the case of CSIR. It shows that there is significant amount of contribution by inventors from India in collaboration with inventors from other countries in patenting. There is a gradual decline in individual inventor patents from India. The contribution by teams of three inventors is maximum. The R&D managers should take initiatives to manage collaborations among individual researchers – bringing them together, creating healthy relationships among them and improving the work environment by minimizing and resolving the bottlenecks during collaboration.

INTRODUCTION

Scientists choose to engage in collaboration for many reasons as a single person does not have the requisite skills, knowledge, and resources to address all research problems. A judicious choice of collaborators can save considerable time and or money. The funding and structure of science also tends to favor programmes that can demonstrate participation of more than one party. The motivations for collaboration may range from access to expertise, equipment, and funding to professional advancement, ability to tackle challenging problems and networking. Collaboration also offers many benefits such as speed, power and efficiency of research, breadth and synergy of projects, reduced risk of venture feedback, dissemination, and visibility of results.

Despite many advantages, collaborations are also a frequent source of problems. In some cases, useful collaborations may not even begin because of reluctance to share or work together. Once

started, the collaboration may be marred by misunderstandings of what is to be provided by each of the participants, unhappiness with a slow collaborator, disagreement about what and when to publish or conflicts regarding authorship and credit.

Modern scientific research environment is more dynamic and indicates an increasing trend in collaboration in different fields of science and technology. This trend is often described in bibliometric and scientometric terms, mostly by using co-authorship in publications as a broad indicator to determine the nature and extent of collaboration among scientists. There are several studies that have focused on the nature of such collaborations [1 to 10]. Indian studies based on co-authorships in publications indicate significant degree of co-operation with scientists from several developed countries, for example, USA, Germany, France, UK, Russia, Australia, the Netherlands and Japan and the developing countries, for example, China, Bangladesh, Argentina, Brazil, Mexico, Columbia and South Africa [11 to 17].

In contrast, there are very few studies on collaboration in technological research [18 to 21]. The team of inventors in patenting is one of the most important data source for this type of collaboration. The collaboration in patenting is more significant as, firstly, by law, it is essential that patents ought to include names of only those scientists who have directly contributed to the patentable features of the invention, and secondly, any royalty and the commercial benefits would accrue to the collaborating scientists whose names are given in the team of inventors. Moreover, in view of the commercial interests and the

competition among participating scientists, the collaboration in patenting will only take place if it is essential to collaborate, for example, in terms of sharing of knowledge, skills, techniques, equipment or facilities.

For R&D managers, it is necessary to realize the importance of collaboration in patenting in order to effectively organize R & D teams and distribute the benefits that may result from such collaborations. The present analysis thus highlights the nature of international collaboration in patenting, specially, the contributions by scientists from India. It also indicates the pattern of collaboration while patenting in India, particularly, reflecting upon the case of Council of Scientific and Industrial Research (CSIR).

INTERNATIONAL COLLABORATION

The inventors from several countries collaborate and jointly contribute to the patenting activity. The analysis of patents granted by the US Patent Office during 1976 to 2004 indicates that inventors from US extensively collaborate with inventors from other advanced as well as those from developing countries. There is significant collaboration among inventors within Europe, particularly, from Germany, Sweden, France, UK, Netherlands, Belgium, Italy, (total number of patents range from 1000 to 7000), and Denmark, Finland, and Swiss (total number of patents less than 1000). Outside Europe and United States, Japan, Canada, Australia, Russia, Israel, New Zealand and South Africa represent significant collaboration with the developed countries.

Many of the developed countries also have significant degree of collaboration with several developing countries. For example, Australia, Belgium, Canada, Denmark, UK, Finland, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Russia, South Africa, Sweden, Swiss, and USA collaborate with inventors from developing countries. Of all the developing countries, the collaboration with Brazil, Taiwan, China, India, Republic of Korea, Malaysia, and Mexico is somewhat significant with total number of patents ranging from 100 to 300. In case of collaboration with Argentina, Thailand and Egypt, the total

number of patents ranges between 10 to 100 while for Cuba and Pakistan the total number of collaborative patents are less than ten.

There is also collaboration in patenting among inventors from developing countries. The developing countries whose inventors collaborate in patenting amongst themselves are: Taiwan, China, Republic of Korea, Malaysia, India, Thailand, Brazil, Mexico, Argentina, Egypt, and Pakistan. This type of collaboration in patenting within developing countries is not significant. Inventors from Taiwan and China together collaborate in about 200 patents. In case of other developing countries, the total number of patents in collaboration with inventors from developing countries ranges from ten to fifty patents. These countries include India, Brazil, Republic of Korea, Malaysia, and Thailand. There are less than ten collaborative patents between other developing countries, namely, Argentina, Egypt, Mexico and Pakistan.

CONTRIBUTIONS FROM INDIA

Inventors from India contribute significantly to the patenting activity in collaboration with inventors from other countries. The analysis based on data obtained from USPTO during 1976 to 2004 indicates that there are about one thousand patents in which inventors from India collaborate with inventors from other countries. Of these, about 80% patents are jointly collaborated with inventors from USA. Other important countries with which Indian inventors have significantly collaborated include Australia, Belgium, UK, France, Russia, the Netherlands, Switzerland, and Canada. Indian inventors have only marginal collaboration with inventors from Austria, Denmark, Hungary, Italy, Israel, Portugal, Spain, and Sweden amongst developed countries and China, Brazil, Taiwan, Thailand, Malaysia among developing countries. Inventors from USA are at the fulcrum of collaborations in most cases – be it bilateral or multi-lateral collaborations. It is likely that the inventors from India are part of research teams in a firm or a university abroad wherein inventors from other countries also participated in the team of inventors in a patent.

PATTERN OF COLLABORATION WITHIN CSIR IN INDIA

The pattern of collaboration among inventors of CSIR in patenting in India for the period 1976 to 2000 was examined using Indian Patents (INPAT) CD-ROM database available from the National Institute of Science Communication and Information Resources (NISCAIR). The data on team of inventors was used to analyse pattern of collaboration among inventors. The degree of collaboration among inventors was examined by applying the collaborative coefficient (C.C.) suggested by Ajifurike for patents [22].

The analysis indicates that there were 1978 patents taken by inventors from CSIR in India during 1976-2000. They obtained an average of 79 patents per year during the period 1976-2000. The single inventor patents were just limited to 6% of the total number of patents. Such patents have decreased over the period 1976 to 2000. It may be due to the shift in focus of R&D policies in CSIR that discouraged individual R&D projects. The maximum numbers of patents (30.5%) are obtained by teams of three inventors, followed by teams of four inventors (19.8%), teams of two inventors (19.5%), and teams of five inventors (12.6%). The teams of inventors consisting of six or more than six inventors share about 10% of the total patents. The teams of two, three or four inventors cover nearly 70% patents. The share of multi-inventor patents (with more than 5 inventors) has almost doubled during 1996-2000 since 1976-80, while in case of patents with 5 or less than 5 inventors the increase has been limited to only 15%. The collaborative coefficient calculated on the basis of the definition of Ajifurike remained around 0.60 to 0.66 during the entire period from 1976 to 2000. It implied that the inventors from CSIR maintained a steady state of collaboration in patenting over the period of time.

CONCLUSIONS & RECOMMENDATION

The analysis indicates an increasing trend in international collaboration in patenting. There is significant amount of contribution by inventors from India in collaboration with inventors from other countries in patenting. The contributions are quite

high in collaboration with inventors from developed countries than those from developing countries. It established the need for proper governance of international co-operation in science and technology, particularly, on guiding the individual inventors about the do's and do not's in sharing intellectual property during such collaborations. The analysis of collaboration in patenting in India further indicates that there is gradual decline in individual inventor patents while the contributions by teams of three inventors are maximum. In order to realize full potential and benefits of the competence of inventors, the R&D managers should take initiatives to manage collaborations among individual researchers – bringing them together, creating healthy relationships among them and improving the work environment by minimizing and resolving the bottlenecks during collaboration. Special attention should be given to establish the guidelines for sharing of intellectual property during research collaborations both within the country and those with inventors from other countries.

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