

# Need to inculcate the culture of intellectual property protection in research and development

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*The burgeoning and the rapidly disseminating shibboleth intellectual property rights (IPRs) normally relate to intangible property having intellectual matters in its background. Intellectual property (IP) is the outcome of creative brain and intellect. IPRs are facsimile to movable and immovable properties and are characterized by specific rights as well as limitations. The separate and distinct types of intangible property, viz. patents, trademarks, copyrights, designs, know-how, trade secrets, etc. are collectively alluded as IP.*

*IPRs are and will be a quintessential component of an innovative knowledge generated and acquired through research and development (R&D) efforts and thereafter protected by an individual, a team, an organization and a nation as a whole. In the present global scenario innovation – which is a process of continuous improvement or a new process – has become imperative for self-sustenance, economic growth and competitive business advantages. It is through R&D that an individual is capable of bringing forth new and innovative ideas. Interfacing IP with R&D will pave the way to productive knowledge protection, enrichment of innovative ideas, creation of well-articulated human resources and also nurturing of an innovation culture.*

ONE often wonders whether the research and development (R&D) personnel are really protecting their intellectual property (IP). There is a general consensus that protection of IP is kept at a low profile in India compared to developed and other developing countries. Among the various forms of protection available, patents assume the pivotal form of protection, especially for a R&D organization<sup>1</sup>. In other areas like computer software, copyright protection is most often resorted to. India, with the second largest scientific manpower in various arenas, must essentially have innumerable patents filed and granted, and should be amongst the top echelon countries in the world. The lesser number of patent filing may be due to lack of awareness of its role, importance and economic value.

Generally, patents protect the creation of mind or intellectual product. Patents are the intellectual property of an organization and ought to be protected from trespassers, just the way one takes impeccable care to protect one's physical belongings like vehicles, house, equipment, etc. This issue of IP protection is gaining prominence<sup>2</sup>, as R&D institutions, corporations, university departments and NGOs are becoming vigilant in securing their innovations by taking patents in India and abroad.

In the Indian context, patents in particular and other forms of intellectual property rights (IPRs) are neglected during the university courses in basic sciences, engineering and other

applied sciences. Young people, leaving the universities with a degree have almost negligible knowledge of the relevance of patents. On the contrary, patents receive much attention from public-funded R&D institutions and private firms/companies, because of their relevance for development of business, having a sustained position in the market to recover the investment made and for partial self-reliance. Table 1 depicts the low filing of patents from universities and educational institutions compared to public-funded R&D institutions like CSIR in India. The increase in the number of patents filed by CSIR probably coincides with a shift in its policy, which emphasizes that laboratories earn a major portion of their budget through sponsored research by industries. TIFAC, affiliated to DST, has taken the initiative and has been periodically organizing various patent awareness workshops to create consciousness among research students, R&D personnel, readers and professors, especially at the university level. The scant interest in IPR-related literature<sup>3</sup>, importance of patents and their protection can be attributed to the following: (i) partial awareness of the role, importance and the essentiality of patents; (ii) poor

**Table 1.** Patents filed by Indian universities, educational institutions and CSIR

Organization	Patents filed		
	1994–95	1995–98	1999–2002
Indian universities	04	54	132
IITs + IISc	31	98	183
CSIR	242	1041 (Indian) 334 (Foreign)	–

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knowledge on the need for innovation and protecting the innovation through IPR route; (iii) poor accessibility of patent texts (in fact, libraries do not procure or display patents and other relevant literature); (iv) inadequate knowledge to access patents through internet, procurement of granted patent copy is complex and costly; (v) insufficient knowledge on drafting patent applications to the desired format discourages students working in different departments of universities; (vi) inadequate knowledge regarding market needs and demands, both within and outside the country; (vii) patents not considered important for achieving higher academic positions or for career development; and (viii) inscrutability to grasp and interpret experimental results and claims in patents.

To take maximum advantage of the cutting-edge technology, multinational corporations, private industries and NGOs have well-articulated IPR policy, which is in close relation to the core business of a company. Thus, the ambience for IP creation and protection is marginally better in the industry compared to university departments. Table 2 lists the top ten US universities and corporations who received patents<sup>4,5</sup> in 2002. Domination of private firms/industries in receiving patents compared to that of universities is fairly clear and their well-defined IPR policies will give them a

competitive edge in the coming years. However, it is commonly agreed upon that basic and innovative work emanates from universities and educational institutions. They are considered as idea-generators on whom the structure of innovation can be built upon. The IP thus developed must be protected. Academic institutions do not evince keen interest regarding patent filling. Table 3 depicts the poor performance of Indian universities compared to private companies/corporations. IP protection in all fields of S&T must be nurtured. Patents protect intellectual endeavours and encourage technological processes, helping to nurture industries that create jobs. Attention and emphasis are given by R&D managers to patents because of the following reasons:

- Patents are the technological strengths and inalienable asset of a company, which can be sold, exchanged or licensed to trade with interested companies.
- Patents are the core and crucial prerequisite for advancement and reinforcement of technological position of a company.
- Knowledge of patents in a particular field allows one to be aware of the strengths of competitors.
- Patents are technological and economical parameters of a company and of a nation as a whole.

**Table 2.** Top ten US universities and corporations who got patents in 2002

Serial no.	University	Patents received	Corporations/companies	Patents received
1	University of California	431	IBM Corporation (USA)	3288
2	Massachusetts Institute of Technology	135	Canon Kabushiki Kaisha (Japan)	1893
3	California Institute of Technology	109	Micron Technology Inc. (USA)	1833
4	Stanford University	104	NEC Corporation (Japan)	1821
5	University of Texas	93	Hitachi Ltd (Japan)	1602
6	Johns Hopkins University	81	Matsushita Electric Industrial Co Ltd (Japan)	1544
7	University of Wisconsin	81	Sony Corporation (Japan)	1434
8	State University of New York	55	General Electric Co (USA)	1416
9	Pennsylvania State University	50	Hewlett-Packard Co Ltd (Japan)	1385
10	Michigan State University	49	Mitsubishi Denki Kabushiki Kaisha (Japan)	1373

Source: USPTO.

**Table 3.** Top ten Indian universities and companies filing patents

Serial no.	University/IITs*	Patents received	Corporations/companies	Patents received
1	IITs Kharagpur and Guwahati	75	CSIR	184
2	IISc, Bangalore	40	Ranbaxy Laboratories Ltd**	56
3	IITs Delhi, Kanpur and Roorkee	31	Dr Reddy's Laboratories Ltd**	19
4	University of Delhi	29	Orchid Chemical and Pharmaceutical Ltd**	16
5	IIT Bombay	22	Biocon India Ltd**	10
6	IIT Madras	14	Bharat Heavy Electricals Ltd†	18
7	AIIMS	14	Larsen and Toubro Ltd†	15
8	Goa University	4	Datar Switchgear Ltd†	8
9	Mahatma Gandhi University	4	Electrex (India) Ltd†	6
10	Jawaharlal Nehru University	3	Crompton Greaves Ltd†	5

\*Top ten academic institutions which have filed patents from 1999 to 2002.

\*\*Indian pharma players among the PCT applicants in the year 2002.

†Indian electrical engineering players filing patents in India from 1997 to 2002.

- Knowledge of patents allows an individual to ascertain the rights of ownership and in case of infringement one can seek prosecution and heavy fines for damage caused.

An attempt is made in this article to inculcate the culture of IP protection in researchers and scientists in order to have competitive edge, to have a sustained position in competitive global market and to expound the need of IP protection, role of patents in R&D and management of IPRs. The article also deals with India's position with respect to patent filing, amendments in Patents Act, and its preparedness for 2005. All these aspects, which are now swiftly gaining momentum in India and in all developing countries are enunciated and dealt at length as they gain importance in the scientific and technical world in the 21st century<sup>2</sup>. There would be no need of IP and patent laws if people are conscious of the rights of others. All countries have created appropriate laws and reinforced them statutorily.

### **Invention and patents**

An 'invention' is described as a new solution to a technical problem, which can be new or old. This solution, in order to qualify as an invention must be new, i.e. it must not have been thought of before or if thought of, should not have been published and be in public domain. The problem solved must be technical, when it relates to invention. The word 'technical' denotes that the invention must have an industrial application and it must not consist of mere recognition of a law of nature (such a recognition is called a scientific discovery and not a technological invention).

Since it is technically viable in industry, an invention is economically valuable. It helps the industry to make new products or make products more economically (faster, cheaper) or improve existing products (making it better, quality-wise). Empirically, inventions are rarely serendipitous or a stroke of genius. Inventions are generally the outcome of long and hard thinking and experimentation with the aim and hope of arriving at a new technical solution. In short, inventions are invariably the results of methodical research.

The technical problem once solved must assume the shape of an invention, i.e. it must end in a patent application. The matter does not end there, but it stimulates investment required for research. The invention once consummated should be allowed to be used for a limited period (tenure of patent), only by the persons who made it (the inventors) and by the organization for which it was made (the employer or the assignee). The inventor is given the exclusivity to use the invention for a limited span of time (maximum 20 years) by law<sup>6</sup>, but only in the country or territory which grants the patent. In return for the grant of patent, the inventor will disclose the invention by keeping it in public domain. Unauthorized persons or companies cannot use this knowledge for commercial benefit and pecuniary advantage. A vital aspect to be remembered is that an invention, which

is not protected in a given country, is considered as being in the public domain in that country. In other words, the invention could be used in the said country for its own development, without the risk of infringement.

### **Criteria for patentability**

To have subject paradigm that contributes to a valid patentable invention<sup>7,8</sup>, there are some prerequisites to be adhered to:

#### *Novelty*

The subject matter of the invention is not or cannot be inferred to be a part of what is already well known. This is referred to as the 'novelty' requirement. 'New' or 'novel' in this context means new to the public. Therefore, something that has been previously known but has been kept as a secret (not revealed to public) is not a deterrent to patentability. Novelty aspects in an invention can be generally met by the schism between the invention and what is already cited in the prior art, i.e. the pre-existing information that constitutes part of the background of the invention.

#### *Non-obviousness*

It is a vital and technical requirement and is subjective in nature, i.e. it varies from one invention to the other. Some inventions meet this legal yardstick by a simple description, while others require comparative test data. The general test for non-obviousness relies on the skill of a person in that particular field to which the invention pertains, at the time of invention, would consider being non-obvious. This pre-requisite to patentability desists others from taking advantage of the patent system and secure protection for something that is a mere extension or trivial variation of what already exists.

#### *Utility*

It is a rudimentary requirement and is met by exhibiting that the invention has some specific application in industry. An invention, to be of some core value, must necessarily need to be commercially viable. It is not a legal binding and the patent system enables the inventors to file the patent application at an early date and enjoy greater chances of securing patent rights.

### **Inventions not patentable**

It is important and indispensable for researchers, innovators and R&D personnel to have explicit knowledge of inventions, which constitute the subject matter that can be patented.

There is a big list of inventions that can be patented *ipso facto*, but to prepare this type of list is a gargantuan task. On the contrary, it is easy to prepare and enumerate a list of inventions which cannot be patented<sup>9</sup>. These are as follows:

- An invention which is frivolous or which claims anything obviously contrary to natural laws.
- An invention contrary to public order or morality or which causes serious prejudice to human, animal or plant life or health or the environment.
- A mere discovery of a scientific principle or the formulation of an abstract theory or discovery of any living thing or non-living substance occurring in nature.
- A mere discovery of any new property or new use for a known substance or mere use of a known process, machine or apparatus unless such known process results in a new product or employs at least one new reactant.
- A substance obtained by a mere admixture resulting in the aggregation of the properties of the components thereof.
- A mere arrangement or rearrangement or duplication of known devices, each functioning independently of one another in a known way.
- A method of agriculture and horticulture.
- Matters related to atomic energy.
- Any process for medicinal, surgical, curative, diagnostic, therapeutic or other treatments of human beings, animals or plants, to render them free from diseases or to increase their economic value or that of their products.

### Criteria for patentability in India

The Indian Patents Act does not delineate, in an inclusive manner, what is patentable; rather omissions of subject matter from the non-patentable inventions clarify what subject matter can be patented. India, from the very basic concept of patentability of inventions, has stringently adopted and practised three basic international criteria, viz. novelty, non-obviousness and utility. In a wider perspective, these three criteria determine the capability of inventions which can be patented. The processes for producing a substance by chemicals, biochemical, biotechnological and microbiological processes are patentable<sup>10</sup>. Therefore, patents are available for processes or methods of production of tangible and non-living substances like a wide range of chemicals, electrical items, engineering goods, biological products, enzymes, hormones, vaccines, etc. Furthermore, processes using chemical conversion, chemical reactions, bioconversions, biotechnology, microbiology and/or chemical substances produced using genetically engineered organisms are patentable<sup>11</sup>. The Indian Patents Act explicitly excludes microorganisms from invention exemption, making them patentable<sup>12</sup>. The methods or processes of manufacture of a new use of known substances and known processes; combination products which are not in public domain are

patentable. Analytical methods for testing the suitability/performance of the products are patentable. Testing methods during the process of manufacture or for quality control of products under manufacture are patentable.

### Procedural delay in filing Indian patents

In India, researchers, innovators and scientists are not conscious of early filing of patents. They are also not aware of the importance and the economic values that can be accrued from patents. Many students and researchers in schools/universities and private R&D institutions are still not aware that patents are indicators of social and economical developments of the country. Beside, the Indian patents offices lack adequate infrastructure as well as qualified and trained patent examiners. These reasons cumulatively affect filing and acceptance of patents, resulting in delay. Some of the probable remedies for overcoming delay in filing patent applications are:

- The basic format (according to the patents office) for drafting patent application should be made simple and be available to all researchers on-line. The World Intellectual Property Organization (WIPO) has Patent Cooperation Treaty (PCT) made easy format.
- There should be patent offices at all the state capitals. This would help in speedy filing of patent applications.
- The patent office should have adequate number of trained personnel in various areas of research.
- The IP managers at the R&D level and the patent examiners should have a network of computers and internet connections for easy access to on-line search for prior art.
- The patent examiners should have the ability to identify the novelty and usefulness of the invention from the patent application.
- The patent examiners should cultivate the skill to pinpoint the non-obviousness (inventive steps) with respect to prior art.
- The legal papers required for filing patent applications should be made simple, for example for joint patent applications where memoranda of understanding (MoU) and authority letters are to be attached.
- The Indian Patents Act 1970 should comply with the TRIPS agreement and allow patents in all fields of technology.
- The patent examiners should ascertain that the claims of the cited prior art are not infringed. This would help in speedy filing of patents.

### Indian Patents Act: Amended

India became a member of the WTO on 1 January 1995 and it was obligatory on the part of India to comply with the TRIPS agreement. This agreement demands that India should provide adequate standards and principles con-

cerning the availability, scope and use of IPRs and effective means for enforcements of these rights. Looking into these aspects critically, it was felt quintessential on the part of India to amend certain provisions of the Patents Act 1970. This Act has been amended by the Patent (Amendment) Act 2002, which came into force<sup>6</sup> on 20 May 2003. Accordingly, the inventions that are now patentable and those which are still not patentable in India, are mentioned below:

#### *Inventions patentable*

- (i) Methods of testing during processes of manufacture or for control of manufacture.
- (ii) Methods of treating plants to render them free of disease or to increase their economic value.
- (iii) A method for improving the plant value or increasing the value of the plant product.

#### *Inventions still not patentable*

- (i) Plants and animals, whole or in part thereof, other than microorganisms, including seeds, varieties and species and their production, or propagation of plants and animals by biological processes.
- (ii) An invention which is a traditional knowledge or which is an aggregation or duplication of known properties of traditionally known component or components.
- (iii) Business method, computer program per se and topography of integrated circuit.
- (iv) Food for human consumption, substances made by chemical processes, biochemical, biotechnological and microbiological processes, medicine or drugs, including drug intermediates per se.

Some of the salient provisions in the amended Act of 2002 are mentioned below.

- Interested parties or entrepreneurs may apply to the Controller of Patents for grant of compulsory license on patents after expiry of 3 years from the date of sealing of patents on the following grounds:
  - (i) Reasonable requirement of the public germane to patent invention has not been satisfied.
  - (ii) The product of the patent invention is not available to public at a reasonable price.
  - (iii) The product is not produced in India.

Here, it is imperative for the applicant to produce evidence for the efforts made to obtain a license from the patentee (in India or abroad) on moderate terms and conditions if the same were not successful within good time. However, in case of national emergency or any other extreme urgency, such requirements are not necessary.

- The compulsory license can be granted by the Central Government by giving a notification in the official gazette in respect of patents in force under the circumstances of national emergency or in case of public non-commercial use which may arise or is required, including public health crises like AIDS, tuberculosis, malaria and other epidemics.
- The patent rights will not be considered infringed by the act of making, constructing, using or selling a patented invention solely for development and submission of information required under any law in India or abroad that regulates the manufacture, construction, use or sale of any patented invention. Further, the import of patented products by any person from a person or party duly authorized by the patentee to sell or distribute the product, will also not constitute an infringement.
- The terms of the patents shall be 20 years from the date of filing for all patents granted after 20 May 2003 and also for patents which have not ceased on 20 May 2003.
- The concept of 'invention' and 'unity of invention' is modified and made at par with European Patent Law.
- Patent protection is now possible for any new product or process involving an 'inventive step' and is capable of 'industrial application' subject to specific conditions.
- The period of putting the application in order for acceptance has been reduced from 18 to 12 months from the date of issuance of the first examination.
- Time for restoration of a ceased patent has been increased from 12 to 18 months; as such, an application for restoration of a patent ceased on or after 20 May 2003 can be filed within 18 months from the date of cessation.
- In the new provision, the burden of proof in the case of infraction has been shifted to the alleged infringer for a new product of a process patent or where the patentee is able to prove that the straits of the new product are facsimile to the one made by the patented process.

#### **The patenting scenario in India**

The patenting activities in India via the PCT route have been abysmally low<sup>13</sup> compared to those in developed countries like the US, Germany, Japan, etc. The data given in Table 4 clearly support this statement. India joined the PCT in December 1998, which is administered by WIPO, an agency of the United Nations. Since joining the PCT system for international filing of patents, India has registered one of the highest growth rates in PCT filings. During 1999, India filed 61 applications and in subsequent years, this number almost doubled with 156 in 2000; 316 in 2001 and 480 applications in 2002. As a result, India has swiftly moved from the sixth position in 1999 to the third position in 2002, as a principal user of the PCT system amongst developing countries. Table 5 gives the list of PCT filing in the leading developing countries<sup>14</sup> in 2002. This buttresses the fact that Indian industries, entrepreneurs, R&D institutions, universi-

ties and individual inventors are actively pursuing international patent protection across different technical fields in a large number of countries through the PCT route. However, gargantuan efforts are required by educational institutions (IITs and IISc), and the large number of universities (ca. 250) and R&D institutions (ca. 200) to protect their inventions through patents in order to keep India abreast with the developed countries (G-8) and make it one of the developed countries by 2020.

In the last two years, from among the Indian PCT applicants from R&D institutions, private sectors, universities, educational institutions (IITs and IISc), etc., CSIR has emerged as the major user of the PCT system. During 2002, CSIR topped the list<sup>15</sup> from developing countries with 184 applications, followed by leading Indian drug companies from private sectors like Ranbaxy Laboratories Ltd with 56; Dr Reddy's Laboratories Ltd, 19; Orchid Chemicals and Pharmaceuticals Ltd, 16; and Biocon India Ltd with 10 PCT applications. Recent statistical data<sup>16</sup> for the year 2002 reveal that CSIR (India) has emerged at the top of the list of PCT applicants from developing countries, by sharing the top position with Samsung Electronics Co Ltd (Republic of Korea) with 184 applications. Down the line is Bio-window Gene Development Inc (China) with 136 applications. LG Electronics Inc (Republic of Korea) with 125 applications and Huawei Technologies Co Ltd (China) with 84 applications. Since 2002, other leading Indian companies like JB Chemicals, Nicholas and Piramal, Degussa, Procter and Gamble, The Star Wire and others looking into the cause and effect of IP protection, have started filing of patents in India and abroad as a national mission. The large number of patents filed by and granted to CSIR has lured a number of Indian as well as transnational companies to sponsor projects to its various laboratories and for joint R&D activities.

The number of patent applications notified in the Gazette of India Part III, Sector-2 evinces that India has been designated<sup>14</sup> in increasing number of PCT applications filed in 125 member states of the PCT. It will be interesting to note

that in 2002, the International Bureau of WIPO received about 114,050 international applications, out of which about 91,650 (80.4%) have designated India as one of the filing countries. The foreign applications filed earlier are now entering the 'National Phase' at the Indian Patent Office (IPO) for grant of patents. In 2000, ca. 4160 patent applications entered the Indian National Phase and this number increased by 53% during 2001. The IPO, from the current trends in Indian filing, envisages about 8000 and 12,000 PCT applications to enter the National Phase in 2002 and 2003 respectively. The large number of patent applications coming to India via the PCT route is an indicator of the attractiveness of the Indian economy and a precursor to the inflow of foreign investment. It also helps boost the revenue of the IPO.

### IP protection in R&D

Indians are parenting patents like never before in their 200 R&D laboratories. IP protection is a secured legal right to be at use for deterring unauthorized individual enterprises or corporations from practising, i.e. making, using or selling inventions covered by the patent. The innovative ignorance of developing countries is due to lack of creativity and awareness to maintain the quality of constructive and creative capabilities and satiate the criteria of patentability, i.e. novelty, non-obviousness and utility. Moreover, people have scarce knowledge of the importance of patents and their pivotal role in socio-economical development of developing countries. Evidently, the explosion in number of patents being filed and granted every year<sup>14</sup> indicates supersession of technologies with periodic improvization and amelioration (by reverse engineering) of the extant technologies with reference to non-obviousness and cost-effectiveness. Incontestably, IP protection dominates planning of core research, business, industry and growth of society, necessitating determination of its potential and consequence by systematic analysis and study.

With the emerging scenario of WTO regime, for developing economies like that of India, it is quintessential to bring in transformation in its pursuit to achieve the goals of quality management and IP protection in order to be globally competitive. The culture of quality and innovation must be inculcated in all R&D activities. This becomes more effective if these qualities are cultivated and nourished in an academic ambience.

It is well known that various forms of IP are the best means of protecting technological assets. We are living in technologically hypnotized times, where today's technology may soon be superseded by an improved one. As Bill Gates has rightly pointed out, new technologies are emerging at the speed of thought. Thus technology is never static, but always turbocharged. The spirit of innovation and comprehension of IP protection needs to be imbibed in order to sustain oneself in a contemporary competitive global market. Industries

**Table 4.** Top ten major PCT applicants from other countries along with those from India

Serial no.	Country	Number of PCT applications in 2002
1	USA	44,609
2	Germany	15,269
3	Japan	15,531
4	UK	6274
5	France	4877
6	The Netherlands	4019
7	Sweden	2988
8	Republic of Korea	2552
9	Switzerland and Liechtenstein	2469
10	Canada	2210
11	India	480

Source: World Patent Information.

**Table 5.** PCT filing in major developing countries

Developing countries/Year	No. of PCT applications				
	1999	2000	2001	2002	2003
Republic of Korea	790	1514	2318	2552	2947
China	240	579	1670	1124	1205
India	61	156	316	480	611
South Africa	281	386	418	407	376
Singapore	144	225	271	322	313
Brazil	126	161	193	204	221
Mexico	51	71	107	128	123
Columbia	Not member of PCT	–	14	33	–
Philippines	Not member of PCT	–	5	26	–
Cuba	7	–	10	13	–

are our national assets and backbone of Indian economies. It will be the protection of IP as a long-term panacea and strategy that will prevent these industries from becoming vegetating and non-performing (infructuous) assets. We have to be ahead of times, not with the times, and this can be achieved through continuous R&D efforts and innovative planning. There will be no alternative and Indian industries should produce new products and patent the knowledge in India and overseas. Like the cause and effect theory, there cannot be patents without invention and there cannot be inventions without research. Research should be productive. Research is directly dependent on investment and investment demands adequate IPR protection<sup>17</sup>.

### Need for IP protection

IP protection is essential for:

- Helping orient future research and development projects.
- Stimulate creativity and bolster indigenous inventive activities.
- Recognition to inventors in terms of legal rights for a stipulated period.
- Apprehend infringement and help to enhance ethical practices in society.
- Protection to investors for their capital invested in the venture.
- Deter competitors/mercenaries from plagiarism or hijacking of company's knowledge base.
- Achieve competitive advantage in the open market.
- Realization of the value of invention in terms of fiscal benefit/advantage.
- Enhance the market prestige of the product and the company.
- Create a corporate niche through trademarks<sup>TM</sup> and brand equity.
- Fast-forward industrial development and resultant economic leap of the country.

- Stamp out piracy and counterfeiting both at national and global level.

### The role of patents in R&D

In the wake of the post-WTO regime, the importance of patents is globally recognized. Of all the vital information available in the public domain, more than 90% is latent in the patent literature. Patents represent an incomparable source for the history of technology, less of the technology of a given era than of the generation of technology for the coming era. Patents reflect the direction taken by researchers' endeavours at all levels, from ingenious craftsmen to researchers in an advanced laboratory. However, it is crucial to keep in mind that the published inventions apparently belong to the same state of affairs in the development of technology; for example, an improvement to apparatus that is already in use is applied for filing, whereas a novel concept will need 20 years of development work before leading to an innovation.

The legal, economical and technological facets of a patent, give them an eminent role to play in technological and industrial development of a country<sup>18</sup>. Patents are weapons that are both offensive and defensive as a right to property. Here, the aphorism 'Forewarned is forearmed' is absolutely true. The publication of patents, as a counterpart to the monopoly it affords, constitutes an element of scientific and technical information and enables them to be used in the following ways:

#### *Patents as technological and industrial development indicators*

Patents are filed in a specific country only when there is a potential for manufacturing the product and an economic leverage is envisaged in that country. The leitmotif for patent application is that the invention could be reproduced by industry of that country. This connotes that the

nature of the invention will determine whether protection will be sought in some countries and not in others. The number of applications for patents in a specific branch of industry (sector) and for a given country is an indicator of the development of that country in such a field. Another reason is that the country constitutes an important market for the subject matter of the patent, knowing well that it is not in a position to manufacture itself.

#### *Patents for assessing economic dynamics*

While seeking protection for inventions abroad, the undertaking critically takes into account: (i) the status of industrial development at the time of filing patent application, and (ii) the future industrial growth based on market demand in that sector of that country during subsequent years. For example, certain countries are striving to become industrialized and it is envisaged that they are about to become producers of such products. They may receive patent applications for those types of products which they are at present not manufacturing.

#### *Patents as yardsticks of innovative capacity*

The capacity for innovation can be studied either in respect of an undertaking or in respect of a specific industry or as regards one country. The capacity for innovation can be judged from the number of patents filed by the undertaking and the development of those patents over a period of time. Similarly, the innovative capacity of a country can be determined and judged from the number of 'domestic' applications and this would serve as an indicator. If an individual desires to study the development of new technologies on a global basis, it is the aggregate of all domestic applications of all countries committed to the development of those technologies that will constitute the most accurate indicator. The number of applications filed for protection abroad, other than those covered by domestic applications, represents the expansion dynamics of the originators and their inventive capabilities.

#### *Patents as elements for monitoring domestic and foreign competition*

Systematic mapping and analysis of patent data makes it possible to draw up statistical profiles of filing trends in various technical fields, e.g. chemicals, pharmaceuticals, electronics, biotechnology, communications, bioinformatics, etc. The patents distinctly reflect the state-of-the-art in a particular sector or a country. In the absence of information on the state-of-the-art, the risk of developing the same product again is extremely high. This would be an impediment for technical and economic development of any country and a deterrence from innovation. Therefore, patent information can be used as an element in assessing the technological position of a country, an industrial sector or of an undertaking.

It is the exploitation of data on the filing of patents over a number of years that constitutes an indicator for technological development and corporal strategy.

#### **Preparing for 2005**

The TRIPS agreement of WTO<sup>19</sup> came into effect on 1 January 1995 with an objective to date the multilateral agreements on IPRs. India is a signatory to the GATT and as a member of WTO it is obliged to honour the commitments made and make necessary amendments in the provisions of the Indian Patents Act 1970. The agreement on TRIPS in the GATT Final Act requires the member countries, including India to provide (i) product protection in all the fields of S&T; (ii) uniform term of 20 years for all patents; (iii) protection for new plant varieties and microorganisms; (iv) marketing rights in areas of agriculture and pharmaceuticals, and (v) grant of compulsory license on case-to-case basis. Now it is time for policy makers, while contemplating the changes, to strike a balance between commitments made and safeguards the national interest.

India, at the time of signing the TRIPS Agreement in 1995, due to the prevailing ambience at that point of time, was not aptly prepared to comply with essential features like minimum standards, procedures and remedies for IPR enforcement and dispute settlements. Therefore, India along with many other countries was given a transition period of five years to change its laws; it was extended by an additional five years, since India was designated as a developing country. As a member of WTO, India is obliged to make appropriate amendments in the provisions of the Indian Patent Act 2002, germane to product protection, marketing rights and grant of compulsory license by December 2004. Besides, with the advent of the product patent in all the fields of S&T from 1 January 2005, the policy makers in India are still clamouring for re-negotiating trade related agreements with the WTO. The patent (Amendment) Act 2002 that came into force from 20 May 2003, does not include/modify any provision for allowing product patent protection<sup>6</sup>. The imperativeness of this protection is strongly felt in pharmaceutical, agro-chemical and chemical sectors and it is envisaged that the product protection provision will be again amended by 31 December 2004. It is to be noted even after a span of one decade, on the legislative front, we are not in a position to amend the provision needed to provide a legal framework for acceptance of application for product patents. This means that we do not sincerely endeavour to keep up to the commitments made to the TRIPS agreements. From this it can be construed that the nation is preparing for an inevitable fallout in the globalization of trade and economy. Contrary to this, IP-savvy personnel in India are trying hard to convince government to amend the Patents Act to make it TRIPS compliant, so that local industries can continue to grow and prepare themselves to face global competition.



## Management of IPRs in R&D

Different people view management of IPRs in different ways. To some, it is merely the period from the beginning of original research to the date of statutory grant of patents, while to others it means the process of management after entering a license contract leading to technology transfer and commercialization. In a broad sense, the basic concept of the management of IPRs<sup>20</sup> includes administration at all the stages of patent management, viz. conceptualization of idea leading to invention, realizing the idea in a laboratory, assimilation of relevant information, drafting patent application, determining the value of the patent, licensing of IP, commercialization of the invention, etc. In the managerial context of IPRs, the national R&D laboratories, R&D departments of industries and universities and multinational corporations have to address some of the following aspects.

- An early identification and assessment of the commercial potential of the research being undertaken.
- Apt awareness and vigilance of R&D managers and scientists in protecting IP generated.
- Decision regarding when to file a patent application, is of crucial importance.
- Keeping track of the state-of-the-art in technology, and new developments in the field in which research is being carried out.
- Introduction of a good system for maintaining R&D records, right from conceptualization of a new idea, experiments and the results, and all R&D related activities carried out through various stages of progress of R&D project.
- Taking decision about the need for filing a patent application. The patent must satisfy the criterion of industrial application for revenue generation. Decision to file a patent should not be casual and frivolous as it involves prohibitive cost.
- Management of contractual relationships between employer and employee with regard to ownership of invention, sharing of benefits, and keeping confidentiality of the know-how and other scientific and technical information.
- Management of effective co-ordination between R&D, marketing, legal and other departments for protection of IPRs.
- Managing the process of licensing of patent and transfer of technology.
- Managing cost during filing and its maintenance. The cost includes (i) patentability search, (ii) preparation of patent application, (iii) filing fees, (iv) search/examination fees, (v) fees at the grant stage, (vi) fees to be paid to attorney (if any), etc.

From these aspects, it is clear that writing and obtaining a patent right is comparatively easier than maintaining and managing the IPRs. Moreover, maintaining a patent in

several countries is all the more expensive if the return on these patents is not envisaged. Beside, the complex relationship between technical value of patented invention and its commercial implication needs to be thoroughly understood at the institutional level.

## Conclusion

Unlike the 'art for art sake', research for research sake is not a self-sustaining proposition in the present knowledge era, which is characterized by competition. Patents, which are the most important form of IP protection, provide knowledge about the state-of-the-art in technology and thus could determine R&D priorities. It is only in the new millennium that patent information has been aggressively pursued in India, as an input for deciding research topics. The large number of patents filed globally every year indicates that R&D managers, scientists and researchers need to be circumspect about IPRs and protection of inventions emerging from their R&D efforts.

Apathy or lack of awareness about IPRs among researchers and considering the drafting of patent application with legal background as arduous militates the very purpose. However, researchers have an ethical responsibility to protect their work or else unauthorized persons could intrude upon the opportunities underlying their research. It is also quintessential that researchers must learn some of the vital ingredients of management of IPRs and dovetails this learning with day-to-day R&D activities and practices.

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