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Patents Ecosystem of India Based on WIPO & IPO Indicators

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1. Introduction

The ingenuity of the mind used for the creation of a commercial entity or a societal use is considered as the intellectual property of the concerned person i.e. inventor. The inventor has a legal right over these properties or inventions, which are termed as Intellectual Property Rights (IPRs). The IP protection is critical to foster innovation. Currently, IPRs cover patents, copyrights, trademarks, industrial designs, geographical indicators (GI), layout designs, trade secrets and new plant varieties. Without protection of ideas, individuals as well as businesses would not reap the full benefits of their inventions and thus would focus less on R&D.

Patents occupy a prominent position as global indicators for ranking of world economies. In general, there is direct relation between the economy and the patent-regime of a nation. Top five nations (Finland, New Zealand, Luxembourg, Norway and Switzerland), based on IPRI indicators (IPR Index-2016), are amongst the top 20 global economies of the world (GCI Report-2015). Similarly, lowest ranked nations (Zimbabwe, Haiti, Bangladesh, Myanmar and Venezuela), based on IPRI indicators (IPR Index-2016), have global rankings in triple digits (GCI Report-2015). India's global ranking in these two indicators hover around fifties. India's dream of becoming a strong and developed nation cannot be fulfilled unless India improves its ranking in the domain of IPR. In order to achieve this, it is imperative that we understand the ecosystem of IPR, especially Patents, existing in India. Keeping this in mind, DST-Centre for Policy Research at Panjab University, Chandigarh undertook a responsibility to (a) compare the IPR regime of five Asian countries namely, India, China, Japan, S. Korea and Singapore based on World Intellectual Property Office (WIPO) Report-2015 and (b) analyze the Indian patents database, compiled by the Controller General of Patents, Designs and Trade Marks (CGPDTM), so as to understand the strengths and weaknesses of Indian patent regime.

2. World Intellectual Property Office (WIPO)

WIPO is a specialized agency under United Nations (UN) and was set up in 1967 (originally known as BIRPI- Bureaux for the Protection of Intellectual Property) with an objective to promote and protect IP throughout the world. Currently, WIPO comprises of 188 member states. Till date, WIPO has administered 26 international treaties for practicing IPRs all over the world. WIPO became a dedicated agency under UN in year 1974 with a mandate to promote innovations and provide impetus to technology transfer, for improving the socio-

economic as well as cultural/artistic levels of the developing economies. WIPO is working in three distinct fields a) protecting IP; b) designing policies and c) development and global cooperation. (Table 1)

Table 1: IPR Related Activity Domains of WIPO

S. No.	Area of Work	Brief Details
1.	IP Protection and Services	<p><i>International patent system via Patent Cooperation Treaty (PCT):</i> assists in seeking patent protection simultaneously in many countries throughout the world by filling one international patent. 148 countries have signed PCT agreement.</p> <p><i>Madrid-The International Trademark System:</i> It is one stop solution for registering and managing trademarks worldwide. It comprise of 97 member states.</p> <p><i>Hague-The International Design System:</i> It is an international registration of industrial designs over 65 territories under one application.</p> <p><i>Lisbon-International Registration of Appellations of Origin:</i> Through single registration protection for an appellation of origin is provided.</p>
2.	Designing Policies	<p>For designing IPR policy, WIPO has developed number of negotiating bodies which are as:</p> <ul style="list-style-type: none"> a) Governing Bodies: WIPO assemblies b) Permanent Committees: Programme and Budget Committee, Committee on Development and IP, Intergovernmental Committee on IP and Genetic Resources, traditional knowledge and folklore (Inter Governmental Committee), Advisory Committee on Enforcement c) Standing Committees: Standing Committee on the Laws of Patents (SCP), law of trademarks, industrial designs and geographical indications (Standing Committee on the Law and Trademarks), copyrights and related rights (Standing Committee on Copy Rights and Related Rights), WIPO standards (Committee on WIPO Standards) <p>These bodies are responsible for designing polices for IPR for its member states.</p>

3.	Development and Global Cooperation	<p>WIPO works in collaboration with the governments of member states along with its public and private sectors/organizations to sensitize them about the benefits accruing from generation of IPRs.</p> <p>Some of the co-operations are mentioned below:</p> <ul style="list-style-type: none"> • Regional Bureaus for Africa; Arab countries; Asia and the Pacific; Latin America and the Caribbean • Division for Least Developed Countries (LDCs) • Department for Transition and Developed Countries • South-South cooperation
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Source: www.wipo.int

Based on the WIPO Report 2015, a comparative study of five Asian countries i.e. Singapore, Japan, S. Korea, China and India has been carried out (Table 2). China, Japan and S. Korea are performing exceedingly well in the parameters of IP Filing in the ‘residents category’ as well as ‘residents & abroad category’. All the three nations are in top five economies of the world, with China occupying first ranking. India’s global ranking is satisfactory as it has been ranked 11 and 14 in the categories of ‘residents’ and ‘resident & abroad’. However, Singapore needs to improve its ranking in both the categories.

In the parameter of ‘number of filing of patent applications’, China is far ahead of other four countries with over 900, 000 patent applications filed in its patent office. This number is 24 fold more than the applications filed in IPO (42,854). Interestingly, the sum total of all the four nations (Japan, S. Korea, Singapore and India) makes up only two-third of the total patent applications filed by China.

Table 2: Global Rankings of Asian Countries Based on WIPO Report 2015

S. No.	Indicators		Global Rankings				
			Singapore	Japan	S. Korea	China	India
1.	IP Filing Rankings* (resident & abroad)	Patents	26	3	4	1	14
2.	IP Filing Rankings** (residents)	Patents	30	3	4	1	11
3.	Number of Patent Applications by Office of the Country	Total	10,312	3,25,989	2,10,292	9,28,177	42,854
		Residents	1,303	2,65,959	1,64,073	8,01,135	12,040
		Non-residents	9,009	60,030	46,219	1,27,042	30,814

* Out of 100 economies, **out of 80 economies

Source: World Intellectual Property Indicators Published by World Intellectual Property Organization (WIPO) (www.wipo.int/ipstats, <http://www.wipo.int>)

3. Patent Regime in India Based on IPO Indicators

In India, the main body looking after IPRs is the office of CGPDPTM located in Mumbai. This office is a subordinate office of the Department of Industrial Policy & Promotion (DIPP), which comes under the Ministry of Commerce and Industry (Fig. 1).

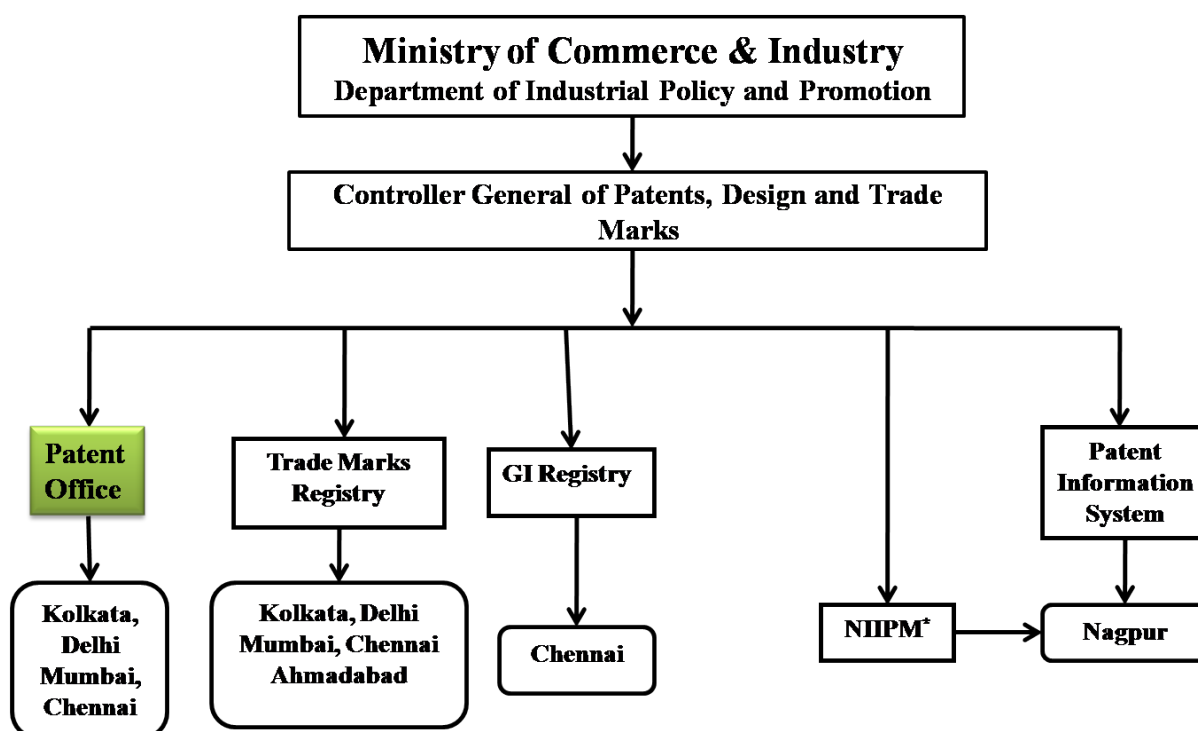


Figure 1: Organizational Structure of Patent Regime in India

*National Institute of Intellectual Property Management

Patent Applications

Table 3 throws a light on the trend of patents filed / granted in India in the last five years. A big jump in the number of patents filed (43,197) was observed in the time period 2011-12 over the preceding year i.e. 2010-11 (39,400). In the subsequent year (2012-13), a marginal increase of 477 patents filed was observed, taking the total tally to 43,674. However, in the following two years (2013-15), a slight decrease was observed in the number of patents filed. In the category of patents granted, 7,509 patents were granted in 2010-11, which is the highest score in the last five years. Following three years saw a significant decline of nearly

20%. However, last year (2014-15) figure showed a remarkable recovery as 5,978 patents was granted by the IPO. In the other two categories Total number of Patents examined, and Disposal of Request for Patent examination (granted, refused, abandoned), by enlarge an increasing trend was observed, suggesting improvement in the functioning of the IPO. Compared to 11,208 patents examined in 2010-11, more than double the number was examined in 2014-15.

Table 3: Trend in Patent Applications

Year	2010-11	2011-12	2012-13	2013-14	2014-15
Filed	39,400	43,197	43,674	42,951	42,763
Examined	11,208	11,031	12,268	18,615	22,631
Granted	7,509	4,381	4,126	4,227	5,978
Disposal of request for examination (Granted + Refused + Abandoned)	12,851	8,488	9,027	11,411	14,316

Source: IPO Annual Report 2014-15

Applications Filed by Indian Applicants

Figures 2 & 3 give the number of patents filed and granted in India in various fields of industrial sector. Mechanical sector leads the table with 10,031 filed-patents, amounting to 23% of the total filed-patents. Second ranking is held by Chemical (6,454), followed by Computers/Electronics (4,285) & Electrical (4,031), drugs (2,640) and Biotechnology (1,035) sectors.

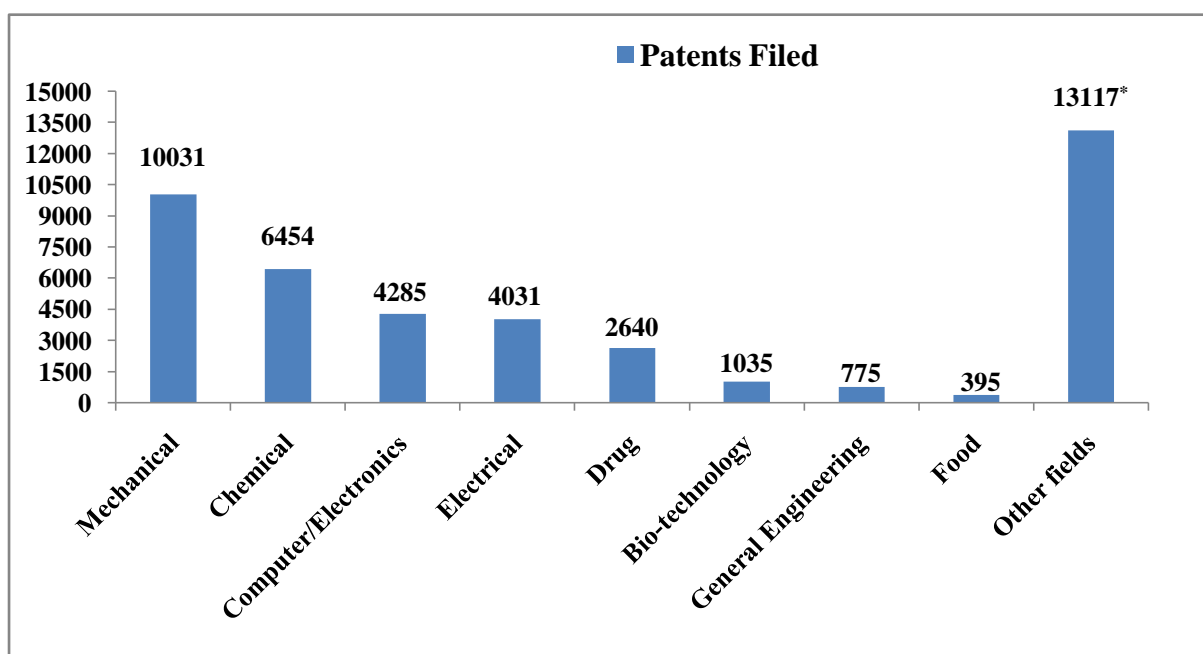


Figure 2: Numbers of Patent Applications Filed in 2014-15 under Major Fields of Inventions

Source: IPO Annual Report 2014-15

* Others – Bio-Medical, Bio-Chemistry, Communication, Physics, Civil, Textile, Metallurgy/Material Science, Agriculture Engineering, Polymer Science/Technology, Micro-Biology, Agrochemical, Traditional Knowledge BIO/CHEM/MECH

In the patent-granted category, top six rankings of industrial sectors are the same as for patent-filed category. However, there is change in the sequence of ranking. Chemical sector (1,533) has replaced Mechanical sector (1,047) as number one ranked industrial sector followed by Computer/Electronic (835), Drugs (389), Electrical (376) and Biotechnology (262) sectors.

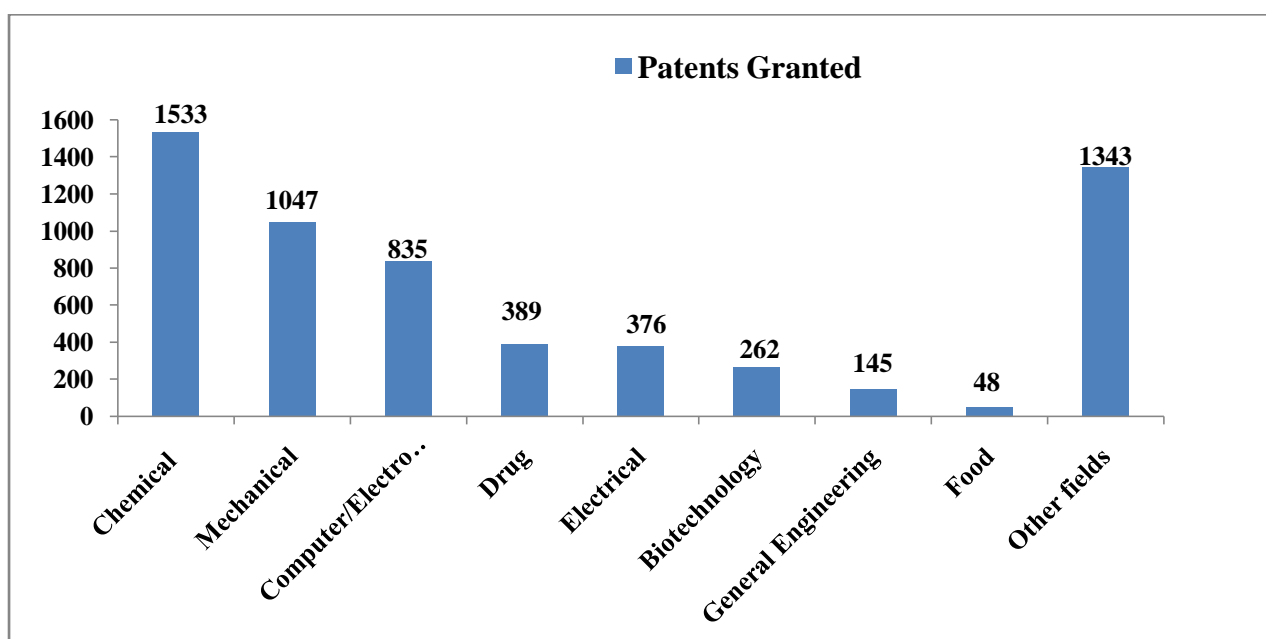


Figure 3: Numbers of Patents Granted in 2014-15 under Major Fields of Inventions

Source: IPO Annual Report 2014-15

* Others – Bio-Medical, Bio-Chemistry, Communication, Physics, Civil, Textile, Metallurgy/Material Science, Agriculture Engineering, Polymer Science/Technology, Micro-Biology, Agrochemical

Analyzing the data on the basis of state-wise categorization of ordinary patents-filed (Fig. 4), Maharashtra (3,193) occupies first position followed by Karnataka (2,102), Tamil Nadu (1,412) and Delhi (1,099). In fact, out of 29 states, and 7 union territories, (data for Lakshadweep is not available) these four states account for 65% of the total ordinary patents filed with IPO. As per IPO data, out of the total of 42,763 patents filed, only 12,071 patent applications (ordinary, convention and PCT) were filed by Indians, and 31,692 were filed by

foreign applicants. In other words, 72% applications were filed by foreigner applicants and only 28% were filed by Indian applicants.

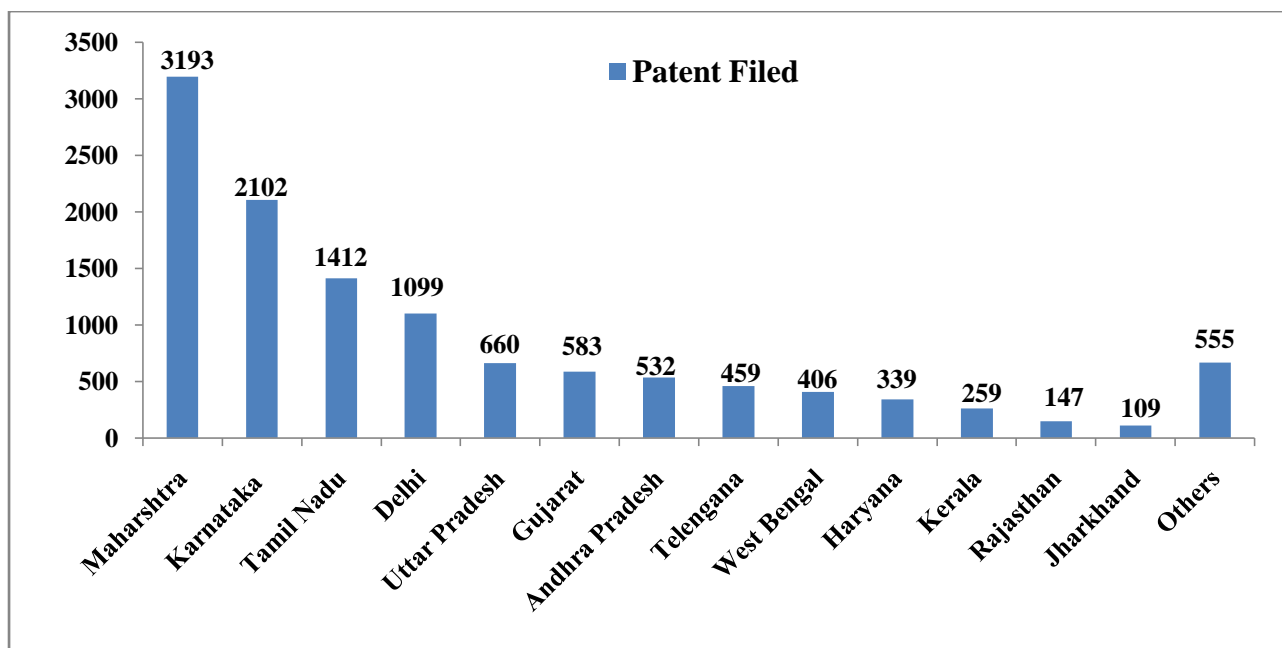


Figure 4: Patents Filed (Ordinary) in the Year 2014-15 (>100 applications Filed)

Source: IPO Annual Report 2014-15

Table 4: Other (of Fig. 4) Comprises of Below States (<100 applications Filed)

S. No.	State/Union Territory	Ordinary (2013-14)	S. No.	State/Union Territory	Ordinary (2013-14)
1.	Madhya Pradesh	98	12.	Pondicherry	16
2.	Punjab	97	13.	Tripura	8
3.	Orissa	88	14.	Manipur	5
4.	Uttaranchal	61	15.	Dadra & Nagar Haveli	2
5.	Assam	46	16.	Arunachal Pradesh	1
6.	Bihar	31	17.	Sikkim	1
7.	Chhattisgarh	28	18.	Meghalaya	0
8.	Chandigarh	24	19.	Mizoram	0
9.	Jammu & Kashmir	17	20.	Nagaland	0
10.	Himachal Pradesh	16	21.	Andaman & Nicobar	0
11.	Goa	16	22.	Daman & Diu	0

Source: IPO Annual Report 2014-15

In the domain of scientific and R&D organizations (Table 5), first ten organizations filed 870 patents in 2014-15, with CSIR organization filing maximum number of patents (315), followed by DRDO (98) and ICAR (68). Out of top ten organizations, seven belong to public

sector. Three private sector companies namely, GHR Labs and Research Centre, Nagpur (31), GSP Crop Science Pvt. Ltd., Maharashtra (23) and Hetero Research Foundation, Hyderabad (22) occupy fourth, sixth and seventh rankings respectively.

Table 5: Top 10 Indian Applicants for Patents from Scientific and Research & Development Organizations

S. No.	Name of Scientific and Research & Development Organization	Applications Filed
1.	Council of Scientific & Industrial Research (CSIR), New Delhi	315
2.	Director General, Defence Research & Development Organisation (DRDO), New Delhi	98
3.	Indian Council of Agricultural Research (ICAR), New Delhi	68
4.	GHR Labs and Research Centre, Nagpur	31
5.	Department of Biotechnology (DBT), New Delhi	23
6.	GSP Crop Science Pvt. Ltd. Ahmedabad	23
7.	Hetero Research Foundation, Hyderabad,	22
8.	Rotary Wing Research & Design Centre Hindustan Aeronautics Ltd., Bengaluru	22
9.	Centre for Development of Advanced Computing (C-DAC), Pune	20
10.	Department of Electronics and Information Technology (DEITY), New Delhi	18

Source: IPO Annual Report 2014-15

Table 6 lists the top ten Higher Education Institutes (HEIs) of India in the area of patent filing for the year 2014-15. IITs continue to occupy the first position. Surprisingly, Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed) University, a new entrant has relegated IISc-Bangalore to third spot even though it showed an increase of nearly 43% over the preceding year i.e. 2013-14. Amity University has slipped to 4th position with a decline in filing as compared to 2013-14 time period. In an interesting observation, eight out of top ten patent filing institutes belong to private sector. Only two institutes i.e. IITs and IISc-Bangalore belong to public sector. However, these two public institutes comprise of 61.48 % of the total patents filed by top HEIs mentioned in table 6.

Table 6: Top 10 Indian Applicants for Patents from Institutes and Universities

S. No.	Name of Institute/University	Applications Filed
1.	Indian Institute of Technology (Collective)	337
2.	Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed) University, Udaipur	53
3.	Indian Institute of Science, Bangalore	46
4.	Amity University, Noida	43
5.	Sandip Foundations: Sandip Institute of Technology & Research Centre, Mumbai	33
6.	Hindustan Institute of Technology & Science, Chennai	31
7.	SAL Institute of Technology & Engineering Research, Ahmedabad	22
8.	Sandip Foundations: Sandip Institute of Engineering and Management, Mumbai	21
9.	Siddaganga Institute of Technology an Institution of Sree Siddaganga Education Society, Tomakuru, Karnataka	19
10.	Karpagam University, Coimbatore.	18

Source: IPO Annual Report 2014-15

Amongst the top 5 Indian Patentees (Table 7), four belong to public sector i.e. CSIR (66). BHEL (56), IITs (30) and Tata Motors Limited (26). They occupy first, second, fourth and fifth rankings. Third position is occupied by a private company i.e. Samsung R&D Institute India Bangalore Private Limited, Bangalore.

Table 7: Top 5 Indian Patentees

S. No.	Name of Organization	Patents Granted
1.	Council of Scientific & Industrial Research, New Delhi	66
2.	Bharat Heavy Electricals Limited, New Delhi	56
3.	Samsung R&D Institute India Bangalore Private Limited, Bengaluru	56
4.	Indian Institute of Technology (Collective)	30
5.	Tata Motors Limited, Mumbai	26

Source: IPO Annual Report 2014-15

As far as top 5 foreign resident patentees are concerned (Table 8), Gm Global Technology Operations INC, a US company providing services for engineering and construction industries, is ranked at the top with 267 patents (granted). Second rank is held by Qualcomm Incorporated (205), an American based Semiconductor and Telecommunications equipment company. Third place is secured by Telefonaktiebolaget Lm Ericsson (Publ) (94 granted patents), a Sweden based company which provides software, equipments and services for

communication technology. Fourth position (87 granted patents) is occupied by a consumer electronics company, known as LG Electronics, which is a S. Korean company. Fifth place is secured by Netherland based company known as Koninklijke Philips Electronics N. V., which focuses in light, health care and electronics.

Table 8: Top 5 Foreign Resident Patentees

S. No.	Name of Applicant	Patents Granted
1.	Gm Global Technology Operations Inc, U.S.A	267
2.	Qualcomm Incorporated, U.S.A	205
3.	Telefonaktiebolaget Lm Ericsson (Publ), Sweden	94
4.	LG Electronics, S. Korea	87
5.	Koninklijke Philips Electronics N. V., Netherlands.	61

Source: IPO Annual Report 2014-15

In the field of Information Technology (Table 9), Samsung R&D Institute India-Bangalore Private Limited (233) occupied the first place in the year 2014-15 which is a mobile telecommunication company, while, next four positions are occupied by public sector organizations i.e. Tata Consultancy Services Limited (147), a consulting and business solutions software company; Wipro limited (117), an information technology services provider; Hindustan Aeronautics Limited (57) and lastly, IITs (Collective) with 50 applications filed in the year 2014-15.

Table 9: Top 5 Indian Applicants for Patents in the Field of Information Technology

S. No.	Name of Company	Applications Filed
1.	Samsung R&D Institute India-Bangalore Private Limited, Bengaluru	233
2.	Tata Consultancy Services Limited, Mumbai	147
3.	Wipro Limited, Bengaluru	117
4.	Hindustan Aeronautics Limited, Bengaluru	57
5.	Indian Institute of Technology (Collective)	50

Source: IPO Annual Report 2014-15

Patent Cooperation Treaty (PCT): National Phase Applications

The majority of foreign patent applications filed in India were through the PCT national phase route. The number of such applications filed during 2014-15 was 26,057, which show 3.77% decrease in comparison with the previous year (2012-13) figure of 27,078 applications. The top five countries filing patents, through PCT national phase route are USA

(8,237), Japan (4,388), Germany (2,581), Netherlands (1,267) and Switzerland (1,252). Many other countries including France (1,236), United Kingdom (973), China (874), Sweden (835), and others are mentioned in figure 5.

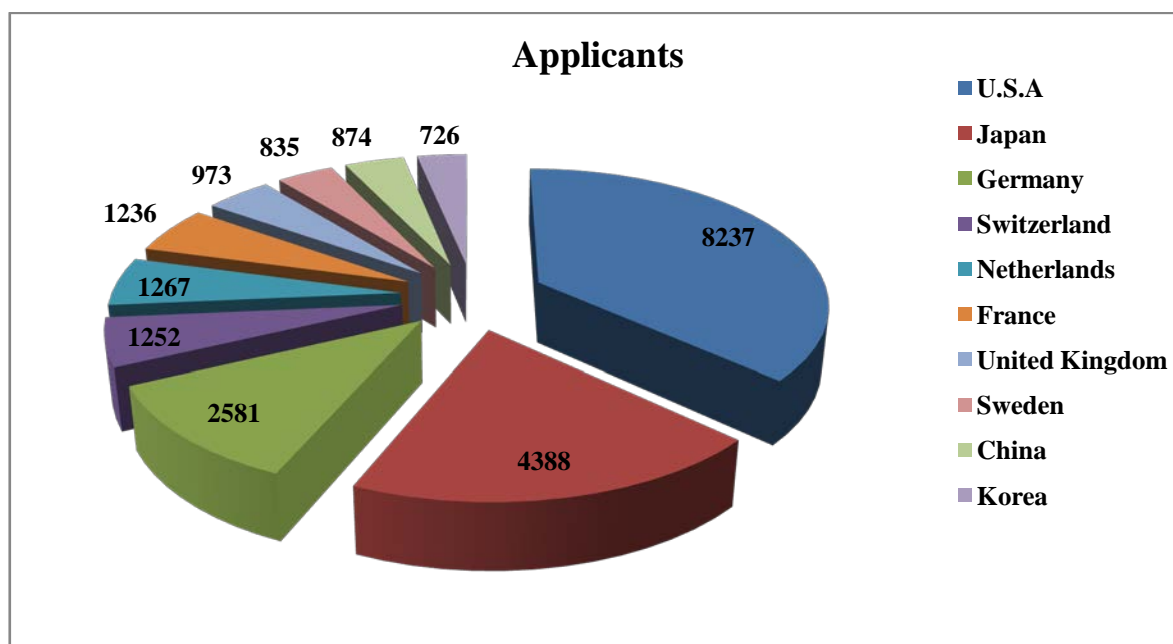


Figure: 5 Top Ten Applicants for PCT National Phase (Country-Wise)

Source: IPO Annual Report 2014-15

Top 10 Foreign Resident Applicants

The following table (Table 10) provides a list of top 10 foreign resident applicants who filed patent applications during 2014-15. It is observed that Qualcomm Incorporated a wireless technology producer continued to top the list with 1,214 applications. It was followed by a consumer electronics company, Koninklijke Philips N.V. (805), a network and telecom company, Telefonaktiebolaget LM Ericsson (449) and Samsung Electronics Co. Ltd. (379) are at 2nd, 3rd and 4th position respectively. Fifth position is secured by a chemical producer company BASF SE which is a Germany based company. Honda Motor Co. Ltd. is at 6th position with 280 applications filed, Siemens Aktiengesells Schaft a power generation technology company (277), General Electric Company (276) which is a consumer electronics and software company, Steel product producer company JFE Steel Corporation (230) and Sony Corporation (218) a consumer electronics company are at 7th, 8th, 9th and 10th positions respectively.

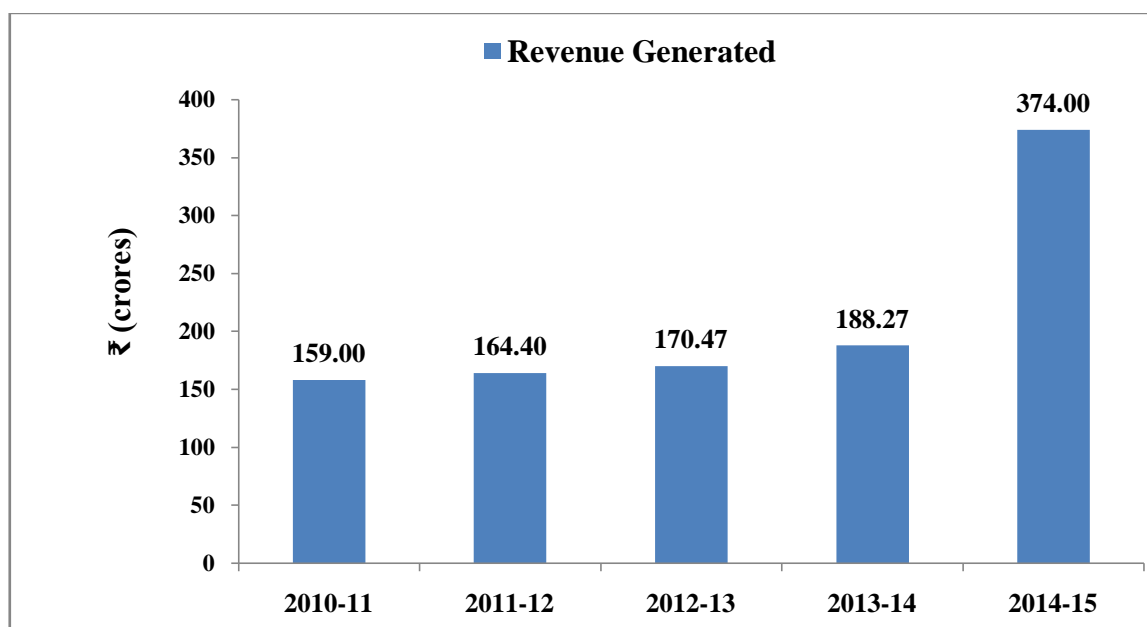
Table 10: Top 10 Foreign Resident Applicants

S. No.	Name of Organisation	Number of Applications
1.	Qualcomm Incorporated, USA	1,214
2.	Koninklijke Philips N.V., Amsterdam	805
3.	Telefonaktiebolaget Lm Ericsson (Publ), Sweden	449
4.	Samsung Electronics Co. Ltd, S. Korea	379
5.	BASF SE, Germany	297
6.	Honda Motor Co. Ltd. Japan	280
7.	Siemens Aktiengesells Schaft, Germany	277
8.	General Electric Company, USA	276
9.	JFE Steel Corporation, Japan	230
10.	Sony Corporation, Japan	218

Source: IPO Annual Report 2014-15

Revenue Generated

During the time period 2010-14, the revenues generated by the patent office, as fee for patent-application processing, ranged between ₹ 159 -180 crores. Surprisingly, last year's (2014-15) earnings jumped to ₹ 374 crores (Fig. 6.6) which were 98.93% more than the amount (₹ 188 crores) accrued in the previous year (2013-14). The trend of revenue-generated and revenue-expenditure are shown in the form of bar diagrams in figures 6. & 7 respectively.

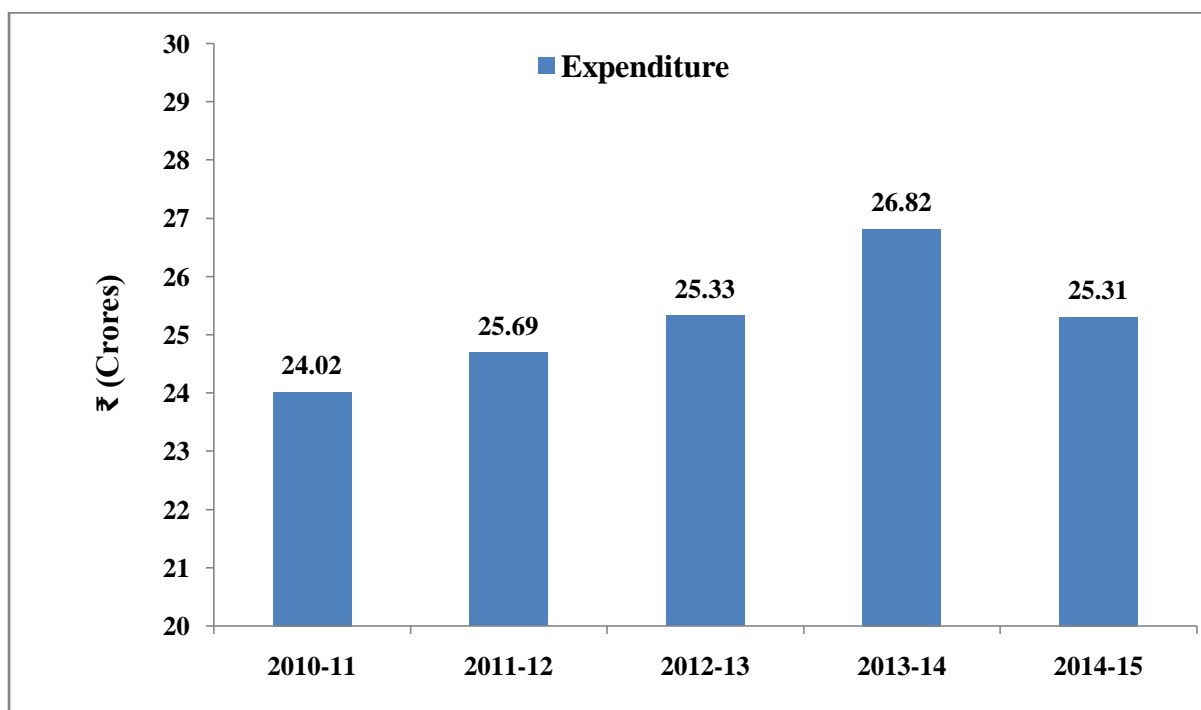


Source: IPO Annual Reports

Figure 6: Revenue Generated by Indian Patent Office

Revenue Expended

During the time period 2010-15, the non-plan expenditure with regard to IP administration hovered around ₹ 25 ± 1.5 crores (Fig. 7). Maximum expenditure (₹ 26.82 crores) was incurred in 2013-14. Despite of peer expenditure, IP office accrued gross profit of 93% in the year 2014-15, whereas, it was 85% in the year 2013-14 and 84% in the year 2012-13.



Source: IPO Annual Reports

Figure 7: Expenditure on Patents by Indian Patent Office

4. Draft of National IPR Policy, 2016

A draft of National Intellectual Property Rights policy has been issued by DIPP on 12th May 2016, which comprises of seven objectives as mentioned below.

1. **IPR Awareness: Outreach and Promotion**-To create public awareness about the economic, social and cultural benefits of IPRs among all sections of society.
2. **Generation of IPRs** - To stimulate the generation of IPRs.
3. **Legal and Legislative Framework**-To have strong and effective IPR laws which balance the interests of rights owners with larger public interest.
4. **Administration and Management** - To modernize and strengthen service oriented IPR administration.
5. **Commercialization of IPR** - Get value for IPRs through commercialization.

6. **Enforcement and Adjudication**-To strengthen the enforcement and adjudicatory mechanisms for combating IPR infringements.
7. **Human Capital Development**-To strengthen and expand human resources, institutions and capacities for teaching, training, research and skill building in IPRs.

Out of these seven objectives 2 and 5 have direct relevance to R&D. The details of these two objectives are mentioned below:

Objective 2: Generation of IPR - In India, the number of patents filing has increased in the last few years, but the percentage of filing by Indians is relatively low. India has a huge talent pool of scientific and technological talent spread over R&D institutions, enterprises, universities and technical institutes. There is a need to tap this productive knowledge resource and stimulate the creation of IP assets. The steps to be taken to attain this objective are outlined below:

- 2.1. Use the campaign "Creative India; Innovative India" to propagate the value of creativity and innovation, and the resultant benefit to the public; to create a mindset and culture that encourages knowledge generation and its application through IP.
- 2.2. Carry out a comprehensive IP audit or base line survey in various sectors in cooperation with stakeholders to assess and evaluate areas of strength and potential, prioritize target groups of inventors and creators, develop specific programs to address their needs, provide resources to enable them to create IP assets and utilize them for their own and social benefit.
- 2.3. Undertake studies to assess the contribution of IP content in different industries on the economy, employment, exports and technology transfer.
- 2.4. Focus on improving IPR output of National Research Laboratories, Universities, Technology Institutions and other researchers by encouraging and facilitating the acquisition of Intellectual Property Rights by them.
- 2.5. Encourage researchers in public funded academic and R&D institutions in IPR creation by linking it with research funding & career progression.
- 2.6. Encourage researchers in public funded academic and R&D institutions by having uniform guidelines for division of royalties between the organizations and individual researchers and innovators.
- 2.7. Include IP creation as a key performance metric for public funded R&D entities as well as Technology Institutions, and gradually extend such evaluation from Tier-1 to Tier-2

Institutions.

2.8. Provide guidance to researchers and innovators about national priority areas to focus on, for instance in energy and food security, healthcare and agriculture, as well as specific sectors such as biotechnology, data analytics, nanotechnology, new materials and ICT.

2.9. Encourage public funded R&D institutes and industry to develop affordable drugs relating to neglected diseases.

2.10. Encourage R&D including open source based research such as Open Source Drug Discovery (OSDD) by the Council of Scientific and Industrial Research (CSIR) for new inventions for prevention, diagnosis and treatment of diseases, especially those that are life threatening and those that have high incidence in India.

2.11. Establish and strengthen IP facilitation centers as nodal points especially in industrial and innovation university clusters.

2.12. Create an industry-academia interface for encouraging cross-fertilization of ideas and IPR-driven research and innovation in jointly identified areas.

2.13. Stimulate large corporations, both Indian and foreign, that have R&D operations, to create, protect and utilize IPRs in India.

2.14. Improve awareness of the value of copyright for creators, the importance of their economic and moral rights.

2.15. Introduce support systems for MSMEs, start-ups and grass root innovators to reduce transaction costs linked to IP creation for the entire value chain from IPR generation to commercialization, including schemes to facilitate domestic IPR filings.

2.16. Consider incentives to promote R&D, including the following steps:

2.16.1. Promote R&D through tax benefits available under various laws, through simplification of procedures for availing direct and indirect tax benefits.

2.16.2. Consider financial support for a limited period on sale and export of products based on IPRs generated from public funded research.

2.16.3. Creation of an effective and simple loan guarantee scheme in order to encourage start-ups and cover the risk of genuine failures in commercialization based on IPRs as mortgage-able assets.

2.17. Promote ‘infusion of funds to public R&D units’ as a part of Corporate Social Responsibility to foster a culture of open innovation.

2.18. Provide special incentives for creation of IPRs in green technologies and manufacture of energy efficient equipment.

- 2.19.** The ambit of Traditional Knowledge Digital Library (TKDL) should also be expanded to include other fields besides Ayurveda, Yoga, Unani and Siddha.
- 2.20.** Public research institutions should be allowed access to TKDL for further R&D, while the possibility of using TKDL for further R&D by private sector may also be explored, provided necessary safeguards are in place to prevent misappropriation.
- 2.21.** Document oral traditional knowledge, taking care that the integrity of the said knowledge is preserved and traditional ways of life of communities are not compromised.
- 2.22.** Introduce IPRs as part of academic curriculum in educational institutions, especially universities, law and technical institutions.
- 2.23.** Increase awareness of international mechanisms and treaties (e.g. PCT, Madrid, Hague) to encourage creation and protection of IPRs by Indian individuals and entities in global markets.
- 2.24.** Encourage and incentivize IP generation and utilization among students at all levels, use awareness programs and educational materials to inculcate an appreciation for the value of IP.
- 2.25.** Encourage innovations in the agriculture and pisciculture sector through application of IP for higher sustainable agricultural production.
- 2.26.** Encourage the registration of Geographical Indications (GIs) through support institutions; assist GI producers to define and maintain acceptable quality standards, and providing better marketability.
- 2.27.** Encourage creation of design related IP rights by identifying, nurturing and promoting the aspects of innovation protectable under the design law and educating designers to utilize and benefit from their designs; involve the NIDs, NIFTs and others institutions in sensitization campaigns.
- 2.28.** IPR generation for ICT technologies, including those relating to cyber security for India, will be encouraged.
- 2.29.** Take steps to increase domestic filings of patent applications.
- 2.30.** Promote India's rich heritage of traditional knowledge with the effective involvement and participation of the holders of such knowledge. Traditional knowledge holders will be provided necessary support and incentives for furthering the knowledge systems that they have nurtured from the dawn of our civilization.

Objective 5: Commercialization of IPR - The economic rewards and value for the owners of IP rights comes only from the commercialization of their IPRs. A planned effort should be made for capitalizing the existing IP assets in the country. Entrepreneurship should be encouraged so that the financial value of IPRs may be comprehended. Existing mechanisms including accelerators and incubators set up to promote entrepreneurship should be enlarged with IP-oriented services. Financing is a major barrier for entrepreneurs and therefore it is necessary to connect IP creators and investors. Another barrier faced is valuation of IP and assessment of the potential of the IPRs for the marketing purpose. There is a critical need to take stock of existing IP funding by different government departments and bodies like BIRAC, TIFAC and NRDC and take measures to centralize the same, scaling up successful models while avoiding duplication of efforts. Public – funded research laboratories, academia and other institutions should stimulate commercialization of their research outcomes. They ought to be suitably state-supported in the development and distribution of their IPRs. While certain bigger organizations have the intent and capabilities to commercialize their technologies/ IPRs, several others do not. Hence, it becomes imperative to establish facilitative mechanisms that can address such limitations, especially in terms of academic institutions, individual innovators and MSMEs. Another effective ways of achieving this would be by synergizing the activities of IP facilitation centres with the industrial clusters. Efforts should be made for the creation of a public platform to function as a common database of IPRs which can help creators and innovators connect to buyers, potential users and funding institutions. It would also be helpful in scouting the technology landscape to identify white spaces and thereby help promotion of innovative activities in uncovered areas. Significant potential for innovation exists in new and emerging technologies like nano-technology, agri-biotech, life sciences, biotechnology, green technologies, space technologies, telecommunications, new materials etc. The steps to be taken towards attaining this objective are outlined below:

5.1. Cell for IPR Promotion and Management (CIPAM) shall also undertake the following tasks:

5.1.1. Provide a platform for IPR owners and users of IPRs by acting as a facilitator for creators and innovators to be connected with potential users, buyers and funding agencies.

5.1.2. Undertake a study to examine the feasibility of an IPR Exchange.

- 5.1.3. Establish links among different organizations for exchange of information and ideas as also to develop promotional/educational products and services.
- 5.1.4. Facilitate access to databases on Indian IP and global databases of creators/innovators, market analysts, funding agencies, IP intermediaries.
- 5.1.5. Study and facilitate implementation of best practices for promotion and commercialization of IP within the country and outside.
- 5.1.6. Promote public sector initiatives for IPR commercialization.
- 5.2.** Promote licensing and technology transfer for IPRs; devising suitable contractual and licensing guidelines to enable commercialization of IPRs; promote patent pooling and cross licensing to create IPR based products and services.
- 5.3.** Provide support for MSMEs, Individual Inventors and Innovators from the informal sectors with enablers like facilitation centers for single window services to help them commercialize their IPRs.
- 5.4.** Incentivize Indian inventors, MSMEs, start-ups to acquire and commercialize IPRs in other countries also.
- 5.5.** Examine availability of Standard Essential Patents (SEPs) on fair, reasonable and non-discriminatory (FRAND) terms.
- 5.6.** Identify opportunities for marketing Indian IPR-based products, especially GIs, and services to a global audience.
- 5.7.** Promote collaborative IP generation and commercialization efforts between R&D institutions, industry, academia and funding agencies.
- 5.8.** Ensure enhanced access to affordable medicines and other healthcare solutions by (a) encouraging cross-sector partnerships between public sector, private sector, universities and NGOs; (b) promoting novel licensing models, and (c) developing novel technology platforms.
- 5.9.** Streamline regulatory processes to ensure timely approval for manufacturing and marketing of drugs while maintaining safety and efficacy standards.
- 5.10.** Make efforts to reduce dependency on active pharmaceutical ingredients (API) imports, including incentivizing manufacture of APIs in India and revitalizing public sector undertakings in health care sector.
- 5.11.** Support the financial aspects of IPR commercialization by:
- 5.11.1. Enabling valuation of IP rights as intangible assets by application of appropriate methodologies and guidelines; facilitating securitization of IP rights and their use as collateral by creation of enabling legislative, administrative and market framework.

5.11.2. Facilitating investments in IP driven industries and services through the proposed IP Exchange for bringing investors/ funding agencies and IP owners/users together.

5.11.3. Providing financial support to the less empowered groups of IP owners or creators like farmers, weavers, artisans, craftsmen, artists etc. through financial institutions like rural banks or cooperative banks offering IP friendly loans.

5.11.4. Providing financial support for development and commercialization of IP assets through links with financial institutions including banks, venture capital funds, angel funds, crowd funding mechanisms.

5.11.5. Utilizing Technology Acquisition and Development Fund under the Manufacturing Policy for licensing or procuring patented technologies.

5.11.6. Taking stock of all IP funding by the Government and suggesting measures to consolidate the same to the extent possible; scaling up the funding as needed and avoiding duplication; enhancing the visibility of IP and innovation related funds so that utilization is increased; performance based evaluation for continued funding.

5.12. Promote use of Free and Open Source Software along with adoption of open standards; possibility of creating Indian standard operating environments will be examined.

5.13. Promote going-to-market activities by:

5.13.1. Creating mechanisms to help MSMEs and research institutions to validate pilots and scale up through market testing.

5.13.2. Providing seed funding for marketing activities such as participating in trade fairs, industry standards bodies and other forums.

5.13.3. Providing guidance and support to IPR owners about commercial opportunities of e-commerce through Internet and mobile platforms.

5.13.4. Encouraging enterprises to create brand equity from their IP rights, such as trademarks and GIs.

5. Summary

- This report gives a vision of patents status of India for which data has been taken from World Intellectual Property Organization (WIPO) Report-2015, and Indian Patent Office (IPO) Annual Report 2014-15.
- As per WIPO Report-2015, the global ranking of India is 11 and 14 in the indicators of IPR filing (residents) and IPR filing (residents and abroad) respectively. China, Japan and S. Korea have been ranked ahead of India and are amongst the top five

nations in these indicators. During the time period 2014-15, the total number of patent-applications received by IPO was 42,854 filed (residents + abroad), whereas China, Japan and S. Korea received 9, 28,177, 3, 25,989 and 2, 10,292 applications respectively.

- As per IPO Report 2014-15, the number of total patent applications (resident + abroad) filed with IPO ranged from 39,400 to 43,197 during the time period 2010-15. For the same period, the number of patents granted ranged from 4,126 to 7,509.
- As per latest report (2014-15), IPO received 42,763 patent applications and granted 5,978 patents.
- Categorizing the filed-patents based on the field of invention, Mechanical (10,031) tops the ranking, followed by Chemical (6,454), Computer/Electronics (4,285) and Electrical (4,031). However, in the category of patents-granted, the top ranking sequence is as follows: Chemical (1,533), Mechanical (1,047), Computer/Electronics (835) and Drugs (389). This data is for the time period 2014-15.
- State-wise categorization of patents-filed indicates that Maharashtra (3,193) leads the pack, followed by (Karnataka (2,102), Tamil Nadu (1,412), Delhi (1,099) and Uttar Pradesh (660). Top four states (Maharashtra, Karnataka, Tamil Nadu and Delhi) account for 65% of the total ordinary-patents filed in 2014-15. No patent was filed by Meghalaya, Mizoram, Nagaland, Andaman & Nicobar, and Daman & Diu.
- IITs (337) are top Indian applicants from *institutes/universities* in the parameter of number of patents filed during 2014-15. Amongst the top ten rankings, two belong to public sector and eight belong to private sector. JRN R Vidyapeeth (Deemed university) Udaipur tops the ranking (2) in the private sector.
- Amongst the top ten rankings, CSIR (315) tops the list in the category of *scientific and research organizations* in the parameter of number of patents filed during 2014-15. Amongst the top ten rankings, seven belong to public sector and three to private sector. GHR Labs and Research Centre, Nagpur tops the ranking (4) in the private sector.
- Amongst the top five Indian Patentees, four belong to the public sector i.e. CSIR (66). BHEL (56), IITs (30) and Tata Motors Limited (26). They occupy first, second, fourth and fifth rankings. Third position is occupied by a Bangalore based private company i.e. Samsung R&D Institute India Bangalore Pvt. Ltd., Bangalore.
- Amongst the top five Foreign Resident Patentees, two are US companies i.e. Gm Global Technology Operations (267 patents granted) and Qualcomm Incorporated

(205 patents granted). Other three Foreign Resident patentees are companies from Sweden, S. Korea and Netherlands.

- In 2014-15, 26,057 patents were filed in India PCT national phase. USA is at the top followed by Japan and Germany. These countries filed 8,237, 4,388 and 2,581 patents respectively. Amongst the companies, Qualcomm Incorporated (USA) filed 1,214 patents followed by Koninklijke Philips N V., Netherlands (805) and Telefonaktiebolaget Lm Ericsson (Publ), Sweden (449).
- In 2015, IPO generated revenue of ₹ 374 crores which was ₹ 186.73 crores more revenue as compared to previous year.
- A portion of the draft of the National IPR Policy-2016, dealing with education and R&D has been included in the report.

6. Conclusions

The patent data discussed in the text clearly indicates the poor status of patent regime in India *vis a vis* other Asian countries like China, Japan, and S. Korea. India lags behind these countries in the parameter of filed-patents under ‘Residents’ category, thus indicating the poor level of R&D being carried out in the research labs (of India). Going deeper into the root cause of this, one finds that India’s ranking in the indicator of ‘Research-Publications’ is quite impressive. It has been globally ranked 5th by SJR International Science Ranking (2015). However, the ranking takes a nose dive (50) in the indicator, Intellectual Property Rights. The last two statements indicate that science in India is publication-centric. A strong intervention is required to convert research into innovative products leading to a patent. The scientists need to be made aware of the benefits of patents. The government policies on IP should lay more emphasis on awareness and introduction of IP related courses in Higher Education Institutes and National Research Laboratories. Also, the universities and research laboratories should have dedicated ‘Patent Cells’ which should be well conversant with patent laws, patent searching and patent filing processes. TIFAC, an organization under DST, has established Patent Information Cells (PICs) in many states of India. These PICs have set up nodal centres at a few places, primarily in the universities for spreading awareness about IP. It is suggested that more nodal centres be set up in public as well as private universities. The science departments of universities may be mandated to introduce IPR courses, such as (a) ‘Certificate Course in IPR’, for under-graduates; (b) ‘Diploma Course in IPR’ for post-graduates; and (c) ‘Advanced Course in IPR’ for Ph.D. research scholars. It is also suggested

that a *prior-art search* of the patents should be carried out before the start of Ph.D. research work, especially in the area of applied sciences. This effort will certainly help the scholar to understand whether his/her research work would lead to some novelty or would just be a repetition of research already taken place. Many a times, it has been observed that the outcome of a Ph.D. thesis has no novelty, as claimed by the scholar, because the information already exists. Such scenario results only in low or zero impact publication along with drain of the public money.

The majority of the patents (filed/granted) in India belong to the engineering sector. It is not surprising as India's premier higher education institute i.e. IITs is engineering-centric, have vibrant industry-academia centres and carry out R&D in collaboration with the industries. In other words, the ecosystem for translating research into technologies and patents is prevalent. Such an ecosystem needs to be created for other disciplines like pharma, agriculture, food and biotechnology. Dedicated institutes should be created in these domains, or the existing ones should be strengthened for R&D ecosystem for translational research. For example, ICAR has hundreds of agriculture universities/research centres spread all over India. A national policy may be drafted to strengthen them with Technology Business Incubators and Centres of Excellence (R&D) in partnership with industries. Similarly there is no dearth of pharma educational institutes, which can be strengthened for R&D, on the lines mentioned above. Also, top 'University-Industry linkage Pharma Institutes' like, University Institute of Pharmaceutical Sciences at Panjab University, Chandigarh; Bombay College of Pharmacy, Mumbai, and Manipal College of Pharmaceutical Sciences of Manipal University, Manipal can act as models for other pharma institutes/colleges. In addition, many R&D units of pharma industries have been accredited by DSIR and thus avail huge incentives from the government. Unfortunately, the number of patents generated by pharma industry is very low. For example, 2,640 patents were filed with IPO in 2014-15, under the field of Drugs. It accounts for only 5% (approx.) of the total patents filed in this period. There is a general feeling that most of the R&D units in the industrials sector are falling short of expectations. It is suggested that an independent body may be constituted to look into the performance of R&D units, especially DSIR- accredited labs. Good performers may be incentivized and bad ones penalized. This move will certainly elevate the level of novel research, which is a basic requirement for patent generation.