

SBI Research

3i (India Incubating Innovations): The revolution on patents front is a harbinger of ascent of a colossal knowledge based economy on global scale

26-January-2024

Please see the last page for disclaimer

Safe Harbor

- This research work is a joint study by Economic Research Department, State Bank of India, Mumbai and Office of the Controller General of Patents, Designs & Trade Marks Department of Promotion of Industry and Internal Trade Ministry of Commerce and Industry, Government of India. The study is an honest effort to analyze the contours of an unprecedented innovation era that India has ushered in during the last decade. It is a story of Indians rising together in unison across multiple geographies in a participative mode undertaking innovation in multiple fields hitherto unexplored. This could be the insignia of a new India, in the making, as the knowledge capital of the world that benefits the humanity, global south in particular!
- We would like to thank CGPDTM and his Office and IT-Quality Division of the IPO with whom we worked in close collaboration to finetune and streamline the exciting world of innovations.

Executive Summary...1/4

- Post the global financial crisis, there is a clear reordering of the global order.. With a surge in World IPR applications..In particular IPR applications have grown at CAGR of 60% for the 9-year ended 2022..driven by a surge in Patents and Industrial Designs...
- The outstanding number of patents published in the current decade (2014-2023) at 4.65 lakh **was ~44% higher** than the patents published in the preceding decade (2004-2013)..**Compared to average 89 patents per day in preceding decade, there were 127 patents published per day in current decade. Significantly, 247 patent applications filed per day in 2023 calendar year**
- The journey of India, the 5th largest economy has been remarkable in this context... India is now the 6th largest in terms of number of patents in 2022..but with 77068 / **25.2% growth in 2022 vis-a-vis a degrowth of 0.4% in 2014**..and is fastest surpassing even China. India has also matched the global innovation upswell by registering a 60% CAGR growth for the 9-year period ended 2022
 - Indian Residents have witnessed a lofty 98% growth in patents for the 9-year period ended 2022. Non-Residents from across the world have also witnessed a doubling of patent growth in India taking advantage of an efficient and responsive IPR regime
 - **32% of the patents published in India are now by Indian Residents...this a jump from ~20% prior to 2014**
 - In terms of Resident Applications of patents, per 100 billion \$ GDP, India is quickly ramping up patent registration with its **decadal growth rate of 110% in 2022 in comparison to 56.9% in 2014**
 - India has now surpassed Canada, Australia, France, Germany and has the potential to surpass entire EU combined along with UK patent filing by 2025 and the Republic of Korea and Japan by 2026, ensuring the IP awareness across the higher education institutions through imparting them national IP awareness mission (NIPAM) training.
 - Persistent efforts to strengthen IPR regime has resulted in drastic reduction in average pendency for patent examination of 2160 days in 2016 (highest among major countries) to 120 days in 2022 in majority subject specialty (fastest among major countries)
- **Innovations in new fields like Computers, Communications, Biomedicals & Polymers** are gaining significant traction on the back of a digital India across Resident Indians

Executive Summary...2/4

- In 2004-2013 decade, among the inventions by multiple inventors, Indian Resident's share in Indian IPR market was just 16.3%. The same has now increased to 37.6% in 2014-2023 period. In 2022, patent applications filed in India by Resident Indians surpassed applications by foreign inventors
 - The share of USA, Japan, Germany, France and UK in Indian markets, in terms of joint inventions are declining reflecting India's innate strength in establishing IP friendly economic growth...
- **Electronics, Electrical, Physics, Biotechnology, Civil, Metallurgy** could be the next emerging sectors for IP creations and Innovation by India...
- **In 2004-2013 decade, among the inventions by single inventors, only 22.9% belonged to India** and rest were from foreigners primarily from USA, Japan, Germany, UK and France, which indicated commercialization of their IP and resultant outflow of money from Indian economy
- **In the current decade 2014-2023, among the inventions by single inventors, share of inventions of Indians has increased to 35.5%.** USA, Japan, China and Germany are major markets from which inventions are being registered in India. **This shows India is a transparent and IP friendly country**
- **India is witnessing a mass scale adoption of IP led innovation culture, and remarkably Uttar Pradesh is now emerging as a leader in innovation....Gujarat is maintaining its share across decade...Telangana, Punjab, Haryana Rajasthan are new age states...coming up as emerging leaders in IP innovation space**
- **In the decade of 2004-13, Indian Companies had 50% share** in inventions, Individuals had 35% share and Indian Educational and Scientific institutions had only 15% share... **In the decade of 2014-23, Educational and Scientific institutions have doubled their share to 31%...**Educational and scientific institutions and individuals across India have now adopted the innovation culture in line with the trend in developed countries...

Executive Summary...3/4

1. Offering Unique Value Proposition

- India is now aspiring to offer the new intellectual and innovative prowess to the world through IP driven, tech-enabled and knowledge embedded economy by offering co-creation and IP generation **in India, for the world**, build around key attributes:
 - Consistent, predictable, seamless and state-of-art IPR administration: Self-sustaining, financially autonomous IPR Offices (Hub-and-spoke)
 - Enhanced physical and e-infrastructure of global standards (all-encompassing architecture of IP-SEWA along the lines of Passport-Sewa)
 - Responsiveness to fluctuations in technology: timely scale-up of physical and e-infrastructure as also superior human capital
 - Closer role in policy formulations in strategic areas such as telecom (6G+, AI/ semiconductors, defence manufacturing / space tech etc.)
 - Standardization of IP related processes / systems across various IP offices (ISO standards)
- It is now the opportune time for Gol with states in tandem to create documentation of India's intangible cultural heritage for wider usage across cross-sections of society, in collaboration with WIPO
 - The government may chart an actionable roadmap to preserve the intangible cultural heritage by adopting measures such as affirmation, recording & filing and protecting the intangible cultural heritage that reflects the distinguished traditional culture of the country having historical, literary, artistic or scientific value keeping the cherished inheritance intact

Executive Summary...4/4

2. Aspiring for a Global Leadership

- Hand Holding & Training to LDCs
- IP Diplomacy through sharing of Indian IPO processes and IP-research & policy support, similar to WIPO technical support offered by Funds-in-Trust countries (US, China, Japan, UK, Switzerland, Republic of Korea etc)
- **Posting of Indian IP Counsellors in select key export markets and leading GII Countries to facilitate and sustain exports through MoUs could boost two-way connect**

3. Leadership in WIPO

- **WIPO Funds-in-Trust for IP diplomacy as also nudging WIPO to open an external office in India.** To enhance collaboration, a Bharat IP academy can be proposed that will become the single nodal agency for collaborating with WIPO
- **Strengthening India's position for occupying Chair and Vice-Chair in different WIPO Unions / Assemblies / Working Groups** through diplomatic channels that may also explore to place select Indian Officers within WIPO at strategic positions for cementing country's image in global knowledge-space

4. Global lead in IPR awareness and promotion

- Scale-up of mission NIPAM and AIM for global innovation diplomacy
- Create working groups (viz. National IP Council) between IP Office and DoT (for ITU); DoHFW (for WHO), NBA (for IGC, CBD, Nagoya); DoS, DRDO and DoAE (for generation of IPRs)
- **India should aspire to take global leadership in traditional knowledge driven AYUSH systems of medicines for the world at large**

5. Legislative amendments: Modernisation of Indian IPR Laws

- IP friendly IPR regime and law necessitate targeted legislative amendments to empower and deliver
- **Facilitate FTAs and enable access to IP assets of India for economic cooperation**

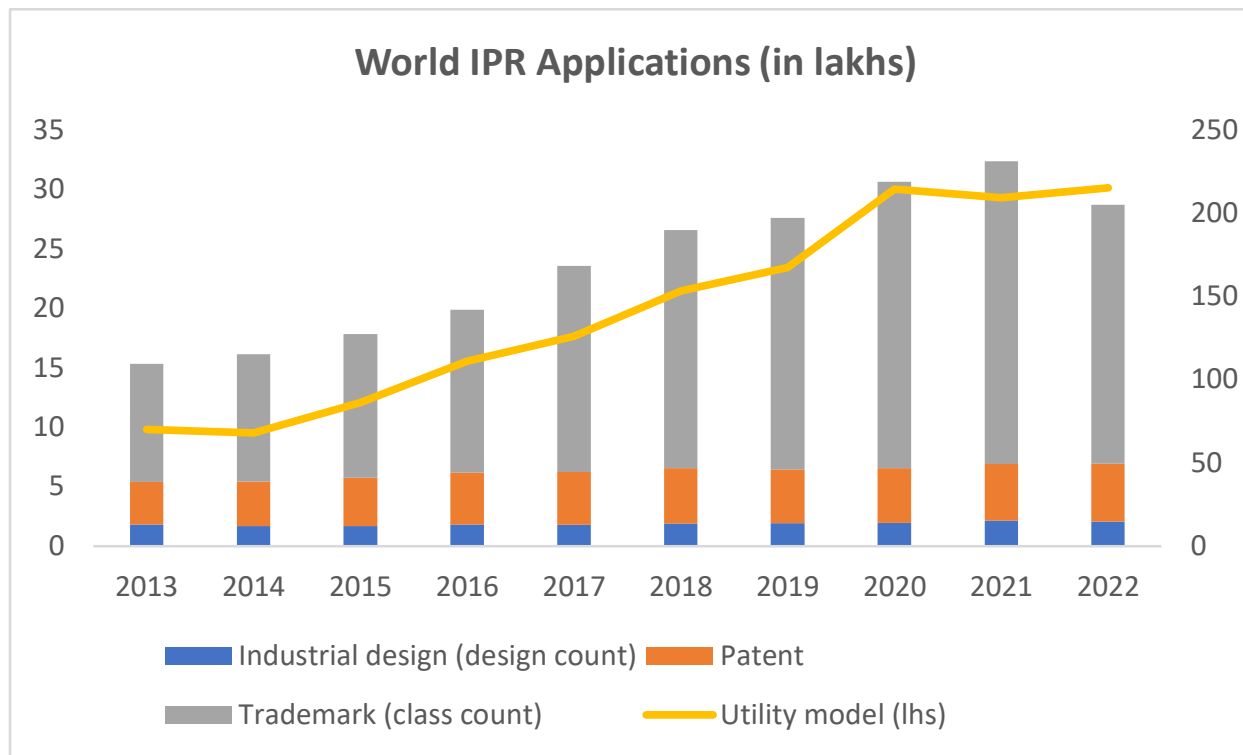
Backdrop

How India is placed in Patent World

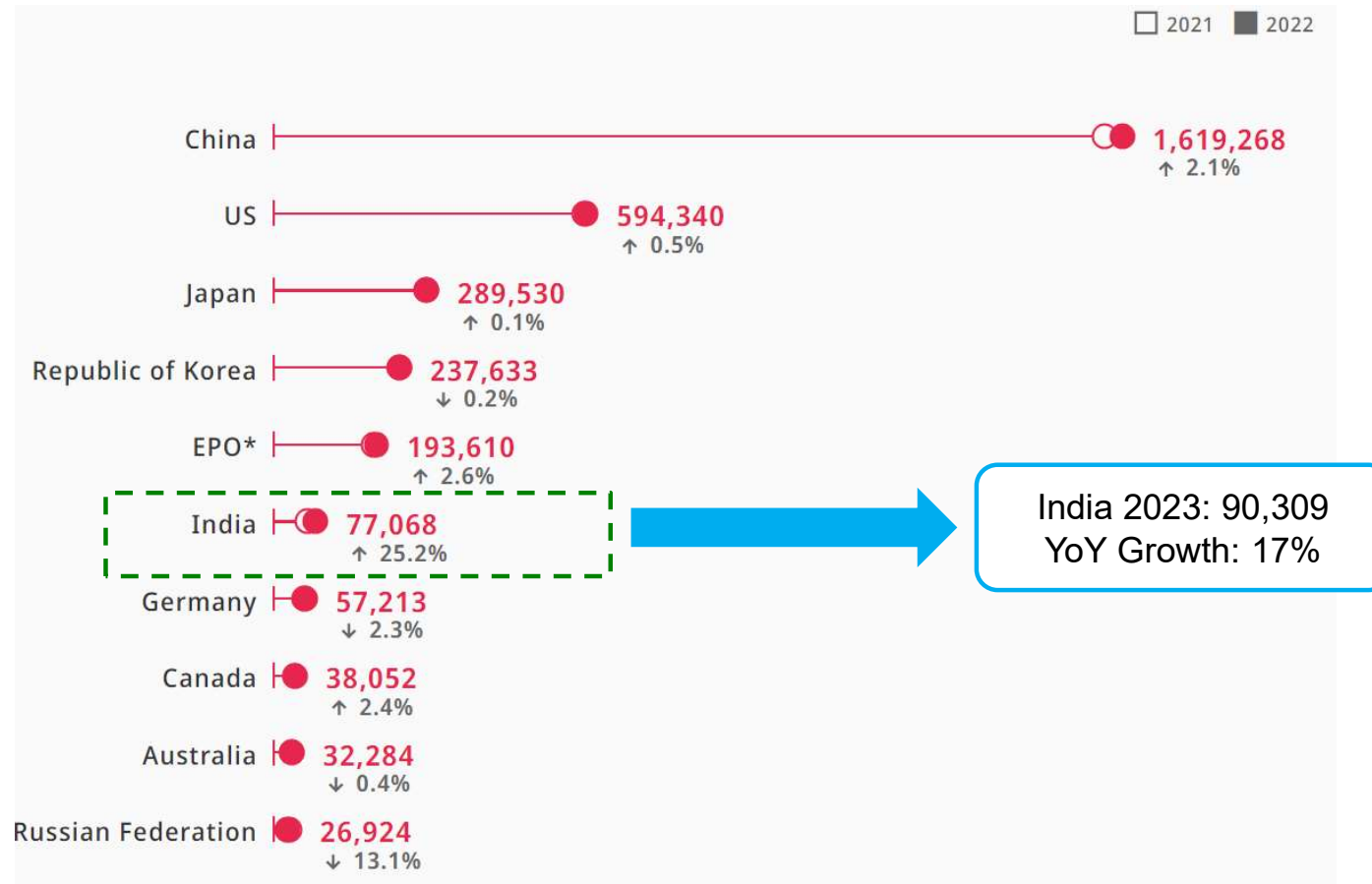
World IPR applications have grown at Compounded Annual Growth Rate of 60% for the 9 year ended 2022..driven by a surge in Patents and Industrial Designs...



- World Intellectual Property Right Applications expanded at 60% for the 9-year period ended 2022



....India the 5th largest economy in the world is the 6th largest in terms of number of patents in 2022..but with 25.2% growth in 2022 was fastest surpassing even China..

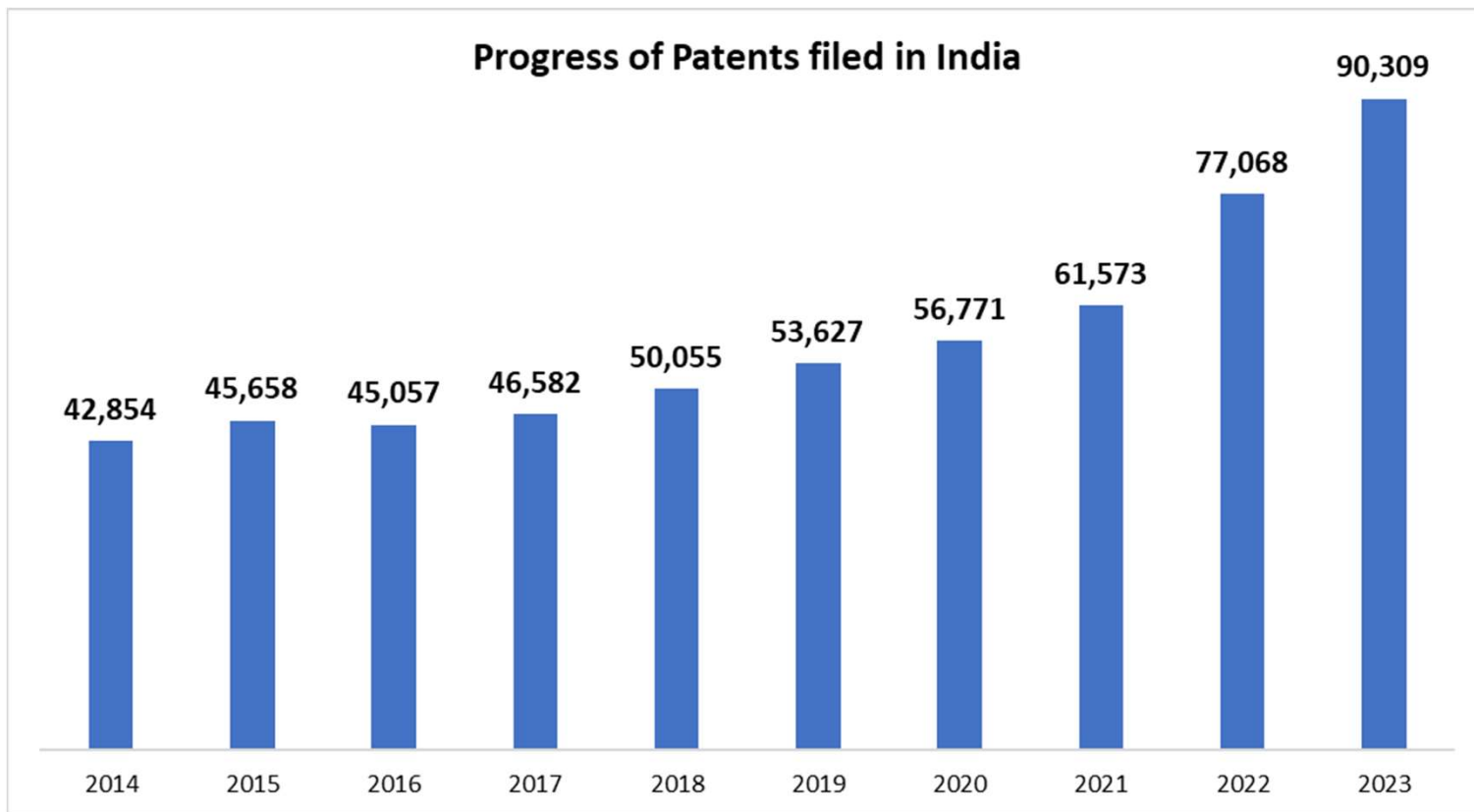


Note: * EPO is the European Patent Office, Source: WIPO Statistics Database, November 2023

India has made a remarkable progress in patents India in last decade with a CAGR of 60%

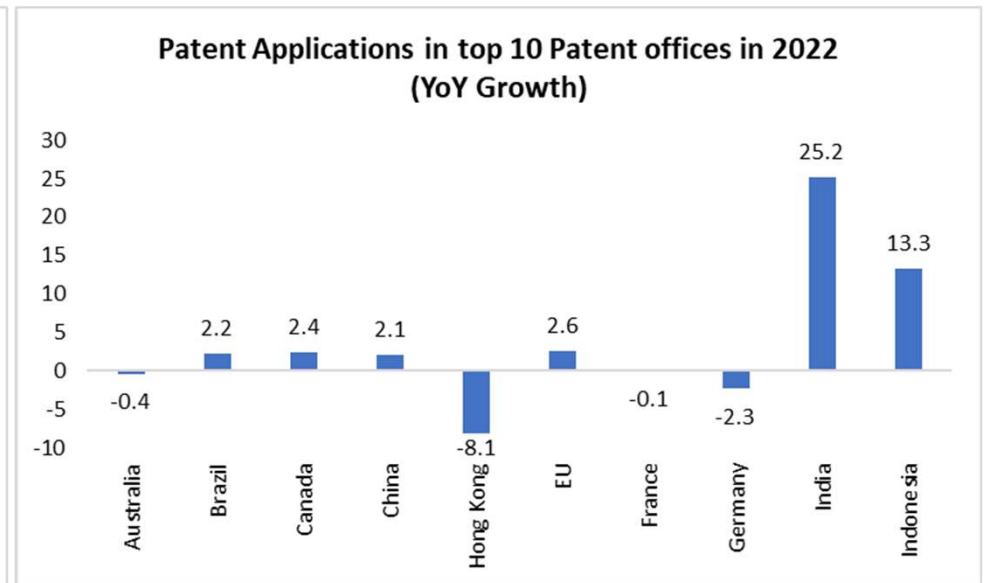
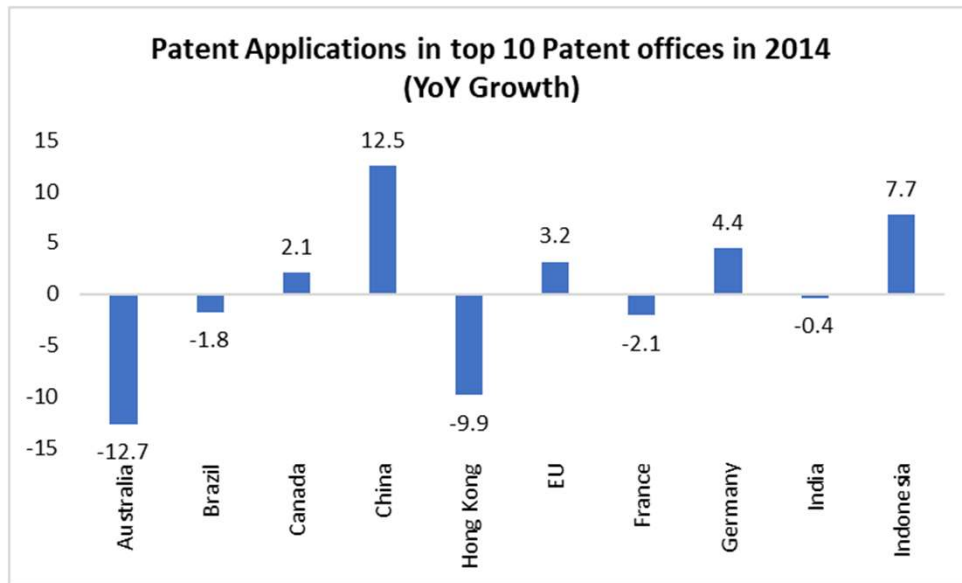


- India's progress is quite impressive in patents
- A total 90,300 patents filed in 2023, which was 17% higher than the last year



India's rate of growth of patent registration in 2022 is highest among major economies...from -0.4% in 2014 to 25.2% in 2022

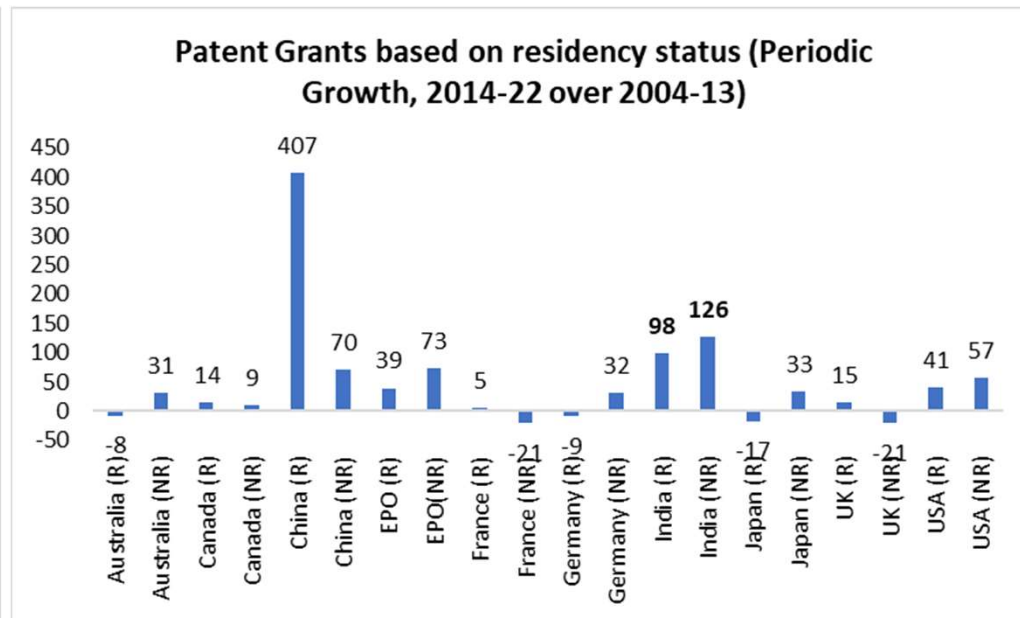
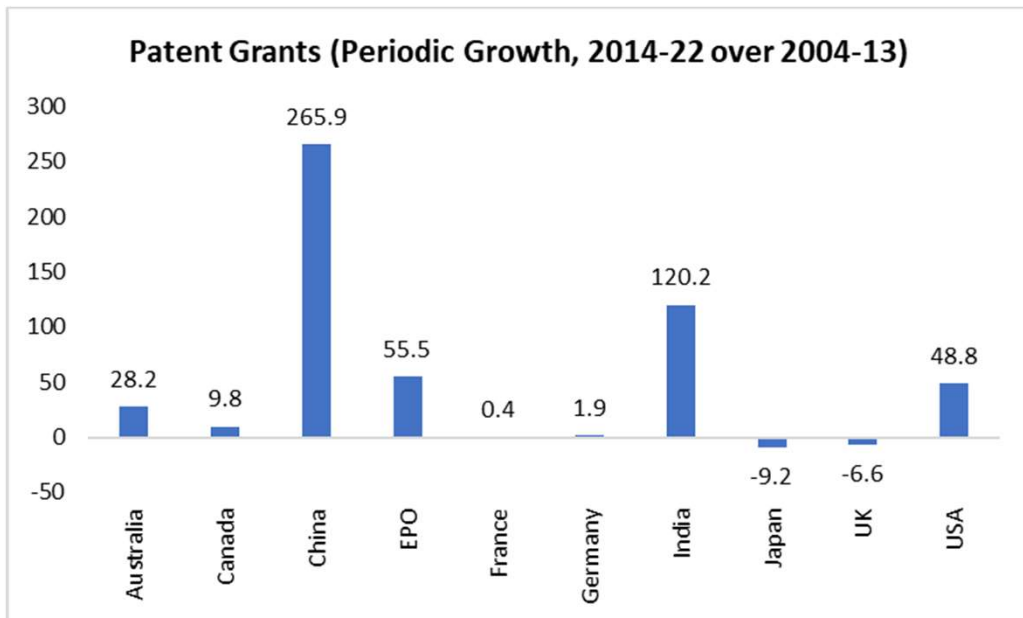
- Indian patents registrations were growing at a negative rate (-0.4%) in 2014, but now these are growing at 25.2% in 2022, highest among the major economies



Indian Residents has witnessed a lofty 98% growth in patents for the 9 year period ended 2022...
 Non residents from across the world have also witnessed a doubling of patent growth in India taking advantage of a liberal IPR regime

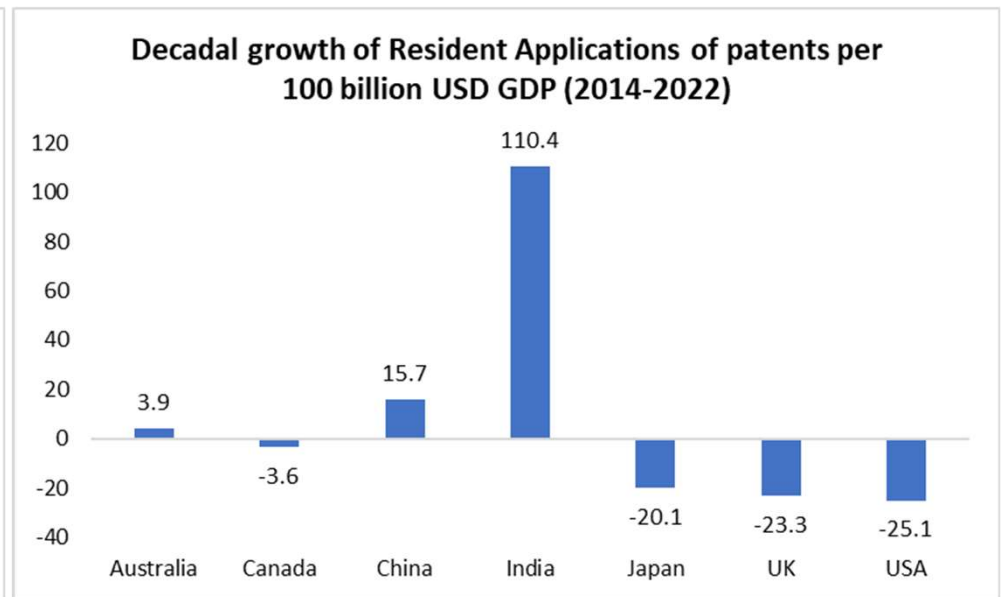
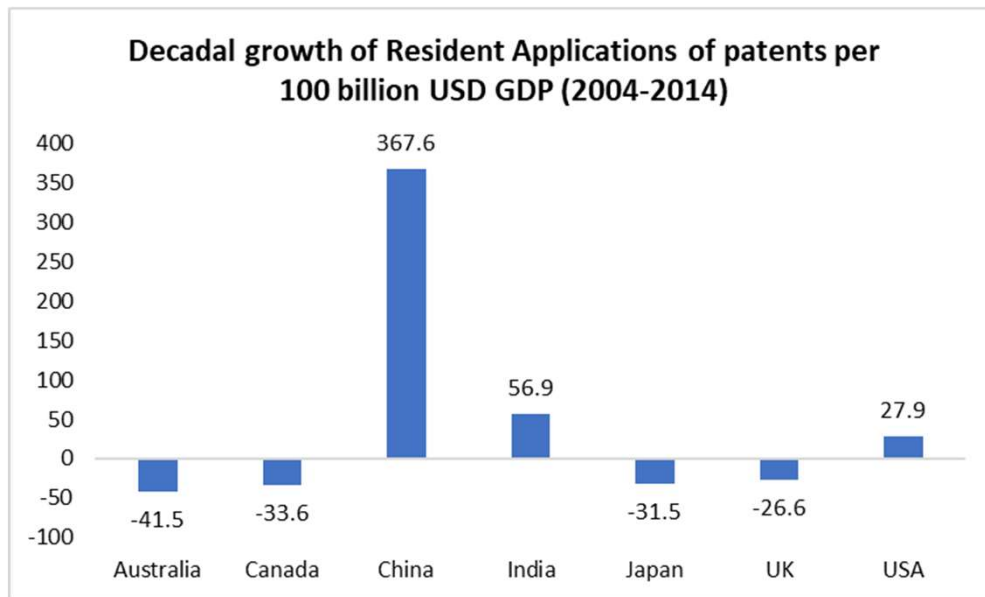


- China has the highest growth of patents registration for a period of 2014-22 over 2004-13. India is 2nd in terms of patents growth
- Chinese Residents are adding up the growth number of the patents. Indian decadal growth rate of patents for Residents is 98% and Non-Residents is 126%, higher than all other major economies, except China



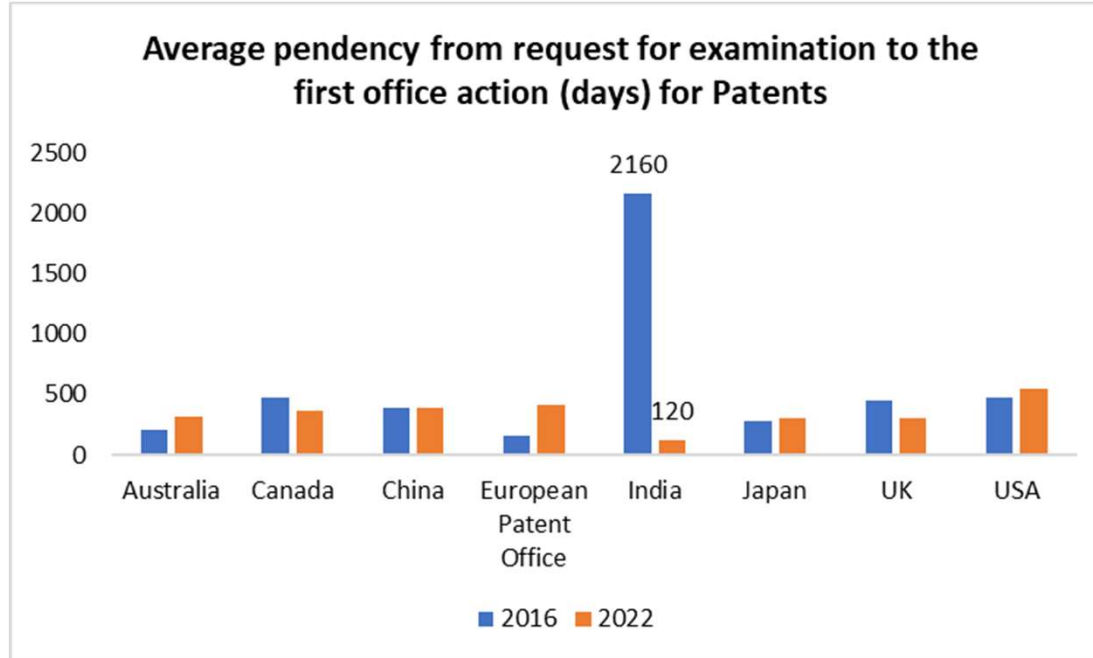
Indian Resident Applications of patents per 100 billion USD GDP are rising at fast pace...have surpassed Australia & Canada and will surpass UK within 2025....

- In terms of Resident Applications of patents, per 100 billion \$ GDP, India is quickly ramping up patent registration with its decadal growth rate of 110% in 2022 in comparison to 56.9% in 2014
- **In terms of magnitude of patents of Resident Applications of patents, per 100 billion USD GDP, India has surpassed Australia and Canada, and is expected to surpass UK in 2-3 years**



India has drastically reduced average pendency of patent examination.....

- India has drastically reduced average pendency of patent examination to the first office action from **2160 days in 2016** (highest among major countries) to 120 days in 2022 (lowest among major countries)



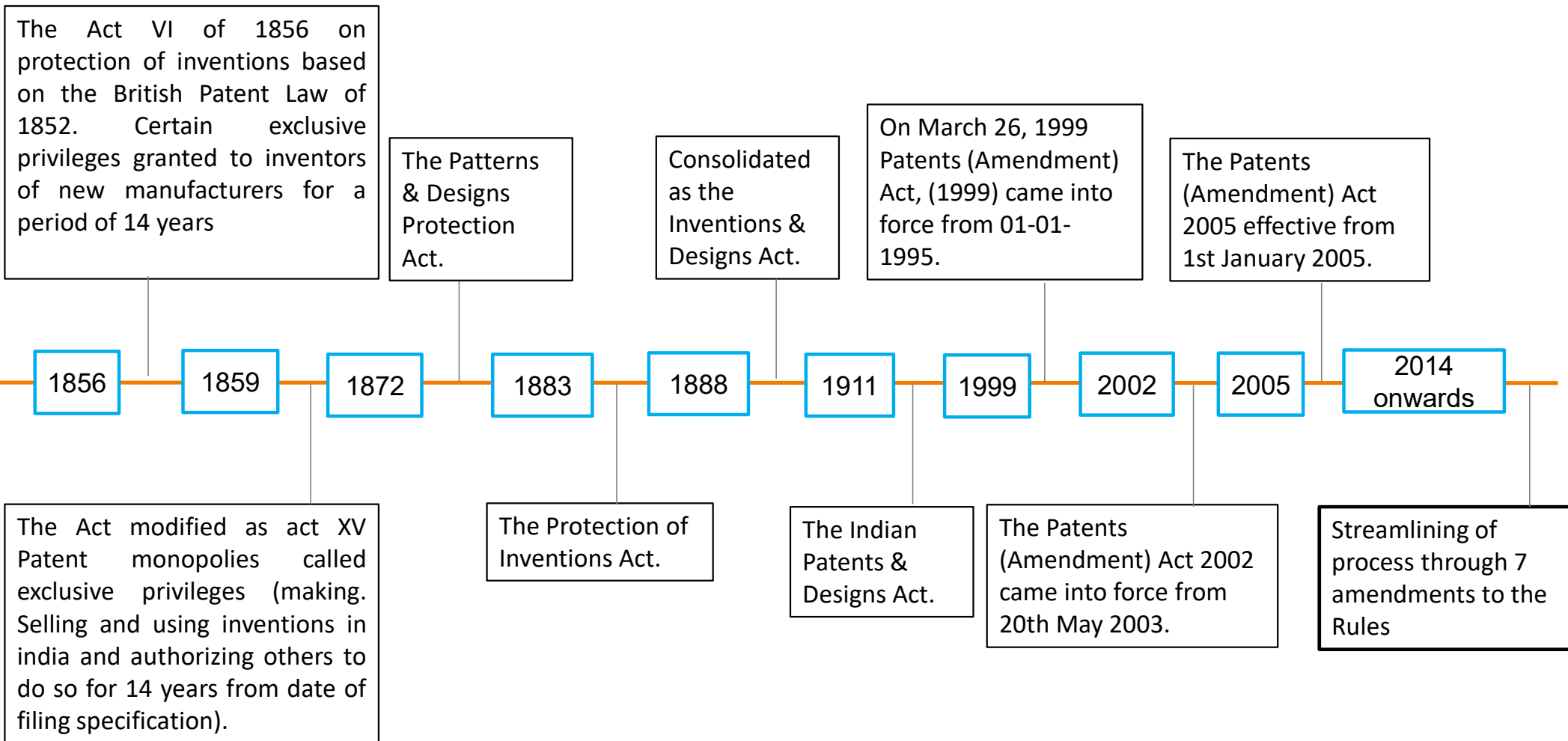
Patent grant time has been reduced by a significant 15 months since 2014

- In 2014, average time taken in patent grant was 68.4 months, the same is now reduced to 53 months in 2023
- Maximum reduction of time in patent grants have been achieved in the fields of Chemistry and Polymer, wherein average time taken for patent grants is only 30 months
- **There had been a long pendency for final grant of patents in IP office which has resulted in increased no of months in Patent grants. IP office has now cleared the old pendency and fresh patent applications are granted patents in only 22 months in post pandemic period**

Average No of Months in patent grants			
Fields	2014	2023	Reduction in No of Months
Biochemistry	62.4	52.9	9.5
Biomedical	74.3	58.0	16.4
Biotechnology	65.1	56.8	8.3
Chemistry	64.3	30.9	33.5
Civil	73.2	46.7	26.6
Communication	70.7	57.3	13.4
Computer	70.7	68.8	1.9
Electrical	71.2	54.3	16.9
Electronics	72.5	61.5	11.0
Food	60.2	55.1	5.1
Mechanical	71.4	53.4	18.0
Metallurgy	66.1	55.3	10.8
Physics	70.8	57.0	13.8
Polymer	65.4	30.0	35.5
Textile	70.5	53.8	16.7
Overall	68.4	53.1	15.3

Source: IP India, SBI Research

History of Indian Patent System: Since 2014, there is a streamlining of the processes...

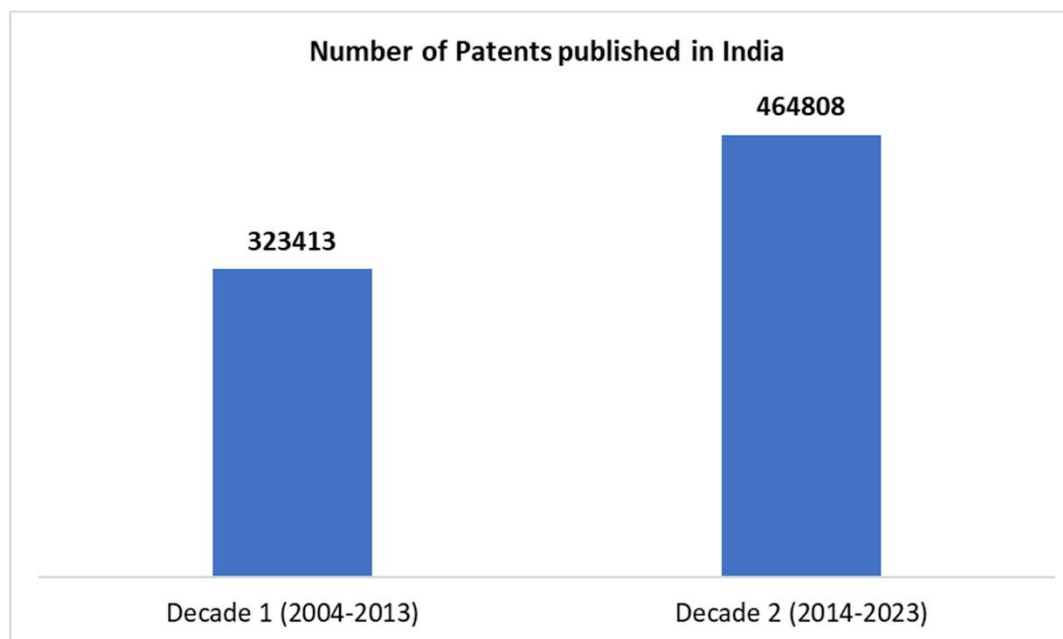


Analysis of Patent Data

Patents published in India for the decade ended 2023 is at 4.65 lakhs...44% higher

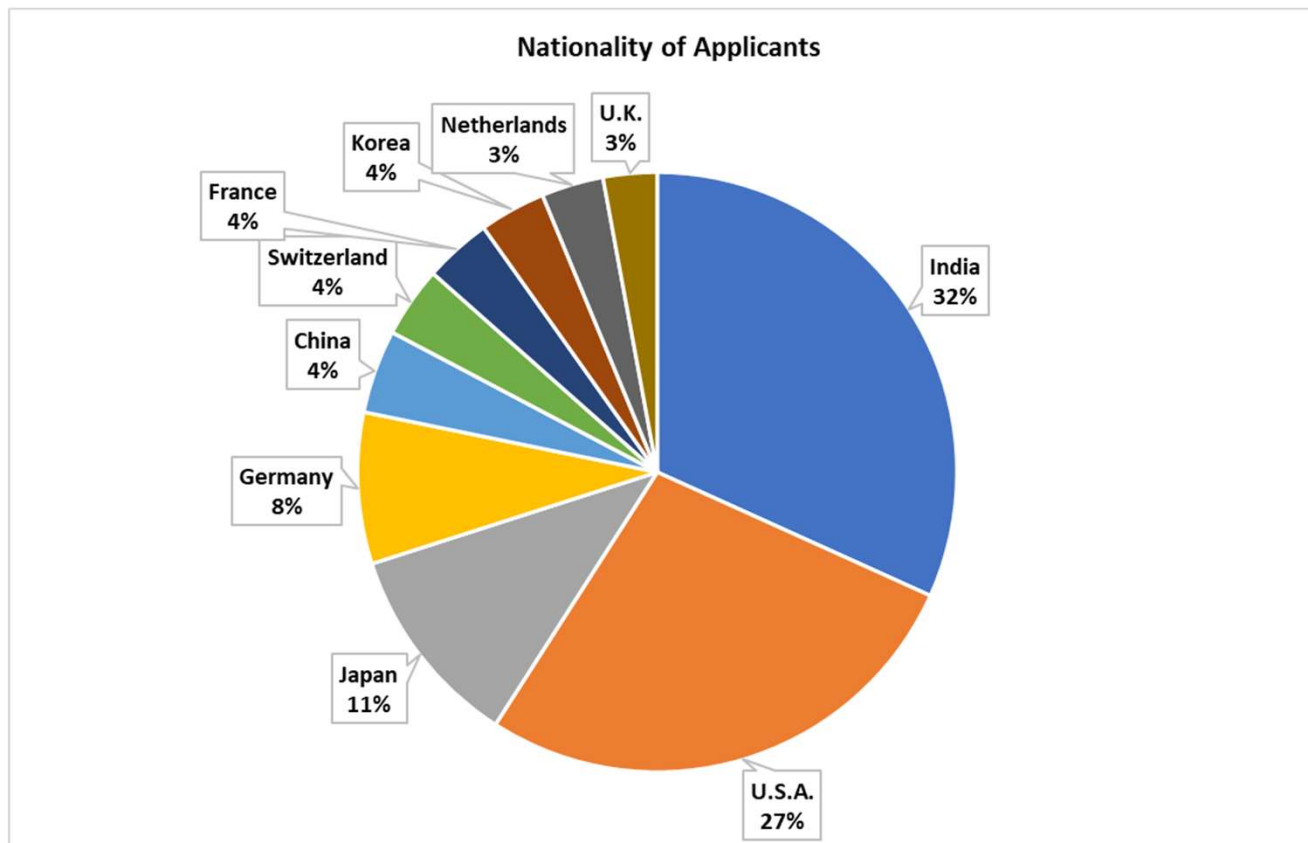


- As per the data, a total of 8.40 lakh patents has been published in India till Dec'23
- The patents published in Decade 2 (2014-2023) at 4.65 lakh was ~44% higher than the patents published in the preceding Decade 1 (2004-2013)
- **Compared to average 89 patents per day in Decade 1 there were 127 patents published per day in Decade 2, wherein 247 patents filed per day in 2023 which is all time high compared to last 20 years**



32% of the patents published in India are by resident Indians...this a jump from ~20% prior to 2014

- Of the total 8.40 lakh patents published in India till Dec'23, 32% (or 2.3 lakh) applicants are Indians, followed by US and Japan's citizens
- Top 10 countries accounted for 87% of the total patents publishes in India



Innovations in new fields like Computers, Communications Biomedicals & Polymer are gaining pace on the back of a digital India....

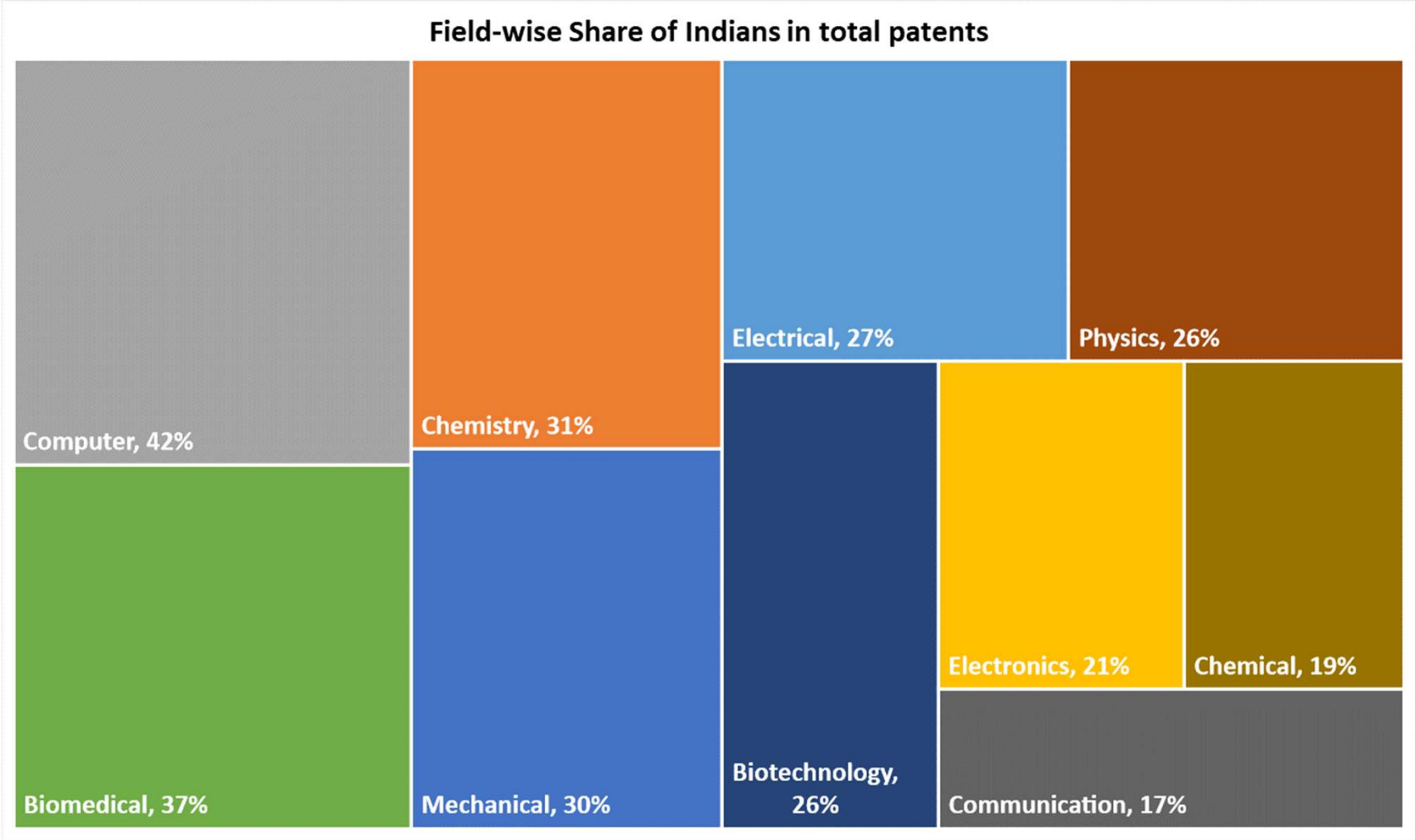


- Mechanical is the top field of innovation (share: ~20%) for the last two decades followed by Chemistry (share: ~16%)
- Innovations in new hot bed IP sectors are gaining pace like Computers, Communication, Biomedicals and Polymer....

Top 15 Fields of Innovation					
Decade 1 (2004-2013)			Decade 2 (2014-2023)		
Field	Number	Share	Field	Number	Share
Mechanical	56147	17%	Mechanical	95002	20%
Chemistry	51491	16%	Chemistry	72808	16%
Electronics	35215	11%	Computer	52774	11%
Electrical	21570	7%	Electronics	46806	10%
Computer	18415	6%	Communication	40866	9%
Biotechnology	17147	5%	Electrical	33627	7%
Chemical	16873	5%	Biomedical	27911	6%
Physics	15338	5%	Biotechnology	23109	5%
Mechanical Engineering	14128	4%	Physics	22682	5%
Communication	12590	4%	Polymer	13208	3%
Biomedical	10971	3%	Metallurgy	7718	2%
Pharmaceuticals	9017	3%	Biochemistry	7535	2%
Polymer	7550	2%	Civil	6872	1%
Textile	4944	2%	Textile	6345	1%
Metallurgy	4755	1%	Food	4453	1%
Grand Total	323413	100%	Grand Total	464808	100%

Source: IPI; SBI Research

Field-wise Indians Contribution in total patents reveal a similar preponderance of fields of Computers, Biomedical & traditional areas of Chemistry & Mechanical

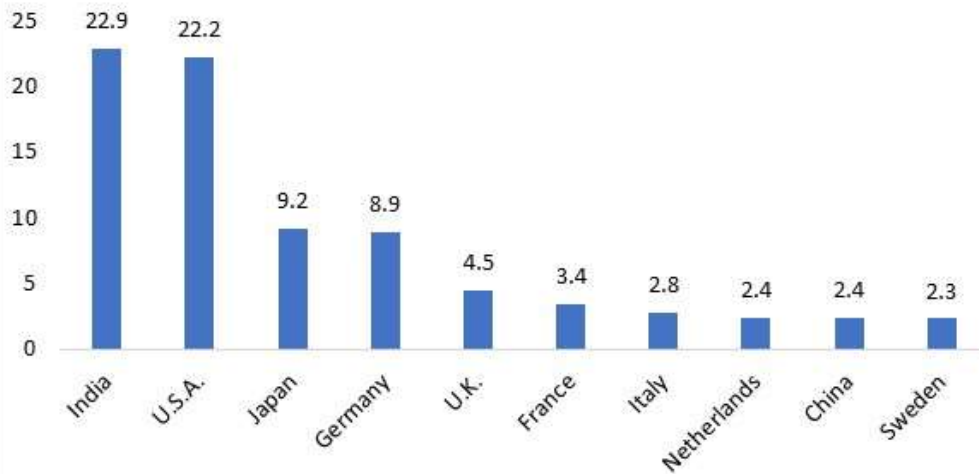


Analysis of Inventions by Single Inventors

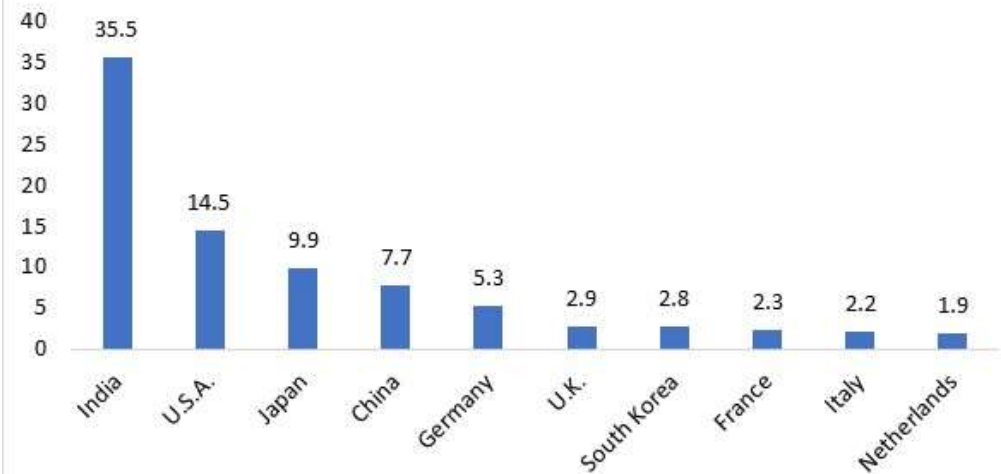
The share of Resident Indians in Indian Innovation market has increased from 22.9% in pre 2014 era to 35.5% post 2014....

- In 2004-2013 decade, among the inventions by single inventors, only 22.9% were belonging to India and rest were from foreigners primarily from USA, Japan, Germany, UK and France to restrict copyright infringement of their inventions in Indian markets
- In the current decade 2014-2023, among the inventions by single inventors, share of inventions of Indians has increased to 35.5%. USA, Japan, China and Germany are major markets from which inventions are being registered in India for restricting copyright infringement

Share of Top 10 Nationalities in single inventor registrations in India (2004-2013)



Share of Top 10 Nationalities in single inventor registrations in India (2014-2023)



Computer and Biomedical are major interest areas of Indian Innovations post 2014....

- Innovations in Mechanical, Computer, and Biomedical are fastest gaining traction in India
- Innovations in Chemistry, Communications, Textile, Food, Polymers and Biochemistry are also growing at fast pace

Emerging sectors of Innovation (% Share)		
Field of Invention	2004-13	2014-23
MECHANICAL	25.8	29.7
COMPUTER	7.5	14.6
CHEMISTRY	8.7	9.3
BIOMEDICAL	2.8	8.1
COMMUNICATION	2.9	4.7
TEXTILE	2.0	2.0
FOOD	1.4	1.8
POLYMER	0.7	1.0
BIOCHEMISTRY	0.7	0.9

Source: SBI Research

Time for innovations in traditional strength areas to enter a decisive phase

- Innovations in Electronics, Electrical, Physics, Bio-technology, Civil, Metallurgy innovations could be the next big area of innovations in India...
- Policy support may be devised to fuel the upsurge innovations in these areas

Innovation sectors in need of Policy support (% share)		
Field of Invention	2004-13	2014-23
ELECTRONICS	8.6	8.1
ELECTRICAL	8.5	7.4
PHYSICS	4.6	4.5
BIOTECHNOLOGY	4.0	3.8
CIVIL	2.9	2.7
METALLURGY	1.0	0.6
MECHANICAL ENGINEERING	7.3	0.5
COMPUTER SCIENCE	2.1	0.2
CHEMICAL	2.3	0.1
BIO-MEDICAL ENGINEERING	0.4	0.0
GENERAL ENGINEERING	2.4	0.0
PHARMACEUTICALS	1.2	0.0
AGRICULTURE ENGINEERING	0.2	0.0
BIO-CHEMISTRY	0.4	0.0
POLYMER TECHNOLOGY	0.2	0.0
AGROCHEMICALS	0.2	0.0
MICRO BIOLOGY	0.5	0.0
TRADITIONAL KNOWLEDGE BIOTECHN	0.3	0.0
NO SUBJECT	0.2	0.0
TRADITIONAL KNOWLEDGE CHEMICAL	0.1	0.0

Source: SBI Research

Remarkably, Uttar Pradesh is now emerging as a leader in innovation...Gujarat maintaining its share across decade...Telangana, Punjab, Haryana Rajasthan are new age states...



- Uttar Pradesh, Punjab, Telangana, Rajasthan, Uttarakhand are states where Innovations are increasing at a fast pace
- Gujarat, Haryana, Odisha, A&N Islands, Chhattisgarh, Jammu and Kashmir, Pondicherry and Himachal Pradesh are also increasingly contributing to Indian Innovation growth

Emerging States in Innovation (% share)

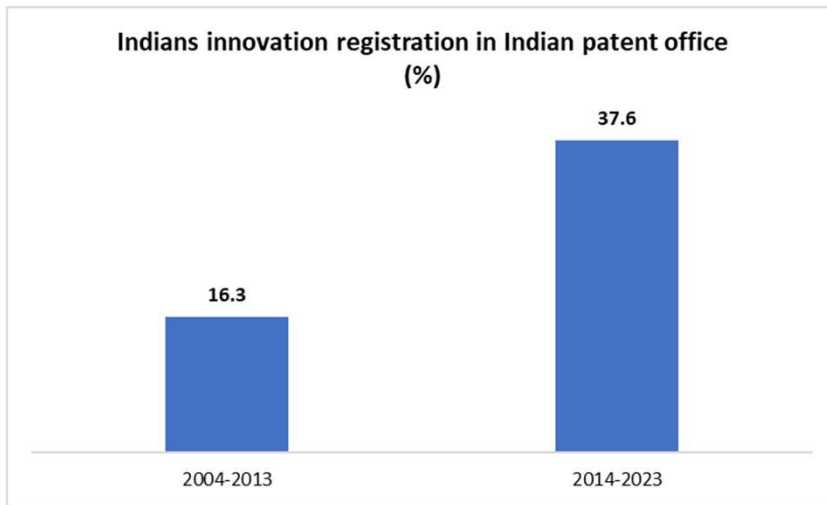
State	2004-13	2014-23
Uttar Pradesh	5.0	7.2
Punjab	1.0	5.8
Gujarat	4.5	4.6
Telangana	0.1	4.0
Haryana	2.7	2.9
Rajasthan	1.2	2.3
Uttarakhand	0.7	1.4
Orissa	0.8	0.9
Andaman & Nicobar	0.6	0.8
Chattisgarh	0.3	0.7
Jammu & Kashmir	0.3	0.4
Pondicherry	0.1	0.4
Himachal Pradesh	0.2	0.3

Source: SBI Research

Analysis of Inventions by Multiple Inventors

Share of Resident Indians in Indian Innovation market is increasing in joint inventions

- In 2004-2013 decade, among the inventions by multiple inventors, Indians share in Indian IPR market was just 16.3%. The same is now increased to 37.6% in 2014-2023 period
- The share of USA, Japan, Germany, France and UK in Indian markets, in terms of joint interventions are declining reflecting India's innate strength...

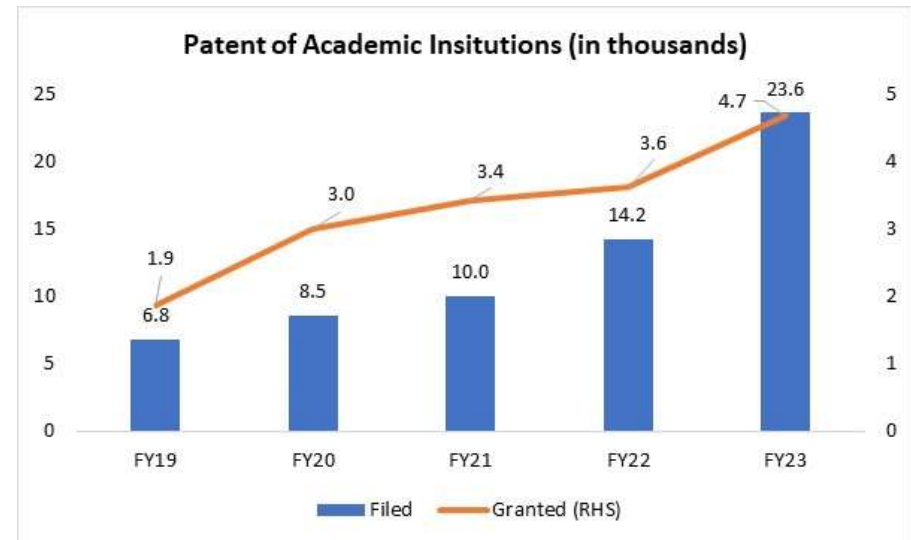
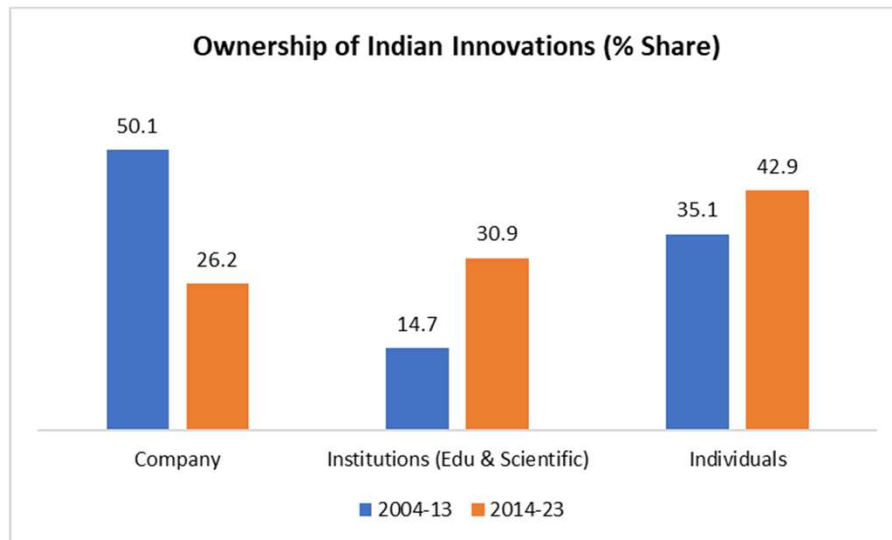


Share of Foreigners innovation registration in India Falling (%)		
Country	2004-2013	2014-2023
U.S.A.	30.6	20.9
Japan	10.6	8.7
Germany	10.4	5.5
France	4.3	2.5
U.K.	4.0	2.3
Netherlands	2.6	2.1
Switzerland	2.3	1.3
Republic of Korea	2.2	3.3
Sweden	2.0	1.5
China	2.0	6.1
Italy	1.9	1.1
Canada	1.8	1.0
Belgium	1.1	0.6
Israel	1.1	0.6
Australia	1.0	0.5

Source: SBI Research

Indian Educational and Scientific Institution's innovations on rise.....Indians are taking innovations to every nook and corner of India....

- In the decade of 2004-13, Companies had 50% share in Indian innovations. Individuals had 35% share and educational and scientific institutions had only 15% share
- **In the decade of 2014-23, Educational and Scientific institutions has doubled their share in innovations to 31%**
- We find increasing evidence of patents filed in India taking advantage of the liberal regime. There is now a spontaneous innovation culture emanating from educational and scientific institutions and individuals across India. Only 6.8 thousands patents were filed by academic institutions in FY19, the same is increased to 23.6 thousands in FY23



Acknowledgements



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thank
you

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