



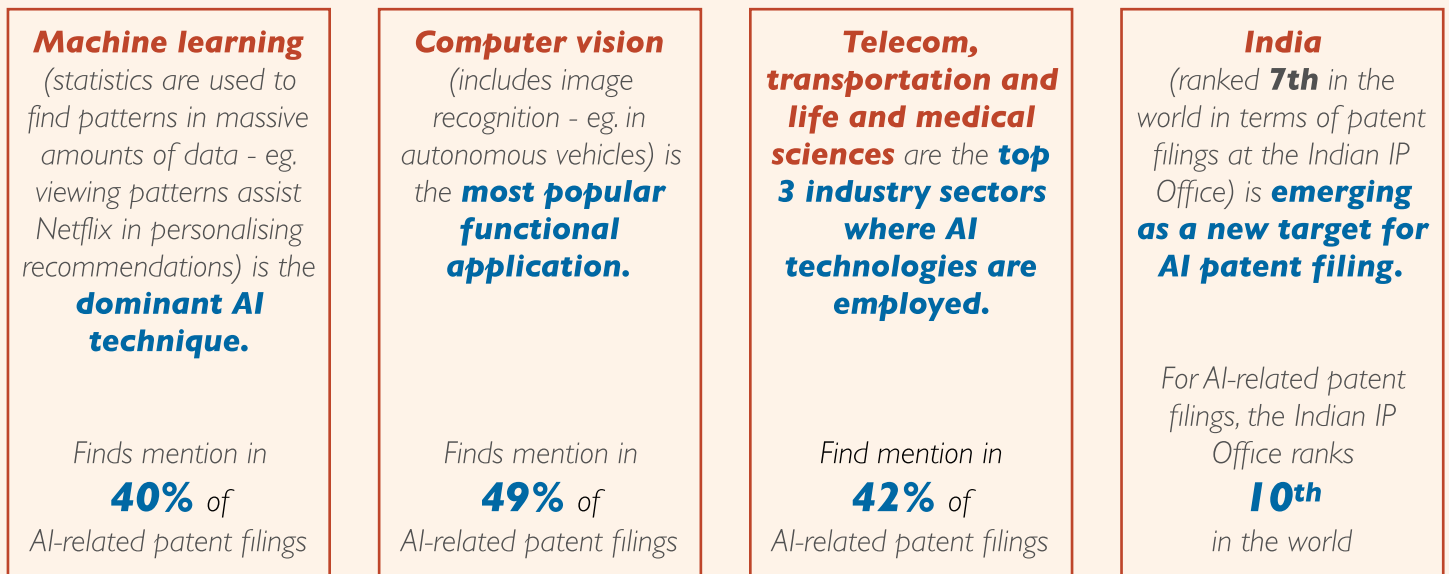
Remfry & Sagor

IP Report
February 2020

Trends in AI

Artificial Intelligence (AI) has been compared to the internal combustion engine or electricity - an enabling technology with myriad applications. It essentially involves the creation of intelligent hardware or software that is able to replicate human behaviours such as the ability to reason, learn from the past, discover meaning, or generalise. Though the term was coined in 1956, it is really in the last decade that AI technologies have become a part of our daily lives.

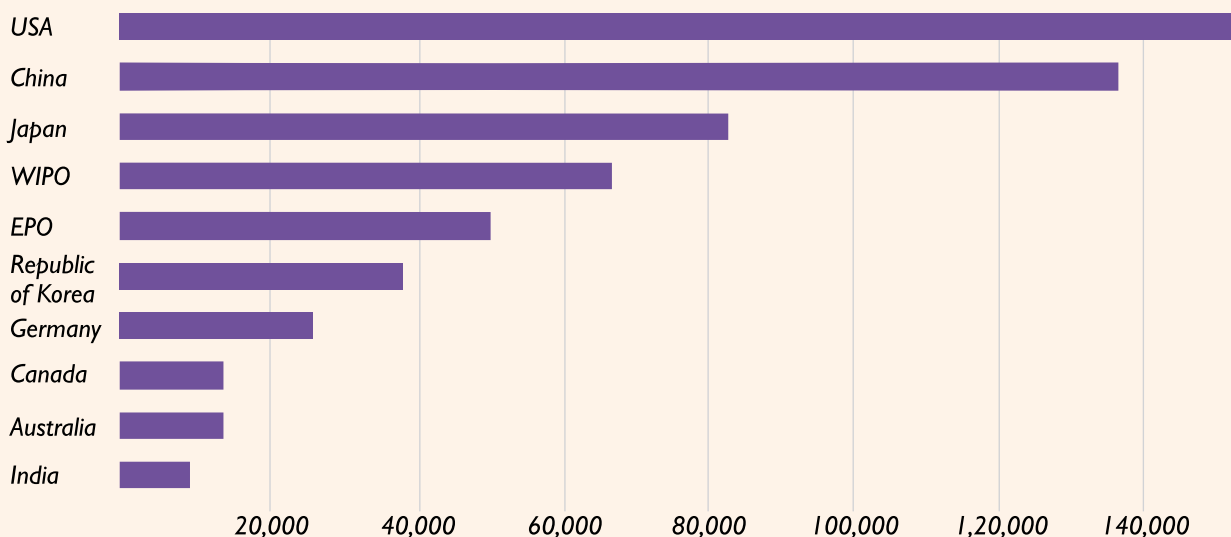
Patents on AI technology provide a measurement of AI activity in industry and its potential impact on products. WIPO's 2019 report on AI provides very useful insights in this regard - some of which are highlighted here.



Source: WIPO (2019). WIPO Technology Trends 2019: Artificial Intelligence.

Top Offices For Overall Patent Applications in AI

Since AI emerged in the 1950s, patent applications have been filed for nearly 3,40,000 AI-related inventions. The graph below shows figures for the top offices in terms of such filings.



Source: WIPO (2019). WIPO Technology Trends 2019: Artificial Intelligence.

Statistical Trends

- ▶ Over 50% of all AI-related patents filed so far have been published post 2013.
- ▶ The most marked increase in patenting activity between 2013 and 2016 features deep learning, a machine learning technique, for which filings showed an average annual growth rate of 175%.
- ▶ Not surprisingly, patent filings in transport technologies are very prominent - their share in global AI filings rose from 20% to 33% between 2006-16. Overall, AI filings in this sector grew at an average 33% between 2013 and 2016 whereas sub-categories of aerospace/avionics and autonomous vehicles posted average annual growth of 67% and 42% respectively.
- ▶ AI filings also grew rapidly in agriculture, computing in government, and banking and finance - annual growth rates between 2013-16 were 32%, 30% and 28% respectively.
- ▶ In terms of global investment in AI technologies, 'autonomous vehicles' received the lion's share (10%), followed by 'drug, cancer and therapy' (6.1%), 'facial recognition' (6%), 'video content' (4.5%), and 'fraud detection and finance' (3.9%). Further, investment in AI startups increased from US\$1.3B in 2010 to over US\$40.4B in 2018 - funding increased at an average annual growth rate of over 48%.

Globally, patent applications in AI grew

6.5 times

between 2006 and 2017

(from 8,515 applications to 55,660 applications)

In the same period, patent applications across all technologies grew

1.76 times

(from 1.79m applications to 3.16m applications)

India's AI Potential

- ▶ India ranks 10th in the world for AI related patent filings and in the field of 'distributed AI', Indian patent filings are the 5th highest in the world. However, as yet, no Indian company/ research organisation features among the list of top applicants globally.
- ▶ Out of Microsoft's global portfolio of 5930 AI patent applications, it has filed more than 10% - over 600 applications - before the Indian Patent Office (IPO). Other top global corporate filers are still to follow.
- ▶ Another metric to ascertain which regions are an already important or potential market for AI, is 'first office filing' pattern (office of first filing refers to the office where the application is first filed). Office of first filing usually coincides with the patent office located where research takes place or where the applicants see a market. India was ranked 8th for first filings in 2015 and has enjoyed a high rate of annual growth during recent years (with an average of 33% in the 3 years up to 2015).

National Comparison of Skill Penetration and Number of Unique AI Occupations



Relative skill penetration is the ratio between the penetration rate of a given skill group in a country and the global average penetration rate.

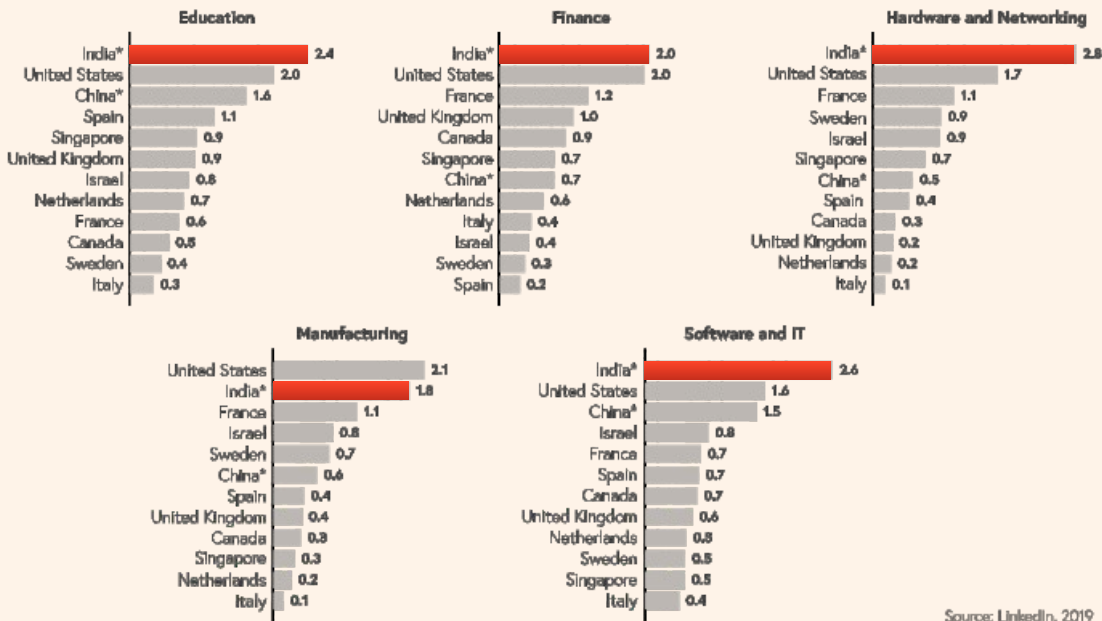
Average penetration of AI skills in India is

2.6 times

times the global average across the same set of occupations.

▶ The top five sectors with the highest AI skill penetration globally are - Software & IT Services, Hardware and Networking, Education, Finance, and Manufacturing. India ranks as the top country in 4 of 5 sectors. With the country expected to add over 10 million people to its labour force every year over the next decade (*Economic Times, 2018*), perhaps AI would be a valuable driver of occupational diversity, jobs and growth.

Sectoral Rankings of AI Skill Penetration Scores, by Country

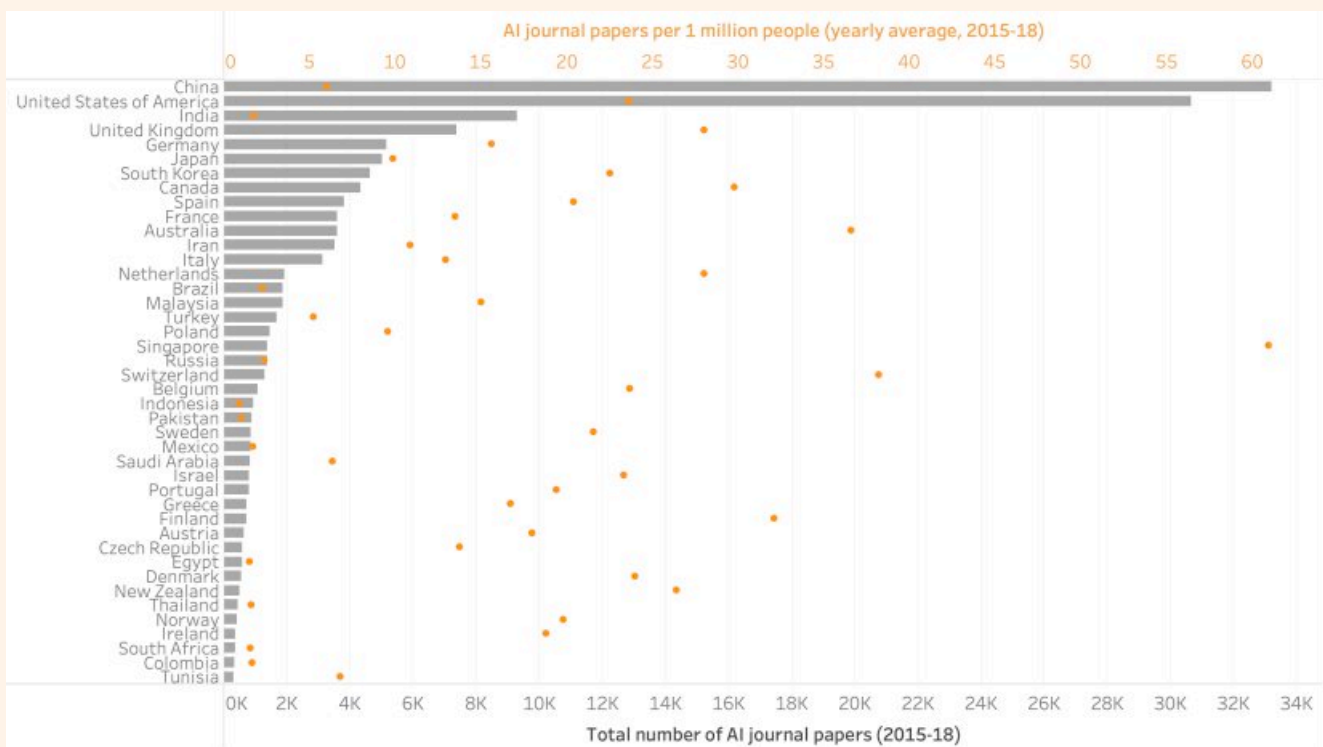


*China and India were included in this sample due to their increasing importance in the global economy, but LinkedIn coverage in these countries does not reach the 40% of the workforce. Insights for these countries may not provide as full a picture as other countries, and should be interpreted accordingly.

The above disclaimer was carried in 'The AI Index 2019 Annual Report: Stanford University' from where this data has been drawn.

Source: LinkedIn, 2019

▶ Scientific publications too indicate strength in AI research that can later translate into patenting activity. In 2018, China had the highest volume of AI journal papers, followed by the US, India, UK, and Germany (see graph below). Increasing its per capita publication would be a future goal for India.



Source: MAG, 2019; The AI Index 2019 Annual Report: Stanford

IMPACT of AI

AI-powered technologies are rapidly entering global markets and to maximise their benefits it is important to understand their expected effect on the workforce, the economy and society as a whole.

For instance, agriculture is a key sector of the Indian economy and provides employment to 60% of its population.

Microsoft has reportedly conducted trials in India (and elsewhere) to test a system ('FarmBeats') powered by solar panels that enables farmers to create an aerial map of their farming plots by placing low cost data-transmitting sensors in the ground and linking a smartphone camera to a drone/helium balloon to photograph their fields. Data from both the sensors and the phone are innovatively transmitted *via* TV white space spectrum to a computer, where machine learning algorithms stitch images and sensor values together into a data map. The data generated can help a farmer decrease his dependency on water for irrigation by about 30%, use 44% less lime to control soil pH, indicate an ideal time for planting seeds etc. - resulting in a more productive harvest. Other players in this sector may not be far behind.

Also, several Indian companies including Mahindra & Mahindra and Escorts Ltd have showcased driverless tractors. Though still in the concept stage, these tractors will be operated through smart devices using the internet of things (IOT) and artificial intelligence (AI) tools. Farmers will be able to steer automatically using GPS-based technology and the tractors will be able to lift tools from the ground and recognise the boundaries of a farm.

These are just two examples of how AI can help increase productivity and contribute to revolutionising the farm sector.



Indian policymakers will have to move quickly to strategise and shape the direction of AI's evolution in order to add the desired impetus to all suitable sectors of the Indian economy thereby enabling the country to realise its enormous growth potential.

IP law and AI

Subject Matter Eligibility: From a patent perspective, one of the main issues is whether AI inventions can/should be considered as patent eligible subject matter. At the moment, the Indian Patent Office does not have a published position on how it intends to deal with AI inventions.

- ▶ Computer programs *per se*/algorithms are not patentable in India; Also, historically, India has been ambivalent with respect to permissibility of computer-related inventions, (CRIs);
- ▶ In 2017, however, it chose an approach closer to the EU position under which CRIs are patent eligible so long as the claimed inventive steps are tied to hardware and exhibit a technical effect.

GAME CHANGER?

The December 12, 2019 order of the Delhi High Court in *Ferid Allani v. Union of India* has the IP community very excited on account of its AI friendly remarks. In March 2013, Ferid Allani's patent application for a "method and device for accessing information sources and services on the web" was rejected by the Intellectual Property Appellate Board (IPAB) under Section 3(k) - pertains to patents related to software - of the Indian Patents Act.

On appeal, the Delhi High Court directed the Patent Office to re-examine the application in the context of developments that had occurred post the filing of the patent – namely 'settled judicial precedents which had now laid down the interpretation of Section 3(k), the Guidelines [for Examination of Computer Related Inventions, 2016] and other material including legislative material.'

The judge re-iterated that there was no absolute bar on patentability of computer programs. Further, the terms technical effect and technical advancement, the meaning of which was no longer in dispute owing to the development of judicial precedents and patent office practices, internationally and in India, must be looked into in determining the eligibility of a computer program for patenting. She continued, "*In today's digital world, when most inventions are based on computer programs, it would be retrograde to argue that all such inventions would not be patentable. Innovation in the field of AI, blockchain technologies and other digital products would be based on computer programs, however, the same would not become non-patentable inventions – simply for that reason. It is rare to see a product which is not based on a computer program. Whether they are cars and other automobiles, microwave ovens, washing machines, refrigerators, they all have some sort of computer programs in-built in them. Thus, the effect that such programs produce including in digital and electronic products is crucial in determining the test of patentability.*"

On remand, the Patent Office has refused the application but the proposition of the Delhi High Court in *Ferid Allani* has not been overturned.

Data Concerns: Underlying all AI technology is data, and reliance on data raises concern around security and privacy.

- ▶ Keeping data secure will be a big challenge because as one author surmises "if someone hacked in and changed a thousand numbers, how would people know? What would it cause?"
- ▶ IP practitioners are more worried about data privacy. There is a balancing act in play because in order to benefit from AI, users must be willing to give up privacy. But how much is enough? For instance, when we talk to Alexa or Siri on a routine basis, if the software used that data for our benefit, such as finding medical irregularities, would we agree? But, what if the software used the data without consent to bolster their data set for some other analytics/statistics? How should transparency in AI applications be

regulated? And who should be regarded as the owner of the data - the original user or the AI developer using the data?

- ▶ The Personal Data Protection Bill, 2019 proposes a framework for processing of personal data by public and private entities, including entities based abroad. Inspired by the General Data Protection Regulation, which protects personal data and privacy of EU citizens, the Bill lays down requirements for collection, storage and processing of personal data, consent of individuals, penalties and compensation, code of conduct and an enforcement mechanism envisaged through a Data Protection Authority (DPA). The requirement of data localisation also finds mention. It will be interesting to see how debates in Parliament shape the Bill into statute.



“Sometimes it seems as though each new step towards AI, rather than producing something which everyone agrees is real intelligence, merely reveals what real intelligence is not.”

- Douglas Hofstadter

Can A Machine Be An Inventor? As we progress towards superintelligence, human involvement in the inventive process will reduce and machine involvement will increase. Therefore, we need to be able to answer the question as to whether a machine/ humanoid can be considered an inventor.

- ▶ In cases where the inventor may not be human (assuming that this interpretation of inventor is accepted), does a humanoid inventor have the power to give consent for change of ownership so that a recognised legal entity can sue for infringement? Thereafter, in cases where patent infringement is established and the cause of the infringing act cannot be traced back to a specific human actor, how would the courts act?
- ▶ Criteria for an inventor is linked to ‘conception of the idea’ behind an invention. In this context, could ownership be co-shared between machines and humans?



Issues of Copyright

▶ ‘The Monkey Selfie’: In 2011, a photographer attempting to get unique pictures of a troop of monkeys, let some curious ones touch his camera. They took a few shots including a selfie that captured an expression of ‘pure joy and self-awareness on the monkey’s face’. A lawsuit followed wherein PETA sued the photographer on behalf of the monkey to assert copyright over that picture; however, the court held that as animals do not have standing in a court of law, they cannot sue for copyright infringement.

▶ Christie’s first piece of auctioned AI art titled “Portrait of Edmond Belamy” sold for US\$432,500. Machines have been programmed to create art by feeding them thousands of images to teach the aesthetics of painting. The software also ‘penalises’ machines if, when creating a work, they too closely emulate an established style. If a machine learns the titles used by artists in the past, the algorithm can even name the works it generates.

▶ Can non-humans be owners of copyright? In the case of AI art should unauthorised use of data subsisting in copyright works for machine

learning be considered infringement of copyright? How will such unauthorised use of data be detected and enforced?

The more the machines achieve, the higher the bar rises – and the more we understand human creativity.

“In the end, competition always forces us to get better - to see what makes us as humans still special.”

- Mario Klingemann



These and many similar concerns are now the subject of debates on the ambiguities of AI, not only in the IP context, but also in the context of criminal liability or civil tort liability. Should consideration be given to a *sui generis* system of IP rights for AI-generated inventions to adjust innovation incentives for AI? Whichever way you look at it, exciting times are in store ahead.

NATIONAL STRATEGY FOR AI

It is estimated that AI has the potential to add \$957 billion to India's GDP, boosting India's annual growth by 1.3 percentage points by 2035.

To leverage AI for economic growth (and social inclusion), the Indian government's think-tank NITI Aayog came out with a working paper titled **National Strategy for AI** (#AIforAll) in June 2018. The paper outlines a national AI policy that aims to:

1. enhance and empower Indians with the skills to find quality jobs;
2. invest in research and sectors that can maximise economic growth and social impact; and
3. scale Indian-made AI solutions to the rest of the developing world.

The government looks to establish India as an “AI Garage,” meaning that if a company can deploy an AI in India, it will then be applicable to the rest of the developing world.

The strategy clarifies five major sectors that AI research in India will focus on:

- healthcare;
- agriculture;
- education;
- smart cities and infrastructure; and
- smart mobility and transportation.

To pave the way for these advancements, the Indian government has doubled its allocation to the 'Digital India' program to \$480m (₹3,073 crore) in 2018-19. Further, acknowledging the need for a **robust intellectual property framework**, the policy recognises that despite a number of government initiatives in strengthening the IP regime, challenges remain, especially in respect of applying stringent and narrowly focused patent laws to AI applications. It outlines the establishment of IP facilitation centres to help bridge the gap between practitioners and AI developers and also suggests adequate training of IP granting authorities, judiciary and tribunals.

Interim Injunctions In Patents

REPORT

Interim injunctions are often in the news when it comes to patent lawsuits in India. How common is the grant of such injunctions?

It is difficult to extract data from the Indian court system. In our endeavour to prepare a statistical analysis on interim injunctions in patent litigation, we collected data on patent suits that were filed in 2019 from various legal databases and to the extent possible, the websites of the Indian courts. Based on this dataset, we list our findings and observations below.

Fig. 1 illustrates that out of 47 patent suits filed in 2019, the patent holder was able to obtain relief (through interim orders, or *via* a settlement with / undertaking given by the defendants) in a majority of cases - 81% to be precise.

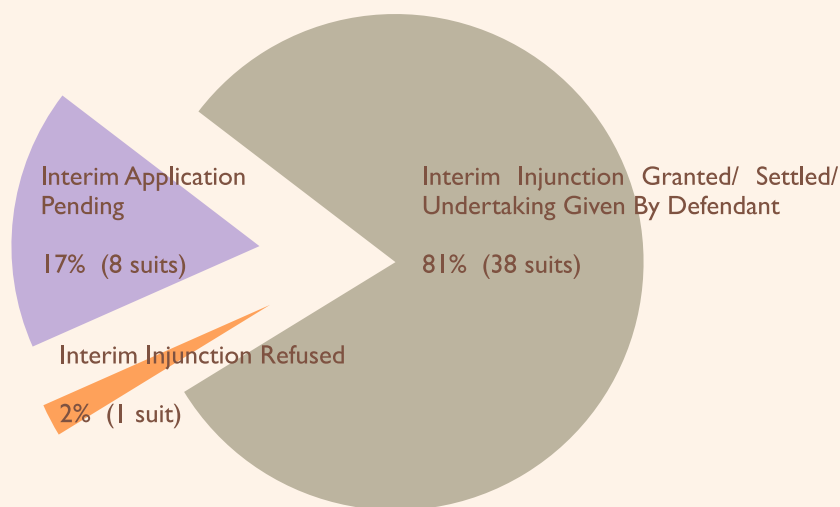


Fig. 1: Patent Suits Filed in 2019

Fig. 2 tells us that in cases where injunctions are granted (29 suits in all), the number of *inter partes* orders was just a little higher than *ex parte* orders.

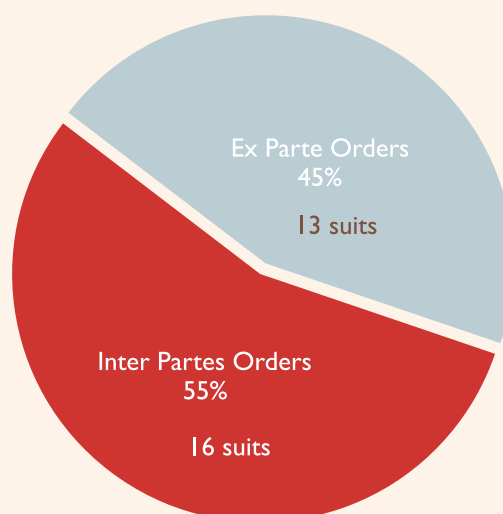


Fig. 2: Nature Of Interim Orders

Fig. 3 gives a more detailed insight - of the 29 suits in which interim injunction was granted, the injunction was later confirmed in a large majority and vacated in only 14% of cases. Also, the chart reveals that in the matters concluded at the interim stage, 7 suits were settled and 2 resolved via undertakings given by the defendants.

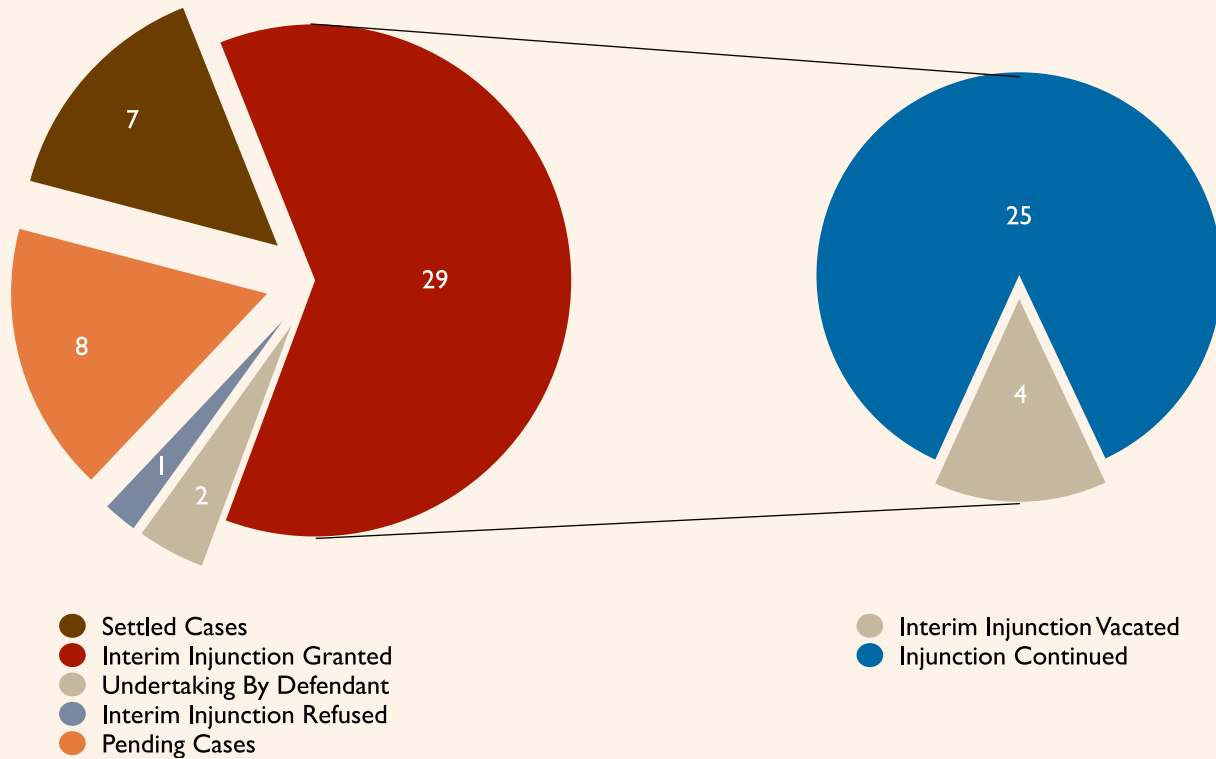


Fig. 3: Nature Of Orders

Fig. 4 brings out which fields of technology involved the most litigation in 2019 - most of the suits were filed for pharma patents.

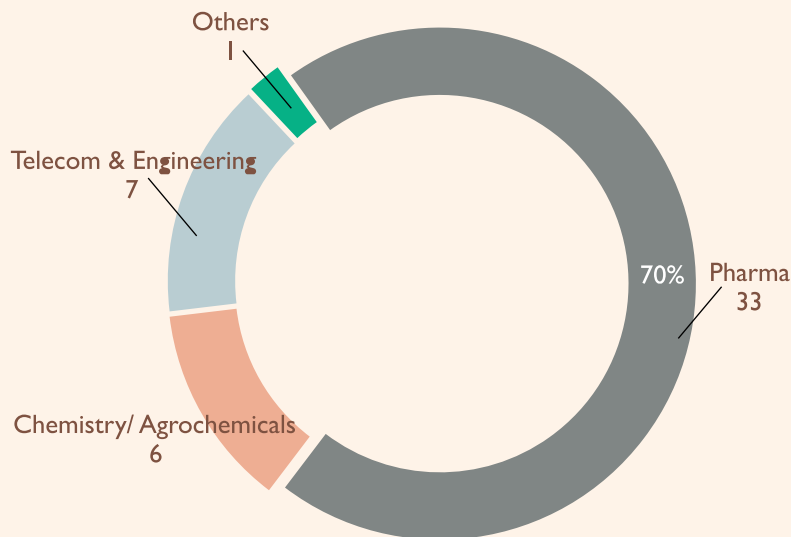


Fig. 4. Technology Involved (Number of Cases)

Fig. 5 indicates the jurisdiction to which a majority of the plaintiffs who instituted patent litigation in India in 2019 belong. To compare, the top non-resident filers at the Indian Patent Office are USA, China, Germany, the United Kingdom and France.

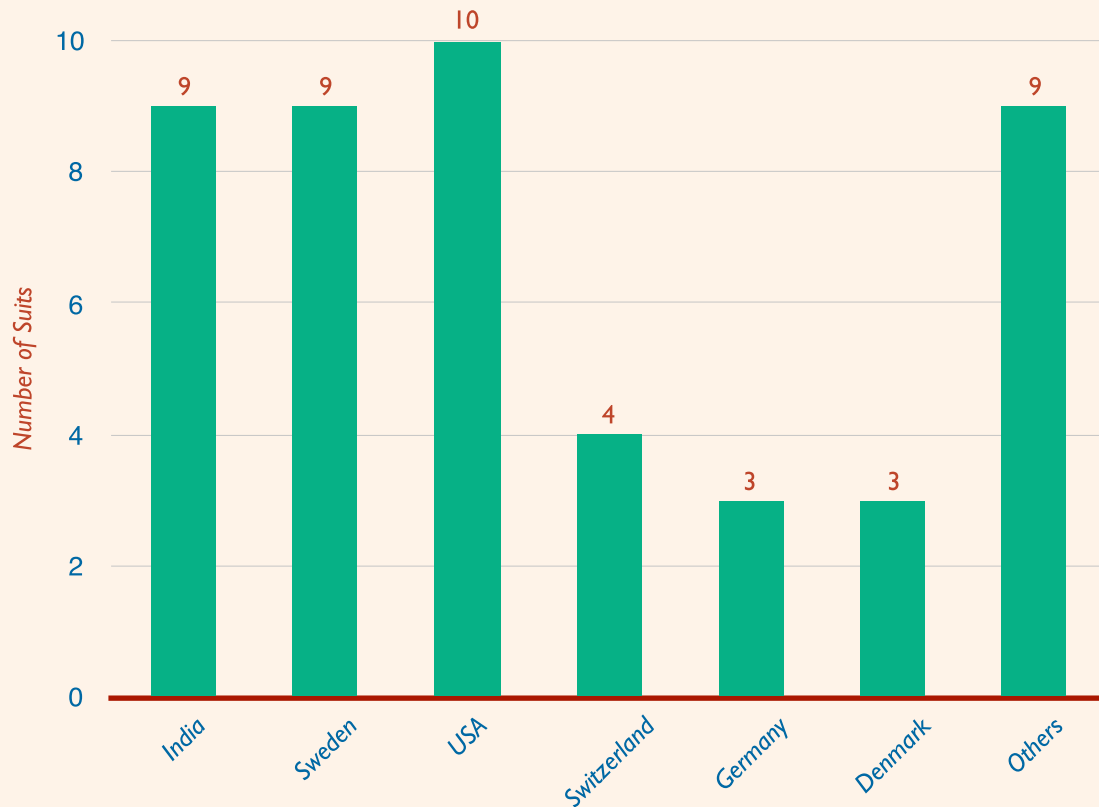


Fig. 5: Plaintiffs - Country of Origin

The analysis above illustrates that when it comes to patent litigation, there are high chances of quick relief being granted by way of an interim injunction. Given that costs of litigation at the interim stage are much lower than costs involved during trial (and beyond), one can say that India is a favourable jurisdiction for enforcement of patents - so companies ought not to hesitate in instituting lawsuits to protect their inventions.

70%



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