



# Technology Start-ups and Patent Protection in India

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# Technology Start-ups and Patent Protection in India - Case Studies

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## List of Abbreviations

B2C	Business to Company
B2B	Business to Business
B2G	Business to Government
BIRAC	Biotechnology Industry Research Assistance Council
CGPDTM	Controller General of Patents, Designs and Trade Marks
CIRC	CUTS Institute for Regulation & Competition
DPIIT	Department for Promotion of Industry and Internal Trade
FFS	Fund of Funds for Startups
FISME	Federation of Indian Small and Medium Enterprises SMEs Small and Medium Enterprises
FITT	Foundation for Innovation and Technology Transfer
GCP	Ground Control Point
GIS	Geographic Information System
GoI	Government of India
HKTDC	Hong Kong Trade Development Council
IFC	Innovation Facilitation Centres
IIT	Indian Institute of Technology
IP	Intellectual Property
IPR	Intellectual Property Rights
IPRX	IPR exchange
NASCOMM	National Association of Software and Services Companies
NRDC	National Resource Development Council
OEM	Original Equipment Manufacturer
PCT	Patent Cooperation Treaty
POC	Point of Care
RBV	Resource Based View
R&D	Research and Development
RQI	Road Quality Index
SIDBI	Small Industries Development Bank of India
SIPP	Start-Ups Intellectual Property Protection
VC	Venture Capital
VR	Virtual Reality
USPTO	United States Patent Office
WIPO	World Intellectual Property Organization

## Executive Summary

Technological innovation has seen a massive boom, especially in the last decade or so, and is no longer restricted to the activities of only technical giants. Start-ups are carving their own niche with new, innovative ideas. India is also witnessing a burgeoning start-up and innovation culture, which is evident from India's improving global ranking in Innovation Index and Ease of Doing Business. The various initiatives taken by the Government of India (GoI) and the state governments to encourage the start-ups in India have greatly contributed to this.

Given the increasing number of start-ups and the technological innovations floated by them, it becomes imperative that their Intellectual Property Rights (IPR) are duly protected. As witnessed in the case of advanced economies, IPR protection gives a boost to start-ups and levels the playing field for them, allowing them to compete with established players and attract investments. However, they often face hindrances in the form of high financial costs and inadequate knowledge regarding the rules and procedures relating to protection of IPR.

In India as well, there have been some Government initiatives in recent years like Start-up India Initiative and National IPR policy 2016 to improve the start-up ecosystem and boost innovation. These developments motivated CUTS Institute for Regulation & Competition (CIRC) to conduct a survey of technology start-ups in India in 2018 to study their Intellectual Property (IP) awareness and activity. The results were published in a report titled 'Technology Start-ups and IP Protection in India' in 2019<sup>1</sup>. The study brought out some interesting findings and encouraged us to go back to the field and dig deeper to fill the gap in understanding of start-ups vis-à-vis the IP landscape in India.

The present study is exploratory in nature and aims to provide a richer understanding of the patenting activity, motivation and challenges of technology start-ups in India through case study method to bring out the nuances that the broad survey method is not able to capture. This report provides a thematic analysis of seven technology start-up case studies conducted by means of interviews and desk research.

Following are the key observations:

1. Patenting is one important part of the entire process of technology entrepreneurship. However, it is not an immediate challenge that start-ups face when they launch their technology. The initial challenges involve funding their operations, supporting infrastructure for their product or service and market access.

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<sup>1</sup> The report may be accessed from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3589334](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3589334)

2. Patenting is important in the long run for survival of an innovative technology as, most importantly, they face the risk of imitation by others. It may be deferred to a later stage due to paucity of time and resources, but cannot be avoided.

3. The start-ups with prior patenting experience filed for patent protection of their present innovation even before launching it, indicating that start-ups' behaviour and their propensity to go for patent protection is greatly affected by their prior understanding and exposure to such activities.

4. Patenting behaviour is also affected by the outlook of angel investors/ venture capital (VC). Results show that investors in India generally decide to invest in a start-up based upon the expected profits and market traction potential of start-ups. Investors and VCs in India see patents as a long-term goal.

5. With paucity of funds initially, filing a patent seems like an additional burden as it requires expertise; start-ups usually need to hire an independent agency/law firm for filing. This also contributes to delay in patenting.

6. Only start-ups with previous patenting experience had plans of patent protection at the time of ideation or development. Others seem to have low awareness of patent protection and consequences of infringing another patent.

7. With respect to licensing activity, we do not find any evidence of licensing-in activity by start-ups. However, our findings reveal the possibility that start-ups may engage in license-out activity to ensure wider diffusion of their technology in the near future, provided they gain market attention and have a suitable partner.

8. Results regarding their motivation to patent or not to patent, suggest patenting is viewed as a means to create entry barrier or protect their innovation from imitation. None of the start-ups cited licensing or revenue generation as a motivation for patenting, indicating that even in the initial phase of the business cycle, when start-ups struggle with financial and human resource constraints, they do not engage in or attempt to monetise patents on their technology.

9. The study remains inconclusive as to the benefits of patenting, since only a single start-up has been granted a patent so far. The patent helped that start-up improve the brand's reputation and it managed to licence out the patent for manufacture of the product, earning royalty on it.

10. No major challenges in patent filing are reported as the process is often outsourced to experts/law firms/independent agencies.

In view of these findings, the following recommendations have been proposed in the report:

**1. Mentorship programme:** The case studies used in this report indicate that the idea of a technological innovation usually germinates in the minds of young technopreneurs during their graduation. They may manage to develop an innovative product; however, in the absence of proper infrastructure and IP-related support, innovators usually fail to realise the implications of not protecting their IP. It is suggested that the government should introduce IP mentorship programmes under the Start-up India Initiative at the college and university level by linking them up with successful start-ups or incumbents.

**2. IP facilitation centres in universities and academic institutions:** Universities and colleges in India lack basic infrastructure and ecosystem to help students give shape to their business ideas. While such infrastructure support is readily available at premier technical institutes like IITs, it is less so in other universities. National Resource Development Council (NRDC) runs numerous Innovation Facilitation Centres across various institutes with the objective of promoting and encouraging innovation activities. This excellent initiative ought to be pursued more aggressively with a wider approach so that it may benefit budding entrepreneurs.

**3. IP Exchange:** Due to absence of a proper marketplace for IP trading in India and low awareness, investment in patents becomes stagnant. While the Federation of Indian Small and Medium Enterprises (FISME) had previously launched an online IPR exchange in 2013, and there had been talks in 2017 of establishment of an IPR exchange in India, like the one in US and Hong Kong, no recent progress has been observed regarding this. It is suggested to expedite the establishment of an IP exchange as this has remained only in discussions for a long time.

**4. Encourage patent-backed financing:** In India, patent is seen as a means for protection of intellectual property but not as an investment. Most investors in India give a higher weightage to the commercialisation of the product as compared to the patents. It is imperative that a patent-backed financial ecosystem be promoted in India and the use of patent as a collateral for financing be encouraged.

**5. Awareness regarding patent infringement as well as monetisation:** Start-ups tend to undermine the significance of patent protection and therefore defer it to a later stage as a long-term goal. They are also unaware of the possible consequences of infringing somebody else's patents and its legal and financial implications. It is strongly recommended that the start-ups should be educated and trained on prior art search and strategising to set aside funds for application. Further, while in the process of setting up an IP marketplace, the government must also take initiatives to educate start-ups about the benefits and strategies of patent monetisation.

# Introduction

The 20<sup>th</sup> century has witnessed a tremendous growth in innovation around the world, especially in technology sector. Today, innovation is not only restricted to mighty enterprises. Start-ups are carving their own niche with new, innovative ideas. India is also witnessing a burgeoning start-up and innovation culture. This is evident from the improved Ease of Doing Business<sup>2</sup> ranking of India from 142 in 2015 to 63 in 2019 as well as Global Innovation Index from 81 in 2015 to 52 in 2019.<sup>3</sup> This may be attributed to the policy initiatives in this direction such as Start-up India Initiative 2016 which focuses on building a vigorous ecosystem for start-ups in India by giving them some financial and regulatory relaxations as well as support. The initiative also promotes job creation.

At present, India's start-up ecosystem is considered the third largest in the world. Figure 1 shows a figurative summary of Indian start-up ecosystem. As of June 2019, approximately 32,677 start-ups have been recognised by the Department for Promotion of Industry and Internal Trade (DPIIT) in India.<sup>4</sup> Maharashtra, Karnataka, Delhi and Uttar Pradesh have emerged as the top four start-up destinations. There are 24 unicorn<sup>5</sup> start-ups, out of which seven were added in 2019.

A NASCOMM report published on November 2019 also reveals that 8,900-9,300 technology start-ups have been incepted during 2014-2019, growing at the rate of 12-15% year on year. Out of this, 1,300 were added in 2019 itself. It was also highlighted that 18% of all start-ups are leveraging deep-tech.

Start-up initiatives have also facilitated employment opportunities with the creation of 1,87,004 direct jobs as reported by 16,105 start-ups with an average of 11 employees per start-up.<sup>6</sup>

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<sup>2</sup> "Rankings." World Bank. Accessed June 12, 2020. <https://www.doingbusiness.org/en/rankings>.

<sup>3</sup> "Global Innovation Index 2019: India Makes Major Gains as Switzerland, Sweden, U.S., Netherlands, U.K. Top Ranking; Trade Protectionism Poses Risks for Future Innovation." WIPO. Accessed June 12, 2020. [https://www.wipo.int/pressroom/en/articles/2019/article\\_0008.html](https://www.wipo.int/pressroom/en/articles/2019/article_0008.html).

<sup>4</sup> "About Startup Portal." Home Page. Accessed June 12, 2020.

[https://www.startupindia.gov.in/content/sih/en/about\\_startup\\_portal.html](https://www.startupindia.gov.in/content/sih/en/about_startup_portal.html).

<sup>5</sup> Unicorn is a term to describe start-ups valued at \$1 billion or more.

Chakraborty, Subhayan. "Startup India Initiative Created over 560,000 Jobs since 2016, Says Govt." Business Standard. Business-Standard, June 4, 2019. [https://www.business-standard.com/article/economy-policy/startup-india-initiative-created-over-560-000-jobs-since-2016-says-govt-119060401491\\_1.html](https://www.business-standard.com/article/economy-policy/startup-india-initiative-created-over-560-000-jobs-since-2016-says-govt-119060401491_1.html).

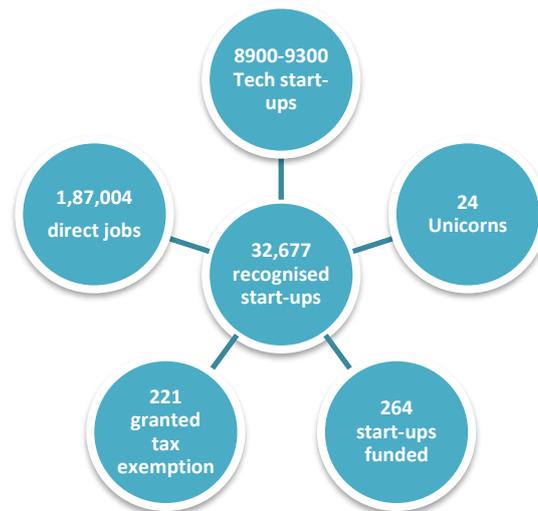


Figure 1. Start-up ecosystem in India

Several benefits are provided under the Start-up India Initiative. DPIIT recognition makes start-ups eligible for income-tax exemption for a period of three consecutive years and exemption on capital gains and investments above fair market value. To provide fund support, the government has created a Fund of Funds for Start-ups (FFS) under the aegis of the Small Industries Development Bank of India (SIDBI) with a corpus of INR 10,000 crore (INR 100 Billion). As of November 2019, 221 start-ups have been granted income tax exemptions and 264 have received funding support.<sup>7</sup>

Multiplier Grant Scheme, Software Technology Park Scheme, Venture Capital Assistance Scheme, Single Point Registration Scheme and Bank Credit Facilitation Scheme are some other measures taken under the initiative to encourage start-ups in India.

With the growing start-up culture in India attempting to do business with innovative technologies, protection of IPR becomes even more important. IP is a vital part of the asset base of a start-up and provides it a competitive edge. The experience of developed economies exhibits that IPR protection gives a push to start-ups and levels the playing field to compete effectively with the already established players in the market, and increases its valuation, thereby attracting more investments. This is, however, often hindered either by high financial cost and effort required for IP protection or the lack of knowledge amongst start-ups on the procedure of converting their ideas and inventions into a strong IP (Sichelman and Graham, 2010).

Under the Start-up India Initiative as well as National Intellectual Property Rights policy, 2016, the government has taken several measures towards promoting IPR protection, as well. Patent (Amendment) Rules, 2016 allowed for expedited examination for start-ups. It is noted that 474 applications have so far been granted expedited examination. Not only this, to increase IPR filings, applicants for 1,630 new start-up

<sup>7</sup> Government of India, Ministry of Commerce & Industry Department for Promotion of Industry and Internal Trade, Rajya Sabha Unstarred Question No. 1334, available at: <https://dipp.gov.in/sites/default/files/ru1334.pdf>

patent applications have availed benefits of 80% fee reduction while filing and 2,895 trademark applications have been given 50% fee concession. To provide assistance to the start-ups, 1,031 facilitators have been empanelled for filing and facilitation free of cost.<sup>8</sup> To encourage IPR protection amongst start-ups, Scheme for Facilitating Start-ups Intellectual Property Protection was also introduced in 2017. Recently, DPIIT has launched a website “L2Pro IP e-learning Platform” to provide assistance to start-ups and small & medium enterprises to understand IPR.

Recognising the role of IP protection to promote innovation and the initiatives taken by the government to improve start-up ecosystem and promote IPR protection by start-ups, CIRC undertook a study in 2018-19 titled ‘Technology Start-ups and IP Protection in India’ to examine the level of awareness of IP among Indian technology start-ups and their efforts for its protection (Sodhi *et al*, 2020). The study exhibited that a very large proportion of tech start-ups are active in copyright and trademark protection, while less than half the start-ups are active in patent filing and meagre 18% are involved in industrial design.

The study indicated that more than half of the tech start-ups conduct IP searches, seek help of IP professionals and do not have a firm-level IP policy. The study also observed that technology transfer activities are less prevalent among Indian tech start-ups in general. More than half of the respondents mentioned that they owned the IP but did not licence it. Regarding the challenges in IP filing, start-ups notified that IP filing is lengthy, time consuming and a costly process. They also pointed to limited resources, lack of transparency, bureaucratic hurdles, long pendency list etc.

As noted above, Sodhi *et al* (2020) provided insights on IP awareness and activity of technology start-ups in India and encouraged us to go back to the field and dig deeper to fill the gap in understanding of start-ups vis-à-vis IP landscape in India. Among various forms of IP protection, we are focussing on patent protection by start-ups as they are acknowledged as a powerful commercial tool and an important link between research and development (R&D), and the marketplace.<sup>9</sup> This study aims to investigate (a) why and why not (and how) technology start-ups engage in IP related activities, specifically patents; (b) what value (if any) tech start-ups are able to capture for themselves through patent filing activities in India and abroad; and (c) what practical challenges do tech-start-ups face while pursuing such patent related activities.

To answer these questions, we performed in-depth qualitative case studies followed by thematic analysis that helped us gain deeper insights into the patenting behaviour of the start-ups and factors that affect it. We conducted in-depth case studies of seven tech start-ups in India that provide innovative product, technology and services ranging

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<sup>8</sup> Government of India, Ministry of Commerce & Industry Department for Promotion of Industry and Internal Trade, Rajya Sabha Unstarred Question No. 1334, available at: <https://dipp.gov.in/sites/default/files/ru1334.pdf>

<sup>9</sup> Assessing the Value of a Patent: Things to Bear in Mind. Accessed June 12, 2020. [https://www.wipo.int/sme/en/documents/valuing\\_patents\\_fulltext.html](https://www.wipo.int/sme/en/documents/valuing_patents_fulltext.html).

from fast internet device to low-cost medical equipment, from technology to improve education service to drones for surveying/mapping, industrial inspection etc.

We acknowledge that patent protection, though crucial for a tech start-up, cannot be studied in isolation. Multiple factors affect a firm's decisions to engage in IP filing activities and its ability to extract value out of it depends greatly on several external and internal factors of their businesses (Hu and Jafferson, 2006; Liefner *et al*, 2016). Some of these factors are: nature of technology, product and service offerings and resource availability (Arrow, 1972), past experiences and exposure of founders to IP activities (Rahko, 2016), efficiency of patent system and institutional structure of the country (Li, 2012) and also founder's or leader's strategic networking (Liefner *et al*, 2016). To understand several dynamics that may influence a start-up's decision to engage in patenting, we used qualitative desk research and interviews methods to perform case studies. This exercise provides a rich understanding of how different individuals ideate technological innovation and bring it to commercialisation, what kind of challenges they face in the process, what are their motivations for patenting and what aspects of their start-up journey affect their patenting behaviour.

Results presented in this report should be of interest to a range of stakeholders like (a) research community researching the IP and strategic technology management, and entrepreneurship field to understand factors affecting technology-start-ups motivation and activity related to patenting in India and (b) practitioners and start-ups in the technology field to help them understand the real-life practical issue and challenges faced by their counterparts while initiating a new venture including challenges faced during the patenting process.

This report is divided into five chapters. The present introduction chapter is followed by Chapter 2, which provides the methodology and case description. Chapter 3 and 4 provide the results of the thematic analysis of case studies and observations cum discussion respectively. Chapter 5 provides practical recommendations to promote innovation and patent protection in India.

## Methodology & Case Description

Seven case studies are conducted through a combination of desk research and interviews.<sup>10</sup> The case study method has been selected due to the exploratory nature of the study and to answer questions like: “why” and “how” technology start-ups engage or do not engage in patenting activity, and “what” benefits start-ups are able to extract from patents. Case study provides an opportunity to study each start-up in-depth, understand its history and journey from ideation of a new technology to its’ commercialisation, role of patenting in the process, challenges faced in this journey, and most importantly to answer questions like: “why” and “how” technology start-ups engage or do not engage in patenting activity, and “what” benefits start-ups are able to extract from patents. Below are the case descriptions:

### Case Study 1- Connected!

The start-up was founded in 2012. It offers a cost-effective, efficient and innovative technology solution to address the problem of low internet penetration in India. The start-up began as a live-streaming service for weddings and events and in 2014 morphed into offering a wi-fi router that combines eight different cellular networks like 2G, 3G and 4G to provide a single high speed internet connection for end-consumers.

The seed of this start-up was sown in 2004 when its founder started to experiment with multiple ideas and ultimately ended up developing the high speed internet technology device. After two years of experimentation, development and demonstration of the proof of concept, its testing, the start-up positioned itself as a product company providing high speed internet devices.

It provides value to customers in different segments like large firms, SMEs, media houses, entertainment and law enforcement agencies that require reliable and faster internet connection speed. The start-up offers the device at a one-time cost plus a small recurring cost on an annual licence. For customers in low-cost segments like small businesses requiring less capacity, it also offers a three-port device at a lower price. It is portable, reliable and a cheaper alternative to satellite-based solutions. With this low cost solution, the company is contributing to the Digital India programme by starting a pilot project with the government to provide internet to five villages in the country. It has started its expansion in the global markets also.

The company is registered with the DPIIT. It was incubated under the Atal Innovation Mission Scheme back in 2012, after which the company was registered. The company has also won many awards for its technology.

The start-up has filed patent applications in India, U.S. and Europe. It has been granted patent protection in 2018 for all three patents filed in India (two of them were filed in 2014 and one was filed in 2016). Among the three patent applications filed in the US

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<sup>10</sup> Refer Annexure I for methodology

during 2015 and 2018, two patents are granted protection in 2019 while one is abandoned, whereas two patent applications filed in Europe in 2015 are still awaiting examination. It hired an independent agency to provide legal advice and assist in filing. It has licensed the patents to another firm to manufacture the devices and collect royalty. The start-up faced challenges in manufacturing the devices as most manufacturers took only bulk orders and demanded upfront payment. So it was decided to license the patent to a manufacturing company.

## **Case Study 2- Bumpy road ahead!**

Incorporated in 2018, the start-up offers technology solutions and services through an application that collects the data on road potholes and rough patches, which is used by road authorities in the country to identify locations that need repair.

This technology determines road roughness and unevenness using an application based on a plurality of parameters which are generated due to vibrations, GPS location, speed, tilt angles, direction of the handheld device during motion of vehicle using sensors. It maps the estimated Road Quality Index (RQI) value generated through the app to several international standard values to categorise the quality of the road and calibrate the parameters generated to standardise them.

During a discussion with an official in the Public Health Department in India, the founder identified that in India, ageing road network gets potholes and bad patches after every monsoon, which causes several road accidents. Riding quality directly impacts the safety of ambulances, school buses, hazmat vehicles and more. Realising this, the founder intended to provide a technology solution to address this problem. At that point, the government was collecting that information manually by sending people out to find such locations, upload a photo or asking public to do that, a method which has its limitations and provides incomplete data. Moreover, even if the potholes were reported, due to limited budgets, there was no way of prioritising certain road patches for repair work over others. Upon research, the founder realised that this was a worldwide problem. In general, some navigation apps give traffic information, but don't provide the information on the road quality. To address this issue and to build a solution around that, the founder developed this technology and thus the start-up came into existence.

The start-up identifies and targets government authorities as the main customer and provides value to them in the form of real-time data generated by the application. The start-up has surveyed road condition of more than 50,000 km ranging from national highways, state highways as well as city roads and provided data to different road authorities in India till now. The company also has some overseas customers.

The start-up is registered with the Department for Promotion of Industry and Internal Trade (DPIIT). It is incubated by Atal Incubation Centre and Nexus. It has also received various awards and recognition held by Atal Innovation Mission.

The start-up attempted to avail benefits under the Start-ups India Initiative like tax exemption. However, it failed to do so due to reasons like difficulty in communicating, demonstrating and convincing concerned authorities about the innovative and technological aspects of the product, and non-responsiveness of the authorities. It remains unaware of several other benefits under the Start-up India scheme.

The start-up initiated the process of protecting its technology in 2016 before incorporating the start-up, with a provisional patent application, followed by a non-provisional patent application. The founder attributes his proactive approach to technology protection and patent filing to his technology background and prior experience of founding two start-ups (one was acquired by another company and the other shut down), realising that patent is important or rather one of the important pieces for the business.

Although the patent grant for this technology is pending, the start-up has licensed the software to other companies through formal agreements. The start-up has overseas customers that purchase the software licence to serve their own customers. The company is expanding operations by starting pilots in five different countries. It is also exploring possibilities to build a business model around the use of big data on riding quality.

### **Case Study 3- The Bird's Eye View**

The start-up was incorporated in 2013 and provides engineering solutions like Geographic Information System (GIS) surveying/mapping, industrial inspection & precision agriculture using drones. The start-up serves several enterprises across industries such as mining, urban infrastructure and agricultural irrigation. Its value proposition involves integrated workflow solutions from data acquisition to data processing to data analytics for different use cases. Such solutions allow commercial enterprises to automatically and instantly collect aerial intelligence, analyse and quickly integrate it into their daily business processes and deliver highly effective approaches to data collection in many sectors.

The traditional method of establishing a Ground Control Point (GCP) network is tedious, time-consuming and often not a feasible process. The accuracies of the data in such networks also depend on the distribution and quantity of GCPs. Therefore, to address this problem, the founder developed this technology where the drones are in-built with Post-Processing Kinematics (PPK) technology, exclusively developed for surveying and mapping applications. The start-up has positioned these drones as a faster technique that saves time and cost, does not require any specialised training and can generate richer data to help businesses make well-informed decisions.

The start-up began its journey from the Indian Institute of Technology (IIT) Kanpur campus. Later, it received incubation funding from the Small Industrial Development of India (SIDBI). It has also attracted funding from several reputed venture capitalist and angel investors in India.

It caters to customers across various verticals in both the private and public sector, including GIS companies, financial institutions, insurance companies and government. These drones have also been useful during natural calamities for measuring the extent of damage. To build customer relationships, the start-up ensures to provide efficient and seamless after-sales support and technology to its customers.

The start-up is registered with the DPIIT as well as the Start-up India initiative, under which it has availed the waiver of guarantee, fees and other financial aids.

The start-up applied for a patent in India in 2019 (pending) and has planned three more patents. It credits many educational institutions such as IIT Kanpur with being helpful in spreading awareness for IP protection at the initial stage and providing the ecosystem for the same. There are patent officers who regularly visit the institution and provide services pro bono.

#### **Case Study 4- Saarthi**

The start-up was established in 2017 and manufactures driving safety apparel such as riding jackets, riding gloves and head safety products with innovative technology. It aims to reduce fatalities during road accidents for two-wheeler users in India and beyond. The start-up uses indigenous material and provides affordable driving safety apparels to a wide range of customers. It targets consumers of all income group and its customer segment varies from daily commuters to motorsport enthusiasts in the country. The start-up has also entered the agricultural and energy efficiency sector. In the agriculture sector, the start-up manufactures special apparel for farmers who work with poisonous pesticides and other sprays. In the energy efficiency sector, it manufactures special wall paint that balances out the effect of heat and cold on the body of the workers.

The founder, due to his passion for bike riding, wanted to address the safety and security concerns of two-wheeler riders in India. After a decade of market research on the needs of motorists, the business was started for manufacturing special safety apparel and equipment for two-wheeler riders which can reduce the impact of any accident on the human body up to 80 per cent. This apparel is made of special impact material.

The start-up operates on the business-to-business (B2B) and business-to-government (B2G) models. It is registered with the DPIIT. The founder is aware of the government's Raftar and Atal Innovation Mission, and sought incubation support under the latter. The founder did not avail any tax exemption under the Start-up India scheme citing (a)

lengthy process and (b) no tax in the agriculture sector, obviating the need for any tax benefit.

Patent application has not been filed but there is a plan to go for patent protection in the near future.

### **Case Study 5- Un-reality**

This start-up was launched in 2016 as a private company. It provides customised and non-customised software along with computer games, operating systems software, business and other applications software. It also provides consultancy services on software issues as per the needs of the consumers.

The start-up was launched with an objective of building a novel form of interactive digital experience through Virtual Reality (VR) setups. It started off as a VR-based platform allowing people to enjoy an interactive experience of global tourist locations from the comfort of their homes. In 2017, the start-up launched an Android app to help people create 3D content in a hassle-free manner on their mobile phones. Users can snap pictures in a new file format by which still pictures ‘come alive’ when the image is swiped or the phone is flipped. Unlike the traditional GIF and JPEG files which only move forward, these files can also be played backwards.

The prototype, built in a week, allowed users to view 360-degree videos of popular travel locations. The founders partnered with content creators overseas to upload content on the website. But they soon realised that this concept wouldn’t work well in India due to slow internet speed leading to poor user experience. In the early and mid-2010s, data packs were expensive, too. They shifted their focus to 3D photography.

The founders were in talks with smartphone original equipment manufacturers (OEMs), to integrate their app directly into phones as an option in the camera feature, just like features such as Prisma, Panorama and others. Initially they were in business-to-consumer (B2C) segment but in order to raise the funds they decided to shift to B2B model because interactive pictures would be helpful for businesses dealing in jewellery and old cars as a 360-degree can be generated by using that app.

The founders acknowledged that they could face tough competition from tech giants that could adopt the technology, easily given their enormous funds and resources. However, they believed that they had projected their technology in such a deeply integrated manner that it was very difficult to extract the code. Even if someone did extract the code, the same energy would have to be spent on creating the same level of user experience that they had incorporated after several iterations.

The start-up was selected in the NASSCOM start-ups programme and received a substantial amount of technical and financial support. However, one of the biggest issues faced was lack of risk capital, since most investors are not inclined to ideas that do not guarantee quick returns. The prevailing bias against non-IIT entrepreneurs also

negatively impacted their start-up. They had to battle with unavailability of funds and limited resources until they found investors who were willing to back them up.

With regard to the government programme for funding, they mentioned that there is a set standard of rules and regulations and uniform benefits and capital for all. It doesn't go by the valuation or the scale of business. For this reason, they did not raise funds from the government, either. They eventually obtained funding from prominent angel investors.

The founders are aware of initiatives like Start-up India but not about tax exemption, facilitation centres, etc. They have not availed any benefits from the government.

The start-up had filed for a provisional patent, but couldn't file for a non-provisional patent owing to clashes on the development side and limited funding.

### **Case Study 6- Early alarms**

The start-up was founded in 2014 as a medical technology company to make innovative and affordable healthcare devices to address consumers at the bottom of the pyramid. The start-up was spun out of the IIT-Delhi start-up ecosystem with a purpose to develop practical, accurate and affordable diagnostic and medical devices for the masses.

After seven years of R&D, the start-up launched a low-cost, affordable medical point of care (PoC) diagnostic device in 2019. This device is used for early detection of high-risk pregnancies and detection of kidney damage in patients with diabetes and hypertension by simple urine test. The start-up has performed more than 50,000 wet-lab tests to achieve the accuracy and affordability of the diagnostic test and has also launched a lab version of this product.

The device was developed with financial support from the Biotechnology Industry Research Assistance Council (BIRAC), Department of Biotechnology, Government of India under the BIRAC-IIPME Programme,<sup>11</sup> and has also undergone a third-party clinical validation in the Department of Laboratory Medicine at AIIMS, New Delhi. The start-up also received funding from the Millennium Alliance from June 2018 to May 2019 and has recently acquired quality assurance certificates such as ISO13485 and CE certification.

In the healthcare market, PoC devices usually use dip-sticks/dip-strips and smartphone dedicated services which help in analysing the readings of the device. These methods generally end up being costly and not inadequately enough. The diagnostic device developed by this start-up uses a dedicated non-dipstick-based protein analyser which easily identifies the proteins present in a urine sample and other colourless body fluids with 90 per cent accuracy. It also has an on-board Bluetooth model that helps to connect the device with a smartphone through a dedicated app, and the patient entry ID on the device is Aadhar enabled.

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<sup>11</sup>ChitrakootWeb. "Industry Innovation Programme on Medical Electronics (IIPME)." BIRAC. Accessed June 12, 2020. [https://birac.nic.in/desc\\_new.php?id=277](https://birac.nic.in/desc_new.php?id=277).

The device has tremendous market potential in the field of medical diagnostics and healthcare. It would specially benefit patients who do not have the financial means to undergo lab tests every now and then. It can also be used by hospitals and path labs as a low cost and high accuracy alternative to conventional diagnostic devices. Each lab tests cost around INR 600 with less accuracy, while the strips test is around INR150 per test. On the other hand, per test costs with their device is around INR 15-16. This would be a very low cost just for the patients. Even the government can use this device in its wellness centres for an early diagnosis of any disease.

The main inventor of this device has been interested in healthcare technology since his graduation, and developed several utility medical devices. He strongly believes that technology alone can bridge the huge gap between the demand for healthcare and supply in India. It was this very conviction that led him to establish this start-up and develop his own PoC diagnostic device, which went on to receive recognition for its progress in the field of medical diagnostics and received several awards and accolades for the same.

Its customers are (1) rural healthcare and telemedicine companies, (2) hospitals and tier two pathology labs and smaller nursing homes and (3) doctors working in the periphery. They are targeting doctors working in the periphery with no access to sophisticated testing machines like auto analysers. The potentially biggest customer would be the state government, which could use the device for maternal health programmes and non-communicable diseases. Ayushman Bharat would also be a big beneficiary of this technology as it could help in early diagnosis and a move towards preventive rather than curative healthcare.

The start-up is registered with the DPIIT. The founder is aware of government schemes for start-ups but is not availing any benefits. As a healthcare start-up, it is exempt from tax up to INR 35 crore (INR 350 Millions). Right now it is not cash positive, so it is not being taxed. They were incubated in IIT Delhi by Foundation for Innovation and Technology Transfer (FITT), from February 2015 to February 2018. Office space was also provided there.

The start-up applied for a provisional patent application in India in 2015, after which it applied for complete specifications. The provisional patent application gave some time to move from proof of concept to product development. Application was filed in-house with the help of networks in a big patent law firm. After that, funds could not be raised in time for Patent Cooperation Treaty (PCT) application. The name of the diagnostic device was registered as a Trademark and the final design is in the process of getting design rights registration. The founder also mentioned that his previous experience in filing a patent by himself in 2003 for one of his technological innovations and lessons learnt from that experience proved useful

## Case Study 7- Well placed

This start-up was incorporated in 2017 as a digital learning platform and started operations with this app in June 2018. The main product is an online study platform app that helps students (usually engineering undergraduates) prepare for upcoming exams such as GATE, CAT, GRE, MBA, along with keeping them updated about upcoming internships and job opportunities. It also allows students to connect with each other and their respective faculties regarding upcoming classes and possible career opportunities. The app ties up with various test centres and allows them to upload their study material based on the options chosen by the student. In addition to this, it also allows the students to upload their own study material on the website which can be accessed by other students.

The founders of the start-up have technical background and have previously been affiliated with tech-based start-ups as well. They started with placement preparation like preparing engineering students to apply for various jobs. In less than a year, they identified some gaps in students' employability skills and decided to make a learning app. In the market today, there is a lot of good engineering study material but it is not well curated or personalised. The start-up curates the study material and provides it in a manner personalised to their branch, year and college through a mobile app. The ability of students is not assessed as the start-up is at a nascent stage and wants to get some traction first. It is targeting all major engineering branches and is going to provide training on machine learning and data science. By imparting professional skills training to students of tier II and III colleges through the app, it intends to fill the education gap.

The start-up's registration with DPIIT is in the pipeline. It has received support from an incubator under the Atal Innovation Mission and is being provided office space, guidance, mentor connect and to some extent financial credits. In its experience, the process of getting the start-up tax exemption is very cumbersome. It gets stuck at multiple stages on the grounds that the committee will be formed to take it forward. They believe that start-ups funded by angel investors can easily get those exemptions and capital support also.

The start-up has not yet filed for a patent in India or in any other jurisdiction and at present have no plans of doing so. The founder does not have much awareness about patents, but is concerned with copyright, given the nature of their offering.

# Case Analysis

This section presents the results obtained from the thematic analysis of case study interviews. We analysed cases based on four broad categories: (a) patent activity that includes filing for patent protection, prior art search, and licensing of patents, (b) motivations of filing for patent protection, (c) benefits obtained from patent filing and finally, (d) challenges faced during patent filing.

## Patent activity

For the purpose of our analysis, patent activity includes prior art search, patent filing and licensing activities.

## Patent filing

Cases in this study reveal that filing for patent protection is limited among the tech start-ups in India, especially those that have no prior experience or knowledge of the patenting process. Among the cases studied here, four start-ups applied for the patent protection in India and only one managed to go for international patent filing.

Start-ups perceive patent filing as an expensive and time-consuming affair. At a nascent stage, market traction and revenue generation are usually the primary goals of start-ups while patenting is only secondary and is thus deferred to a later stage. This is shown by the fact that almost all the start-ups that applied for patent protection (except one) started the process of patent filing only after two or more years of their incorporation. The ones that have not applied for patent protection yet are still in the stage of gaining market traction and generating revenue flow. One of these stated:

*“There is negligible amount of value of patents. In India, no one is concerned about patents and there is a sheer lack of awareness about patents. The stakeholders look at patents as a long term goal which shall be completed after other small term goals are completed, such as revenue generation, profit maximisation and increased customer base. The patent filing procedure is time consuming and expensive, which is also a reason why a lot of entrepreneurs choose not to go for it. On paper, the patent looks like an achievement, but in reality, it is not helpful in building value for the company and the stakeholders do not consider it as a valuable asset. It appears that revenue maximization is more important than patents, as it will help the business grow.”*

Stating the financial and technical challenges faced during the filing process, one start-up founder mentioned:

*“We applied for a provisional patent, but couldn't file a non-provisional patent owing to some clashes in the development side*

*and limited funding. We were filing patent application in the US to generate funds from companies there, as it has the biggest market in technology. We also gave a thought about getting a copyright for the algorithm before filing the provisional patent. However, it was decided to drop this idea.”*

It shows that even though some start-ups do realise the importance of patents early on and intend to apply for it, sometimes other internal business concerns also affect their patenting decision.

Start-ups, however, expressed their intention of filing a patent in the near future by stating:

*“Once you get the revenues coming in, then it makes more sense to invest in IPRs, beyond a certain stage.”*

There are two start-ups (with patent application still pending) that filed a provisional application, followed by a regular non-provisional patent application, even before launching their technology/product. The reason for the early application is founders' prior experience with patents for their previous innovations. They do understand the long-term importance of patenting.

The statutory fee for patenting may be manageable, but patent filing requires expertise and most companies hire a law firm or independent agency for registration, which is expensive. Among the start-up founders, only those who had any type of prior exposure to the patenting process cited its relevance and thus hired experts/law firm/independent agency for patent filing process. Under the SIPP, for effective implementation, the Controller General of Patents, Designs and Trade Marks (CGPDTM) empanelled facilitators to provide free consultation/guidance and assistance in filing and disposal of IP applications to start-ups for free. Facilitators are directly paid by the CGPDTM for their services. None of the start-ups have reported availing the services of these facilitators.

### **Prior art search**

Prior art refers to scientific and technical information that exists prior to the effective date of a patent application.<sup>12</sup> A prior art search seeks all relevant technological information publicly known to find out whether an invention has been previously described or detailed. It helps the inventor/innovator to ascertain if his innovation is novel and can be patented. The inventor can carry out a prior art search at the ideation stage, during the R&D and before filing for a patent. At the initial stage, the inventor could carry it out himself, but before filing a patent, it must be done by an information

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<sup>12</sup> Hamano, Yumiko. “Use of Patent Information Patent Information (Prior Art) for Technology Management,” n.d

specialist using a professional tool.<sup>13</sup> The prior art search in the patent processing will speed up patent prosecution, avoid duplication of research, generate new ideas for R&D, assist in allocating R&D funds, plan new products, find the legal status of patent applications, update new technological trends, monitor competitor's research activities and prevent infringement actions (Singh, Chakraborty, & Vincent, 2016).

There is very little literature on prior art search activity of inventors/start-ups in India. In our case studies, only a couple of start-ups conducted prior art search themselves, that is also before starting the process of developing the prototype. One of them said:

*“We did the prior art search because when we developed a proof of concept, it was a point for all of us to decide whether we should commit our lives and our whole career to this or not. We wanted to make ourselves convinced that it is worth putting everything into this. So we did a lot of prior-art search. We searched the USPTO, Canadian Patent Office, and European Patent Office for similar concept but we could not find this. For prior art we did not hire any professional service but that was all done at our own level.”*

One more start-up conducted prior art search at the ideation stage by itself and again by an expert during patent filing. The founder of this start-up is experienced as he had founded two start-ups earlier and understood the importance of prior art search. For all those that filed a patent, it was conducted by the law firm/independent agency/expert hired by them for patent filing.

### Patent Licensing

Patent licensing is an important strategy for start-ups. Licensing-out of the patents brings additional revenue while licensing-in provides additional channels to acquire new knowledge or complement the knowledge base. Belingheri & Leone (2017) suggest that licensing-in is quite prevalent among start-ups; it can, however, be costly. Sodhi *et al* (2020) revealed that technology transfer through licensing/sale of patent is less prevalent among Indian tech-start-ups (18 per cent). More than half of the start-ups indicated that they own an IP protection, but do not license it. Sectoral classification indicates that the firms in e-commerce and technology solutions (e-ticketing, Internet of Things, etc.) are more active in licensing-out than firms in other sectors.

In this study, only one start-up that has been granted patents has licensed them out to other firms. This start-up was grappling with manufacturing of the device as no firm was ready to take the manufacturing contract for low-scale production and demanded upfront payment. In this scenario, licensing-out was necessary. They stated:

*“We have licensed the patents to another firm for manufacturing the devices and collect royalty from them. A huge cash-flow*

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<sup>13</sup> Prior Art Searches: A Must For Innovative SMES. Accessed June 12, 2020. [https://www.wipo.int/sme/en/documents/prior\\_art\\_fulltext.html](https://www.wipo.int/sme/en/documents/prior_art_fulltext.html).

*(working capital) is needed for manufacturing the devices, so it was decided to license the patents to a company which has a better cash-flow."*

An empirical study by Motohashi (2008) on Japanese start-ups found that out-licensing is imperative for the survival of high-tech start-ups as they usually lack complementary managerial assets such as production facilities and marketing staff to appropriate an economic rent from R&D.

One start-up has a patent pending grant but has already licensed its software through a contract to other companies outside India with intent of licensing the patent as soon as it is granted.

It shows that start-ups use licensing-out strategy to address challenges related to the further development and expansion of their business and also to facilitate wider diffusion of their technology.

### **Motivation for filing a patent (or not)**

The World Intellectual Property Organisation (WIPO) suggests several motives/reasons to patent like exclusive rights, strong market positions, higher returns on investment, opportunity to license or sell the invention, attract investors, increase in negotiating power, improving prestige/reputation of the business, etc.<sup>14</sup> Some empirical studies have identified similar motives for patenting (Blind *et al*, 2006; Frietsch & Schmoch, 2006; Cohen *et al*, 2000; Graham & Sichelman, 2008; Sichelman & Graham, 2011).

The findings of a study by Veer & Jell (2012) indicate that the individual inventors and small firms place a higher importance on patents' functioning as signals to investors as well as the generation of licensing opportunities. They also find that individual inventors place high importance on blocking as a motive for patenting, which they believe could lead to patent troll-like behaviour. Another study by Sichelman & Graham (2011) finds that small companies patent less than large companies, especially to prevent imitation. A study by Rassenfosse (2012) reveals that small companies license a larger share of their patent portfolios.

Results of our study revealed that start-ups use or plan patents for blocking purpose i.e. to create entry barrier for others or to protect their innovation due to fear of imitation by others. Fear of imitation comes to start-ups only when it reaches a point where it has gained some market traction and visibility. Citing blocking as the purpose, one start-up founder said:

*"I have some experience with technologies and I do realise patent is important or rather one of the important pieces for the business which acts as a barrier to entry."*

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<sup>14</sup> Reasons for Patenting Your Inventions. Accessed June 12, 2020.  
[https://www.wipo.int/sme/en/ip\\_business/importance/reasons.htm](https://www.wipo.int/sme/en/ip_business/importance/reasons.htm)

Another start-up shared this view of using patent to create an entry barrier and stated on similar lines:

*“Patent is primarily a means for creating an entry barrier for new entrants in the market, but not so much as an asset. In addition, it secures the product from being used by another enterprise(s).”*

However, the need of patent for blocking purpose gets stronger when the start-up starts to fear the possibility of imitation of its technology by others. One start-up mentioned that they did not feel the need for a patent until they noticed similar applications on app stores. It revealed this tendency by stating:

*“The company had reached a position where other competitors were trying to copy the product, and hence it was felt that in order to have an edge over others, a patent was indispensable”.*

Although some studies do suggest that patents play an important role in securing funding, the narratives provided by Sichelman (2012) indicate some ambiguity, even by the firms holding patents. In contrast, in our interviews, none of the start-ups, including the ones holding patents, perceived patents as a signal to investors. These start-ups are of the view that a patent is more of a tick in the box for investors in India. A notable common experience of start-ups here is that the investors are more concerned about their traction in the market and do not consider patents as valuable asset. They observed that patents are considered as a rather long term goal by the investors in India. Thus, most start-ups initially invest their time and resources in market access, revenue generation and consumer satisfaction instead of patenting. One of the start-up founders stated:

*“In countries like the U.S, China & Singapore, while looking at the financial health of the company, the stakeholders also consider the IPRs granted to that company as it builds trust that value will be delivered, which is not the case in India.”*

Another interesting experience of a start-up brings out lack of confidence of investors in innovation capabilities of Indian start-ups and their inclination towards an imitation or incremental technology that has been established and proven in other advanced countries:

*“Initially I reached out to some angel investors in India, but 90% of them were looking for an imitation of a well-established model from the US or the UK, etc. They do not believe any good innovation can come out of India.”*

## Benefits of Patent

The extant literature suggests that patenting provides benefits to start-ups like funding and brand reputation. Nadeau (2010) shows that patenting activity acts as an important quality signal that helps technology firms attract VC investors from an early embryonic stage until going public. To explain why patented innovation is highly and consistently valued by VC investors, the empirical study builds on signalling theory that patenting reduces information asymmetry and risk of adverse selection by VC investors, and on Resource Based View (RBV) theory that patented innovation (ii) contributes to firm's sustained competitive advantage and (iii) produces firm's intangible value. Several other studies show a positive association between patenting and VC financing (Baum & Silverman, 2004; Conti *et al*, 2013; Mann & Sager, 2005). HSU & Zeidonis (2008) study temporal aspects of patenting activity, which revealed that the effect of patenting on start-up valuation is more pronounced in earlier financing rounds when information asymmetries are the greatest. However, we find limited literature on patent backed financing in India.

Sodhi *et al* (2020), revealed that 43 per cent of the Indian tech start-ups received investment funds after applying for IPR protection or after registration, while 20 per cent indicated no sign of increased investment funds from outside after IP protection. The study, however, was not exclusively for patents.

In our present case studies, we find that the start-ups with the granted or published patents have not received any funding as yet. However, one start-up among them has managed to license its technology to a manufacturing company, with good cash flow, for the production of the devices. Although there is a perception among start-ups that investors/VCs in India do not assign much value to patents, it is premature to conclude anything from our study regarding funding.

Studies have also found that patents also improve brand reputation/image as in the US, some companies have used "patent pending" on their brands in their product advertisements (Dorr & Munch, 1995). Sichelman (2012) shows that patents play a moderately important role in enhancing the company's reputation or product image.

In our study, the start-up with granted patents mentioned that its market reputation improved after patenting. However, another start-up believes that patenting doesn't bring in any additional benefit in terms of brand reputation/image if the technology itself has potential. This start-up has been able to establish trust and license-out software even without a granted patent and has been able to get many clients including the government. It is the same start-up whose founder previously incorporated two more start-ups and had a similar experience with his technology earlier. They may have built a technology that is unique and useful to clients that they managed to create a solid clientele already, but it is possible that their reputation improves even more after the grant of the patent and helps them in further expansion. It is also possible that it doesn't. Only time will tell.

It can, thus, be said that patenting may or may not bring value to start-ups through improved image or reputation. The ability to extract value out of patents depends upon many other factors like trust of inventors and clients in the market, potential of the technology, ability and enthusiasm of the technology owner to attract the attention of the inventors and market etc.

## Challenges faced in Patent filing

Start-ups mentioned that since they hired a law firm/independent agency to file the patent and perform other ancillary tasks for them, the start-ups themselves did not face any challenges in the filing process.

One of the start-ups drafted the patent application in-house with the help of their networks in a big patent law firm and did not report to have faced any challenges. Another start-up attempted to file a patent itself, but in the process faced challenges due to lack of experience and eventually decided to hire a law firm. The founder faced challenges in even finding a good law firm for patent filing. He remarked:

*“The main challenge with regard to patent filing was scouting for a good firm. A lot of IP firms are only aware of the basics of the procedure, but this line of work involves proper drafting, sound legal knowledge and accurate legal opinions, which majority of the firms have overlooked.”*

Some start-ups are concerned about the time lag in the grant of patents. In India, it usually takes 2-5 years for a patent grant, sometimes longer. During that timeframe, technology becomes obsolete. They emphasise that the innovation cycle needs to be in consonance with the patent registration cycle, only then can patents be considered an asset and not a liability. It was noted that recently there has been cases of patent grants in much less time. In 2016, in fact, the government introduced expedited examination process for start-ups. Since then, out of 450 applications filed by start-ups, about 120 have been granted patents.<sup>15</sup>

It was noted that examination of an invention patent is a complex and time-consuming task and in other jurisdictions like EU and China also it takes time. In the US, the average time is about 2-3 years, but may be longer depending on the complexity of the invention. Moreover, from 2016-2019, the government has appointed 650 additional patent examiners, increasing the total to 800.<sup>16</sup> They would be helpful in clearing the backlog and expediting the grant in the future.

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<sup>15</sup> “120 Startups Get Patents under Expedited Examination Process: DPIIT Secy.” Livemint, April 26, 2019. <https://www.livemint.com/companies/start-ups/120-startups-get-patents-under-expedited-examination-process-dpiit-secy-1556274720741.html>.

<sup>16</sup> “Transforming Science and Technology in India.” Department of Economic Affairs. Economic Survey 2017-18; Vol I, n.d. [http://mofapp.nic.in:8080/economicsurvey/pdf/119-130\\_Chapter\\_08\\_ENGLISH\\_Vol\\_01\\_2017-18.pdf](http://mofapp.nic.in:8080/economicsurvey/pdf/119-130_Chapter_08_ENGLISH_Vol_01_2017-18.pdf).

## Observations

Cases presented in this study reveal that the passion for solving a real world problem through technological innovation and entrepreneurial spirit develop much earlier. Taking inspiration by new technologies coming in the market, the founders of these start-ups built solutions to address the problems that they observed around them. They ideate and put their heart and soul into building a product out of it. Most times they are successful in building an innovative product and technology. However, cases reveal that the journey of ideating a technological innovation and bringing it to reality is less daunting than the journey of commercialising it.

Entrepreneurship brings many challenges. Patenting is one important part of the entire process of technology entrepreneurship. However, it is not an immediate challenge that start-ups face when they launch their technology. The initial challenges involve funding their operations, supporting infrastructure for their product or service and market access. Hurdles do not stop with ideation, proof of concept and prototype development for new technological solutions. It further requires strategic planning, actions and most importantly support from the entire ecosystem. In some cases where supportive infrastructure and ecosystem is not available, start-up may have to deal with the challenge of building such infrastructure from scratch.

More often than not, young, passionate technologists do not strategise these aspects at the time of ideation or development of the technology. There may also be several unanticipated operational challenges for a start-up. Sometimes even market demand for their technology does not meet their expectation. So the first instinct of start-ups is to deal with these challenges and streamline their business. They perceive patenting as one small aspect of a new business. However, it is important in the long run for survival of an innovative technology as, most importantly, they may face the risk of imitation by others. It may be deferred to a later stage due to paucity of time and resources but it cannot be avoided.

Some start-ups in our case studies had not planned any patents during their initial years of operations. They applied for the patent protection later as they feared possibility of imitation by others. A couple of start-ups have not yet filed patent applications even after operating for 2-3 years now. This reveals that such start-ups do not give immediate importance to patents, rather perceive them as a long-term goal. On the other hand, there are some start-ups that filed provisional patent application, followed by regular full patent applications, even before launching their product and also intend to file more patent applications in the near future. These start-ups had prior experience of patenting and developing an innovative technology, and knew that sooner or later they would need to apply for patent protection for their inventions. This reveals that start-ups' behaviour and their propensity to go for patent protection is greatly affected by their prior understanding and exposure to such activities.

Our study reveals that patenting behaviour is also affected by the outlook of angel investors/VCs. Results show that investors generally decide to invest in a start-up based on expected profits and market traction potential. Patents may make a case strong for funding, but without a useful product or service, potential of building and growing a good consumer base, investors do not show much interest. They see it as a stagnant investment which would not generate any effective returns initially. Investors and VCs also see patents as a long-term goal. As the immediate challenge for a new start-up is funding, they expend their time and resources on gaining market access and generating revenue first. Some feel the need for patenting only when they find similar technology foraying into the market.

Another important aspect is cost incurred and time required in the patenting process. With paucity of funds initially, the additional burden of filing a patent also takes a financial toll as it requires expertise. Thus, start-ups usually need to hire an independent agency/law firm for filing. Regarding the cost of patenting, one start-up was of the opinion that patent protection in India is manageable if the start-up has a regular flow of revenue. In fact, the statutory fee is nominal, but hiring a law firm/independent agency is heavy on the pocket. The government launched Start-Ups Intellectual Property Protection (SIPP)<sup>17</sup> in January 2016 to encourage start-ups to protect their IP. Under this scheme, the government provided 80 per cent rebate in statutory fee and empaneled some institutes and firms as facilitators to offer IP guidance and filing assistance which was to be borne by DPIIT.<sup>18</sup> However, the interviewed start-ups have low awareness of such schemes and therefore reported not to have availed such benefits. Some start-ups are not aware of the facilitation services while others find them less useful as guidance related to international patent filing under PCT or any other is not covered under the scheme. The start-ups that expressed their intention of going for a PCT application mentioned that they have been deferring it due to the cost and complexity involved.

With regard to prior art search, very few start-ups reported to have conducted it at an early stage of development. Only those start-ups that have prior experience with technological innovation and patenting reported to have conducted prior-art search. Technological innovation usually has a long gestation period, indicating it is a huge investment of time and effort. Prior art search helps in ascertaining if the innovation is novel and could be patented. This reveals that most start-ups are either not aware of the importance of prior art search and consequences of infringing another patent. This indicates that they had no plans of patent protection at the time of ideation or development or were probably had low awareness of patent protection.

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<sup>17</sup> "Scheme for Facilitating Startups Intellectual Property Protection (SIPP)" Accessed June 12, 2020.

[http://www.ipindia.nic.in/writereaddata/Portal/News/323\\_1\\_Scheme\\_for\\_facilitating\\_start-ups.pdf](http://www.ipindia.nic.in/writereaddata/Portal/News/323_1_Scheme_for_facilitating_start-ups.pdf)

<sup>18</sup> Chitravanshi, Ruchika. "Startups Get 80% Rebate on Patent Fee." The Economic Times. Economic Times, September 5, 2017. <https://economictimes.indiatimes.com/small-biz/policy-trends/startups-get-80-rebate-on-patent-fee/articleshow/60368626.cms?from=mdr>.

With respect to licensing activity, we do not find any evidence where a start-up takes licence of any external technology for its technology or product development. However, in one of the cases, start-up licensed-out its technology through a formal agreement to facilitate device manufacturing using its technology. This points to the possibility that start-ups may engage in licensing-out activity to ensure wider diffusion of their technology in near future, provided they gain market attention and a suitable partner. At the same time, none of the start-ups cited licensing or revenue generation as a motivation for patenting. This implies that even in the initial phase of the business cycle when start-ups struggle with financial and human resource constraints, start-ups do not engage in or attempt to monetise patents on their technology. Although, evidence available with us is insufficient to conclude specific reasons behind it, two reasons that we can deduce are low awareness and thus motivation among Indian technology start-ups for patenting (Sodhi *et al*, 2020) and limited importance given to patents by Indian users, venture capitalist and other stakeholders of the technology. This observation is backed by the fact that the start-up founder who had been granted patents in this study mentioned his intent of patent trading, but believed that there was no proper marketplace and patent trading in India is still at its infancy. Moreover, patent monetisation is a complex and specialised task that requires professional expertise, and experience. Start-ups themselves lack patent understanding and during their initial years of operation, patent monetisation takes the back seat.

Results regarding motivation of start-ups to patent or not to patent suggest patenting is viewed as a medium to create entry barrier or protection from imitation by Indian start-ups. This is unlike findings from Veer & Jell (2012) and other literature from developed countries that suggest signalling to investors, licensing, brand reputation, etc. as main motivations for start-ups to patents. This shows a narrow perception of patents among technology start-ups in India.

Our study remains inconclusive regarding the benefits of patenting as only one start-up has been granted the patent so far. Its management believes that its brand reputation has improved after patent grant. It also managed to license the patent to a manufacturing firm for mass production of the product and reaped royalties.

On the patent filing front, the process has become more convenient with e-filing. The start-ups that filed a patent application reported not to have faced any major challenges as they hired a law firm/expert/independent agency to take care of the filing process and other related matters.

The start-ups have a certain perception about patents in the early stages of their business. After a few years, when they look at their business in hindsight, their perception about patents could possibly be different. It may be a useful exercise to revisit these companies in a few years (if they manage to sustain their business) and see if patent served them more than just protection from imitation and creation of entry barriers and if their perception about patents changed.

## Conclusion & Recommendations

In this report, we explore the factors that affect patenting activity of start-ups and also identify micro-level challenges faced by them. With this research, we came across some more pertinent issues that need to be addressed to promote the generation and protection of Intellectual Property in India. Below are some recommendations in that direction.

### Mentorship Programme

Stories shared by start-ups in this report point to the fact that ideas of a technology start-up start to sprout in the minds of technopreneurs usually during their graduation years. During that time, when they are passionate about their idea and focus completely on developing the technology, it is very important to provide them sufficient knowledge, skills and mentorship for technology protection.

It is important for graduate technical students to understand the benefits and importance of patent filing. Students may develop a brilliant technology solution, but in the absence of proper infrastructure and IP-related support they fail to realise the implications of lack of protection. They also do not understand the market and lack entrepreneurship skills.

It is, therefore, suggested that under Start-up India Initiative, the government should introduce mentorship programme at the college and university level where it facilitates mentorship by successful start-ups or incumbents in a similar industry to give students entrepreneurship exposure to the budding start-ups on business and patenting strategies.

### IP facilitation centres in universities and academic institutions

We recommend that the government, instead of focusing on only select premier technical institutes i.e. IITs, should provide assistance and necessary infrastructural and institutional support to all other public and private universities. At present, universities and colleges in India lack even basic infrastructure and ecosystem to help students in giving shape to their innovative business ideas. During interviews, while one start-up highlighted challenges that a technology entrepreneur from a non-premier institute i.e. non-IIT in India face, another start-up mentioned the benefits and support that the IIT ecosystem provides in nurturing technological ideas.

IITs have incubation centres that act as IP facilitators for start-ups, providing them all the necessary support required, e.g. SIDBI Innovation and Incubation Centre at IIT, Kanpur,<sup>19</sup> Incubation Cell at IIT Madras,<sup>20</sup> Technology Business Incubation Unit, IIT

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<sup>19</sup> SIIC IIT Kanpur – Startup Incubation and Innovation Centre, IIT Kanpur. Accessed June 12, 2020. <http://www.iitk.ac.in/siic/d/incubation>.

Delhi,<sup>21</sup> etc. They are either run by the IIT Alumni and backed by government funding or registered as non-profit companies. These centres work extensively to provide incubation and IP facilitation to emerging start-ups at a very early stage. Many non-IITians have brilliant innovation and start-up ideas but due to lack of guidance and support, they are unable to develop them.

The National Resource Development Council (NRDC) also runs several Innovation Facilitation Centres (IFC) across various institutes,<sup>22</sup> with the primary objective of “promoting and encouraging innovation activities among the faculty, students and researchers” and would facilitate the effective management of Intellectual Property, development of an association with manufacturing enterprises of the country and abroad and subsequently the transfer of the IP to the industry and entrepreneurs”.<sup>23</sup> The most recent IFC was launched at the University of Hyderabad<sup>24</sup> and while many IFCs continue to operate at select institutes, they have still not managed to achieve a pan-India growth. Several universities remain deprived of the initial exposure and support given to IIT graduates during and after their graduation. The IFC scheme launched by NRDC should be pursued more aggressively, with a wider approach so that the benefits of an early exposure to patent awareness and its development are availed by everyone.

## IP Exchange in India

During the interview, a founder of the start-up contended that in India, an investment in patents becomes stagnant as there are no IP exchanges or platforms for patent trading. Although India has a few patent sale agents and brokerage firms,<sup>25</sup> it lacks a proper, professional marketplace for IP trading. For licensing, however, there is a regulatory framework and entrepreneurs have taken well to the practice.

The Federation of Indian Small and Medium Enterprises (FISME) had previously launched an online IPR exchange in 2013 with support from the British High Commission. It provided services such as direct sale and purchase of Intellectual

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<sup>20</sup> “IIT Madras Incubation Cell.” IIT Madras Incubation Cell. Accessed June 12, 2020.

<http://www.incubation.iitm.ac.in/home>.

<sup>21</sup> FITT. Accessed June 12, 2020. <https://fitt-iitd.in/>.

<sup>22</sup> Akash. “NRDC: Promoting Research & Innovation Across Universities.” digitalLEARNING Magazine. >, August 17, 2018. <https://digitalllearning.eletsonline.com/2018/08/nrdc-promoting-research-innovation-across-universities/>.

<sup>23</sup> “Innovation Facilitation Centre.” NRDC. Accessed June 12, 2020. <http://www.nrdcindia.com/Pages/IFC>.

<sup>24</sup> “Innovation Facilitation Centre to Be Setup at UoH.” Innovation Facilitation Centre to be setup at UoH, Education Times. Accessed June 12, 2020.

<https://www.educationtimes.com/article/65779739/70176620>.

<sup>25</sup> 26, surender singh maan July. “Patent Selling: Patents & Trademarks.” patent sales agent india.

Accessed June 12, 2020. <http://www.patentsntrademarks.com/patent-process-outsourcing/patent-sales-agent-patent-selling-in-india/>.

“Commercialization.” EnnobleIP. Accessed June 12, 2020.

<https://ennobleip.com/services/commercialization/>.

Property as well as specialised services to help SMEs to assess valuation of their IPRs.<sup>26</sup> Again in 2017, as part of the new national IP rights policy, the establishment of an IPR exchange (IPRX) in India, like in the United Kingdom and Hong Kong, made the news. The exchange was reported to be established and developed under the guidance of the Ministry of Science and Technology through the National Research Development Corporation (NRDC). However, there was no official announcement on this and no update after that.

In 2018, there was an encouraging development in this regard, with NRDC signing an MoU with Hong Kong Trade Development Council (HKTDC), which established and manages the largest online IP Exchange in Asia. The strategic relationship is meant to facilitate business matching services, IP commercialisation for mutual benefit and listing of Indian IPs on Asia IP Exchange on voluntary free basis. HKTDC will share its experiences with NRDC in establishing an Indian IP Exchange.<sup>27</sup> The IP exchange would encourage patent monetisation in India and make it a lucrative asset for investment by third-parties. It is suggested that the setting up of an IP exchange should be expedited, as this partnership has remained at the discussion stage for a long time.

### **Encourage patent-backed financing**

In India, patents are seen as a tool for protection of intellectual property but not as a lucrative investment. This can be attributed to many reasons like the investors' unwillingness to treat patent as a business asset, insufficient market and legal infrastructure for monetising patents, challenges in patent licensing and transfer, and lack of uniformity in the valuation of patents.

As found during interviews with start-ups, most investors in India give higher weightage to the commercialisation of the product/service and market access. They also highlight the fact that most angel investors are looking for well-established imitation models from other countries as compared to innovative technology, as they do not believe good innovation can come from Indian start-ups.

There is a need to create a patent-backed financing ecosystem in India and encourage the use of IP as collateral for financing. India can take lessons from IP-friendly countries such as Singapore and Korea and improve regulatory infrastructure and design schemes to encourage IP financing for SMEs and start-ups that also incentivises lending institutions with benefits.<sup>28</sup>

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<sup>26</sup> "Welcome to The IPRExchange.in! The Best Way to Exchange Intellectual Property!" Accessed June 12, 2020. <http://www.iprexchange.in/>

<sup>27</sup> "NRDC Signs MoU with Hong Kong Trade Development Council for Strategic Relationship.", December 10, 2018. <https://www.psuconnect.in/index.php/news/nrdc-signs-mou-with-hong-kong-trade-development-council-for-strategic-relationship/16984>

<sup>28</sup> Srivats, KR. "India Should Bring in Robust Infrastructure for IP Financing, Says Report." The Hindu BusinessLine, February 21, 2020. <https://www.thehindubusinessline.com/economy/india-should-bring-in-robust-infrastructure-for-ip-financing-says-report/article30880771.ece>.

## Awareness regarding patent infringement and monetisation

The interaction with some technology start-ups gave an impression that they mostly underestimate the importance of patents, considering them as nothing more than a means of creating entry barrier for other players. For that reason, they often defer the patent protection until they have generated some revenue stream. The start-ups generally do not consider the probability of infringing someone else's patent and its legal and financial implications. Patent filing requires expertise, so start-ups are not in a position to apply it themselves. They either reach out to the government empaneled facilitation centres or hire a private law firm for filing. The private law firms are costly and the government-empaneled IP facilitation centres are few in number; there are complaints against them for demanding extra fee or refusing to provide facilitation.

We recommend that start-ups should be educated and trained on conducting prior art search, at least, so they do not run the risk of patent infringement. As the process is expensive, they must also be guided on how they can strategise to set aside funds for at least domestic patent application in the beginning and international patent (if required) as they scale up.

Furthermore, start-ups are not much aware of patent monetisation other than licensing. While India is in the process of setting up an IP marketplace, we recommend that meanwhile, the government should build capacity on this front by educating start-ups about its benefits, strategies, ways and process as it is a complex task and needs specific skills and abilities.

## References

- Arrow, K. J. "Economic Welfare and the Allocation of Resources for Invention." Readings in Industrial Economics (1972); 219–36. [https://doi.org/10.1007/978-1-349-15486-9\\_13](https://doi.org/10.1007/978-1-349-15486-9_13)
- Baum, Joel A.C. and Brian S. Silverman. "Picking Winners or Building Them? Alliance, Intellectual, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups." *Journal of Business Venturing* 19, no. 3 (2004): 411–36. [https://doi.org/10.1016/s0883-9026\(03\)00038-7](https://doi.org/10.1016/s0883-9026(03)00038-7)
- Belingheri, Paola and Maria Isabella Leone. "Walking into the Room with IP: Exploring Start-Ups' IP Licensing Strategy." *Management Decision* 55, no. 6 (October 2017): 1209–25. <https://doi.org/10.1108/md-04-2016-0227>.
- Blind, Knut, Jakob Edler, Rainer Frietsch and Ulrich Schmoch. "Motives to Patent: Empirical Evidence from Germany." *Research Policy* 35, no. 5 (2006): 655–72. <https://doi.org/10.1016/j.respol.2006.03.002>.
- Cohen, Wesley M, Richard R Nelson and John P Walsh. "Protecting Their Intellectual Assets: Appropriability ..." Researchgate. Accessed June 11, 2020. [https://www.researchgate.net/publication/4726764\\_Protecting\\_Their\\_Intellectual\\_Assets\\_Appropriability\\_Conditions\\_and\\_Why\\_US\\_Manufacturing\\_Firms\\_Patent\\_Or\\_Not](https://www.researchgate.net/publication/4726764_Protecting_Their_Intellectual_Assets_Appropriability_Conditions_and_Why_US_Manufacturing_Firms_Patent_Or_Not).
- Conti, Annamaria, Jerry Thursby and Marie Thursby. "Patents as Signals for Startup Financing." *The Journal of Industrial Economics* 61, no. 3 (2013): 592–622. <https://doi.org/10.1111/joie.12025>.
- Dorr, Robert C. and Christopher H. Munch. "Protecting Trade Secrets, Patents, Copyrights, and Trademarks". 3<sup>rd</sup> edition, Gaithersburg: Aspen Law & Business, (2000).
- Graham, Stuart J.H. and Ted Sichelman. "Why Do Start-Ups Patent?" *Berkeley Technology Law Journal* 23, no. 3 (2008): 1063-097. Accessed June 11, 2020. [www.jstor.org/stable/24118267](http://www.jstor.org/stable/24118267).
- Graham, Stuart JH, Robert P. Merges, Pam Samuelson, and Ted Sichelman. "High technology entrepreneurs and the patent system: Results of the 2008 Berkeley patent survey." *Berkeley Technology Law Journal* 24, no. 4 (2009): 1255. <https://conference.nber.org/conferences/2009/SI2009/IPPI/Graham%20et%20al%20HTEPS%20070309%20final.pdf>
- Hu, Albert Guangzhou and Gary H. Jefferson. "A Great Wall of Patents: What Is behind China's Recent Patent Explosion?" *Journal of Development Economics* 90, no. 1 (2009): 57–68. <https://doi.org/10.1016/j.jdeveco.2008.11.004>.
- Hsu, David H. and Rosemarie H. Ziedonis. "Patents As Quality Signals For Entrepreneurial Ventures." *Academy of Management Proceedings* 2008, no. 1 (2008): 1–6. <https://doi.org/10.5465/ambpp.2008.33653924>.

- Li, Xibao. "Behind the Recent Surge of Chinese Patenting: An Institutional View." *Research Policy* 41, no. 1 (2012): 236–49. <https://doi.org/10.1016/j.respol.2011.07.003>.
- Mann, Ronald J., and Thomas W. Sager. "Patents, Venture Capital, and Software Start-Ups." *Research Policy* 36, no. 2 (2007): 193–208. <https://doi.org/10.1016/j.respol.2006.10.002>
- Liefner, Ingo, Henning Kroll and Arman Peighambari. "Research-Driven or Party-Promoted? Factors Affecting Patent Applications of Private Small and Medium-Sized Enterprises in China's Pearl River Delta." *Science and Public Policy*, (May 2016). <https://doi.org/10.1093/scipol/scw002>
- Motohashi, Kazuyuki. "Licensing or Not Licensing? An Empirical Analysis of the Strategic Use of Patents by Japanese Firms." *Research Policy* 37, no. 9 (2008): 1548–55. <https://doi.org/10.1016/j.respol.2007.12.014>
- Nadeau, Pierre. "Venture Capital Investment Selection: Do Patents Attract Investors?" *Strategic Change* 19, no. 7-8 (2010): 325–42. <https://doi.org/10.1002/jsc.879>
- Rahko, Jaana. "Knowledge Spillovers through Inventor Mobility: the Effect on Firm-Level Patenting." *The Journal of Technology Transfer* 42, no. 3 (2016): 585–614. <https://doi.org/10.1007/s10961-016-9494-3>.
- Rassenfosse, Gaétan De. "How SMEs Exploit Their Intellectual Property Assets: Evidence from Survey Data." *Small Business Economics* 39, no. 2 (2011): 437–52. <https://doi.org/10.1007/s11187-010-9313-4>.
- Sichelman, Ted M. "Startups & the Patent System: A Narrative." *SSRN Electronic Journal*, (2012). <https://doi.org/10.2139/ssrn.2029098>
- Singh, Vikram, Kajal Chakraborty, and C. Lavina-Vincent. "Patent Database: Their Importance In Prior Art Documentation and Patent Search". *Journal of Intellectual Property Rights*. 21 (2016): 42-56
- Sodhi, Garima, Jain, Akriti and Singh, Rinki. "Technology Start-Ups and IP Protection in India." *SSRN*, May 28, (2020). <https://ssrn.com/abstract=3589334>.
- Veer, Theresa and Florian Jell. "Contributing to Markets for Technology? A Comparison of Patent Filing Motives of Individual Inventors, Small Companies and Universities." *Technovation* 32, no. 9-10 (2012): 513–22. <https://doi.org/10.1016/j.technovation.2012.03.002>

## Annexure I

This report presents findings from seven case studies of technology start-ups that were picked randomly from technology start-ups database in India. The case studies are a combination of interviews and desk research.

For desk research, we collected data from the official website of Indian patent office, new reports, company websites and press release of companies. Desk research was then complemented with in-depth, interactive and semi-structured interviews with the founders of seven tech-start-ups in India. For the interviews, we referred to an open-ended semi-structured questionnaire concentrating on the business offering, ideation and execution of technology development, patent activity, motivation for patenting or not patenting, benefits from patenting and challenges faced in patent filing. Each interview lasted for 60-120 minutes and was conducted over the telephone. Table I provides a descriptive profile of tech-start-ups that participated in the study:

Table I Descriptive profile of tech-start-ups

Case No.	Sector	Year of Establishment	Offering	Patents
1	Technological Solutions for ICT sector	2012	It offers an innovative product designed to combine multiple cellular networks like 2G, 3G and 4G into a single high speed internet for the end consumers.	<ul style="list-style-type: none"> <li>- 3 patents in India 2 applied in 2014 and one in 2016 (all were granted in 2018);</li> <li>- 3 in the US 2 applied in 2015 (both granted in 2019) and 1 in 2018 (abandoned);</li> <li>- 1 applied in the EU in 2015 (pending)</li> <li>- 1 applied in Spain in 2015 (pending)</li> </ul>
2	Technological Solutions for multiple industries	2017	The start-up provides automation solutions, IT services and technology solution for data collection on road condition to find accident prone spots for traffic safety.	<ul style="list-style-type: none"> <li>- 1 patent applied in 2017 (pending) (provisional application was filed in 2016)</li> </ul>
3	Technological Solutions for multiple industries	2013	The startup is operating in the area of GIS surveying/mapping, industrial inspection, precision agriculture with the use of drones and other deep-tech.	<ul style="list-style-type: none"> <li>- 1 patent applied in 2019</li> </ul>
4	Technological Solutions for multiple	2017	The company operates in the area of manufacturing special apparels and gear for protection, safety and security	None

	industries		of two wheeler riders as well as agriculture. The company also works in the areas of energy efficiency.	
5	Technological Solutions for entertainment	2016	The company was involved in building an interactive photo application.	- Provisional patent
6	Technology solution for Healthcare industry	2014	The company provides affordable and practical healthcare solutions.	- 1 patent applied in 2017 (pending) (Provisional patent application in 2016)
7	Technology solutions for education sector	2017	The company provides technology-led education and training to graduate students.	None