Royal Academy of Engineering

A spinout guide for academic entrepreneurs in India

Foreword

Welcome from Ian Ritchie CBE FREng FRSE

Ian Ritchie CBE FREng FRSE
Chair of the Royal Academy of Engineering Leaders in Innovation Fellowships programme steering group, 2022 to 2025

I'm delighted to present the Academy's latest work on academic entrepreneurship in India.

Whether you want to commercialise your research or learn more about how commercialisation works in India, this guidebook is full of useful information for would-be entrepreneurs, those who help them, and those who fund them.

Starting a new business can be challenging. However, those that succeed change the lives of those around them for the better – creating jobs, growing their economies and solving problems. Bringing inventions and other innovations to market is a huge driver of improved social wellbeing, and innovators often gain tremendous satisfaction from doing so.

This guide explores the commercialisation process for researchers in India. First, it provides you with the questions to decide if your research has potential. It then looks at the spinout process, from understanding your commitment to the mechanics of company formation. Finally, it gives insights on growing the business, including raising funding and exporting. We have drawn upon the research undertaken by Startup Genome and the UK's Centre for Entrepreneurs – both of which have significant experience in supporting founders – and the guide makes use of interviews and a new survey of Indian academic entrepreneurs and other stakeholders. It also draws on the expertise of the Royal Academy of Engineering's Fellowship and the Leaders in Innovation Fellowships (LIF) programme, which supports talented entrepreneurs from around the globe to turn their engineering innovation into impactful, sustainable businesses. I'm particularly pleased to see that LIF alumni stories have been highlighted.

Now, more than ever, we need to do all we can to support research commercialisation that leads to more impactful, sustainable businesses, which address societies' problems. If universities and researchers do not actively engage in commercialisation and technology transfer, many valuable ideas will never be realised, and opportunities to improve people's lives will be wasted. Whether by increasing the entrepreneurial mindset, offering best-in-class support or developing an active local innovation ecosystem, all of us at the Academy are energised by the possibility of helping to develop vibrant innovation ecosystems.

1. Introduction

1.1. Who is this guide for?

This guide aims to help Indian researchers and inventors turn their ideas into reality. It outlines the tough but exciting process of bringing new ideas to market through the creation of a new company. It is particularly tailored towards inventors working in research institutions, such as universities and public research laboratories, but may also benefit a range of other individuals who wish to build new ventures.

The document is based in part on surveys and interviews with Indian academic entrepreneurs and investors.[1] The structure follows the sequence that is typically required for a spinout: deciding if an idea has potential; planning the business; forming the business; and then scaling it. However, since every spinout is different, some parts will likely be more relevant to you than others. Inevitably, the guide can only provide a high-level overview, and so links to further resources are provided in the appendix and in footnotes.

BOX 1
Some terminology

A glossary is included in the Appendix. However, it will be helpful to introduce some terminology now.

We define a ***startup*** as an innovative or technology-driven young company. Startups can be considered as a specialist subset of small and medium-sized enterprises (SMEs), but in comparison with the wider set of SMEs, they typically have greater technology risk, greater uncertainty concerning their business model, and (hopefully) greater potential for scale. Some people may refer to them as 'innovation-driven enterprises' (IDEs).

We define a ***spinout*** as a startup that originates from within a parent organisation, such as a university or large corporate firm, using IP developed within the parent organisation.

We define an ***entrepreneur*** as a person who is responsible for creating the startup. For the purposes of this guide, we use this interchangeably with ***founder***. We use the term ***academic entrepreneur*** to mean an entrepreneur who is working in a university or other research institution, usually in a research or teaching role.

An ***invention*** is defined by the Indian Patent Act as a new product or process involving an inventive step (that is, a non-obvious technical advancement), which is capable of industrial application. An ***inventor*** is a person who has made an intellectual contribution to an invention.

An ***innovation*** we define as a new or significantly improved product, process or service. Innovations may or may not incorporate inventions; social innovations, for example, may solve social needs through new practices that do not meet the definition of an invention.

For the purpose of this guidebook, we use the term ***universities*** and ***higher education institutions (HEIs)*** interchangeably, and intend the terms to include institutes such as the Indian Institutes of Technology, the Indian Institutes of Science, the National Institutes of Technology and others.

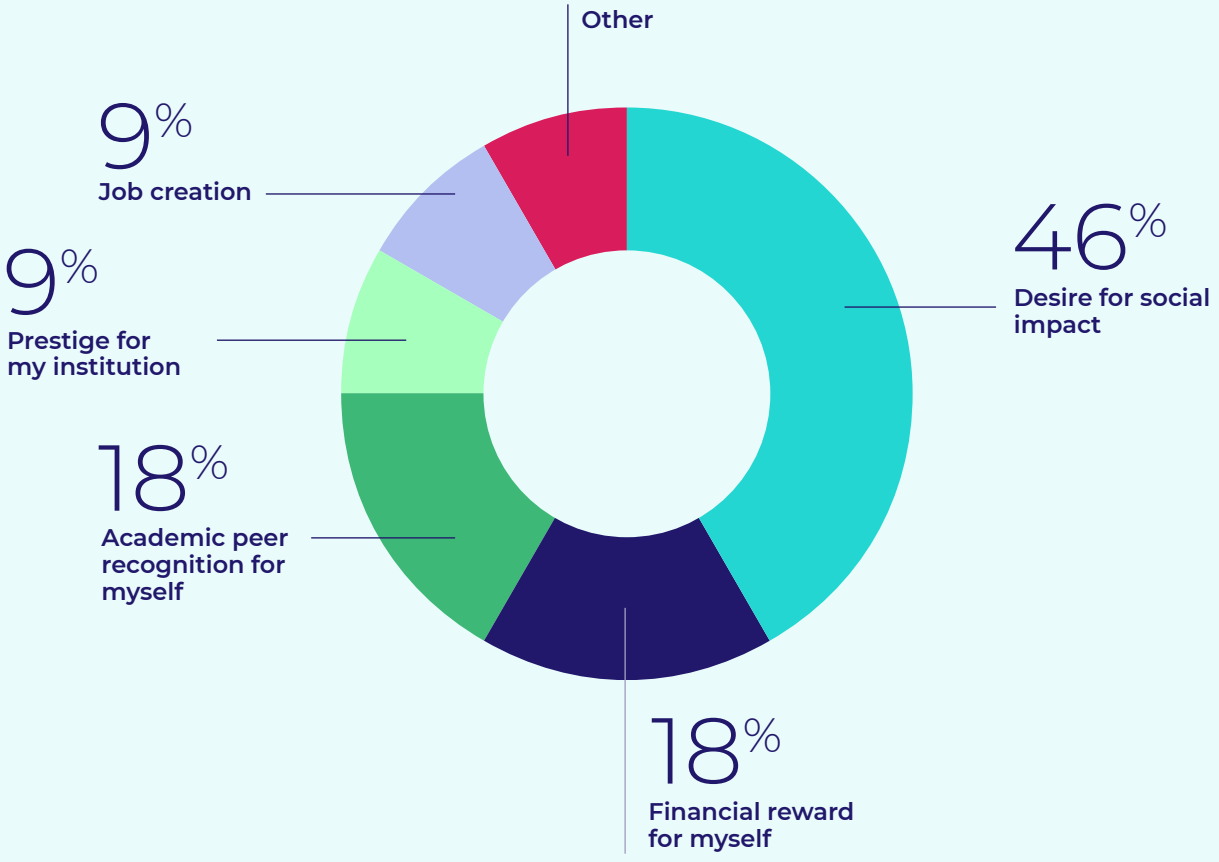
We define ***commercialisation*** as the process of turning an idea into a new product, process of service, and bringing this to market such that it is available for consumers. There are different ways of doing this.

1.2. What are the benefits of commercialisation?

The most common reason for commercialisation is usually the desire to see work being applied in the real world, generating social impact. Those who take this path often report an enhanced sense of purpose.

Academics who engage in a spinout or other commercialisation activity often report that it generates fresh insights and new motivation that reinvigorates their research work. Commercialisation can also bring attention to their publications, increase the prestige of their institution, attract welcome sponsorship to their research group, create valuable employment opportunities for graduates and postdocs, and potentially add a helpful source of alternative personal income.

FIGURE 1
Motivations for commercialisation reported by academic entrepreneurs (RAEng survey, 2024)



Academic inventors can sometimes have mixed feelings about spinning out, however. Academics have a number of competing pressures – to research, publish, supervise and teach – which often leave little time for other activities. Moreover, university culture often tended in the past to view commercial activity as less worthy than research – or, worse, as something that may 'contaminate' the purity of academia. Fortunately, this attitude is changing: universities and publicly-funded research organisations (not only in India but around the world) are increasingly acknowledging that creating impact is part of their 'social contract' with taxpayers, and that it is unrealistic to expect external firms to take an idea from a research publication to a market-ready product.

In addition, some universities gain substantial economic benefits from commercialisation: the US association of technology transfer, AUTM, calculates that licensing income alone (that is, not including the value of spinouts) is worth nearly $4 billion per annum to US universities (AUTM 2023). Commercialisation by US universities is also estimated to have supported up to 5.9 million jobs between 1996 and 2017, a significant proportion of total employment (Pressman et al. 2019). While most Indian universities do not yet undertake commercialisation activities at this scale, it is an indication of what may be possible, and the Indian government has indicated that it wishes to see greater levels of commercialisation. The Ministry of Education now has a dedicated 'Innovation Cell' and a National Innovation and Start-up Policy (NISP), developed in conjunction with other ministries and organisations, which aims to provide a framework for all HEIs and encourages universities to implement their own policies (MHRD 2019).

Commercialisation of an invention can take place through different possible routes. The easiest and quickest route is usually to *licence* it to an existing company, if one can be found. If your institution has limited experience or resources for commercialisation, this is very likely to be the option that is recommended to you. However, some academics feel that they want to be more closely involved in guiding and directing the development of their idea, and so want to *spinout* a new company instead. This guide is primarily aimed at such people.

The factors that should be considered in making this decision are discussed in more detail in section 3.3 below.

BOX 2
Technology readiness levels

TRLs are a conceptual way of assessing the maturity of a particular technology. Originally developed by NASA in the 1970s, the concept has since been adopted by a wide range of organisations. The levels are typically described as follows:

TRL 1 – basic principles observed
TRL 2 – technology concept formulated
TRL 3 – experimental proof of concept
TRL 4 – technology validated in lab
TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
TRL 6 – technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
TRL 7 – system prototype demonstration in operational environment
TRL 8 – system complete and qualified
TRL 9 – actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)

2. Pre-formation: deciding if your research has potential

2.1. Will people use your idea?

Commercialisation should always be focused on market need. Many inventors may begin with the discovery of a new phenomenon or the development of a new technology, and then seek to identify whether there is a need for this. Others – like one of our case studies – may begin with the identification of a market need, and then seek to identify the appropriate solution. However, whichever way around one begins, identifying a market need is critical.

The first questions of the commercialisation process should therefore be whether a discovery or an invention is something that people would use, and how the research could be 'productised' – that is, turned into a product or service that can be sold. You should consider questions such as 'what could be the product or process that this technology enables?' and 'what might this product or process enable people to do, which they otherwise cannot?' One way to think about the market need is to ask whether there is a real 'market pain' that your invention can relieve, as opposed to merely offering something 'nice to have'.

Answering these questions requires external market research – contacting prospective users or industry experts to determine if there is indeed a need for the product or process. This market research is likely to be iterative: your first few conversations will help you gauge if there is any commercial application, and successive conversations will help you shape and refine a 'value proposition' (see Box 3).

This process often requires changing your mindset away from that of an academic researcher, and putting yourself in the shoes of the end-user: it is not enough that your invention is excitingly novel, or technically elegant, or that you think there *should* be demand – all that matters is whether other people want it.

BOX 3

Value proposition and USPs

A 'value proposition' is a short statement about how an innovation brings value to its users. It describes how the product or service solves a problem or meets a specific need.

While a good value proposition appears simple, its creation requires extensive research and refinement over time as you discover what the market actually wants. For example, you may start off thinking that the technology's value proposition is that it enables a product to be produced more cheaply, but discover through market research that a more valuable proposition is actually something else – such as reduced size or greater reliability, for example.

A 'unique selling proposition' (USP) is a statement that summarises the uniqueness of an innovation, usually in terms of how it is better (e.g. cheaper, quicker, simpler, more reliable) than all the alternatives that are currently available in the market.

Note that there is *always* competition for a product or service, even if the alternative for potential customers is to maintain the status quo. Thus the key point is to understand from the user's or buyer's perspective *why* they would adopt your innovation – as opposed to using an alternative solution, or simply doing nothing.

At the same time, you will also need to start forming an idea of what it is that the spinout will sell, and to whom. Innovations may include physical devices, software, processes, services, or some combination of these.

In some cases, you might be overwhelmed with potential applications. In other cases, the application might not be entirely obvious at first, and may require some brainstorming (if doing this with colleagues, be aware that this might generate new intellectual property – see below).

Most products have a long 'value chain' (Porter 1985) – that is, the full series of activities needed to create and deliver it to the end-user – and it may be more effective to limit yourself to part of that chain than attempt to encompass it all. This choice will determine who your customers are (e.g. whether you are selling the final system to end-users, or selling components to system integrators), how you will reach them, and what resources the spinout will need.

2.2. Is it scalable?

A crucial question for any potential business to answer is whether its product is scalable – meaning that it can easily be built many times. For example, a software package can easily be replicated any number of times, and so can be sold easily to many different customers at once, if the market demand exists.

However, a consultancy business that depends upon an individual's knowledge and time is much more difficult to scale, since you can only serve one customer at a time, and imparting the necessary knowledge to others is often slow and difficult. In between these extremes, there are businesses with products that require some bespoke development, or need the inventor's time to support integration with customers' systems.

While all these types of business can be potential spinouts, it will help to have an idea of the potential scalability. Many academics are content to build 'lifestyle businesses' – so-called because they provide the founder with flexibility, autonomy, or income to live a lifestyle of their choosing, without necessarily involving creating a large company or managing a large team. However, if the spinout does not have the potential for significant growth, then it will be unlikely to be suitable for venture capital investment.

2.3. Is it technically feasible?

Just because a process works well in a lab once, doesn't mean you can consistently repeat that process at scale. It will thus be important to know whether the technology will perform as expected once incorporated into a product.

Fortunately, many Proof-of-concept grants exist in India, at both State and National level, to help Indian academics. The idea of such grants is usually to help an inventor take a technology from one TRL to the next. One of the largest schemes is Startup India's Seed Fund Scheme (SISFS), which provides funding for proof of concept, prototype development, product trials and other commercialisation activities.[2]

Do not fall into the common trap of using proof-of-concept funding for further research. To avoid this, you should develop a technical roadmap – incorporating the critical milestones that customers, partners and investors want to see – and ensure that proof-of-concept funding is strictly applied towards furthering this roadmap (see section 3.6 below for more detail).

It will be important to know that others cannot take advantage of your hard work by copying your idea. Intellectual property (IP) protection is thus important for technology-based spinouts.

2.4. Is it protectable?

If you are investing your resources in developing a new product – and if you want others, like venture capitalists (VCs) (see 4.2 below), to invest with you – it will be important to know that others cannot take advantage of your hard work by copying your idea. Intellectual property (IP) protection is thus important for technology-based spinouts.

Additionally, IP can carry symbolic weight with investors, since it signals novelty as well as defensibility. However, IP law is a specialist area, and this is likely to be one area where you will need to seek expert advice from an appropriately qualified IP lawyer.

There are different types of IP, which have different rules. The most common types are the following:

- **Copyright** – this not only covers original literary works, but also extends to software code.
- **Patents** – this protects an invention, defined by the Indian Patent Act 1970 as "a new product or process involving an inventive step and capable of industrial application".
- **Trademarks** – this protects marks capable of being represented graphically, and which are used to distinguish the goods or services of one person from those of others.
- **Design rights** – these are in some sense between patents and trademarks, and are used to protect designs that are “capable of being applied to something that can be manufactured by an industrial process”; for example, a ball-point pen or a specifically shaped engine part might have design rights attached.
- **Know-how and trade secrets** – sometimes firms may choose to guard valuable information through non-disclosure agreements and secrecy. One famous example of this is the recipe for Coca-Cola.

Some types of IP, such as patents, must be formally registered. Other types of IP – like trademarks – may be formally registered, which provides stronger protection, but may still exist in unregistered form even if you do not register them, thus potentially providing some protection.

To file a patent application, your idea will need to be inventive (which typically means 'not obvious to others', nor similar to something previously invented), capable of industrial application (that is, you can think of a product or process where it would be applied), and not already have been publicly disclosed. Many academics are unfortunately caught out by the last point, and sadly find themselves unable to file a patent application because they have presented their discovery in a lecture of some kind, or otherwise disclosed it to others. Note that even a small talk may be considered 'public disclosure'. To prevent this, it is best to get advice (including from your Technology Transfer Office (TTO), if there is one – see Box 4) as soon as possible after you think you may have an invention, and have non-disclosure agreements with all those with whom you discuss the idea.

Further, you will need to determine who owns the IP rights for your invention. Under Indian law, the ownership of inventions developed using university resources will usually sit with the university itself, rather than the individual academic. However, this default position may be modified by institutional policies and by funding agreements, so you will need to check. Note also that many universities will not distinguish between IP in your own field of research and other fields, or between ideas developed at the institution versus ideas developed in your 'spare time' – since these distinctions are very difficult to adjudicate.

In addition to your own IP, you will need to research pre-existing IP that has been developed by others, which may affect your 'freedom to operate' – that is, the degree to which you can develop your idea without infringing upon someone else's IP rights. With patents, in particular, it is invariably the case that someone, somewhere, will have filed a patent that makes claims similar to yours. However, a good patent attorney can advise you on how to navigate this – this may sometimes mean restricting the claims of your own patent to a specific area, filing only in specific jurisdictions, or even negotiating a licence from the party which holds the prior IP.

Sometimes inventors feel that they do not want to protect their idea at all, since they feel that it should be part of the 'common good' and available to all. However, we find that firms will rarely invest the resources needed to bring an invention to market if the ultimate product can be easily copied, and so not patenting often means that an idea is developed by nobody. A better approach is to patent the idea but then grant multiple licences, or else exclusive licences with a requirement to commercialise, so that there is an incentive for others to invest resources, which they might then recoup.

2.5. What else will you need?

One critical consideration is what other assets or resources besides the core invention are needed to bring the invention to market, and how easily these can be accessed.

This might include manufacturing capabilities, marketing channels, distribution networks, complementary technologies, specific relationships or human capital, and so on; these are often termed *complementary assets* (Teece 1986). If your invention clearly requires complementary assets to which you do not have access, then it may be preferable to partner with, or licence the invention to, an organisation that does possess these assets – or to produce a sub-component that requires fewer such assets and capabilities.

CASE STUDY

SimYog Technology

SimYog Technology was founded in 2017 as a spinout from the Indian Institute of Science in Bangalore. The company was founded by a team who met at the IISc, including CEO Dipanjan Gope, who is still a faculty member there.

The startup specialises in electromagnetic interference (EMI) and electromagnetic compatibility (EMC) simulation software, particularly for the automotive sector. Its products allow designers of electrical and electronic systems to identify and fix EMI/EMC issues early in the product development process, potentially saving significant time and resources.

The company is an example of a spinout that was founded primarily around a market need, rather than around a technology looking for an application. Dr Gope had early exposure to startups after his PhD supervisor at the University of Washington started a company and invited him to join the founding team; he also worked for Intel in Santa Clara for a period. This commercial experience, and awareness of the issues faced by customers of these firms, stayed with him when he returned to academia in India some time later. "I kept wondering about the challenges that the customers of the old (spinout) company faced, and how to solve them," says Dr Gope. Thus, when some Bosch engineers joined the PhD programme at the IISc and wanted to collaborate on solving similar challenges, Dr Gope saw an opportunity to turn their collaboration into a spinout.

Specifically, he saw that vehicle manufacturers were rapidly increasing the degree of electronics in vehicles, but did not have the deep understanding and legacy competences to match. As Dr Gope puts it: "Sometimes when a sector changes dramatically, the years of experience that the big companies have gathered can't help them and are less relevant than what you, as a startup, can bring to the table."

"Sometimes when a sector changes dramatically, the years of experience that the big companies have gathered can't help them and are less relevant than what you, as a startup, can bring to the table."

Fortunately, at IISc Bangalore the spinout "process was already fairly well laid out". The Foundation for Science Innovation and Development (FSID) – which offers centralised commercialisation support to the IISc – provided some commercialisation support and connected the team to key people in the ecosystem, including local VCs. This led to a seed round of $750,000 USD with investment from Bosch and Ideaspring Capital, followed by a series A round with Mela Ventures of $2.5 million USD.

Although they are both in the same field, Dr Gope says that managing his dual roles – teaching at IISc Bangalore and managing his spinout – has been challenging. As a result, he decided to take leave without pay to focus on SimYog. At the time of writing, SimYog's products are used by several top automotive, semiconductor and defence companies, including Texas Instruments, ST Micro, Infineon, and Mercedes-Benz. The company now employs over 30 people and has expanded its presence with an additional office in Austin, Texas.

CASE STUDY

SmartKosh Technologies

SmartKosh is a spinout from IIT Hyderabad that produces battery management systems.

The company was founded by Dr Rashi Dutt, a former PhD student at IITH. Rashi began thinking of applications for her research during the course of her PhD, partly as a result of an Intel fellowship which brought significant industry exposure. When the COVID pandemic delayed her PhD viva, she used the time to develop her ideas for a spinout.

The path for commercialisation was initially unclear, since at that time the university did not have official policies or processes for guidance. However, Rashi turned to the Incubation Cell at IITH to explore the feasibility of her idea. This provided her with some advice, and put her in touch with other similarly-minded academics. She also educated herself about the basics of entrepreneurship through online content from other universities, such as MIT. Convinced that her idea had potential, Rashi then applied for – and won – a number of proof-of-concept grants which helped to get the business off the ground, and build her team.

Partly because Rashi was a PhD student, the intellectual property for the spinout was assigned to the startup, rather than licensed (a move which is often not considered good practice – see section 3.5 below). In return, the IIT took just 2% equity in the firm, and no royalties.

Dr Dutt says she has no regrets about becoming an entrepreneur, but would do some things differently next time round. At the beginning, "I was still thinking about research, not business", she said. "My biggest mistake was not to get out of the researcher mindset more quickly and embrace the entrepreneurial journey more thoroughly!"

She adds: "Entrepreneurship has been a big learning curve, and many of our decisions have resulted in unexpected outcomes. For example, we were hesitant to approach big technology companies in the mobility sector, but once we did, the response to our innovation has been largely positive."

"Entrepreneurship has been a big learning curve, and many of our decisions have resulted in unexpected outcomes. For example, we were hesitant to approach big technology companies in the mobility sector, but once we did, the response to our innovation has been largely positive."

SmartKosh has secured pilot projects with a few drone and Electric Vehicle companies to test and validate the technology in an operational environment. The firm is also in discussions with customers in the mobility and energy sectors. At the time of writing, Rashi plans to raise funds from Angel investors or VCs to scale the company – with ambitions to reach global markets in the energy sector including the UK and USA.

3. The spinout process

Among our survey respondents, opinion was highly mixed as to whether it is possible to run a spinout alongside academic research and teaching. Interestingly, serial academic entrepreneurs – those who had established more than one spinout – were far more likely to report being able to balance these activities.

3.1. Understanding your commitment

Forming a spinout is an exciting and rewarding process – but rarely a quick one. In terms of the actual process of spinning out, research from the US, UK and Europe suggests that it usually takes 4 to 12 months to complete the formalities of university approvals (DSIT 2023). Initial evidence suggests that it is usually about the same in India, but with significant variability: one survey respondent reported that it typically took 24 months at their university.

However, this is just the start of the journey: while data from India is unfortunately rather scarce, it can often take several years to reach first revenue (Shane 2005; Slavtchev and Göktepe-Hultén 2016). Fortunately, the process is usually shorter in engineering and physical sciences than for biotechs and pharmaceuticals: one study of US pharma spinouts found a median time of 29 years until the first clinical trial, and 36 years until FDA approval (McNamee, Walsh, and Ledley 2017).

You do not necessarily have to be closely involved for all this time (see section 3.7), but you should be aware that it will most likely be a marathon, not a sprint. If you do not want to be involved – and cannot find other colleagues to take this on – then alternative routes to market, such as licensing, may be better-suited (see 3.3).

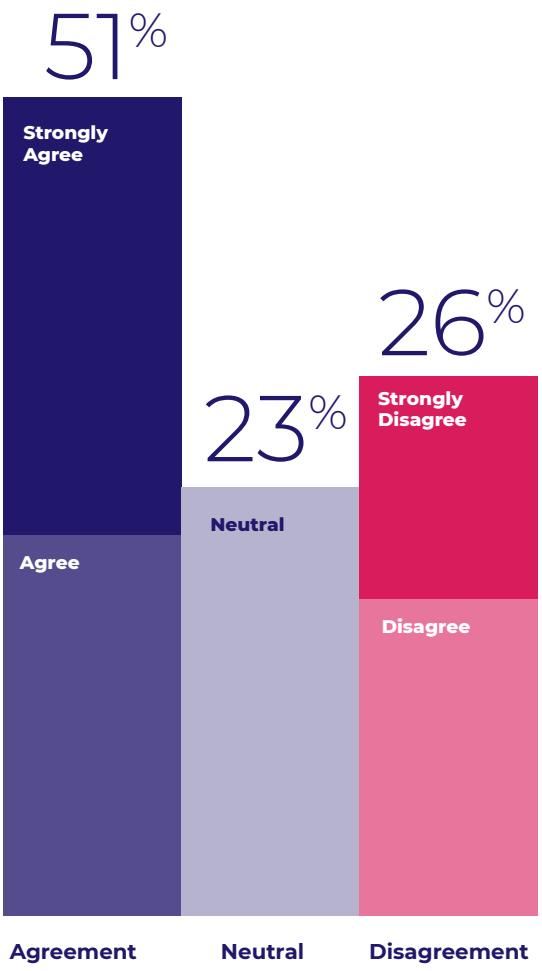
Among our survey respondents, opinion was highly mixed as to whether it is possible to run a spinout alongside academic research and teaching. Interestingly, serial academic entrepreneurs – those who had established more than one spinout – were far more likely to report being able to balance these activities. However, a number of investors and entrepreneurs – including one of our case studies, SimYog – felt that it was better to take leave to concentrate on their spinout, at least once the company was VC funded.

3.2. Engaging with your institution

Spinouts, by definition, originate from within a parent institution, such as a university. Inventors report mixed experiences as to how helpful such institutions may be: some are very supportive, but others may unfortunately actively hinder the process. Either way, you will probably need to engage with the institution to ensure that you have the necessary permission to exploit any IP.

Most survey respondents agreed that the pathways or processes for an academic to spinout are unclear (see figure 2). If your institution has a dedicated TTO, the process may be clearer, and speaking with your TTO will be a good place to start. A few of the more established TTOs have a formalised 'invention disclosure' process, which encompasses questions of commercial application, technical feasibility and protectability

FIGURE 2
Opinion: Pathways to spinning out are unclear



mentioned above. They will be able to clarify your institutional policy concerning IP, and may have a formalised spinout process for you to follow. There is, however, great variability in the capacity of TTOs – with some composed only of one part-time member of staff – and also a great variation in institutions' experience and procedures.

Most institutions do not yet have such TTOs, but may have an 'entrepreneurship cell', 'incubation cell' or 'innovation cell' instead. These are networks of entrepreneurially minded people within the institution, who are able to share stories of their own experiences and provide some advice. Compared with a formal TTO, these cells may not have formal support from the university and many are student focused – but may nevertheless be able to provide advice and connections.

Outside India, many HEIs now positively incentivise commercial engagement of various kinds, and academics find that being involved in a spinout increases their prospects of career advancement. While India is moving rapidly in that direction, and a substantial proportion of survey respondents reported that there was now some kind of institutional incentive for commercialisation, sadly some academics in India (about 1 in 5 of our survey respondents) still report that their university administration is overly bureaucratic, unhelpful, and may even prevent their attempts to create a spinout.

In such cases, it is possible that directing university administrators to the National Innovation and Start-up Policy may help.[3] However, if the administration remains intransigent or obstructive, one option may be to limit your own role to that of an adviser, and have postdocs or postgrads form the company instead (see section 3.7). Another option may be to take a sabbatical, if your contract allows. You must still ensure that you are not in breach of your employment contact or any other university policies.

BOX 4

TTOs and entrepreneurship cells

A TTO is an official university office or function that exists specifically to support inventors. These have many different names, structures and functions – which might include IP advice and patent filing, business planning, finding cofounders and investors, and drafting legal agreements. Some offices include wider industrial engagement functions, such as supporting consultancy and collaborative research agreements, too.

An entrepreneurship cell is typically a group of entrepreneurially minded individuals who aim to help each other with entrepreneurial activities. These tend to be more 'grassroots' organisations – that is, not created by the university hierarchy, nor funded by the university.

Within the IISc structure, the Foundation for Science Innovation and Development (FSID) (**www.fsid-iisc.in**) provides a centralised portal for support, including incubation.

3.3. Deciding on the route to market

As discussed above, licensing is typically an easier route to market and is preferable in many cases. However, spinouts are generally more favoured in cases where the technology is a so-called 'platform technology' (meaning that it provides a foundational base for numerous products or applications); where there is significant potential upside for the spinout; where it may be possible to build a strong portfolio of IP; where the innovation is radical (and hence 'competence destroying' for established firms, rather than sustaining their existing products); or simply where no licensee can be found:

Factors favouring spinouts	Factors favouring licencing
• Few complementary assets needed	• Substantial complementary assets needed
• Radical, disruptive innovation	• Incremental innovation
• New market	• Established market
• Platform (general purpose) technology	• One-off (specific) product
• Large potential upside	• Limited potential upside
• Founder committed to long term	• Founder involvement limited
• Rich local startup ecosystem	• Weak local startup ecosystem
• Tacit knowledge	• Codified knowledge
• Strong IP	• Weak IP

Adapted from Shane 2005.

For completeness, it is also worth noting that there can sometimes be a 'middle way' between a spinout and licensing, in the form of 'development vehicles'. These are startups formed for the specific purpose of taking a technology to a higher TRL, when it will be more suitable for licensing, but not all the way to market. This approach is sometimes used for process innovations, which will ultimately be licensed but may need more advanced demonstrators or other supporting evidence to convince prospective licensees.

As mentioned above, your ability to access complementary assets will also affect your route to market. Particularly in a country the size of India, distribution channels may be very important. For example, many Indian inventors develop products for low-income communities, but lack the channels to reach them effectively; furthermore, the potential beneficiaries may lack the resources to find out about the products or purchase them. In such instances, it may be appropriate to partner with a governmental body, charity or a non-governmental organisation. This might mean that the 'customer' (buyer) might not be the end-user.

3.4. Market research and marketing

One of the major shifts that academic founders usually need to make is from thinking just about the *technology*, towards thinking about the market. The failure to adopt this mindset adequately is a common complaint of many investors.

Moreover, founders themselves often say that they underestimated the importance of sales and marketing, and wish that they had recruited staff in this area sooner. When we asked a number of Indian academic entrepreneurs to identify which of their perceptions of the process had been proven wrong, the majority of respondents reported issues relating to the market or their customers (see figure 3).

Investors (see 4.2) will usually want to see convincing evidence of market demand before they invest. Actual sales will be the best evidence (as one Indian academic founder said: "unless someone is paying, their feedback is not real!"). However, if you cannot demonstrate actual sales, the next best thing will be partnership agreements or expressions of interest. Thus you will need to have early conversations with prospective customers. Part of your market research should be to segment the market – dividing it into different groups of customers who have similar characteristics or needs – and then identify the most promising initial customers.

FIGURE 3
Challenges to spinning-out, reported by survey respondents'

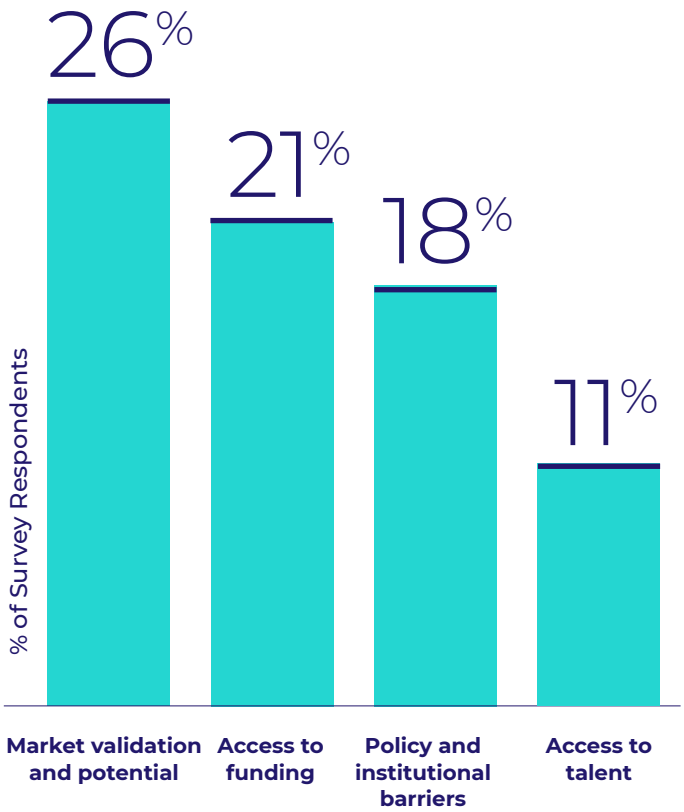
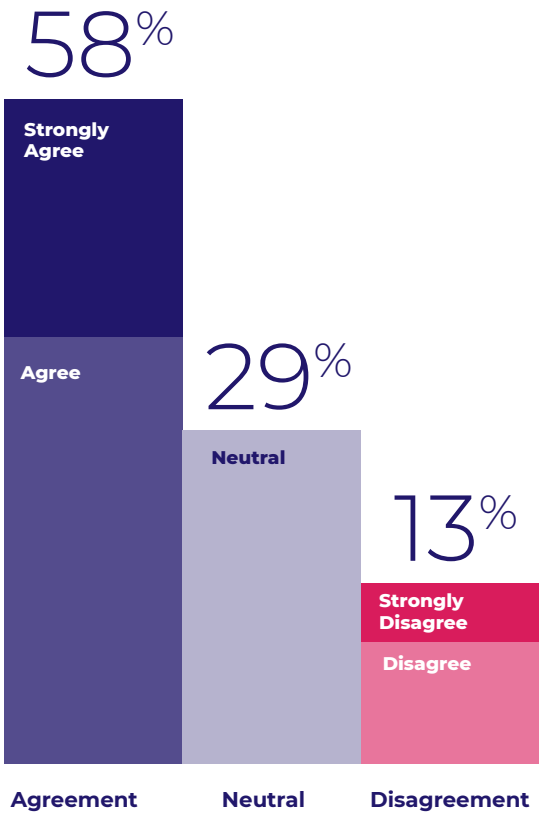


FIGURE 4
Opinion: Being associated with a university makes a spinout more attractive to customers



From our survey, the academic community largely believes that association with a university is an attractive feature for customers (see figure 4). However, while this may be true, it does not mean that you should treat the product as a research project. Certainly, you should not wait until you have your final product, or even a *minimum viable product (MVP)*, before you speak to customers – you will very likely find that feedback from customers helps you refine it.

In addition, early feedback from customers helps to prevent founders from becoming too attached to their ideas. While perseverance and confidence are valuable traits for entrepreneurs, you should avoid obstinately pursuing a particular solution if the market wants something else. As one Indian academic founder said:

"Don't make the product that you want; make the product your customers want!"

That said, it is possible to be too responsive and attempt to customise your product in many different ways for different customers. Startups that do this often find themselves being spread too thinly, or get stuck in a process of constant refinement, and unable to scale effectively.

"We were wrong to think that we could hit all applicable markets for our technology at once. The truth is that we needed to pick one niche and dominate it first."
- Indian academic founder

BOX 5
MVP

The idea of an MVP is that it represents the most basic, viable version of a product or service that can still deliver value to early users, and is functional enough to test in the real world, but without additional features that would require excessive time or resources.

The concept of an MVP was introduced by software company CEO Frank Robinson in 2001, and then popularised by entrepreneurs Steve Blank and Eric Ries. The idea of an MVP features heavily in Eric Ries' Lean Startup methodology. This advocates for rapid market testing, using a MVP to validate or invalidate key assumptions about a product or market, to avoid devoting too much resource into developing a product that might not have a good fit with the market needs ('product–market fit').

When undertaking market research, or subsequent sales and marketing of your product, it may be useful to consider the ACCORD framework, developed by Everett Rogers (Rogers 2003):[4]

- **Advantage** – the degree to which an innovation is perceived as better than the existing solution (i.e. its USPs).
- **Compatibility** – how consistent the innovation is with existing values, past experiences, and needs of potential adopters. (Radical innovations may not be easy to integrate into existing systems.)
- **Complexity** – the degree to which an innovation is perceived as difficult to understand and use. (If there is a steep learning curve, how can this be reduced for users?)
- **Observability** – the extent to which an innovation's results or benefits are visible to others. (If benefits are invisible, can they be made more visible – for example, by customer testimonials?)
- **Risk** – the level of uncertainty or potential negative consequences associated with adopting the innovation. (Can you help mitigate these risks in any way?)
- **Divisibility** (or 'trialability') – the extent to which an innovation can be tried on a limited basis or divided into smaller, more manageable parts. (Customers are more likely to adopt an innovation that they can trial before committing to buy.)

3.5. IP protection and licensing

Types of IP were outlined previously. As mentioned, we suggest that seeking expert advice is worthwhile. If you decide to patent your technology, you will need to devote time to explaining the details to a patent attorney under a non-disclosure agreement; we suggest that you do not try to draft the application yourself, since seemingly innocuous mistakes can potentially invalidate the patent.

The cost of the actual patent application itself is not substantial[5], although you will pay more to the attorney for drafting the application. Initial costs for drafting and filing will likely be in the range of INR 45,000 to 115,000 – although your university may pay this for you, especially if it asserts ownership of the IP.

There will be additional fees if you subsequently decide to seek protection via the Patent Cooperation Treaty (PCT) process. This allows protection in multiple countries through a single application, and includes the National Phase, in which the PCT application passes into the individual patent systems of the participating countries. These decisions do not have to be made at the outset, but can usually be decided once the spinout has started up.

If you are an academic inventor and the university asserts ownership of the IP, you will need to agree a licence between yourself (or your spinout) and the university in order for you to use the IP – even if you are the original inventor. This agreement is likely to consist of an upfront fee (although this may be a token amount) plus royalties – that is, a share of the future income your spinout makes from using the IP. Other clauses typically describe the duration of the licence and terms for renewal, whether you have exclusive use of the IP, who will be responsible for maintaining the patent, and often reserved rights for the university to continue academic use. Note that funders might also have a claim on the IP, depending on the terms of the funding agreement.

If there are multiple inventors – for instance, if you had academic collaborators – you will need to agree on the relative 'inventive contribution' of each of you. This is not only to decide who is named on the patent (in some jurisdictions, failing to name an inventor can result in a patent being declared invalid or unenforceable) but also in case of future distribution of royalties (for example, if the patent is licensed to someone else for a different application). For patents, this will usually need to be established on a detailed, claim-by-claim basis. Interpersonal dynamics can sometimes make this difficult, especially if there are different levels of academic hierarchy involved (subordinates may be unwilling to challenge their superiors if they disagree with the proposed split). If the inventors are spread across multiple institutions, it should be agreed which institution will take the lead and be responsible for patent renewals, distribution of future royalties and so on. Remember, inventorship is not the same as ownership.

Note that, although many founders sometimes want the IP to be assigned to the spinout (and some institutions will agree), this is not considered good practice by many universities globally – since if the spinout fails, it may be difficult for the university or founder to recreate another. An exclusive licence is usually a better way forward, provided that it covers the key market jurisdictions, and experienced investors will understand this. However, if the HEI will not grant exclusivity, this will be much less attractive for investors.

There will be additional fees if you subsequently decide to seek protection via the Patent Cooperation Treaty (PCT) process. This allows protection in multiple countries through a single application and includes the National Phase, in which the PCT application passes into the individual patent systems of the participating countries. These decisions do not have to be made at the outset, but can usually be decided once the spinout has started up.

A business model is a high-level, conceptual framework of how the business will make money. It outlines how the company will generate revenue, and what its major activities and costs will be.

3.6. Business modelling and planning

One of the most important tasks before actually forming your company is to develop a business model, and then turn this into a business plan.

A business model is a high-level, conceptual framework of how the business will make money. It outlines how the company will generate revenue, and what its major activities and costs will be. It encapsulates your core strategy for creating and capturing value, and your hypotheses about how the market works. The model does not have to be complex – indeed, some of the most successful startups have very simple models – but it must be viable. Understanding and testing the assumptions that you might have made in designing it, is critical. Even if you are undertaking commercialisation for reasons of social impact rather than profit, it is important to be able to identify a viable business model, since unsustainable social enterprises create little impact. Many entrepreneurs use the Business Model Canvas developed by Alexander Osterwalder as a template to help its development (Osterwalder and Pigneur 2010).

A business plan, in contrast, is usually a more formal, written document. This will typically add detail to the framework of the business model, containing more information about the market, the target segments and first customers, the structure and management of the spinout, financial projections, fundraising requirements, actionable steps, and more. This serves as a roadmap for the startup.

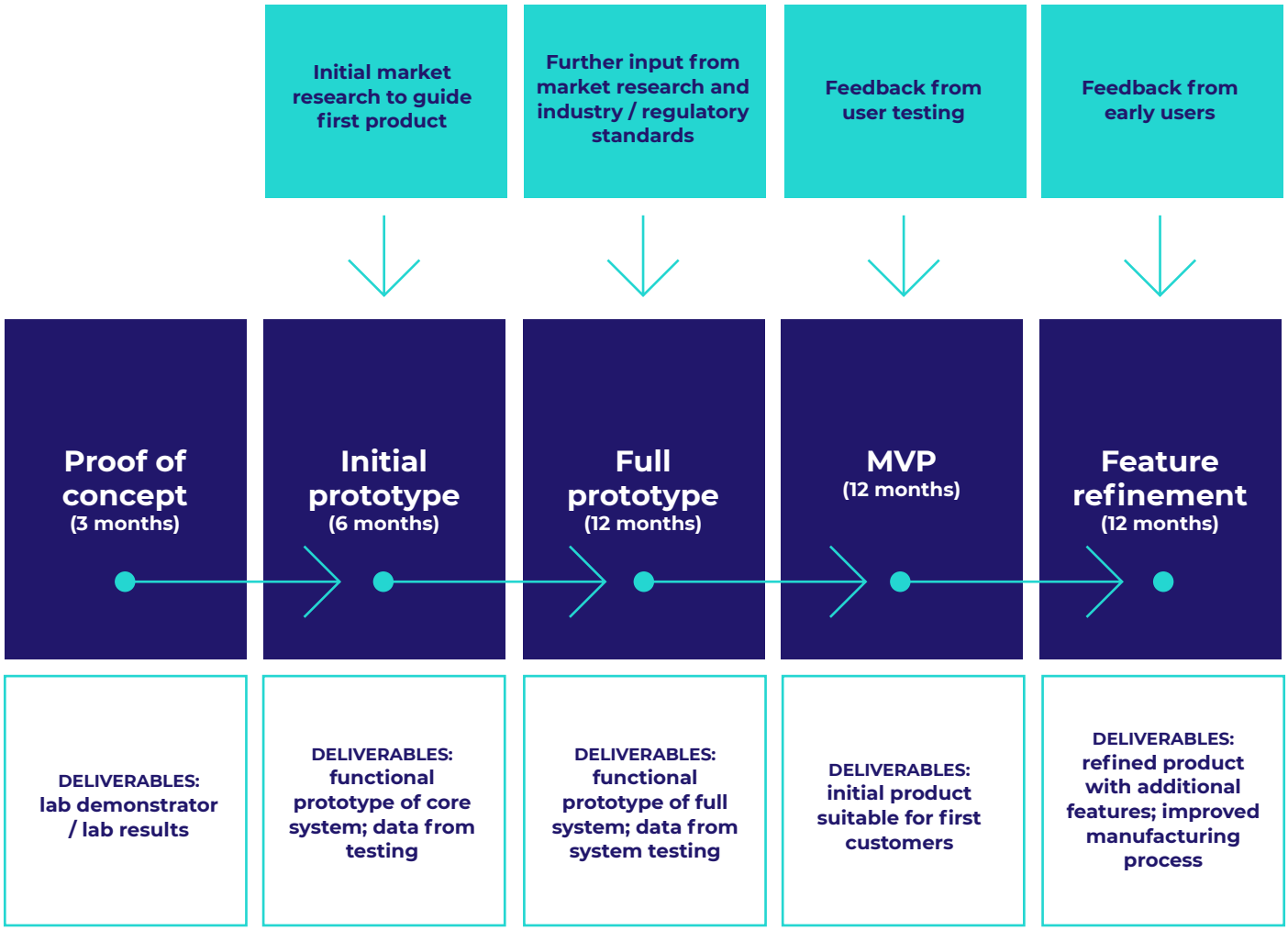
Part of your business plan should include a technical roadmap (see figure 5) which incorporates key milestones – such as conceptual validation, lab demonstrator, partial prototype, full prototype, minimum viable product, and so on. This will not only keep the startup focused on the product (rather than potentially open-ended research), but will also help you decide how much funding you will need. If you need to raise investment, having a sound business plan is

particularly important, since most investors will expect to read it and see a rationale for how those funds will be used, and a plan for how they will be repaid.

Both components are important, although the business model is more fundamental, in the sense that it describes the foundations of the business itself, and the strategy from which everything else should follow.

Note that your business plan is very likely to go through several changes, as you discover more about the market or the technology. However, "a good plan today is better than a perfect plan tomorrow". Your core business model might also need to change, too. Entrepreneurs often refer to fundamental change in strategy or business model as 'pivoting'. Some of the most successful global companies went through major pivots: Amazon, for instance, has clearly moved a long way from being just an online bookstore; Instagram started life as a meetup and check-in app called Burbn; and YouTube was initially intended as a dating site.

FIGURE 5
A rudimentary technical roadmap



3.7. Team formation and talent

A good team is essential, and recruiting the right talent can be one of the biggest challenges to growth that a company faces. Knowledgeable technical specialists may sometimes be found among university colleagues.

More difficult to find – and often underappreciated by academics – may be good sales and marketing staff. You may also benefit from having a group of experienced industry experts as advisors, who can also facilitate introductions to potential customers.

Team dynamics are important. Operating in a young startup can be stressful, and may require people to be very flexible in terms of their activities. Many startups sadly fail, not because of technical risk or lack of market demand, but because of conflict between co-founders or other team members. Choosing your team members must therefore be done wisely. Conversely, letting go of underperforming team members is especially important when you have limited funds, or when team dynamics are suffering: "hire slowly but fire quickly" is an adage often recommended by founders. Moreover, the skills and expertise needed will change as the startup grows and matures: the right leadership team to get the firm off the ground may not be the right team to continue growing it once it is an established company.

Attracting talent can be difficult when your startup has few funds and an uncertain future. While some people enjoy the excitement, flexibility and potential for impact of working for a new company, the potential for financial gain is also a strong motivator for many. For that reason, many startups make use of employee stock option plans (ESOPs), through which staff may receive equity (or a promise of future equity) as compensation for lower salaries. Designing such a scheme in a tax efficient manner is likely to require external advice, and in India is regulated by the Companies Act of 2013 and the SEBI (Share Based Employees Benefits) Regulations of 2014. However, research shows that startups that incentivise their staff in this way typically grow two to three times faster than those that do not (Startup Genome 2023).[6] This will usually mean allocating a portion of equity to an Option Pool, at the point when the equity split is decided (see following section).

You will need to decide on your own role in the company, too. Survey responses were mixed concerning the view of whether academics in general make good CEOs (see figure 6). While some academics go on to become great CEOs, there are often major advantages in finding someone else with business experience to take on the role. First, spinouts with industry experts in the team typically perform better (Shane 2005); and second, most academics find that they are happier with a position as Chief Technology Officer or Chief Scientific Officer instead, since they can focus on the core technology development, instead of matters such as fundraising and shareholder management. Additionally, investors will want confidence that the CEO is committed to the spinout and is not spread too thinly across multiple commitments, including any remaining academic teaching or research.

While it may be unsettling to have someone else lead your company, you should remember that the end goal is to commercialise the innovation and get it in use, and so should ask who is best placed to make that happen: yourself or an experienced team? Additionally, remember that the allocation of roles is separate to the allocation of equity shareholding (although shareholding should be commensurate with the effort and roles of the team).

Attracting talent can be difficult when your startup has few funds and an uncertain future. While some people enjoy the excitement, flexibility and potential for impact of working for a new company, the potential for financial gain is also a strong motivator for many.

FIGURE 6
Opinion: Academics don't make good CEOs

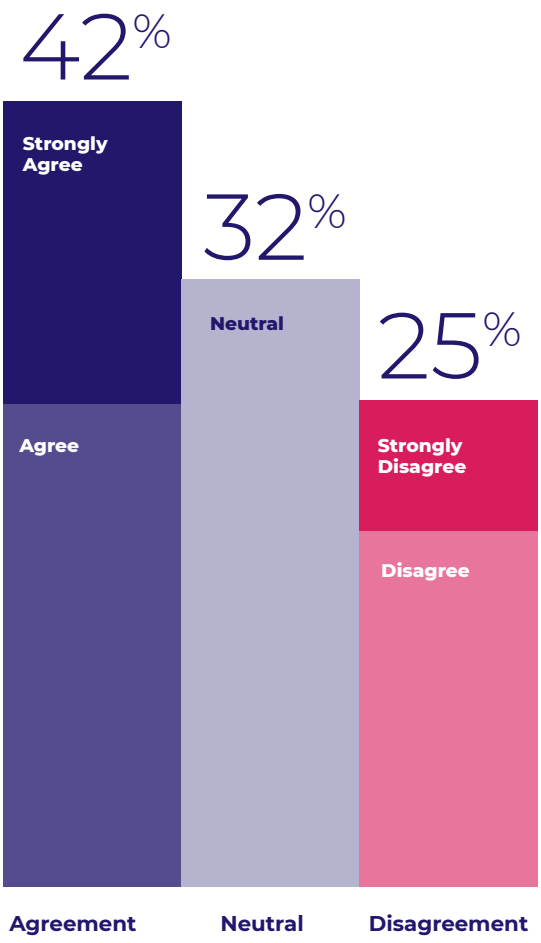
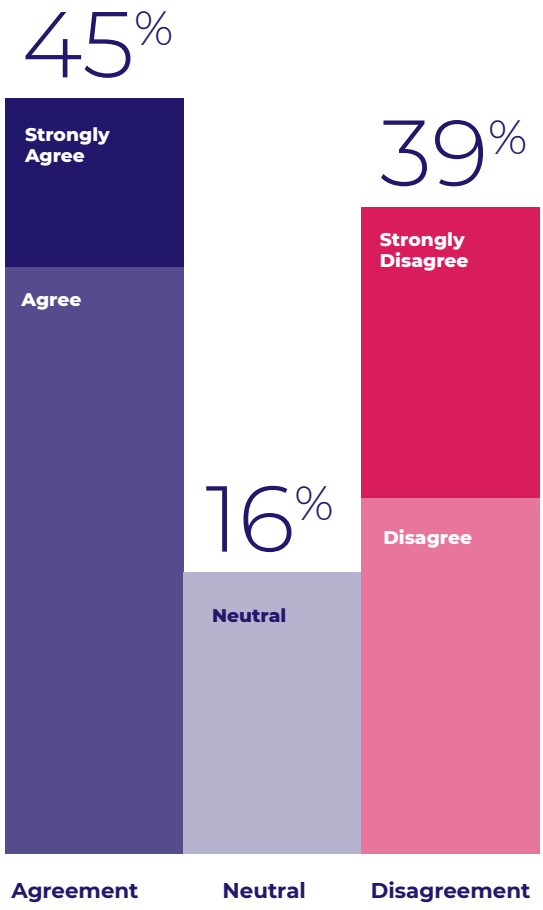


FIGURE 7
Opinion: Is it possible to run a startup for academics with their research and teaching commitments



Some academics prefer not to assume any formal managerial responsibilities in a spinout, and instead encourage their postdocs or research associates to form the company, limiting their own role to that of a mentor or adviser. This is sometimes done because of the time commitment required, or because of contractual constraints that limit activities outside teaching and research. While this can work, you should be aware that investors will frequently want assurances that the original inventor is committed to the startup, and will often not look favourably at company structures where a large share of equity is held by a person who is not actively involved. The founding team will need to hold suitable equity to remain incentivised.

If you do take a board position, you should also be aware that being a company director carries legal responsibilities. These are laid out in the Companies Act of 2013[7], as well as the Companies Act 1956[8], the Limited Liability Partnership Act 2008[9] and other other laws. Among other things, you will be required to ensure that the company complies with relevant laws, corporate governance and regulatory obligations; to be liable for fraud or breaches of duty; and ensure accurate financial reporting. Company closure can be a bureaucratic and drawn-out process, so that even if the spinout fails, you may be committed to these obligations for some time.

3.8. Mechanics of company formation

The legal process of company formation is the process by which your startup becomes an official entity. It is a necessary step – but definitely not sufficient to make a successful spinout. You will likely need external advice for this process, since it is important to get the structure of the company right for your purposes.

First, you will need to decide on the legal form of your company. The main options in India are:

- **Sole proprietorship** – this is the simplest form of firm, and does not require formal registration, but has unlimited personal liability. It will not be suitable if you plan to expand and employ others, or if you are not an Indian citizen.
- **One person company (OPC)** – this may be suitable for solo entrepreneurs, providing limited liability protection, but again will not be suitable if you plan to expand.
- **Private limited company** – this is a common choice for startups, which carries the protection of limited liability (that is, shareholders' liability is limited to the amount they invest in the company, and their personal assets are not at risk if the company goes bankrupt) and is well-recognised by funders.
- **Limited liability partnership (LLP)** – this combines the benefits of a partnership with limited liability for partners.
- **Partnership firm** – this involves two or more partners sharing profits and liabilities. It has unlimited liability, which introduces significant personal financial exposure, and so is best avoided.
- **Public limited company** – this is less common for startups due to more complex regulations and higher capital requirements.

The most common form for startups is a private limited company. In this case, your main steps will be:

- Finding a cofounder (if you do not have one – since a private limited company requires at least two directors and two shareholders. If you are an academic or researcher, you should think carefully about finding a cofounder with business or sectoral experience).
- Obtaining director identification numbers (DINs) for each director from the Ministry of Corporate Affairs (MCA). This may also necessitate your obtaining digital signature certificates (DSCs) for each person in order to process the documentation online.
- Deciding your company name (ensuring it is unique and doesn't infringe trademarks of others).
- Drafting the memorandum of association (MOA) and articles of association (AOA) for the company (see Box 6).
- Applying for incorporation, submitting your MOA, director information and other details.

After this, you will also need to:

- Obtain a permanent account number (PAN) and tax deduction and collection account number (TAN), for tax compliance.
- Open a bank account in the company name – several banks now offer special accounts for startups.
- Register for goods and services tax (GST) – if you will supply goods and services.
- File a declaration of commencement of business with the registrar of companies (ROC).

BOX 6

Memorandum of association (MOA) and articles of association (AOA)

The MOA is a legal document which serves as the formal charter or foundational constitution of the company. It defines the firm's name, the object of the firm (i.e. what activities are within scope), the registered office, the liability of shareholders, and related things. By law, your MOA is a public document, and investors or creditors will want to review it. If you act in a way which is outside the scope of the MOA, your actions are said to be *'ultra vires'* and can be challenged or overturned in legal proceedings.

The AOA are subordinate to the MOA, and detail the internal regulations of the firm, including governance structures and decision-making processes, rights of shareholders, procedures for appointing directors, voting, and so on. One way to think of the difference is that the MOA defines the relationship of the company with external parties, while the AOA defines the relationship *between* the members of the company. For legal reasons, it is usually easier to change the AOA than the MOA.

Part of the AOA will specify the initial shareholding structure – that is, who owns how much of the company (equity). It is important to seek advice and get this right, since early problems can be difficult to fix later, and your own shareholding will very likely be diluted in later funding rounds. Drafting this is a good time to reserve 10-20% of the company's shares for an 'option pool', in order to attract early employees when your cash is limited. In the case of university spinouts, some equity may also be demanded by the parent institution – although this varies significantly between institutions.

4. Post-formation: growing the business

Accelerators and incubators can offer substantial benefits to founders and startups, and there is evidence that they can increase various success outcomes.

4.1. Acceleration and incubation

Accelerators and incubators have flourished in recent years. Both aim to support young firms through the early stages of growth. The difference between these is sometimes unclear, and the meanings often vary, but one definition of the distinction is that accelerators are fixed-duration, selective, and focused mainly on providing services including peer-learning with other founders, while incubators are open-ended, and more focused on the provision of physical space (Bone, Allen, and Haley 2017).

Some accelerators provide a stipend in return for equity: for example, Y Combinator – one of the leading global programmes – offers successful applicants $125,000 in exchange for 7% equity.[10] That said, 'equity-free' models are increasingly common – including the Royal Academy of Engineering's entrepreneurship programmes. Incubators, in contrast, usually adopt a fee-based model.

Accelerators and incubators can offer substantial benefits to founders and startups, and there is evidence that they can increase various success outcomes (Bone et al. 2019). However, each has its own admissions criteria – which might, for example, include affiliation to a specific university, your stage of development, or your sector of operations – so you will need to check whether you fit. Some are tailored to very early-stage, pre-formation startups, and aim to help founders through the process of formation, to the point of investment-readiness; others are more focused on post-formation firms. Some incubators are funded by the National Initiative for Developing and Harnessing Innovations (NIDHI); at the time of writing, the NIDHI funds 40 Technology Business Incubators (TBIs).

As with all purchases in life, quality varies, so do your due diligence before joining an accelerator. If possible, you should also aim to speak to founders who have been through the accelerator programme previously, and ask about the quality of their mentors and what you are expected to give up, so that you can consider whether a programme offers value for money.

4.2. Raising funding

Some startups are able to grow without raising funding. However, other firms – particularly those which require substantial technology development, which need clinical trials or long regulatory processes, or which need a large up-front marketing campaign in order to develop a sizeable user-base – will need to raise funding, in order to develop the business and support it in the period before it becomes profitable. The market research leading up to this handbook illustrates that academics, commercialisation staff, and investors in India understand and are largely aligned on the need to make funding accessible for spinoffs.

4.2.1. Types of funding and their implications

Bootstrapping is a term applied to growing organically, using the personal resources of the founders and revenue from sales. Bootstrapping allows founders to maintain control over their business, but often at the expense of slower growth. Moreover, many founders do not have the personal resources to do this, and this may not be possible for startups that need to grow fast (for example, if they need to outcompete rivals), are very capital-intensive, or have a long time-to-market.

Grants are financial awards given by a government, foundation or other organisation, without the requirement of being repaid. Grants are usually fairly well understood, and have the major advantage that they do not dilute your equity. However, they bring two dangers: first, that founders become dependent on them, instead of seeking income from customers or raising funding from other, more demanding sources; and second, that founders divert their startup's strategy to fit the eligibility criteria (since it is common for grants to be limited to applications in a specific field).

Debt as a concept is also fairly well understood: these are loans that incur interest payments, and that must be repaid after a period. Lenders will often request some security or collateral for the loan – that is, an asset that they can claim if the debt is not repaid. Debt is said to be 'senior' if it must be repaid first in the event of the company's liquidation, and 'subordinate' if other debt is more senior. The Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) is an initiative that supports loans without requiring collateral (currently up INR 50 million, at the time of writing).

BOX 7

Finding grants

The MyScheme portal – managed by the Ministry of Electronics and Information Technology (MeitY) – is intended as a central portal to find grants.[11] At the time of writing, there are 372 grant schemes listed on MyScheme for the support of business and entrepreneurship. The Ministry of Micro, Small and Medium Enterprises (MSME) also maintains a list of many grants schemes.

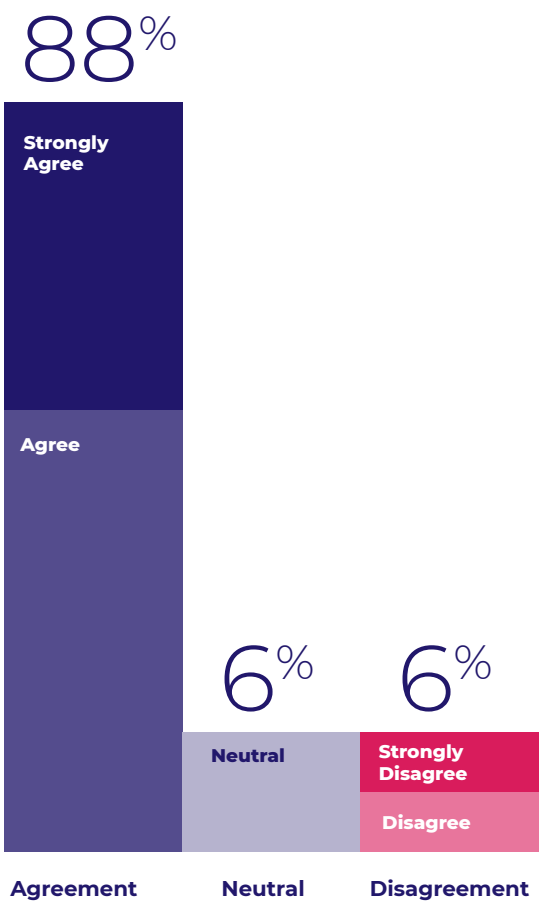
Two of the most established schemes are the Startup India Seed Fund Scheme (SISFS) and the Prime Minister's Employment Generation Programme (PMEGP).

In addition, the NIDHI – run by the National Science and Technology Entrepreneurship Development Board (NSEDB), under the Department of Science and Technology (DST) – operates several relevant grant schemes, such as the Promotion and Acceleration of Young and Aspiring Technology Entrepreneurs (PRAYAS)[12], and the Seed Support Program (SSP).[13]

Business Angel Funding is a form of early-stage financing where high net-worth individuals, known as business angels, invest their personal money. Business angels often syndicate into a group to help scrutinise investment opportunities. Angel funding can be considered as a subset of VC funding (see below), but with more emphasis on the advice and business connections provided by the business angels, and usually limited to smaller, earlier round sizes. For many startups, business angel funding can be very important in the early stages. However, it is worth understanding the business angels' experience, and enquiring about their relationship with VCs (such as asking how many of their investments have proceeded to larger VC rounds), since it is not uncommon for professional VC firms to complain that business angels have created share structures (also known as capitalisation tables, or 'cap tables' for short) that make the startup unattractive for subsequent investment.

Venture capital (VC) is a type of private equity financing, whereby funding is provided in exchange for equity. Venture capitalists (VCs) aim to invest in firms which have high growth potential, so that their share of the firm will become worth substantially more when they subsequently sell ('exit'). VCs often prefer to invest in specific sectors and investment stages (e.g. 'seed stage', 'series A' etc). Some accelerators provide small amounts of pre-seed or seed-stage venture capital funding as part of their offer. The vast majority of survey respondents were of the opinion that academic spinouts needed VC to scale (see chart).

FIGURE 8
Opinion: Spinouts need VC to scale



Private equity (PE) is a form of private risk capital that is often used as an alternative to a listing on a public market. PE is similar to VC, except that PE firms usually target more mature, lower-risk companies, and will typically seek to acquire a controlling equity stake in the business.

"Warning: Cap Tables can become unfixable"

- Indian VC Investor

Venture debt is less well-understood. This refers to loans that are designed specifically for early-stage, high-growth companies, often to fill a relatively short-term gap, and it is usually only offered to startups that have already raised equity funding. Whereas conventional bank lenders will examine a firm's cashflow in order to decide whether to make a loan, venture debt lenders will focus on the firm's ability to raise future equity-based capital. Like a bank loan, the borrower must pay interest. However, the debt is usually structured such that it can be repaid at the next equity funding round – or, alternatively, converted to equity in that round.

Convertible loan notes (or just 'convertible notes') are somewhat similar. These are loans that convert to equity upon the achievement of specific milestones, or after a specific period, often at an agreed discount to the price at a future equity round. Interest may be payable, but often only when the note converts. Under the 2016 rules of the Ministry of Corporate Affairs, they can only be issued to startups that are registered with the Department for Promotion of Industry and Internal Trade (DPIIT), are less than 10 years old, and have a turnover under 1 billion / 100 crore rupees.[14] One advantage is that they postpone the (often protracted) discussion of company valuation until a future funding round.

Crowdfunding is another fairly new alternative, enabled by online platforms. Crowdfunding entails raising very small sums from very large numbers of people – potentially tens of thousands of individuals – usually via an online intermediary. In exchange, funders may receive equity, benefits such as early access to products, or simply recognition as a supporter. When this works well, the 'crowd' of funders can become vocal advocates for the company and its product, raising market awareness. A successful crowdfunding campaign can also convince other investors of market demand, thus helping subsequent VC rounds. However, it does not bring the guidance and network access that you will obtain with angel investors or VCs – and so there may be advantages in considering this in conjunction with an angel or seed-stage VC round.

Funding type	Advantages	Disadvantages
Bootstrapping	Retain equity Retain company control Faster decision-making	Slower growth Increased personal financial risk
Grants	Retain equity Retain company control Possibly access to regulatory assistance	Bureaucratic application and reporting Eligibility criteria often limited Size of funding limited Temptation to divert strategy
Debt (bank loans)	Retain equity Retain company control Predictable repayment schedule Possible business advice	May be difficult to obtain for startups (that cannot offer security) May require personal guarantees from directors Business advice often not suited to high-growth firms Fixed interest repayments
Crowdfunding	Market validation Builds community of users or supporters	Time-consuming campaign management Increased burden for shareholder management Size of funding limited
Venture capital (including angel investment)	Access to mentorship and expertise Access to more capital	Equity dilution Loss of some control Pressure for growth
Venture debt	Retain equity Retain company control Possible access to mentorship and expertise	Higher interest than bank loans Shorter repayment terms than bank loans Need to have raised equity funding previously Potential for loss of equity
Convertible loan notes	Easier to draft and quicker than full venture capital round Access to mentorship and expertise	Future equity dilution Future loss of some control Future pressure for growth

4.2.2. Fundraising rounds and terms

It is very rare for a startup to raise all the capital it needs in one go. Instead, investment – particularly equity investment – usually proceeds in a number of 'rounds' of increasing size, often linked with specific development milestones. Investors typically participate at specific stages or rounds, and not others – usually because of their own fund size, as well as their past experience. It may take six to nine months to raise a round, so you should ensure that you start the process in good time, before you run out of funding. The typical rounds are as follows:

Round	Description	Typical size
Pre-seed	Very earliest stage, where little more than an idea exists (the 'ideation' stage). Funding may come from friends and family, personal savings, angel investors, small VC firms and accelerators.	**< $500,000 USD**
Seed	Often used for feasibility studies, prototype development and market validation. Typical stage for angel investors, some VCs, crowdfunding platforms and accelerators.	**~ $1.5 million USD**
Series A	Often used for market entry and gaining customer traction. Typical stage for some local or national VCs, and some larger, international accelerators.	**~$9 million USD**
Series B	Often used for market growth. Typically from later-stage VCs or private equity firms.	**~ $52 million USD**
Series C+	Used by successful startups for major expansion, such as international growth or additional product lines. Typically from large international VCs, PE firms or banks.	

[Data from Startup Genome, based on average deal sizes in India over the period 2020-2024, except for pre-seed data, which is taken from Privateequitylist.com].

4.2.3. Becoming investment ready

To raise investment, you will need to have a business plan, including a solid value proposition and some evidence of market need. You will need to explain why the funds are needed, how you intend to use them, and how the investor will get their funding back – which, in the case of equity investment, entails a convincing description of how the startup will scale and grow in value. You will likely also need to have recruited some of the leadership team.

It is important to raise the *right amount* of funds for your roadmap: too little and you may find yourself raising again sooner than you expected; too much and you may spend it poorly and dilute yourself too quickly, hampering future raises. Additionally, excessive funding can lead to an inflated valuation: while a high valuation may be seen by some founders as a sign of success, it can make subsequent fundraising more difficult (since investors will expect to see a further increase in valuation).

It is also important to find the *right investor*. As mentioned above, investors each have their own preferred niches (or 'investment thesis') – which will include investment stage, and possibly also sector, business type (e.g. B2B vs B2C) and more. Moreover, a good, experienced investor can add more than just capital – their knowledge and industry contacts can often be invaluable.

Finding such 'smart investors' can sometimes be difficult. If you are part of an accelerator, introductions to relevant, knowledgeable VCs are usually part of their services. However, you should also undertake your own research to understand the VCs to whom you are pitching – their typical ticket size, sectors, previous investments, and so on – to ensure alignment with your own needs.

Some VCs and angel investors have public contact points, and the India Angel Investment Network can help connect you with local Angels.[15] There are also increasing numbers of investor matching platforms – such as AngelList, AngelMatch, EquityNet[16] , Kagaar[17] , F6S and Gust – which may be helpful. Many investors respond most favourably to startups which are recommended to them through their network, so it may also help to network through industry events, meetups, local business groups and sector-relevant business conferences.

Most VCs will require a business plan but will first want to see a concise investment pitch – that is, a short presentation explaining your business model, the market opportunity, the competitive landscape, your team, the opportunity for investors, and other key facts and figures from your plan. Refining and practising this pitch so that it is concise, impressive and persuasive will help your fundraising. However, investors frequently report that one of their major turn-offs is over-claiming, so while you should be positive and optimistic, you should not overstate your achievements or stage of development.

Another frequent complaint from investors is that founders, especially academic founders, focus too much on the technology itself, and not enough on the customer – another example of the mindset change academics need to make in becoming an entrepreneur. Note that most investors will not sign a non-disclosure agreement before reading your plan or watching your pitch, so do not include anything that is confidential. There are several resources available that relate specifically to pitching; some are linked in section 5.

It is important to raise the right amount of funds for your roadmap: too little and you may find yourself raising again sooner than you expected; too much you may spend it poorly and dilute yourself too quickly, hampering future raises.

4.2.4. Negotiating and closing the investment

If you find an investor willing to invest, you should ensure you have external advice – ideally a lawyer who is experienced with startup investment (there are increasing numbers of firms now offering legal templates and standardised services tailored to startups, to reduce costs). For equity investment, you will be giving up part of the ownership of the company, and usually also some control (in the form of a board seat), so you need to ensure that you understand everything to which you are committing. The typical steps involved in the process will include:

- **Exchanging a term sheet** – this is a high-level outline of the main commercial and legal terms that are proposed for the investment. This is non-binding (with the possible exception of some parts that relate to confidentiality), but serves as the basis for subsequent binding agreements. It will typically include a summary of:
  - the proposed investment amount,
  - the company's proposed valuation,
  - the funding type, share class and liquidation preference (see box 8),
  - how or when preference shares might convert to common 'equity shares',
  - how and when any dividends (distribution of profits) might be paid,
  - voting rights of shareholders (i.e. the ability of investors to influence the spinout's direction and its sale),
  - anti-dilution measures (i.e. measures intended to protect investors from dilution in future funding rounds; some measures can be more aggressive than others, and these must be considered carefully as they can impact not only your equity but also your firm's future fundraising).
- **Due diligence** – the investor will undertake a very thorough examination of your company, including an analysis of your finances, background checks on key team members, your IP, estimates of market potential, competitors, etc. It may be appropriate to ask for a non-disclosure agreement at this stage. Virtual data rooms – secure online data stores with very strict digital rights management – are often used for sharing data of a privileged nature.
- **Negotiation** – you and the investor will discuss and finalise terms such as the valuation of the company and the equity stake that they will take; whether funding will be released in tranches and, if so, what milestones will trigger this; investor rights such as whether they have a board seat and voting rights; your reporting obligations; and so on.
- **Preparation of legal documents** – based on the term sheet and subsequent negotiations, the investor will draw up the binding agreement. Your lawyers should review this carefully.
- **Amending your MOA and AOA** – you may need to amend your AOA, and possibly even your MOA, to reflect changes in your firm's share structure and voting rights.
- **Closing** – once changes have been approved and the documents have been signed, the funds (or at least the first tranche) will be transferred. Congratulations on closing the deal!

BOX 8
Share classes and liquidation preference

Not all shares in a company may be equal. If a company is divided simply between shareholders, these shares are usually called 'equity shares' (known in other countries as 'ordinary shares' or 'common stock'). However, investors often request the creation of different classes of shares, with different rights, such as priority over ordinary shares in the event of liquidation and for dividend distribution. These shares are called 'preference shares', and help give investors additional confidence that they can recoup their investment – but at the expense of other shareholders. The Companies Act 2013 specifies sub-types of preference shares that have different rights. Be careful when agreeing the terms of preference shares: if they are too generous, the founders of the business can become wiped-out in the event of an exit that doesn't meet pre-set expectations.

4.2.5. Exiting

At some point, your investors will want their investment back, and you may also want to move on to other projects.

If your company is successful, then there are two main ways in which VCs can 'exit' the firm: trade sales (mergers and acquisitions), and initial public offerings (IPOs or 'floats') on the stock market. Trade sales are far more common than IPOs, and follow a process not dissimilar to the investment process described above. The procedures involved in an IPO, however, are beyond the scope of this guide. Although these events may seem very distant when you are at the beginning of your journey, investors will want to know what their exit options are, and so you may need to have a rough idea of these.

If your company is unsuccessful, then you will need to close the firm. This is guided by the Companies Act 2013 and the Insolvency and Bankruptcy Code 2016, and unfortunately can be a very bureaucratic process. In the case of a *voluntary winding up* of the firm, a resolution must be passed by members in a meeting, in accordance with the firm's MOA. An official liquidator will then be appointed, who will oversee the closure of the firm and the sale of its assets to any creditors in order of debt seniority; after all debts are paid off, then any surplus will be distributed to shareholders, according to share classes; after that the firm will be legally dissolved. In the case of an *involuntary (compulsory) winding up*, a court will order the appointment of a liquidator. This can happen if the firm is unable to pay its debts and a creditor petitions a court – or if members of the company pass a resolution demanding it.

4.3. Exporting

There is a link between startup success and exporting. The causation appears to run in both directions – that is, more successful startups tend to self-select for exporting, but exporting also drives growth and learning, leading to startup success. In other words, competing internationally often forces firms to 'raise their game'.

In addition, if your market is quite niche, then you may have little option other than to export. This can often be the case for high-tech innovations, even in a country as large as India: many founders report that the Indian market is often not sufficiently developed for their technology, and hence they need to look to overseas markets first – and even relocate, in some cases.

In such cases, it can be invaluable to have local knowledge of your target market, including differences in law, regulation, culture, and so on. Alumni networks can be very helpful in identifying India diaspora who may be able to support you or offer further contacts.

For firms wishing to enter the UK market, the UK Department for Business and Trade (DBT) provides trade and investment services, offering practical support to Indian companies looking to set up and invest in the UK; DBT has offices across India, including in New Delhi, Mumbai, Chennai, and other major cities. The UK–India Business Council also aims to grow UK–India trade and investment. The Royal Academy of Engineering offers, through the Leaders in Innovation Fellowships (LIF) programme, relationship-building and business growth modules for tech entrepreneurs who are ready to scale and grow internationally. The Incubator and Accelerator Network (IAN), run by the UK Centre for Entrepreneurs, also maintains a directory of UK programmes, some of which may be suitable for startups relocating to the UK.

5. Where to look for further support

Where neither mature TTOs nor entrepreneurship cells exist, alternative sources of advice may include alumni networks, local entrepreneurial networks and meetups (organisations such as Headstart, GrowthX, Global Startups Club, The Founder's Network, eChai and others host regular entrepreneurship-related meetups, many of which are listed on meetup.com). Some of the most valuable information will likely come from other entrepreneurs, and entrepreneurs who are in a similar sector, but more advanced – that is, one or two application rounds ahead of you – are likely to be particularly helpful.

In terms of third-party resources, there are lots of sources of information available to entrepreneurs, but many of these tend to be low-quality. The following are, however, amongst the more useful:

5.1. Resources for Entrepreneurs

- **Startup India** (**https://www.startupindia.gov.in/**) aims to be a comprehensive platform for entrepreneurs, offering resources, information on government schemes, and a learning program that includes lessons from top Indian founders.
- **Atal Innovation Mission (AIM) (https://aim.gov.in/)** is a public initiative to promote a culture of innovation and entrepreneurship across India. The mission is hosted by the NITI Aayog – India's premier thinktank – and at the time of writing sponsors 10,000 Atal Tinkering Labs (ATLs, mostly within schools), 72 Atal Incubation Centers (AICs) and 14 Atal Community Innovation Centres (ACICs).
- **The Confederation of Indian Industry's Centre of Excellence for Innovation, Entrepreneurship and Startups (CII CIES) (https://www.ciicies.in/)** aims to bridge the gap between corporates and startups, running initiatives like market access programs, corporate-startup pitching events, and other programmes
- **The Indus Entrepreneur (TiE) (https://tie.org/)** is a global nonprofit organisation focused on fostering entrepreneurship.
- **The Ministry of Micro, Small and Medium Enterprises (https://msme.gov.in/)** provides links to funding schemes, various online services, and much more.
- **MyScheme portal (https://www.myscheme.gov.in/)** is intended as a central portal to find grants, including many dedicated to business and entrepreneurship.
- **The UK's Royal Academy of Engineering's Leaders in Innovation Fellowships (LIF) programme (https://raeng.org.uk/lif)** nurtures bold, scalable innovations from around the globe and in all areas of engineering and technology that are addressing some of the world's most complex environmental, economic, and societal challenges.

5.2. Resources for Entrepreneurship Cells and TTOs

- **STEMGlobal (https://stemglobal.org/)** is a a non-profit association of technology transfer professionals in India
- **AUTM (https://autm.net/)**, which was formerly known as the Association of University Technology Managers, provides various services for TTOs. It is US-centric, but with international chapters.
- **The Alliance of Technology Transfer Professionals (ATTP) (https://attp.global/)** manages the Registered Technology Transfer Professional (RTTP) scheme, an international professional standard for knowledge transfer and commercialisation practitioners.
- **The Ministry of Education's Innovation Cell (https://mic.gov.in/)** aims to foster a culture of Innovation in all HEIs across the country, and manages various programmes and initiatives, including IP education, entrepreneurship bootcamps, and much more.
- **The UK Royal Academy of Engineering's Leaders in Innovation Fellowships (LIF) programme (https://raeng.org.uk/lif)** supports the development of local innovation ecosystems with tailored programme development, technology transfer training and mentoring, and ecosystem discovery trips.

5.3. References and Recommended Reading

AUTM. 2023. "AUTM Technology Transfer Licensing Survey 2023." 2023. https://autm.net/surveys-and-tools/surveys/licensing-survey/2023-licensing-survey.

Blank, Steven G., and Bob Dorf. 2012. *The Startup Owner's Manual. Vol. 1: The Step-by-Step Guide for Building a Great Company*. K and S Ranch Consulting.

Bone, Jonathan, Olivia Allen, and Christopher Haley. 2017. "Business Incubators and Accelerators: The National Picture." *BEIS Research Paper* 7 (1). https://www.kentinvictachamber.co.uk/wp-content/uploads/2018/11/business-incubators-accelerators-uk-report.pdf.

Bone, Jonathan, Juanita Gonzalez-Uribe, Christopher Haley, and Henry Lahr. 2019. "The Impact of Business Accelerators and Incubators in the UK (BEIS Research Paper Number 2019/009)." BEIS. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/839755/The_impact_of_business_accelerators_and_incubators_in_the_UK.pdf.

Christensen, Clayton M. 1997. *The Innovator's Dilemma : The Revolutionary Book That Will Change the Way You Do Business*. Boston, Mass: Harvard Business School Press.

DSIT. 2023. "Independent Review of University Spin-out Companies: Final Report and Recommendations." Department for Science, Innovation and Technology. https://assets.publishing.service.gov.uk/media/6549fcb23ff5770013a88131/independent_review_of_university_spin-out_companies.pdf.

Feld, B., and J. Mendelson. 2016. *Venture Deals: Be Smarter Than Your Lawyer and Venture Capitalist*. John Wiley and Sons, Incorporated.

McNamee, Laura M., Michael Jay Walsh, and Fred D. Ledley. 2017. "Timelines of Translational Science: From Technology Initiation to FDA Approval." PloS One 12 (5): e0177371.

MHRD. 2019. "National Innovation and Startup Policy 2019 for Students and Faculty: A Guiding Framework for Higher Education Institutions." Ministry of Human Resource Development. https://mic.gov.in/assets/doc/startup_policy_2019.pdf.

Moore, Geoffrey A. 2014. *Crossing the Chasm, 3rd Edition: Marketing and Selling Disruptive Products to Mainstream Customers*. Collins Business Essentials. HarperBusiness.

Osterwalder, Alexander, and Yves Pigneur. 2010. *Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers*. John Wiley and Sons.

Porter, Michael E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York, NY: Simon and Schuster.

Pressman, Lori, Mark A. Planting, Jennifer Bond, Robert Yuskavage, and Carol E. Moylan. 2019. "The Economic Contribution of University/Nonprofit Inventions in the United States: 1996 – 2017." *Social Science Research Network*. https://papers.ssrn.com/abstract=3777218.

Ries, Eric. 2011. The Lean Startup : *How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*. New York: Crown Business.

Rogers, Everett M. 2003. *Diffusion of Innovations, 5th Edition*. 5th ed. New York, NY: Free Press.

Shane, Scott. 2005. *Academic Entrepreneurship: University Spinoffs and Wealth Creation (New Horizons in Entrepreneurship Series)*. Edward Elgar Publishing.

Slavtchev, Viktor, and Devrim Göktepe-Hultén. 2016. "Support for Public Research Spin-Offs by the Parent Organizations and the Speed of Commercialization." *The Journal of Technology Transfer 41* (December):1507–25.

Startup Genome. 2023. "The Scaleup Report: The DNA of Successful Startups." Startup Genome. https://startupgenome.com/articles/the-scaleup-report-the-dna-of-successful-startups.

Teece, David J. 1986. "Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy." Research Policy 15 (6): 285–305.

Thiel, Peter, and Blake Masters. 2014. *Zero to One: Notes on Startups, or How to Build the Future*. Currency.

5.4. Endnotes

[1] The survey was distributed in December 2024 and results shown in this report are based on a total of 80 responses, of which approximately half were from academic entrepreneurs, and the remainder from investors, incubator managers, etc. A total of 16 in-depth interviews were conducted from November 2024 to January 2025.

[2] seedfund.startupindia.gov.in

[3] mic.gov.in/assets/doc/startup_policy_2019.pdf

[4] Rogers originally developed the ACCORD framework as a high-level explanation for why some technologies are adopted faster than others. However, it is also well suited for use as a marketing framework by individual technology-based firms.

[5] For filing fees, see: ipindia.gov.in/writereaddata/Portal/ev/schedules/Schedule_1.pdf

[6] This research could not prove the direction of causation. Nevertheless, many VCs and founders have publicly said that they believe stock options drive startup growth – as shown by the signatories of the 'Not Optional' campaign (www.notoptional.eu) led by Index Ventures, which aimed to persuade European policymakers to ensure that ESOPs could operate effectively.

[7] www.mca.gov.in/Ministry/pdf/CompaniesAct2013.pdf

[8] www.mca.gov.in/Ministry/actsbills/pdf/Companies_Act_1956_Part_1.pdf

[9] www.mca.gov.in/content/mca/global/en/acts-rules/llp-act-2008.html

[10] www.ycombinator.com/blog/ycs-500-000-standard-deal

[11] www.myscheme.gov.in

[12] www.nidhi-prayas.org

[13] nidhi.dst.gov.in

[14] www.mca.gov.in/Ministry/pdf/Rules_30062016.pdf

[15] www.investmentnetwork.in

[16] www.equitynet.com

[17] kagaar.in

6. Appendices

6. Appendices

6.1. Glossary

ACIC	Atal Community Innovation Centre
AIM	Atal Innovation Mission
AIC	Atal Incubation Centers
AOA	Articles of Association
ATL	Atal Tinkering Labs
ATTP	Alliance of Technology Transfer Professionals
AUTM	Association of University Technology Managers (former name)
B2B	Business to Business
B2C	Business to Consumer
CEO	Chief Executive Officer
CGTMSE	Credit Guarantee Fund Trust for Micro and Small Enterprises
DBT	Department of Business and Trade (UK)
DIN	Director Identification Number
DPIIT	Department for Promotion of Industry and Internal Trade
DSC	Digital Signature Certificate
DST	Department of Science and Technology
ESOP	Employee Stock Option Plan
EU	European Union
FDA	Food and Drug Administration (US)
GST	Goods and Services Tax
HEI	Higher Education Institution
IPO	Initial Public Offering
LIF	Leaders in Innovation Fellowships (Royal Academy of Engineering)
LLP	Limited Liability Partnership
MCA	Ministry of Corporate Affairs
MeitY	Ministry of Electronics and Information Technology
MIC	Ministry of Education's Innovation Cell
MOA	Memorandum of Association
MOE	Ministry of Education
(Mo)MSME	(Ministry of) Micro, Small and Medium Enterprises
NDA	Non-Disclosure Agreement
NDHI	National Initiative for Developing and Harnessing Innovations
NISP	National Innovation and Startup Policy
NSTEDB	National Science and Technology Entrepreneurship Development Board
OPC	One Person Company
PAN	Permanent Account Number
PE	Private Equity
PMEGP	Prime Minister's Employment Generation Programme
POC	Proof of Concept
PRAYAS	Promotion and Acceleration of Young and Aspiring TechEntrepreneurs
ROC	Registrar of Companies
SISFS	Startup India Seed Fund Scheme
SME	Small- and Medium- sized Enterprises
SSP	Seed Support Program
TAN	Tax Deduction and Collection Account
TRL	Technology Readiness Level
USD	United States Dollars
USP	Unique Selling Proposition
VC	Venture Capital / Venture Capitalists

6.2. About the organisations

Royal Academy of Engineering

The Royal Academy of Engineering harnesses the power of engineering to build a sustainable society and an inclusive economy that works for everyone. In collaboration with our Fellows and partners, we're growing talent and developing skills for the future, driving innovation and building global partnerships, and influencing policy and engaging the public. Together we're working to tackle the greatest challenges of our age.

Startup Genome

Startup Genome is the world-leading policy advisory and research organisation for public and private organisations committed to accelerating the success of their startup ecosystem. We have advised more than 125 clients across six continents in 45+ countries to date. Our mission is to accelerate startup success and ecosystem performance everywhere.

Centre for Entrepreneurs

The Centre for Entrepreneurs is a UK-registered charity which supports entrepreneurs through practical development schemes, networks, research, and pilot programmes.

6.3. Acknowledgements

This publication was written by Dr. Christopher Haley with support from Timothy Barnes, Stephan Kuester, Ravi Narayan and Sara Duodo, and under the direction of Ana Avaliani, Angus Baker, Clementine Flack, Gaelle Elisha, and Juanita Camacho. While errors and omissions remain the responsibility of the authors, we would like to thank all the academics, entrepreneurs, investors, administrators and other individuals who supported this work, through interviews and surveys, especially Ms. Nirupa Vijaykumar, Prof. Chandrasekaran Jayaraman FREng, Prof. Srinivas Chary, Dr. Rashi Dutt FREng, Mr. Shantanu Chaturvedi, Mr. Mayuresh Raut, Dr. Shivani Gupta FREng, Dr. Debashish Bhattacharjee FREng, Dr. Dipanjan Gope, Mr. Tharun Kumar FREng and Mr. Azhar Yakkundi. In addition, we would like to pay particular thanks to the members of the Steering Group, who provided expert input and suggestions:

Prof. Anil Gupta, CSIR Bhatnagar Fellow and Founder of the Honey Bee Network
Prof. Thillai Rajan, Director of the Startup Financing Centre, IIT Madras
Prof. Satyanarayanan Chakravarthy, Professor of Aeronautical Engineering, IIT Madras
Mr. Suryaprakash Konanuru, Founder and CEO, IdeaSpring Capital
Prof. Jagadeesh Gopalan, Professor of Aerodynamics, IIS Bengaluru

6.4. Contact

If you have any comments on the guide, or resources to submit for consideration in future editions, please get in touch with us at **info-lif@lif.raeng.org.uk**.

Royal Academy of Engineering

Royal Academy of Engineering
Prince Philip House
3 Carlton House Terrace
London SW1Y 5DG

Tel 020 7766 0600
www.raeng.org.uk
@RAEngNews