



Technology transfer tool kit

David Baghurst presents 10 IP strategies to enhance technology commercialisation within university R&D

Universities are potent sources of ideas with the capacity to create or transform industries. With development in consumer sophistication the world over, governments are turning to their universities and research institutes to provide the raw materials for development of the fabled knowledge economy. With the rapid growth of product manufacturing in Asia, other countries need to innovate to survive in an increasingly competitive environment. This means economies need to identify, nurture and increasingly exploit complex products and services – products and services that could be seeded within a university research setting.

The article presents 10 strategy tips for managing and exploiting university IP, covering actions for researchers, university administrators (often called 'technology transfer' staff) and the governments who seek to support their activities.

1. Work with people who want to commercialise research

Not all researchers are committed to working with industrial companies. In the words of one Spanish chemistry professor: "Let me tell you this from the start. I am not interested in commercialisation. I want to concentrate only on basic research." I had mistakenly assumed that applied chemistry was fertile ground for industrial activity; I was wrong.

From the very start, Isis Innovation, the University of Oxford's technology transfer company, has practised the mantra: we work with researchers who *wish* to commercialise their research as researchers have to be engaged in the process. They need to respond to patent questions, attend meetings with potential licensees or investors, and support the transfer of experience from the university to the industrial research laboratory once a licensing deal has been drawn up.

The tactics used by university administrators to encourage researchers to engage in technology commercialisation are considered as the following:

- Focusing initially on the few people who are genuinely interested, develop an internal marketing plan to educate researchers on the patenting, licensing and spinout processes.
- Focus the education particularly on common concerns such as delays to publication or undue influence over the direction of research.
- Provide clear policies for sharing revenues from consultancy, licensing

or spinout sales; and then ensure people get paid.

- Illustrate the intellectual challenge associated with taking research from the university laboratory to the market.

2. Talk to the market early

The value of a technology comes from the feedback you receive from marketing contacts. University administrators can begin to have conversations with industrial contacts as soon as they start working on a project.

There is clearly a balance to be struck in providing information to industrial contacts prior to filing a patent application and/or entering into a confidentiality agreement. On the one hand, you need to be able to provide enough information on what the new technology can achieve for any conversation to generate useful information; on the other hand, you need to be cautious in describing how it works.

It is key to communicate to contacts in language they understand. Given the wide scope of research generated at universities, it is rare for technology transfer staff to have all of the right technical or business contacts at target partner companies. Often there is a need to go through several intermediate contacts to find the right person to speak to. To work effectively, the impact of the idea needs to be communicated in language that can be clearly understood by non-specialists – no obscure scientific terms, obscure acronyms or jargon.

The best commercialisation partners could be located anywhere in the world. English is a commonly used business language, so too are Chinese languages and Japanese. To market effectively, you need to communicate in the language your customers are comfortable with.

Once you have identified the right people to speak to, your objective should be to understand the special features your technology offers to the customers of your client. What business advantage will they gain as a result of absorbing your new technology into their products or services?





3. To patent or not to patent: find out what a 'real business' would do

Ultimately, university inventions are taken to the market by "real businesses", so it is a good discipline to use a business-like approach in deciding if and where to file a patent in the first place. There are two main considerations: law and economics.

The legal aspects are slightly easier to deal with by asking a few simple questions. Firstly, will the licensees be able to exert their patent rights in the target markets where the products will be sold? In some territories, there are significant differences in what subject matter will be accepted. In Europe, and in the UK

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in particular, it is increasingly difficult to prosecute software patents. Countries also vary regarding the extent to which the legal system can be successfully navigated by foreign companies.

Second, will licensees be able to police for infringement of their rights? Unless the process imparts specific characteristics on final products, then it can be impossible for a rightsholder to confidently establish whether a third party is using their patented process to make products.

The economics is more variable, but the following illustrates some of the principles. A patent costs money, at least €100k for a European university invention protected in selected European countries, the US and in any one of China, India or Japan. Let us assume that the licensee invests a further €150k in product development over a three year period.

Next assume that the cost of investment capital is 12%, profits are shared 75:25 by licensee:licensor through a royalty agreement, profits are 25% of net sales, and that only one in 10 early stage projects is successful in generating a profitable product. A back of the envelope calculation shows that in order to justify the investment, a company will need to convince itself that product sales will exceed €1m per year over a five-year period.

If the world market can support the sale of 15 machines a year, and the selling price of each instrument is just €20k, then on the basis of these numbers you should not file a patent or invest much time in its exploitation.

4. Protect more than just patents

Driven by the historic significance of biotechnology and pharmaceutical innovations towards the growth of technology transfer outputs from US universities, there is a bias towards patents

in many studies of university knowledge transfer. Studies influence government policy and local practice, leading to an obsession with patents as the main route for protecting university concepts and transferring these ideas to industry.

However, a well balanced portfolio will also seek to identify, protect and transfer other forms of IP, or develop a portfolio of IP around the same core concept:

- **Copyright software:** It is true that some jurisdictions provide for some patent protection, but given the short time to market and product lifecycles, licensing the copyright is often a better strategy than patent licensing.
- **Trademarks:** Brand value is established through usage. Many universities have valuable brands, but are reluctant to use these brands to label licensed products due to the risk that their brand might become associated with a poor product/service marketed by one of their partners. More commonly researchers will label a technique, methodology or process with a snappy label which itself gains respect as more and more researchers use the technology. The label can become a valuable trademark asset if the underlying IP becomes the *de facto* industry standard. An example are the copyright patient outcome questionnaires developed at Oxford and marketed using specific names. Here, the brand names are used to establish and build value in these assets which are then used by pharmaceutical companies as part of clinical trial submissions.
- **Designs:** Where ideas and associated products cannot justify patent costs, or the subject matter does not lend itself to patenting then licensing designs, registered or unregistered, provides an alternative. Some healthcare research outputs, such as hospital consumables, have used this strategy.

5. Build value through translational research and industrial design

Ideas go through many stages of development before they become marketed products. The challenge for university ideas is that they are often many stages and years away from a commercial product. In order to reach the market, more money and time needs to be invested in them. The investment can pay for a range of additional work including, further focused applied research work in the university, development research at a consultancy or industrial design. Financial sources include: university seed funds, government 'proof of concept' schemes, or healthcare funding bodies. It is notable that institute researchers have a tendency to produce more advanced prototypes than their university contemporaries.

6. Be methodical, structured and persistent

Whilst not a straightforward linear process, there are phases which projects pass through on the road from research to commercialisation. A key phase sometimes overlooked is thorough due diligence to establish the funding sources and ownership rights associated with exploitable research results. Where ownership is shared, it is advisable to establish ground rules between the partners. Who leads protection? Who pays for patents? Who leads the marketing? How will costs be recovered and downstream profits shared? It is advisable to reach agreements before spending valuable time and money.

Always perform patent searches and check the researcher has not already published the results. For this, it is important to always speak to contacts in the market. One of the challenges of working in some countries, for example Spain, is that the roles of protecting, marketing/licensing technology and



creating spinout companies are often split amongst different individuals, teams or even divisions within a university or research institute. There are, however, advantages of sub-dividing the support and that is the individuals can become functional experts in patents, licensing or business creation. The downside is that knowledge is often lost in the handover between roles. This causes delays and frustration for both the administration staff and potential partners. The biggest weakness is that the researchers have to communicate with multiple individuals internally.

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7. Use consultancy to transfer knowledge

The experiments described in a patent or report impart only a fraction of the knowledge gained by the research team during the years they have often spent building a research portfolio. Anyone who has tried to repeat experiments published in scientific journals will know that there are often key pieces of information missing from the description, subtle, but nevertheless critical nuances. In licensing situations, for all but the most basic ideas, it is essential that researchers who have performed studies in the university laboratory are available to support transfer of the experiments into an industrial laboratory. Due to the range of demands on the average university researcher's time, it is essential to ensure that in addition to a licence, a carefully considered consultancy agreement is negotiated allowing access to key researchers.

8. Spinouts v licensing

In theory, the low risk route towards effective exploitation of university research results is finding an established company to license in the technology. An existing business already employs a management team, has developed products, knows how to manufacture and has relationships with current customers looking to buy into new added-value products and services.

Where you try and fail to find an appropriate partner, or when the research team insists it wants a company, then the alternative is setting up a university spinout. In addition to recruiting a management team, most university spinout companies will need to raise funding to develop the nascent prototype into a marketable product.

Spinout formation is time consuming. The biggest challenge is the increased number of stakeholders in the new venture and the time it takes to develop and test a robust business plan. The passage of time gives the players ample time to disagree on substantial (what should be the first marketed product) and insubstantial matters (what should the company be called).

The challenge does not end when the company is formed. Inevitably, once the company finds its feet and it begins to develop its own strategy and technology, often diminishing the role of the original scientific founders and the original management team.

9. Develop a balanced set of metrics

Any one from the business world will know that the wrong set of metrics can distort behaviour. The technology commercialisation strategy at many universities is set by governments through their funding programmes. Governments rarely appreciate the need to measure and monitor the performance of their technology transfer support schemes with a balanced set of metrics. This creates problems at universities. One Asian government has used a succession of funding programmes with divergent objectives and measures. In the beginning they promoted the filing of patent applications and measured the performance of universities in the number of patents filed. The result, many local patent filings and grants, but very little technology transferred out to industry. Next the government promoted the creation of spinout companies. This resulted in the creation of numerous business with no substance whatsoever. A more intelligent metrics scheme identifies a balanced set of measures which evolves with the maturity of a project portfolio. As time passes the projects should be converted into licence agreements, new companies, licensing revenues and valuable shareholdings.

10. Work with student entrepreneurs

Traditional university technology transfer involves the exploitation of years of scientific research built up by senior professors using teams of doctoral students. The message from history is that bigger opportunities rest with the entrepreneurial students such as the founders of Microsoft, Yahoo and Google. Of these, only Google qualifies as a university spinout. Stanford University provided the patented PageRank software technology developed during the founders' doctoral studies. Having failed to find a licensee, the team chose to explore the spinout route with remarkable results for all involved. Universities employ a few thousand researchers, but teach 10s of thousands of students a year. Within the student community there are great ideas to be identified and nurtured.

Author



With degrees in science and business, David has worked as a university lecturer, industrial research manager, start-up company director and university technology transfer manager. David's teams have concluded numerous licensing agreements and created a portfolio of high growth companies. David currently works for clients worldwide linking technology providers with technology seekers at ISIS Innovation.