



# Universities, Academics, and Spinout Companies: Lessons from Imperial

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**Abstract.** This paper explores the issues faced by organisations when attempting to commercialise their Intellectual Property. It draws upon the particular experiences of Imperial College of Science, Technology and Medicine, the largest university in the UK in terms of research revenue and with the largest medical school. Because of the nature of the academic system, and the concept of academic freedom, these issues are more complicated and more difficult to solve in a university than anywhere else. Nevertheless, the lessons are common to all types of organisation. The paper argues that there are three types of spinout, which are called orthodox, hybrid and technology, with the hybrid being the most common and most complicated within the university context. The issues explored include establishing proof of both technology and market concept, the potential roles of the inventor, the multiple stakeholders, the various conflicts of interest, the allocation of equity, the assigning of Intellectual Property, and the resultant need to provide warranties.

**Key words:** spinouts, universities, intellectual property, entrepreneurship

## 1. Introduction

By their nature, scientific and technological inventions rarely happen in a vacuum. They usually evolve from a body of research conducted in a variety of research laboratories over many years, sometimes with teams of researchers working on parallel projects. Witness the current genome project. In other words, they work within an organisational context – not in the shed at the end of the garden. These organisations may be independent research laboratories, companies, national defence agencies, or universities. All have their individual norms, policies, and rules about the relationship between their employees and their ideas, their Intellectual Property, and about the commercialisation of these ideas whether through licensing or through spinout companies. However, whatever the specific organisational environment may be, the underlying issues are common. In this paper, I will explore these issues within the context of the university.

Why have I chosen the university context? The simple answer is because that is where I work, because I am a director of my university technology transfer company, and because we have spent considerable time over the past few years exploring and debating these issues. This has not been a trivial exercise. Imperial College of Science, Technology and Medicine is one of the

largest universities in the UK in terms of research revenue. It also has the largest medical school.

But my reason goes beyond my personal experience. Because of the nature of the academic system, and the concept of academic freedom, the issues are more complicated and more difficult to solve in a university than anywhere else. As a result, there are bound to be lessons for others, whatever their situation. The universities stand in stark relief.

My aim is not to produce a technology transfer template. I do not believe that is possible or desirable. But rather my aim is to inform the debate, to help researchers to understand their organisation and to help organisations understand the many black holes that we face in the entrepreneurial world. Beyond this, there is a wider debate and that is the role of the universities in commercialising their inventions. Any managed technology transfer activity is likely to be both costly and peripheral to the main purpose of the university, which is to develop and disseminate knowledge. It will also require a different form of managerial structure and style than the rest of the institution. In other words, it is akin to a corporate venture.

## **2. Technology Transfer and Universities**

The growth of new technology-based firms around university incubators such as Stanford University and MIT (Roberts, 1991) and Cambridge (Segal, 1986) has provided exemplars for other universities both in the United States and elsewhere. Indeed, in the United Kingdom, universities are now being exhorted by Government to reap the harvest of their intellectual investment through the creation of Technology Transfer Offices (TTO) which are charged both with licensing the university technology to industry and through the creation of new businesses (Auril, CBI and DTI, 1997; HM Treasury and DTI, 1998).

Whilst a number of these universities have been actively involved in licensing for many years, in the UK the focus upon spinout companies is relatively new. However, recent research in the United States by Bray and Lee (2000) found that the average value of equity held by universities in spinout companies is greater than the average annual license income. Moreover, Mustar (1997) found that in France spinouts constituted 40% of the high technology firms founded between 1987 and 1997, and AUTM<sup>1</sup> (1999) found that approximately 12% of university-assigned inventions are transferred to the private sector through the founding of new organisations. In other words, spinout companies have the potential to be a significant contributor both to the national economy as well as to university revenues.

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1. Association of University Technology Managers, USA

Despite their apparent importance, very few studies have examined the phenomenon of university spinout companies (Lindholm, 1997). Of those that have been conducted it is clear that the culture and strategy of the university is central to the level of activity (Segal, 1986; Smilor et al., 1990). For example, Roberts (1991) notes “MIT’s tacit approval of entrepreneurs, to some extent even making it the norm, was in my judgement a dramatic contribution to the Greater Boston culture” (p.45). By contrast, Bok (1982) suggests that a focus upon the commercial imperative may corrupt academic research, a point echoed by Rosenberg and Nelson (1994). This issue of culture also translates to the departmental level where departmental norms and the attitudes of peer group to commercial activity may be critical factors in the individual’s decision to consider a spinout (Doutriaux, 1991; Peters and Etzkowitz, 1990, Louis et al., 1989). Beyond this, there is the issue of academic reward systems and the possible conflict between the institutional rewards for research publication and the commercial rewards of ownership (Butler and Birley, 1998; Downs and Eadie, 1998; Franklin, Wright, and Lockett, 2000; Lissenburgh and Harding, 2000).

These issues of culture and reward systems, the “rules of the game” (Baumol, 1990) have resulted in some academics operating outside the system and creating companies without the knowledge of the university. This black market activity has, in turn, resulted in an unquantifiable level of technology leakage (Birley 1992, 1993) and very little reliable data about the level of entrepreneurial activity amongst academics, although there have been some studies of the characteristics of the academic entrepreneur (Louis et al., 1989; Chrisman et al., 1995).

The research described above allows some insight to the potential importance of spinout companies to some of the cultural issues faced by the university when deciding to actively pursue a spinout strategy. However, it does not help in understanding the detailed issues that need to be resolved when creating these new companies.

This paper explores the issues that we faced at Imperial College of Science, Technology, and Medicine as we moved from a technology transfer strategy that focused upon licensing technologies to large organisations and positively discouraged faculty entrepreneurial activity to one that focuses upon actively encouraging the creation of new ventures from faculty research; from the occasional spinout each year to a current rate of more than a company a month formed from faculty research.

### 3. What is a Spinout?

It is relevant at this point to introduce a definition of the term “spinout” since there is certainly confusion in the literature and, more particularly, in the UK. For example, a recent Government consultation paper defined a spinout as a company wholly owned by the university. How can this be? Surely, that is a subsidiary such as, in our case, the university technology transfer company!

In my view a spinout is a company that is created using the intellectual assets of the university but which is neither wholly owned nor managed by the university.

My colleague, Nicos Nicolaou, and I have been looking at spinouts from Imperial College (Nicolau and Birley, 2001), and they fall into three distinct types that we have named:

*The Orthodox Spinout* is the one to which most people usually refer. It is a company formed by one or more academics, all of whom have contributed to the IP. They leave the university to form the company and the break is clean. It is a kind of Management Buyout (MBO) and the founders are often called academic entrepreneurs.

*The Technology Spinout* is more akin to a Management Buy-In (MBI). An outside investor/manager buys or leases the IP from the university and forms a new company. The inventor academics continue with their research and have nothing to do with the day-to-day management of the company, although they may hold equity and/or act as consultants.

*The Hybrid Spinout* is the most complicated for reasons which will be explored later in this paper. It arises where one or all of the following apply:

- Only a subset of those who have contributed to the IP (the inventors) become shareholders of the company (the founders).
- Some of the founders of the company may stay in the university and have a role in the company, whilst others may spin out with the company (the academic entrepreneurs). Those who stay in the university may be a director of the company, sit on a Scientific Advisory Board, or act as a part-time, paid consultant.
- One or more of the founders take a sabbatical from the university to start the company for, say, a year.

Not only is the hybrid the most complicated, but it is also the model that predominates at Imperial College. Figure 1 shows our analysis of the current distribution of spinouts at the College. It is clear from this that the majority of

our spinout companies retain relationships with the College through their founders, and it is this set of relationships that give rise to a number of the managerial issues that I will explore later in the paper. First, however, it is important to be clear about the start-up process and the ways in which the academic entrepreneur maps onto this process.

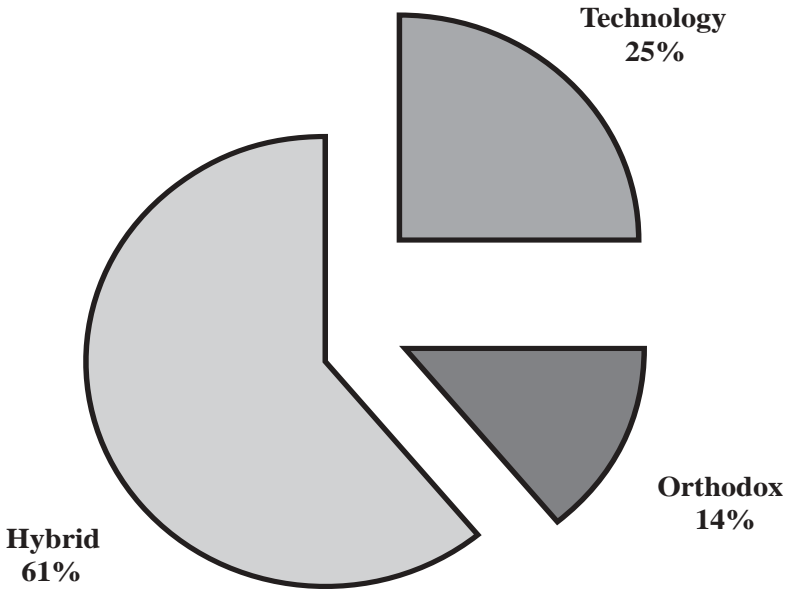


Figure 1

#### 4. Translating the Vision into a Plan

Academics love problems to solve and the more complicated the better. Depending upon their inclination, these problems can be either immediately practical, such as stopping the Tower of Pisa from falling over, or theoretical such as finding the Higgs boson or “God’s particle”<sup>2</sup>. Whichever is the case, at some time along the path, they will need to persuade others to buy in to their vision and their route to the solution. For the theoretician, this will be through discussion with colleagues, working with doctoral students, and publishing academic papers; for the practitioner, it will be through convincing those who

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2. This is the particle that is thought to give matter its mass. First proposed by Peter Higgs in the early 1960s, an estimated £6 billion has been spent on experiments to no avail ... until 2000!

hold the purse strings to release resources. Of course, the better the track record, the more the chances improve each time. Successfully shoring up the Tower of Pisa is likely to increase the chances of winning the next difficult, high profile, engineering project.

In other words, the successful academic has some of the skills and attributes of the successful entrepreneur such as vision, creativity, ability to think laterally, understanding of how to translate the vision into reality, self-belief, and dogged determination. They also understand how to manage risk. These attributes are particularly critical during the start-up process. I do not mean how to create a company or set up a research laboratory. I mean the process prior to this. The process by which the vision, the idea in your head, the feeling in the gut that this one *will* work begins to move forward. How does the entrepreneur take the intangible and create the tangible. What do they have to do? Quite simply, they have to persuade others to invest resources.

## 5. Translating the Dream into a Business Plan

Take the following simple, but very common, story. Peter is a producer of television programmes working for one of the major companies. He has a vision for a series about the development of the brain that he *knows* will work and is convinced that it could command major international sales. But he is tired of working for others and wants to use this as the foundation for a new, independent production company. He also knows that he will need £3m because that is how much the series will cost to make. He has heard that there is no point in approaching venture capitalists since they are not interested in project financing and, anyway, he is not asking for enough money for them to be interested. So, he goes along to his bank manager and broaches the possibility of a loan. Of course, he is laughed “out of court”. The bank manager says.....“That is much more than I can lend on the security of your house (assuming that your wife would agree)...and, anyway, who else is involved in this,...and, most important, your business plan is just a dream....where is the order?”

Undeterred, Peter approaches a couple of producers in other companies with his “concept”. They express interest. They usually do. It is a way of keeping their options open! But they are not able to commit without a more detailed “Proof of Concept”, and a fully resourced plan. In other words, what is the evidence that this will syndicate worldwide, what is the technical team that Peter plans to use, who is going to “front it”, and who will provide the scientific support.

So, he approaches the acknowledged world expert on the brain, the best animators, technicians and camera crew. To a person, they ask (or imply)

“What is in it for me, how do I know you can make this work, and where do you plan to set up the studio?”

Still undeterred, he scours the available studio facilities, but the landlords are not interested in talking until Peter is prepared to sign a lease, produce guarantees, and pay a deposit. He also talks to camera and computer manufacturers that he has dealt with previously about the arrangements for leasing or buying equipment, but finds a very different reaction when they realise that this is a new venture. No longer can he negotiate special discounts and credit. Now they want full price and cash up front.

**The Credibility Carousel.** What are all these people saying? It is simple. Peter is asking them to invest in his business idea by taking a risk. For example, the bank manager has credit limits and is evaluated on his bad debt record. He is worried about his job. The brain expert does not want to waste time in working on something that will not get off the ground. He also does not want to be associated with a second rate product, which could be the case if the best animators are not involved. The salesman for the equipment manufacturer is not able to alter company credit regulations.

So what to do? How does anyone manage to start a business? Basically, Peter is caught in the Credibility Carousel illustrated in Figure 2 (Birley and Norburn, 1985). All are protecting their jobs or their reputations and are unwilling to “invest” in just an idea.

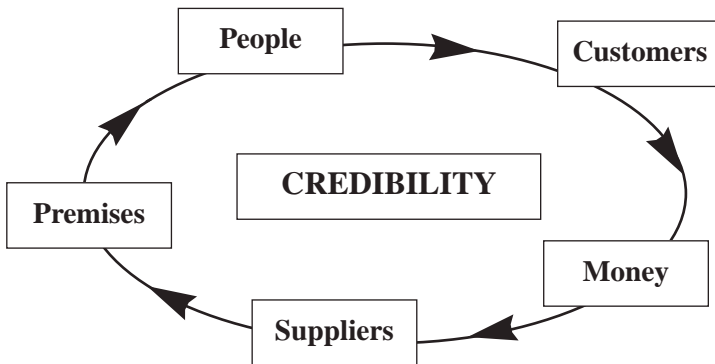


Figure 2

In order to have a chance of moving forward, he needs to persuade someone to believe in him and to break the credibility carousel. For example, the world expert on the brain commits to the idea and begins to persuade others, his previous employers agree to let him use an old studio, or a rich maiden aunt agrees to provide bank guarantees. Slowly, people begin to believe in him and the project gains credibility. It also gains more reliable data.

How did he do it? Almost certainly through his personal network, the people who know him personally or have been introduced to him by someone they trust. For example, the world brain expert just happens to play golf with his father!

Now the dream is becoming a reality. More importantly, the business concept is becoming a business plan, with increasingly credible assumptions and costs.

## **6. What Has This to Do with Academics and Researchers?**

A great deal. Increasingly, all organisations are asking their employees to produce the “business case” for new projects, and academics are not excluded. If they wish to raise research funds, they have to explain why. They need to explain what is the likely output of their research in the future and what is the likely demand? For example, if they do find a cure for hepatitis C, is the incidence of the disease great enough to support both the research costs and the costs to market, as well as providing a significant income stream to give an acceptable return on the investment. In other words, what is the business case? What is the “Proof of Market Concept?”

Consider Sandra, a post-doctoral biochemist who is fascinated by tropical diseases. She and a colleague in the medical field are convinced that if they pool their experience and skills, they can produce a cure for a particularly debilitating skin disease found in tropical climates. But, they need money to fund a major research project.

There are three possible sources – the drug companies, the government funded research councils, or independent funding organisations such as the Wellcome Trust or the Kellogg Foundation. Each will expect a different arrangement or “deal”, should the project be successful, and Sandra and her colleague need to think about that at the beginning. But first, they need to write a proposal.

Let us assume that they are targeting a medical research council. There will be standard forms that Sandra and her colleague must complete and a suggestion that corporate sponsorship and support would add weight to their case. After all, the council receives many more applications than they can fund. So, Sandra writes to the marketing directors of all the major drug companies asking for an endorsement but is either ignored or told that they only deal with a select group of universities or senior academics.

Returning to the application form, Sandra is in more familiar territory. She is asked to produce a research proposal that outlines prior research and indicates how her proposed research will contribute to knowledge. The first part is relatively easy, but she is nervous about the second part, about giving



away too much of her intellectual property. After all, her proposal will be evaluated by other academics working in the field.

The forms also require a detailed explanation of how the research will be conducted and the resources that will be used – a timescaled and costed plan. Sandra knows that she will need two research assistants to do the experiments. She also knows that the application will be greatly strengthened if she has the support, and involvement, of a senior member of her department, who happens to be an expert in the field. So, she needs to convince her Professor to agree to allocate, say, half a day a week to the project if she raises the funds. However, she is currently on a one-year contract, and this is a three-year project. Her Professor will want to see the research proposal and some of her written papers since she has to decide if she wants to continue to employ Sandra. In other words, she needs to decide if Sandra is likely to develop into an academic who will enhance the reputation of the department. Her Professor will also need to decide if this project is sufficiently interesting to justify asking the Head of Department for extra laboratory space.

## **7. The Research Credibility Carousel**

What is happening here? Much the same as for Peter but this time, Sandra has to break the Research Credibility Carousel. She has to convince others to invest their reputation and their resources in her idea. How does any junior academic raise funds? Like Peter, by using their network. Indeed, it could be argued that your personal network is the only real asset that you have at this stage. However, for Sandra, her professional network is likely to be narrow and to include mainly other academics. So, like many entrepreneurs, she must also draw upon her social network. For example, her cousin is a doctor and knows someone in one of the major drug companies who is prepared to talk to her or Sandra is working in the department where she gained her doctorate and her supervisor is encouraging her to make the application. She is riding the Research Credibility Carousel (Figure 3).

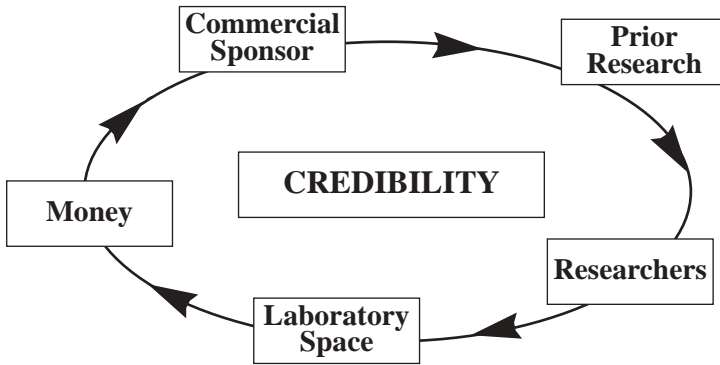


Figure 3

## 8. Proof of Concept

What does the story of Sandra tell us? That even in the development stage of a research idea, the academic will increase their chances of raising resources if they are able to establish both their research credibility and their understanding of potential market opportunities.

However, should the academic wish to go a step further and build a company from intellectual property that has a scientific, technological, or biomedical base they will require two proofs (Figure 4).



Figure 4

**Platform Technologies:** All of the above depends upon identifying the target market space and that is fine if the market opportunity is clear. It is more difficult if the academic is developing a platform technology, one that could be used in many industries or for many products. On the surface, this would seem to be a greater market opportunity and, indeed, it would be if the research is successful and the technology is developed. At this stage, however, the academic is faced with presenting an argument for support from a variety of possible sponsors.

So, selecting the particular market opportunity and matching that to particular sponsors interests may be critical. Often, the market chosen depends

upon serendipity or personal interest. For example, a colleague from the Mathematics department developed an algorithm that allows a computer to produce music scores when it is attached to an instrument. Wonderful for composers. So, he talked to piano manufacturers because he plays the piano. What he hadn't realised, and why should he, is that he has created a product that can recognise pitch in sound – and this could be useful in a range of manufacturing industries for stress testing.

### 9. The Credibility Loop

What do the combined stories tell us? They tell us that academic entrepreneurs will have to establish their credibility both scientifically and in their understanding of the business concept by riding the *Credibility Loop* (Figure 5) if they are to have a chance of creating a business from their technology. From my conversations with colleagues over the past few years, most understand this and make clear choices as to their involvement in the business.

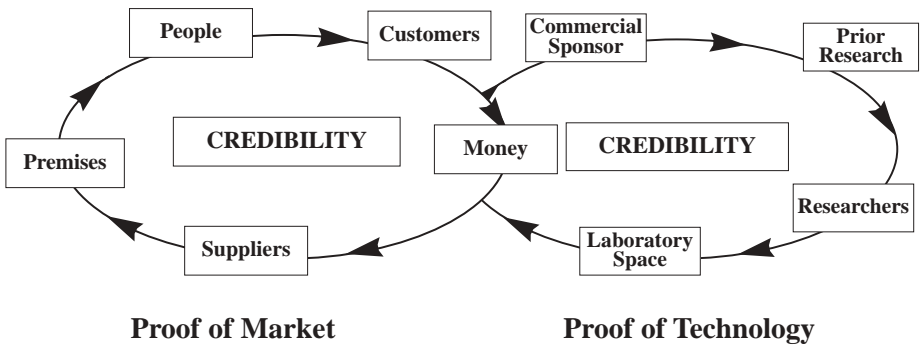


Figure 5

### 10. Intellectual Property

Dr. Chris Evans, Founder and Chairman, Merlin Ventures and Visiting Professor at Imperial College, is of the view that “Academics and universities...have no management, no muscle, no vision, and no business plan and that is 90% of the task of exploiting science and taking it to the marketplace” (Times Higher, March 1998). This may be true, and yet these same scientists manage to run large research laboratories, international collaborative research projects, and create science that, for example, allows Professor Ara Darzi at Imperial to conduct heart bypass surgery remotely. In

other words, it is not necessarily a question of skill but of experience and inclination. Quite simply, most academics did not join the university to become business people, though some eventually change their mind, but, rather, to be researchers and teachers.

Continuing the quote, Dr Evans notes that “There is a tendency for universities to think we invented the thing so we are already 50% there. The fact is they are 50% to nowhere.” Quite true, but the reverse is also the case. Without the idea, the customers and investors cannot benefit. So, we arrive at the critical issue of *Who Owns the Intellectual Property (IP)*. For companies, it is usually straightforward and, in the UK, is embedded in company law and the employment contract. Any IP developed whilst in the pursuance of the job is owned by the company unless, of course, the company waives the right.

For university research, however, it is neither simple nor obvious although it is central to the governance in the organisation, a point that is often forgotten or ignored. After all, the IP of the university is its prime asset. Therefore, as effective directors of the organisation, it is the responsibility of the Chairman and Board of Governors to manage these assets prudently on behalf of the stakeholders.

So, the university must have a policy on the ownership of IP and this should be clear, simple, and evident to all concerned. Nice idea, but I am afraid that the reality is more complicated. Let me start by assuming that the university owns the IP of all its employees. Some have waived this right, but I am afraid that this doesn't mean that the problem goes away, as will become evident.

**The Organisational Stakeholders:** The first step is to determine the stakeholders in the process. They are the people who have contributed to the development of the IP by providing resource and support. They are also the people who will facilitate the commercialisation process (or not) and who, therefore, will expect a stake in the proceeds. In other words, the stakeholder group is wider than simply the inventors. There will usually be three levels (Figure 6).

Notice that I have used the plural in each case. At Imperial, we have a number of research projects that include more than one researcher, from more than one department, and more than one university. And to make it even more complicated the partner university(ies) does not necessarily have the same IPR policy as do we. Even worse, they may not be in the UK and so will operate under different norms and legal structures. Yet, at some stage, the rewards of any commercialisation activity must be divided equitably.

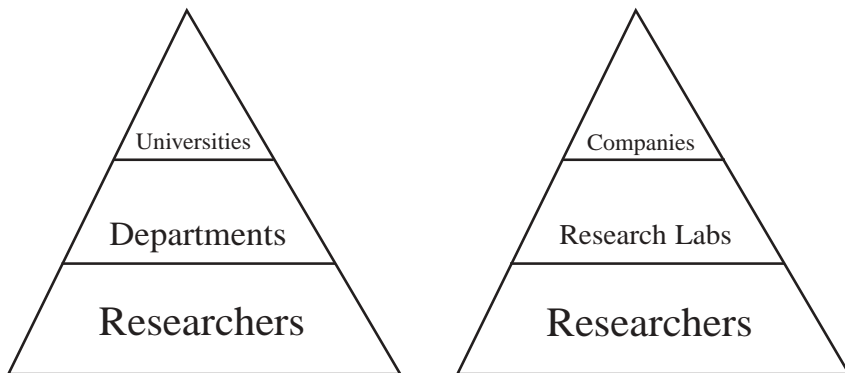


Figure 6

Moreover, there is the issue of student IP. What is the university policy on this? After all, students are customers and, in my view, are entitled to retain their IP. Certainly, that is the policy that we have at Imperial after debate with both faculty and students. So the problem is solved. Students own the IP that they develop whilst at university and the university has neither liabilities nor responsibilities.

Well, not quite. There is, for example, the issue of how we deal with students who are sponsored by a company, or students who use IP developed in joint projects with other students or with faculty to start a business. This issue is particularly keen when doctoral students are working on developing new solutions to problems in a sponsoring organisation, or on ideas developed from the IP of their supervisor.

## 11. The Sponsor Stakeholders

The majority of research in universities is funded by outside bodies, whether they are Government Research Councils, Charitable Trusts, or Companies. Increasingly, these organisations are seeking, as part of the research contract, a lien on any IP developed as a result of their funding. After all, they have governance responsibilities too! To make it more complicated, imagine what you might be dealing with if the product to be commercialised is a result of bundling platform technologies! Why does this all matter? For two reasons. First, because the venture is unlikely to succeed in reaching first base without the positive, or at least neutral, support of all the stakeholders. This is particularly the case if the department is positively against such activities, even though the university may be positively for it (Samson and Gurdon, 1993). Second, the owners of, and stakeholders in, the IP have liabilities and responsibilities should they choose to commercialise.

## **12. Transferring the IP to the New Company**

Assume that the chosen route to market is through a spinout, whatever the type. Seems simple. All we have to do is to form a company that owns the IP and off we go. Not quite. The IP may not be self-contained. It may be a piece of software that has been developed as part of an on-going research project and it is essential that the researchers continue to have use of it. So, it could be licensed back to the university for research purposes. This is certainly possible, but what if the company was acquired or failed and the IP is lost? Perhaps the solution is for the Department to retain ownership of the IP and to assign it to the company for a fixed period of time. Of course, this will almost certainly need legal agreements and long-term management. The need for university procedures and for lawyers is clearly looming!

There is another issue that needs to be dealt with at this point. The founders of the company will almost certainly want first call on future associated research developments. Indeed, their potential investors may wish to make this a condition of any deal. But how will the researchers who are not part of the company, and may even have joined the department after the company was started, feel about the university mortgaging their future research? This is a particularly sensitive issue in hybrid spinouts should such arrangements be put in place and where, as a result, some members of the department may be seen as unfairly benefiting from the research of others through their ownership of the company.

## **13. The Equity Issue or the Question of Greed**

When the company is founded, it is relatively simple if there are just two or three founders sharing the equity with the university. However, in many of our spinouts, and certainly the hybrids, the list of eventual stakeholders may be long. Beyond those shown in Figure 6, and the sponsoring stakeholders listed above, there may be venture capitalists, angel investors, and employees, all expecting a real and substantive “piece of the action”. There is also the question of where the university technology transfer company or office and its employees fit. After all, they may have been pivotal in identifying and bundling technologies from across the campus, and in steering the deal to a conclusion. They may also feel that they ought to have a “carried interest”<sup>3</sup>.

Sadly, there are no rules for the sharing of equity, except one. Add up the shares that each stakeholder believes that they are due and the total will almost certainly be greater than 100%. If nobody is prepared to compromise, this can be a deal-breaker. Indeed, some 60% of projects that venture capitalists are prepared to invest in never happen because the parties cannot come to an agreement on the deal.

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3. A mechanism whereby Venture Capitalists carry a shadow equity interest on the capital gains made on realisation of a fund or portfolio.

This division of the equity is a very real issue for the university. Academics are usually fair-minded people, recognise that the university has contributed to the genesis of the business, and believe that this entitles the university to a **fair** share in the equity. The question is – what is fair? If the university is not perceived to behave fairly, either the business will have no chance of starting or the academic inventors will go underground and start anyway (Birley 1992, 1993). Clearly, therefore, the task for the university is one of developing transparent policies and procedures that are accepted by the faculty.

#### **14. Providing Warranties**

Venture capitalists may take more risks than most investors, but they are calculated risks. Therefore, one of the things that they are almost always clear about when investing in technology-based companies is that the patent, copyright and IP portfolio is clean – ownership is clear, and warranties as to ownership have been provided. This makes sense from their perspective but look at it from the university point of view. A warranty as to ownership implies that the university is able to state that they know all the inventors who have contributed to the IP and that, as a result, they can warrant ownership. But what if one of the researchers has left or been forgotten? For example, what if a doctoral student was working on a particular element of the project for her thesis some five years ago? When she graduated, she moved to another country and has continued to work on it unbeknown to her supervisor, and later emerges with a competing product. The company sues the university. Alternatively, what if the company is spectacularly successful and she suddenly realises that her work is being used, and sues the university? Either way, it is the university that may be liable, not the inventors, since it is the university that signs the warranty.

What recourse does the university have? Take a simple example from our experience. The company asks the university to warrant ownership of the IP. The university asks the team leader of the research project to list those who have contributed in order that the university can be confident in agreeing to the warrant. However, the team leader is also the person spinning out the company and, as such, the one who has asked for the warrant. Without entering into any probable legal technicalities, it is clear that the university is taking a risk. The question is whether the university should accept such liabilities and insure against them. Indeed, is this the business they are in? In truth, it has no choice if it wishes to promote spinouts. So, it is obviously extremely important for universities, departments and academics to keep clean research records and laboratory files, just in case. Of course, in reality these problems only arise when a spinout company is very successful, the virus of envy takes hold, and the “greedometer” begins to rise.

## 15. Wearing Many Hats

This is a particular issue in hybrid spinouts and stems from the various roles that academics may hold. It is an issue not only for the individual founders concerned but also for their department, the university, and the company. Let me give an example of a particular situation at Imperial. PSE Ltd was a spinout from the Centre for Process Systems Engineering. In this hybrid spinout, equity was divided between five inventor-founder shareholders and the university. Table 1 shows the roles played by the various involved parties.

Sandro was seconded to the company for the first 18 months, after which he returned to run the research centre, but continued as Chairman of the company. Sue (me) is the College nominated Director of the Company since Imperial has a significant equity holding. In 2000, Costas took a sabbatical from the department to join the company as Technical Director to develop a new business opportunity. Mark joined the company as Managing Director when Sandro returned to Imperial. Nilay, John, and Stratos act as consultants to the company but are not directors. However, their close involvement in strategic issues and their regular attendance at board meetings in the early days made them Shadow Directors at the time.

As the table shows, all except Mark are full-time faculty at the university. This can create tensions as the academics have a language and a common experience not shared by Mark. Yet he has to manage them, and to manage the relationship with the university. This is not always an easy task!

*Table 1*

	Sandro	Sue	Costas	Mark	Nilay	John	Stratos
IC Faculty	*	*	*		*	*	*
Inventor	*		*		*	*	*
Shareholder	*		*		*	*	*
Chairman	*						
Director	*	*	*	*			
Shadow Director					*	*	*
Manager			*		*		
FT Employee			*	*			
Consultant	*				*	*	*



## **16. What has this meant for the academics?**

### 16.1. Learning New Skills

Negotiating legal agreements and financial deals are not new to senior academics, who will almost certainly have been involved in negotiating major research contracts. However, the terminology and the “rules of the game” will certainly be different, as it is for most entrepreneurs who will not have seen a Shareholders Agreement or Articles of Association before, much less negotiated the fine detail. Yet these documents are critical since, for example, the former embodies the rules by which the equity is managed. So, it might outline pre-emption procedures with regard to equity if a shareholder wishes to sell. Certainly, the university may wish to include veto arrangements in the event that the directors wish to sell the company.

Beyond this, there is the need to research and understand the market, prepare cash flow forecasts, and to understand balance sheets. More important is the need for both founder directors and university nominated directors to understand their roles and responsibilities as company directors. Indeed, it is for this reason that at Imperial we now run regular seminars on this issue for founder shareholders and nominated directors.

### 16.2. Managing the Conflicts of Interest

Even a glance at Table 1 will make it clear that there are likely to be potential conflicts of interest for the academics (including myself) between their role in the company and that in the university. Take three simple examples:

1. There is a need to monitor the involvement of university staff in the company since there is a possibility that they could end up being paid twice for the same work! This is a particularly difficult issue if the spinout company is, in effect, the development arm of its research incubator department.
2. In a number of cases the research leader within the incubator department is also a shareholder of a company, which may be looking to place research contracts in the department.
3. In Imperial, we frequently nominate directors<sup>4</sup> of our spinout companies from the faculty or staff of the College. This means that the director may be

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4. Like the policy adopted by some venture capitalists, the university may wish to retain the right to nominate a director of the company.

faced with a situation where a decision that is right for the company is against the interests of the university. Of course, they must act on behalf of the company since they hold the company in trust for all the shareholders, not just the university but what, if anything, should they tell the university? The answer is that they should treat all shareholders equally. This is easy to say but not always clearly understood by the various parties, either within the company or within the university, where the nominated director may be seen as a “spy” for the university.

Each of these examples is drawn from our experience at Imperial. They are difficult issues that demonstrate the clear potential for conflicts of interest to arise and an evident need for the creation and management of a variety of Chinese Walls within the university.

## **17. Managing the Business**

All that I have said so far implies that academics will manage the business in both the hybrid and the orthodox spinout; and that an outside investor-manager will have initiated the technology spinout. In reality, this is often not the case. Despite Government enthusiasm for “Academic Entrepreneurs”, the majority of academics wish to stay associated with the university system. The research bug is what drives them. I am relieved that this is so. Indeed, this is why the majority of our spinouts are hybrid. The academic inventors are the very ones that I believe we need to keep in the university continuing to develop yet more commercialisable ideas and so becoming *habitual spinout inventors*. As Ronstadt (1988) states when developing his corridor principle “the mere act of starting a venture enables entrepreneurs to see other venture opportunities they could neither see nor take advantage of until they had started their initial venture” (p. 31). Beyond this, these resident spinout entrepreneurs provide important role models for colleagues throughout the university.

In such cases, what is needed is a businessperson to launch and manage the company, a professional manager or surrogate entrepreneur (Radosevich, 1995). Of course, this is a start-up and so they will want equity. This is not the only reason for seeking professional management. Investors are wary of academics and will be concerned to see a strong, experienced, and focused management team in place. However, these surrogate entrepreneurs will need to understand and manage the academic’s strong sense of ownership of their research, which can often manifest itself in attitudes of scientific purity and of commercial meddling. They will also need to understand the scientific base of the products that they will be marketing. In other words, they will need a particular set of skills that are not easy to find, and one of the roles of the Technology Transfer Office will be to build a network of contacts who may be interested in investing in, and managing, technology-based spinouts. Interestingly, these can often be

found within the alumnus base. For example, we currently have a team of three MBA students who are running a technology spinout.

## 18. Dividing the Spoils

There are three types of potential revenue that flow from the university investment in spinout companies – royalties, dividends, and capital gain – and it is important to have clear policies for each.

Most universities are used to dealing with licensing arrangements that involve royalties flowing from the assignment of IPR. However, there is one difference for a spinout. In a licensing deal, the only possible reward for individual academics is through the license fee and the royalty stream. Therefore, all can be treated equally. In a spinout where a portion of the IP from a department or research centre has been assigned to the company, the shareholder academics could benefit from dividend and capital gain through ownership of the company, and a share in the university royalties as an inventor. In other words, they could “feed at the trough” three times. Clearly the university needs a policy to deal with such circumstances if it is to avoid anger, envy and conflict within the department.

So, we come to the question of capital gain. In a recent study of American universities, Bray and Lee (2000) concluded that “...*even if none of the start-ups produces a million dollar equity sale, the financial return of equity will be within the range normally received as a license issue fee. Taking equity leaves the door open for the occasional jackpot, which will bring in significantly more money than a standard license*” (p.386). Government policy is vindicated! Encourage more academic entrepreneurs to spinout and then sit back and wait for the rewards to roll in. Well, not quite. There are a couple of other issues to take into account.

- Remember portfolio theory? Capital gain from an individual investment in a start-up company is unreliable. That is why venture capitalists have a portfolio of investments. Certainly, regular, annual capital gain cannot be assumed. Therefore, it must not be assumed for university revenue purposes. In short, it is no substitute for student fees.
- Most start-up companies are cash hungry and require more than one round of funding to finance their growth. Universities are not venture capitalists. Usually, they do not invest cash but Intellectual Property. Therefore, they are unlikely to participate in any further funding rounds and so, inevitably, they will be diluted. For example, in a recent case from Imperial, one of our spinouts, Turbogenset, was floated at a market capitalisation of around £540m which rose rapidly to over £1bn. By the time of the float, Imperial

had just less than 10%. However, in this case as in many IPOs the founder shareholders were constrained by a “lock in”<sup>5</sup> clause whereby gains can only be realised over a period of time after which there is the question of when to realise - another committee for the university! And, of course, not all the capital gain will stay with the university. There may be academic inventors who were not founders that the university may wish to reward. Moreover, any capital gain must be set against the cost of making the investment in the first place not least the cost of the technology transfer office.

## **19. Conclusion**

As I said at the beginning, it is complicated. There are major managerial issues that need to be resolved. However, the fact that it is complicated is not a reason not to do it. Academics should never be under-estimated. They may be commercially naïve but they know how to seek knowledge, can speed read and digest complicated documents, and they learn very fast. They also enjoy seeing their ideas used. The university simply needs to have clear and fair policies and procedures, and to communicate them positively and enthusiastically. I do not believe that we really want our finest scientific brains to become CEOs of companies but rather they should do what they are best at – researching.

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5. Whereby at the float there are conditions as to when founder shareholders are allowed to sell.

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