

Creating effective innovation ecosystems through IP management

How industry and universities can best collaborate

Phil Webster and Richard Granger

Open innovation – the practice of creating and commercializing new ideas using inputs from multiple partners, especially academics – has been around as a concept for many years as the foundation for an “innovation ecosystem.” However, collaborating businesses often don’t realize the benefits they expect. We believe this is often because of the way in which intellectual property is managed in collaborative research arrangements. What should companies do? This article sets out a practical guide.

Open innovation and innovation ecosystems often don’t work

So you decided open innovation sounded like a good idea. After all, your business was desperately short of good new ideas and several universities seemed to be working in relevant areas. One or two even kept knocking on your door with new technologies to offer. Also, even in these austere times, government funding for collaborative research programs is still plentiful. Why not take advantage of all this external creativity and fresh ideas, you thought, use it to stimulate and enrich the efforts of those sleepy guys in Development, and use the resulting flood of exciting new products and services to beat the competition and build a faster, stronger business? Even better, public funders might help pay for it!

Now you wonder: is it worth it? Finding universities that really have the right skills isn’t easy. Doing the deals always seems to take forever – and costs a fortune in lawyers’ fees. That’s because every academic seems to want different contract arrangements and comes with unrealistic views of what their idea is worth. Even when the deal is set up, it can be hard work getting access to

results you can use in time to fit in with your own product launch and marketing plans. And then there was that time when you all thought that at last you had a world-beating breakthrough and tried to protect it with a patent, only to discover that half the idea had already been published in an academic paper and the other half was based on earlier work by a different research group.

What do the academics have to say for themselves? On the time needed to do a deal, they say industry is its own worst enemy: cooperation agreements disappear into corporate legal departments, where they get buried for months by more “important” cases. Then the company wants to pay almost nothing for the results of all their scientific excellence, and even tries to stop them publishing when it should realize that publications are central to their struggles for research grants and career progression.

These are, of course, caricatures. Yet many industrialists and academics will acknowledge a ring of truth. Despite all the evidence from studies of the benefits of open innovation, and from examples of industry-academic partnering that have produced great value for both sides (Rolls-Royce’s use of its network of university technology companies is one example), we find that the potential of such partnerships is greatly underused. Too often, it seems that the effort is just too much and the results don’t match expectations.

How can industry and academia – and the public policy bodies that want to promote innovation to drive economic and social development – capture more of this potential by creating a functioning “innovation ecosystem”? In this article we set out some common pitfalls and practical steps to overcome them.

What is an innovation ecosystem?

A company's innovation ecosystem is the "cloud" of external individuals and organizations that the company has built up and maintains as a source of ideas and stimuli. It is characterized by partnership and collaboration. Members of an innovation ecosystem have similar interests and aim for collective and mutual benefit. They may be customers and end users, entrepreneurs, investors and other businesses. Here, we focus on universities as collaborators. Unlike an innovation cluster, an innovation ecosystem may not necessarily be geographically co-located – though national and regional governments often try to stimulate growth of local innovation ecosystems through the provision of people (e.g. support teams to help create linkages and networks) and money (e.g. to encourage collaborative research programs). One example of support is the Otaniemi Technology Hub around Helsinki in Finland; a larger-scale example is the Enterprise Europe Network, which supports innovation relationships across Europe, in particular those involving universities and SMEs.

Why bother?

When they work properly, innovation ecosystems can create benefits for all parties involved. They can generate new ideas for companies, economic growth for governments, and financial rewards for academics in universities. Table 1 summarizes the main benefits, and the box overleaf shows examples of how Siemens and Audi have generated new products and sourced new staff through ecosystem innovation.

Innovation ecosystems: case studies of success

Case study: Siemens realizes six times its foreseen turnover from collaboration with the University of Lincoln.

Siemens has a close relationship with the University of Lincoln in the UK. A collaborative R&D commissioning framework has generated six times the turnover foreseen in the original business plan, with significant business benefits generated for the company and research outcomes for the university, while protecting intellectual property and observing commercial sensitivities. In parallel, Siemens helps Lincoln produce “industry-ready” students by contributing to teaching within Lincoln’s engineering department and providing scholarships, internships and consultancy projects.

Case study: Audi transfers in new staff skilled in lightweighting materials from the University of Munich.

Since 2004, Audi has had a deep and strategic collaboration with the Technical University of Munich, a research institute near Audi’s headquarters in Ingolstadt, Germany, that supports more than 100 PhD students working on technology and innovation issues vital to Audi’s competitiveness. Audi sees a steady flow of technology process innovations, which are built into its cars and production lines. Current models incorporate advances in lightweight construction, suspension technologies, electronics and man-machine interface software. It is also a highly successful recruitment mechanism: 80 % of candidates stay with the company following their PhD.

We see successful innovation ecosystems as those that are based on good communications and relationships of trust; that appreciate the long-term value these relationships bring; and that set out expectations up front. This goes much further than just the occasional arm’s-length contract research agreement, although contract research may be one element.

Industry	Universities	Government
<ul style="list-style-type: none"> ■ New ideas: Obtain ideas from adjacent industries, or from those who are experts in a particular area or simply from a fresh approach ■ New people: Often businesses transfer in academic staff for a period of secondment, or hire PhD students who complete industrial placements ■ Non-core science: Access technology outside the bounds of existing research and development activities, at a low cost ■ First look: Maintain a watching brief over new, emerging and potentially disruptive technologies 	<ul style="list-style-type: none"> ■ Get paid: Financial rewards for academic researchers and the universities they work in ■ Career progression: Prestige associated with working with industry and new transferable skills ■ Stimulus of exposure to real-world problems: Application of basic and applied expertise to practical challenges 	<ul style="list-style-type: none"> ■ Sustainable jobs: Industry and academia working together creates new jobs ■ Economic growth: New jobs means a knock-on effect for the national economy, as people spend money

Table 1 Benefits of ecosystem innovation

Source: Arthur D. Little analysis

We believe that creating an effective innovation ecosystem involves being clear about what you want up front; working together productively; and, above all, not forgetting some simple principles about good IP management to help the relationship run well in the background. The remainder of this paper sets out ten tips for making this happen, which are summarized in Table 2 below.

Decide what you want up front...	...work together productively...
<ul style="list-style-type: none"> ■ Tip 1: Be clear about what objectives you want to achieve from your innovation ecosystem ■ Tip 2: Use these objectives to guide you to the right collaborator ■ Tip 3: Agree, together, what each partner gets out of the relationship 	<ul style="list-style-type: none"> ■ Tip 4: Don't expect results straightaway ■ Tip 5: Focus on transferring people and expertise through a sustainable flow of deals rather than big license fees ■ Tip 6: Know when to exit when the relationship is no longer beneficial
<div style="display: flex; justify-content: center; align-items: center; gap: 20px;"> <div style="border: 2px solid red; border-radius: 50%; padding: 10px; background-color: white; color: red; font-weight: bold;">An effective innovation ecosystem</div> <ul style="list-style-type: none"> ■ Tip 7: Agree some "ground rules" up front about how to work together, especially around who "owns" the IP ■ Tip 8: Ensure that your collaborators have good IP management processes in place ■ Tip 9: Ensure that you and your collaborators are following the processes ■ Tip 10: Repeat as above! </div>	
...but don't forget the importance of IP management	

Table 2 Ten tips for a successful innovation ecosystem

Source: Arthur D. Little analysis

Decide what you want up front...

Tip 1: Be clear about what objectives you want to achieve from your innovation ecosystem

Companies often collaborate with universities without a clear idea of what they want to get in return. When setting up an initiative to work with a university, first ask yourself: why are we doing this, and **what do we want out of this relationship?** Do you want new products, almost ready to take to market? Or early access to new technology, to feed into your own long-term development programs? Or simply an “early-warning radar” to help you to keep watch on emerging technology? Then consider how much time and resource you are willing or able to invest in this activity, and how it fits with the rest of your ecosystem. Once these questions are an-

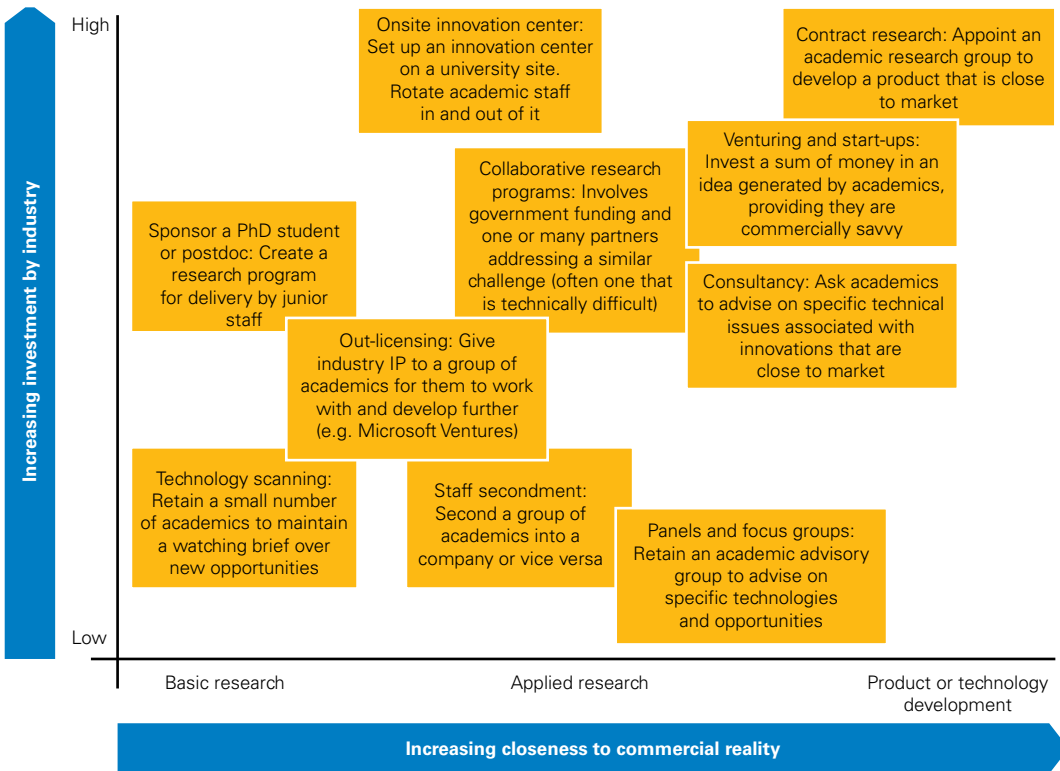


Table 3 Types of relationship, depending on industry objectives

Source: Arthur D. Little analysis

swered, you will know what type of commercial relationship you will enter into with the universities. Table 3 provides some examples.

Tip 2: Use these objectives to guide you to the right collaborator

This in turn helps to define a way in which to **find the right collaborator**. There are plenty out there – but which will deliver what you need? And which ones will be able to benefit from a relationship with you? Once you know what you want, it's more straightforward to decide who to work with, and then at what level of the organization you should work. Should you give your scientists free rein to build informal relationships with other specialists in their field, or should you initiate a large-scale collaborative research program with one or more universities? Often, government agencies, keen to foster enterprise development, can introduce you to potential collaborators, help to set up a sound relationship and sometimes provide money. Singapore's A*STAR is one example.

Tip 3: Agree, together, what each partner gets out of the relationship

A clear view of objectives also helps you to manage your collaboration relationships within the innovation ecosystem. This is much more than a matter of legal contracts; it also involves **understanding your partner's underlying needs and strengths**, communicating regularly and honestly and taking the time to found a relationship that is mutually beneficial.

To do this, discuss with the university not just what they aim to achieve out of the partnership, but also what their plans are more broadly. In addition, get to know the staff at the university's technology transfer organization (most universities have these now; leading examples include Cambridge University's Cambridge Enterprise Limited, the Technology Licensing Office at the Massachusetts Institute of Technology and the very commercially oriented organization at China's Tsinghua University) and ask them to help you understand the ambitions and constraints of your academic

...work together productively...

Tip 4: Don't expect results straightaway

Partnerships rarely deliver results immediately. People work together on ideas, and progressively advance them to a point where they have commercial value. Operating in an innovation ecosystem takes time and investment, and rarely can a company arrive at the gates of a university to find a commercially viable innovation ready to go.

Dealing with this requires a company to **decouple objectives in ecosystem innovation from its wider – and often shorter-term – business objectives**. Many companies decouple their open innovation and venturing activities from the objectives and timelines of the rest of the business.

At one time it was fashionable to set up entirely separate innovation units or corporate venturing organizations to incubate new ideas, in an effort to re-create the entrepreneurial atmosphere of a start-up (such as Shell's GameChanger or IBM's Emerging Business Opportunities Programme). While that is still a useful model, increasingly we see companies emphasising that innovation is everyone's business, for example by:

- Organizing research and product development explicitly around different innovation missions, such as current business support and longer-term exploration (e.g. at Unilever and Hershey).
- Tasking individual "innovation catalysts" or "champions" with purely innovation-based objectives, to stimulate and channel the creativity of the entire organization and its ecosystem (e.g. at Solvay and IBM).

Tip 5: Focus on transferring people and expertise through a sustainable flow of deals rather than big license fees

Companies and universities often have unrealistic financial expectations when finding new partners for their innovation ecosystem. Industry collaborators must recognize that universities need to find new ways of making money in a world where public funding for higher education is declining. For the universities, generating commercial income is increasingly seen as vital. Licensing intellectual property to a company for a fee is one way of obtaining a flow of income – and, if individual academics share in the proceeds, a way of encouraging them to look for commercialization opportunities. Don't be surprised if your potential academic partner demands substantial payments. After all, you are benefiting from substantial public-sector investment in creating the intellectual property in the first place.

Universities, for their part, must avoid unrealistic expectations. Income from licensing is rarely large. Even in the US, widely perceived to be the most advanced commercialization culture in the world for public-sector research, average income from commercialization is only around 3 % of total research funding². The average in Europe is much less and is very low compared to other ways of working with industry, such as contract research and consultancy, as shown in Table 4 for the UK. It is usually only the largest universities with the most significant partnerships (e.g. Cambridge, UK and Stanford, USA) that generate significant income from IP licensing.

Universities may also find that in the long run it is better to build long-lasting relationships with industry partners, as part of an innovation ecosystem, than aim for the occasional one-off major licensing deal. Relationships can provide a continuing stream of income, insights into real-world needs and opportunities to exchange ideas and people.

²There are notable exceptions. For many years, Columbia University topped the league table of license income at US universities. Columbia hit the jackpot with its 1983 patent for a method for inserting DNA into cells – fundamental to today's biotech industry. But such examples are rare.

Income from IP licensing is insignificant compared to other activities associated with collaborating

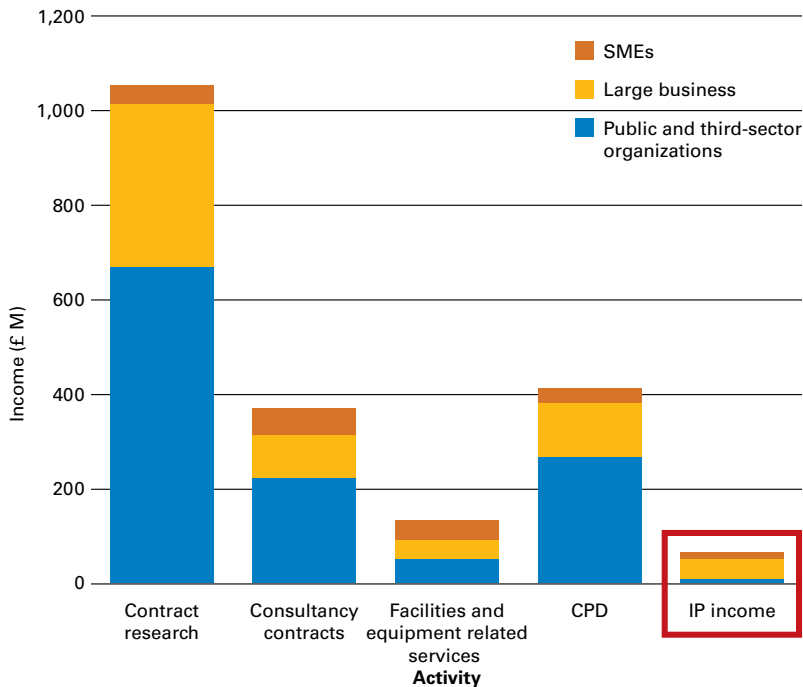


Table 4
Income from IP licensing across UK universities (2010-11)
 Source: HEFCE Higher Education – Business and Community Interaction Survey, July 2012

Our view is that the **transfer of people** as part of ongoing relationships rather than the transfer of patents as a one-off licensing deal is more valuable in an innovation ecosystem – not least because in order to successfully make use of a technology, you also need someone who knows how it works. Table 4 supports this, with far more revenue being generated from contract research and advisory work than from IP licensing.

That said, the fundamental concept of **licensing a piece of intellectual property remains valid** and is an essential part of contract research. Without IP licensing, industry will not gain the temporary rights of exclusivity needed to give a company an advantage over its competitors when selling the results of the research. But this does not always mean trying to maximize income. Indeed, we have seen some instances where universities are prepared to give intellectual property away for free, at least in the first instance. The box overleaf provides an example from Ireland.

Royalty-free licenses in Ireland

The new Irish IP and commercialization framework, Putting public research to work for Ireland, sets out provisions for non-exclusive, royalty-free (NERF) licenses, awarded to companies that contribute financially towards a collaborative research program. Here, a company receives a NERF automatically for a short period to test and trial the IP, in order to decide whether it wants to license it exclusively – for a fee. If not, the university can seek another licensee. The system brings advantages through encouraging companies to make use of the IP arising from the research program, as well as encouraging collaboration in the first place.

Tip 6: Know when to exit when the relationship is no longer beneficial

Clarity over objectives can also help to know **when to exit the relationship**. Collaboration agreements are not everlasting. They grow, evolve and may die. If you are not receiving a return that is proportionate to your investment, it's time to move on.

...but don't forget the importance of IP management

Even when industry knows what it wants, and where universities have set up a sustainable flow of deals, an underlying problem remains: once IP has changed hands as part of a license deal, is it actually viable and defensible in use? Here are some tips to make sure it is:

Tip 7: Agree some “ground rules” up front about how to work together, especially around who “owns” the IP

IP licensing deals often take so long to complete that the commercial opportunity has passed. This is often due to both industry and academia arriving at the negotiating table with their own standard IP licensing conditions, and a desire among both parties to create a legally watertight agreement when – in many instances – it’s not needed. Even the leaders in this field are not nimble – Microsoft specifies that licensing activities can take anywhere between three and 12 months to arrange³. In a fast-moving sector such as ICT, the opportunity may have passed and the technology have been superseded.

A contentious issue in the deal-making process is often deciding who will own any IP that is created. Some national measures, such as the Bayh-Dole Act in the US, prescribe that the IP resulting from publicly funded research will always be owned by the academic party. In many other parts of the world, including in most of Europe, there is no such legal framework so there is more ambiguity and room for negotiation. Regardless of the situation, it is essential to tackle such issues up front in **agreeing the “ground rules” for working together in a partnership**. A frequently cited example of good practice in this area is Ireland’s Innovation Partnership Programme, which sets out unambiguous arrangements for ownership and for rights of use by all parties.

Standard forms and templates can help set out some ground rules. Rather than start from scratch in writing each new collaboration agreement, can you make use of one of the available standard templates that have already been agreed between industry and the public research sector?

Governments frequently want to encourage their publicly funded research organizations to pay more attention to the effective commercialization of intellectual property arising from research while,

³ <http://www.microsoft.com/about/legal/en/us/intellectualproperty/iplicensing/ventures.aspx>, accessed October 2012 .

at the same time, encouraging the private sector to make better use of these public sector research and knowledge resources. Recognizing the difficulties of preparing fresh agreements in every case, many have developed national guidelines and standard templates. For example, the UK Intellectual Property Office published a series of standard agreements known as the Lambert Agreements, which cover both bilateral (one company and one research institution) and multi-party situations. Other prescriptive models exist elsewhere – for example, the EU Framework Programme model contracts and the national model agreements in France and Germany.

Universities in the United States often publish clear principles on their websites that potential licensees are expected to accept – principles that are largely consistent among the institutions as they are framed by legislation such as the Bayh-Dole Act. Ireland has very recently published a new set of guidelines that stop short of offering standard texts for collaboration agreements but provide detailed guidance on what the agreements should say. Similarly, Denmark offers guidelines, while the European Commission has been working towards common guidelines to apply across Europe. Even if your own country does not offer such standard approaches, adapting approaches from other countries may save time and effort.

Tip 8: Ensure that your collaborators have good IP management processes in place

Before starting a university relationship, ask yourself: does this organization have a good process for educating its staff and students about the value of IP and how to recognize and protect it? Does it have sound processes for documenting its IP and keeping track of its commercial agreements? Often they do. If they don't, you may need to think about what a good IP management process looks like, and teach your collaborators to follow it. Table 6 shows a typical IP management process.

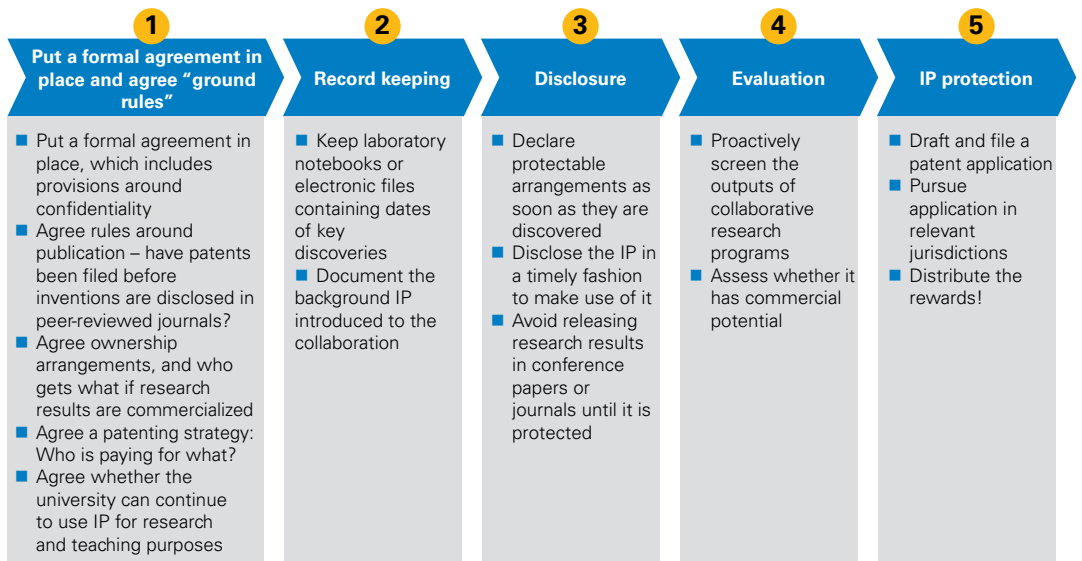


Table 5 A typical IP management process

Source: Arthur D. Little analysis

A common problem encountered in this process is that IP might not have been identified and protected in the first place. Here, there is a role for the technology transfer function within the university to systematically **screen the output of research programs**, to identify and document IP and establish whether it has commercial value, then to seek appropriate protection (e.g. by filing a patent) and to keep a record of commercialization agreements.

A further issue surrounds the introduction and use of background intellectual property (any existing IP introduced to a partnership), which may have existing restrictions over its use (i.e. it has already been licensed to someone else). Here, standard **background IP disclosure templates** can be used to capture and disclose any existing restrictions.

We also observe that **premature publication** is often a problem. Academics are measured by their publication rate in high-impact-factor journals, so naturally are keen to publish their results as soon as possible. But if a piece of IP arrives in a journal article before a patent application is filed, the patent could be rejected or invalidated. The development of "open access" publishing, while designed to make research results available faster and so speed up

innovation based on those results, potentially increases this risk. This trend will continue – already, the current EU Framework Programme of collaborative research is trialing an arrangement by which 20 % of results must be published via open access; future EU programs are likely to make this the norm and the European Commission has recently recommended that all EU Member States apply the same principle to their national research programs.

Our view is that this can largely be managed by ensuring that basic principles and procedures are in place in universities to **ensure that academic staff and students are clear about the circumstances under which they can publish** as part of the IP management process. These might include, for example, a process for obtaining permission from other collaborators, with a default position to go ahead if no objections are raised and a time limit (say six months) on how long an industry collaborator can block publication. To ensure that this process works, staff and students must be aware of the importance of IP management up front. In some cases, it could be appropriate to ask them to sign an undertaking to indicate that they understand what is expected of them before they can draw down research funding, as is the case in Ireland.

Tip 9: Ensure that you and your collaborators are following the processes

Processes are great – but not so great if no one sticks to them, either within universities or within your business. There are several factors that may influence whether processes are followed. The most common is a question of **incentives** – are appropriate measures in place to encourage people to adhere to processes? Do they get something out of it, or are they reprimanded for not following them? The next most common is **education**: do researchers understand the processes and principles associated with IP management? Have they had the process for approving publications described to them? Finally, it may not be clear who is **responsible** for delivery of the process – whose job description does it lie in, and who is measuring their performance?

Tip 10: Repeat as above!

An innovation ecosystem isn't an ecosystem with only two partners. It's an interactive and dynamic arrangement involving **multiple parties**, all of whom benefit from each other. Aim for several collaborating arrangements; introduce your collaborators to each other, and encourage the collaborators to collaborate!

Follow these ten tips, and you are well on the road to a successful innovation ecosystem – and all the benefits it can bring.

Insights for the executive

An innovation ecosystem – the “cloud” of external organizations that a company builds up and maintains as its source of ideas and stimuli – involves organizations with similar interests working together for collective and mutual benefit. Bringing publicly funded research organizations such as universities into an innovation ecosystem brings four main problems:

- Companies are not clear enough on what they want to obtain from an innovation ecosystem arrangement.
- Companies and universities have unrealistic financial expectations around the value of IP or a license deal.
- Universities do not always manage their IP well.
- Doing deals can be bureaucratic and slow.

We believe that creating an effective innovation ecosystem involves being clear about what you want up front, working together productively, and, above all, not forgetting some simple principles about good IP management to help the relationship run well in the background.

We see that the key principles about getting good IP management working include:

- Agreeing some “ground rules” up front about how to work together, especially around who “owns” the IP.
- Ensuring that your collaborators have good IP management processes in place.
- Ensuring that you and your collaborators are following the processes.

What’s more important for an executive tasked with operating an innovation ecosystem is **being clear about what you want to achieve out of a collaboration**, realizing that your collaborator needs to realize a benefit as well, and that **it may take longer than expected to realize results**.

Knowing what you want will help to structure the type of relationship you initiate – it might be anything from sponsoring a PhD student for a “look-see” into some basic research, or a tightly controlled contract research arrangement for a product that is close to market.

Often, companies complain that they don’t see results from open innovation programs. We believe that results can only be obtained if there is a **flow of people** who can work together on shared issues, rather than a flow of money – and by making sure that these people stick to the rules and are aware of the importance of good IP management in stimulating ecosystem innovation.

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