Distilling Intellectual Property from Higher Education - Why and How

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## Introduction

Higher Education (HE) is always in a state of change. It may take a long time to change direction, but generally it understands its duty to be reflective, to learn and continually improve its performance. In a global climate of financial decline every area of public service is being scrutinised for its value to the taxpayers (Willets D, 2012). As such, a response to external scrutiny must be approached with more speed than previous developments in HE.

Reporting on the value of outputs from the process of learning and teaching has two main indicators: the experience of the students and the relevance of that experience in their future lives, and the value to society of having people educated to the level and in the subjects that HE provides.

The areas of operation that an individual institution chooses to focus on may be externally or internally influenced. Red brick universities with a long tradition of research and advanced scholarship will find it easy to continue in that area, whereas post-92 universities may find that differentiation in the marketplace comes from imbuing its charges with more practical experiences. New teaching institutions focussed solely on delivering professional and fast track degrees without the ‘university experience’ are being favoured in the new political regime (Willets D, 2013), which is putting further pressure on HE funding.

By virtue of the processes in maintaining state of the art knowledge to pass on to the learners, most universities will create some new knowledge in some form. The bulk of this knowledge will be embodied in the craft of delivering knowledge through teaching. This pedagogy can be classified as advanced scholarship even though it is often self-reflective. Knowledge which is of value not to the learners or the institution itself but to external markets is less common. It is often thought to have greater value because impacts beyond the institutional boundaries are more visible; news-worthy successes making huge amounts of money or creating new medical breakthroughs stick in the mind. Both of these knowledge creation routes generate Intellectual Property (IP) and may create impact in HE itself or society.

Despite the potential value of this IP to HE, government, society and the host nation, the financial benefit from commercialising IP less than 0.2% of UK research funding and institutions are obviously not correctly set up to turn knowledge into impact (THE, 28 February 2008).

## The Value of Intellectual Property

Drucker in the 1960’s discussed knowledge workers as opposed to manual workers. Knowledge is not interchangeable with information, and has value where there is market for it. If the knowledge is held in common or not unique then the cost is lower, tending to zero cost in ‘open source’ or ‘prior art’ scenarios. Trading in the knowledge that has - or is predicted to have - value is termed the knowledge economy. By no means all of the actors in the knowledge economy are generating new knowledge.

Knowledge is very difficult to value and its acquisition is most often the route to creating greater value for an existing asset. This is the case for people who increase their worth with continuing professional development (CPD) and for industry that increases the value of production with incremental innovation on manufacturing processes.

Universities’ IP is created without specific reference to its market value, unlike the previous examples. Given that it is almost an accidental product, it is difficult to see how its production can be foreseen in the way that a business would project income from sales.

This is born out in the increasingly common practice of giving free access to IP, provided that the originator can show some societal impact. Staffordshire Universities ‘easy-access IP’ is such a licensing scheme. Many companies secure large tracts of IP from academia to gamble on some of it being valuable in the long term (i.e. THE, 13 April 2007).

Wellings (2008) ignores individual academics in the IP process and deals solely with the institutional requirements for commercialising the value of the IP itself. Looking at the success rate for academics and spin-outs achieving return on investment, this is probably a good choice.

Once potentially valuable IP has been identified as an output of the knowledge generation process there are a number of routes to commercialisation, some of which have been discussed as part of the generation process itself.

There are buyers in the marketplace who are already aware of the potential value of IP such as investment capital funds (VC) and business angels. For other potential consumers of IP, the marketing effort is a long road. Some industry does not see solutions in academic process and others that do have a difficult time getting to the right subject expert within HE to find the solutions or whether they even as yet exist.

Industry led research and development collaboration is partly funded by government across Europe in various schemes. The UK version of this is the technology strategy board’s (TSB) themed funding calls, knowledge transfer partnerships and Smart awards. These funds are necessarily led by an industry partner who contracts a research and development supplier (almost always HE) to provide the knowledge based outcomes.

In a reverse of this process, consultancy by HE to external organisations takes IP from industry that needs R&D for the full commercialisation and adds the academic rigour that is lacking or too costly to do in-house.

Talking to external partners is a valuable process, partly enabled by networking (see next section) wider discussion with a range of subject experts and the industry sector leaders reveals significant ‘pinch points’ whose solution might assist whole industries or sectors.

In Staffordshire university (SU), the assessment of IP value is made at a number of levels. It is taken into consideration at faculty level when planning a project. THe likely value or number of financial and non-financial deliverables form a project influence the decision on allocation of resources, as does the project’s fit with faculty themes or priorities.

Within the Enterprise and Commercial Development service at SU, technical feasibility is less of a measure and the number and impact of deliverables is paramount to allocating funding.

Both of these processes are trying to predict the value of the outputs before project commencement. How IP generated is valued once it has been completed is further complicated by the routes to commercialisation available.

SU is a post-92 university, with its focus on near-market delivery, community engagement and creating impact through collaboration through knowledge transfer. THe techniques used for delivering IP are state of the art, as demonstrated by its continuing success in Higher Education Innovation Fund (HEIF) delivery and accolades for EU fund outputs.

As a strategy for maximising value from IP, however, both SU’s work, the approach taken by VC funds and the impacts required by UK government are short of the mark.

Other value in IP comes from re-use. An exploration of the value chain for cross-sector applications of knowledge is proposed by new IP managers such as The Commercial Edge Initiative[[1]](#footnote-1). This, coupled with open innovation strategies and value-added project management about to be funded by the EU Horizon2020 fund will start to fill in the gaps where IP’s value is not realised.

## The Generation of Intellectual Property

Agreeing for now that generating IP is a worthwhile undertaking for a university, what can we learn from state of the art in HE organisational theory that would enable the process?

In any community of learning or practice, the environment has both physical and non-physical attributes:

* People
* Places in which they work
* Motivation for particular behaviour
* Incentives for success against performance indicators.

In academic institutions, the senior staff are usually required to perform supervision or organisation of their faculty. When coupled with research and teaching, this puts pressure on the remaining time. Should staff be encouraged to spend this time generating IP or getting commercial value form their knowledge? This is an institutional decision which varies widely across the HE sector.

One approach is the Imperial College Consultancy[[2]](#footnote-2) (ICC), where value is created in a conventional consultancy format using academics to deliver knowledge based solutions to commercial clients. The academics are rewarded for their part int his work.

Cambridge University has returned to a scheme where the academic owns 85% of any IP generated. This is unusually high, but bears in mind that historically the author of written work retains the copyright and hence 100% of the potential income. This favours humanities and arts where IP is difficult to protect by patent over science and engineering subjects.

Motivation to participate in the knowledge economy external to one’s organisation comes from areas other than remuneration. An institution and staff that reflect on their own value to society may see the benefits as purely philanthropic, rising to the top of Maslow’s hierarchy of needs. To support these motivations the institute still needs to provide clear encouragement, which may also include financial rewards not directly connected to external income.

Attention should be paid to the state of the faculty in terms of morale using techniques including Hertzberg’s motivation/hygiene theory and Vroom’s expectancy theory. Combining these into a measure of the current state of the faculty, is discussed by McCaffery (2008, pp186-198).

How the academics feel about their environment is also partly dictated by the work space they inhabit. Legacy abounds in HE - how we used to teach, how academics used to interact. Previous behaviours and processes are embedded in the fabric of the buildings. Modern work spaces are often still based around the equipment that we use. An academic building has large lecture theatres and one-to-many delivery spaces. A call centre will be designed around the information technology used and the per-square-metre value of the office floor, whereas linear assembly in factories still revolves around moving physical objects from place to place with the production workflow.

How might these environments be better tailored not for the core activity, but the development of a knowledge economy and the IP that may emerge from the interaction between people and processes?

From Myerson and Ross (2003), there are narrative, nodal, neighbourly and nomadic workplaces. Each has evolved to solve a particular issue arising from historical business behaviour.

A work environment suitable for stimulating the generation of IP may take on any of the four forms; different subject areas may require different creative environments. There is no answer in the texts to how one might specifically overlay these environments on to specific existing environments. What might the result of a fusion between, say, a nodal task based central hub of disparate resource areas and the existing one-to-many delivery structures of a university look like?

State of the art in workplace design seems to be based on answers to the questions ‘what are you trying to achieve’ and ‘what you make you happy’. There is some work around designing spaces for potential outcomes where the users are not involved in the design process, mainly from global consulting companies (Price Waterhouse Cooper 1995).

The legacy environment often dictates the success of new ventures. WIth the best will in the world, trying to follow best practice for creative spaces fall down when you are limited to legacy buildings. Spin-out companies, rather than being put in their own office on a corridor in an old municipal building, should benefit form the co-mentoring and creative support that other spin-out companies could provide in a n informal, open, workplace. Academics are expected to function with new, commercial, behaviours when still working the same teaching environment.

UK government (Wellings 2005) wants universities to make best use of science park space to incubate innovation and to co-create innovation with industry, but pays no attention to the relevance of the physical spaces provided or being planned.

The reverse of this problem can be true in industry. There is often the money for innovation and improvement. Continual improvement is understood to lead to continued performance in the market. However a knowledge economy is difficult to embed when academic rigour is not the basis for decision making.

Regardless of the type of work undertaken by industry, some decisions will always be outside of the direct experience of the company. HE can make its breadth of knowledge available to generate new knowledge for industry as their trusted third party or a critical friend. This will require either a physical or virtual (Felstead 2005) exploding workspace which creates and nurtures an overlap between industry and academia.

This is one of the aims of the new Catapult centres set up by UK government and is the basis for the Fraunhofer operations in Germany. Although impressive results are seen within industry sectors related to the theme or focus of these centres, it must be remembered that they are not designed to be cross-disciplinary.

## Communities of Learning and Practice

At the basic level of operation knowledge creation comes from people and the interaction and translation of understanding between them. It has been understood for many years that good value for taxpayers is to get the knowledge economy started by building inter-personal networks. The UK and EU have wide ranging programmes to build networks of people, companies, public sector organisations and specifically academics.

Although these networking schemes are popular, there is little activity building support frameworks to nurture the outputs. Success of creating IP from relationships or projects started through networking relies on there being a framework of support. This is left to the participating agents and therefore has the same issues we started with at the beginning of the section.

Frameworks to support a productive knowledge economy in HE include the consultancy model like ICC, the IP purchase model like the IP Group[[3]](#footnote-3), and academics ‘doing it themselves’ supported by central services like Warwick Ventures[[4]](#footnote-4). Staffordshire University is growing capacity in IP generation through imposition of an advanced scholarship requirement on all academic staff.

Unfortunately these frameworks are not comprehensive. They are focussed on value streams for their own performance indicators as a service within the university. Creation of spin-outs from a stand-alone item of IP or delivering patents does not support a wide range of creative processes in and between areas at the faculty level.

As opposed to networks and frameworks built around encouraging outputs in a particular academic theme or sector, communities are organic and self-sustaining. At best they can be a self-organising entity which draws on all of the areas for growth in knowledge: funding; market demand; emergent IP; reflective development.

Since they sit above any one physical node or organisational boundary, the physical, virtual, local, regional, national and international members of a community of learning or practice can interact as symbiotic relationships are required or emerge.

As an academic basis for collaboration, it is presumed that members of a community have ‘perfect information’ about the other’s situation and knowledge. This is important because it promotes open and honest disclosure to reach the mutually beneficial outcomes as quickly as possible using least resources. In business, this is not always the case. The participation of commercial players in the community of IP generation will create silos of ‘knows’ and ‘don’t-knows’ among it’s members as confidential information cannot be freely shared.

## Conclusion

Staffordshire University has many examples of excellence in knowledge generation, intellectual property capture, commercialisation and value maximisation. Research shows that these areas of excellent performance are on a par with national and international best practice. To bring knowledge generators’ experience of being enabled, nurtured and rewarded to an even level across the university, the following areas need to be addressed.

Examining the creative processes in brief (i.e. Winstanley 2009 Ch.3), one key to creative emergence could be to make the familiar unfamiliar. The inverse approach may also lead to the generation of new knowledge. Tools like those in the JISC Infonet[[5]](#footnote-5) (particularly here, the Delphi method) should be available for use in subject areas to ensure that the wicked problems which abound in creating communities of practice can be honestly discussed and generate solutions to the lack of performance in IP value creation.

Managing subject or faculty based knowledge generation through internal communities can then be fed into a higher level cross-disciplinary community of practice, either by developing physical collision spaces or virtual systems (De Lido, Concilio 2009).

By putting in place an inclusive community which overarches the subject areas, job roles (lecturer and researcher) and working practices, an environment could be created to distill valuable latent IP from all areas of university life.

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1. [www.tcei.co.uk](http://www.tcei.co.uk) [↑](#footnote-ref-1)
2. [www.imperial-consultants.co.uk](http://www.imperial-consultants.co.uk) [↑](#footnote-ref-2)
3. [www.ipgroupplc.com](http://www.ipgroupplc.com/) [↑](#footnote-ref-3)
4. <http://www2.warwick.ac.uk/services/ventures/> [↑](#footnote-ref-4)
5. <http://www.jiscinfonet.ac.uk/tools/> [↑](#footnote-ref-5)