

Intellectual property and Irish universities

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Dissent and alarm

One focus for current dissent and alarm in the academy is the link between the university and business and industry, and the political influence that is brought to bear in order to accelerate such linkages. The Lisbon Agenda [1] urges more investment in more efficient research, better links with business, new knowledge driving new enterprises of a highly technological or service-oriented nature and greater competitiveness of Europe relative to its American and Asian trading partners: this is the agenda that countries now expect their scientists, researchers and universities to absorb, plan to execute and deliver. What a business would regard as opportunity, the academy fears.

University members also fear that the state's investments made in their educational functions, in the form of capital and annual-running budgets, will unduly influence the directions chosen by universities in organising their main educational functions, as they respond to changes in society, changes that they help to bring about. So the manner in which universities perform their new and their old functions is likely to change some attitudes and cultural orientations within universities. How can they handle these changes while they are achieving their own goals of self-government in matters of scholarship, teaching and research, to enable learning about the truth?

The history of IP (intellectual property)

The processes and procedures of IP management, commercial use and legal protection have grown up over centuries, and have suffered from influences that are far from those that animate the universities' agenda. In Ireland, the first copyright case, back in the Dark Ages, in which a monk explained his right to copy thus "the book was not damaged in any way by my having copied it, and the action permitted the better dissemination of the truth (the word of God) contained in the book" resulted in restoration of the copy to the owner of the original [2]. But like any academic insisting on principle over procedure, the monk went to war to retain his copy of the book, and the consequent losses were greater than any advantage to either party in the original suit. Most IP disputes enrich intermediaries. They occur because of the clash of cultures, and often because one side tries to force the bargain too far in its own direction.

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IP and tax in Ireland

Ireland has seen a series of fiscal incentives for those investing in creativity: income-tax free status on copyright earnings since the 1960s has paralleled great advances in literature and literary culture in Ireland [3]. But the complementary relief on income tax from patent royalties in Ireland was clouded by dubious schemes that awarded tax-free royalty incomes to those whose participation in inventions was only nominal. Accounting technicians set to work, undermining confidence in this method of rewarding innovation by turning it into schemes for rewarding the bosses. The system has also been worked to benefit foreign direct investment, although that sector already had one of the lowest corporate tax rates on earnings in Europe [4]. Indigenous inventors did not flourish in the engineering sciences, and little effort was made to make the scheme work for local industry.

Attempts to secure certainty as to how the system would work were, in my experience, brushed aside by official obfuscation. Getting simple information about the scheme was made difficult. A similar fate befell schemes to return, for investment in start-up companies, income tax previously paid by those with modest earnings: the income of billionaires was carefully protected from tax in property schemes largely available to the super-wealthy [5].

IP and creativity

The IP system is a method of rewarding creativity in a controlled manner, aiming to reduce uncertainty for investors in what is a high-risk area of business. The quarrel of the academic mind with the internationally accepted IP system continues to this day. It sometimes arises because the law protects the creation of a new artistic endeavour, or literary or filmed work through copyright. One may not reproduce from books even for one's class of students, a group inherently impecunious but thirsting for knowledge, without the permission of the copyright owner, however inconvenient this may be. But it was not the intellectual content that was protected, it was the manner in which the ideas are expressed that counted as the original work, and communication of the ideas and recital of relevant extracts of the works for critical commentary is not forbidden. Ideas are not owned. The purpose of allowing a monopoly to the writer, or through assignment of that right, to the publisher who risks the money on printing and publication, is to reward the investor. It is beneficial for society that those with surplus capital to invest should choose to risk that capital on unknown poets or writers.

Similarly, it is thought to be beneficial that those who invest in the manufacture of new inventions should be allowed to reap a harvest by being the only ones entitled to profit from the invention for a limited period. (Again, the rights are patent rights that are licensed or assigned to the investors by the inventors). That the system should have been distorted (some might say corrupted) to allow the heirs of a copyright holder to maintain their monopoly for 70 years after the death of the author, a practice that is enormously beneficial to multinationals owning part of the Hollywood corpus of work, is merely a detailed accident

of international trade negotiation compromises. (Such compromises have certainly allowed valuable monopolies to be created that frighten those concerned with the public availability of information: “The dramatic proposal to establish database protection for collections of information primarily unprotected by copyright law could have a devastating impact on what librarians think of as ‘the public domain’”, according to the ALA [6]).

IP and the university

How do these processes affect the university? Briefly, the practices of IP management do not sit well with the scientist’s or scholar’s imperative to get the new creation into publication as soon as possible; nor can the process of IP management be divined by intuition and raw logic. The system is not what a scientist would wish to design from first principles.

In order to create an effective patent and have a chance of a monopoly, the discovery must be first disclosed entirely to the world in the patent by the inventor. So publishing a scientific paper describing a discovery that teaches how the invention would work can prevent the later issuance of a patent (except in the U.S.A., Australia, Japan and some other countries, where there is a grace period of 1 year or 6 months, and these exceptions are commercially very important) [7]. Scientific papers need to be screened for possible inventions: in the case of new therapeutic drugs which may require an investment of nearly a billion dollars in tests of efficacy and safety before they can be sold, it is critical for the investors to know they will have a monopoly on the sale of the drug for many years into the future; it is also critical for patients, since fewer drugs are created in countries where investment capital for this purpose is scarce, owing to the uncertainty of future rewards. How long can the delay be? Although conventionally a delay of a few months is adequate for most patenting purposes, many companies in this and other fields of research seek much longer delays for the purpose of prolonging commercial advantage through delays in disclosure of the discoveries to competitors.

We now enter an arena of conflict between the goals of the individual scientists and their universities, on the one hand, and the entire enterprise of new drug discovery, on the other. What are the goals of the original scientists? They are to be recognized as the first to do, create, discover, disclose or teach some new phenomenon or explanation that better describes a fact of nature, or that is a creative synthesis of earlier-discovered facts. However, such discoveries nowadays may take place against a background of ‘road maps’ of international endeavour, in which learned assemblies have charted the path towards discovery using predictions available from theory and logical alternatives for possible future discoveries.

Quantum computing is such an area of research, in which there is a 280 page road map available that charts where future discoveries are likely and welcome as possible useful technologies. It contains over 30 references to work by Bell, an Irishman who worked largely in the U.K. and in CERN (European Organization for Nuclear Research). A fellow scientist has assessed Bell’s

achievement as “one of the most profound discoveries of all time” [8,9], an accolade that most scientists would regard as a crowning achievement.

The problem raised by such processes is who will be the inventor when a discovery is made consequent on the scientific thought experiments deriving from one that Bell proposed? If it becomes possible to achieve secure communications with the expected property that intercepting them reveals the fact of interception, then will Bell be an inventor entitled to benefit? If not (as a deceased researcher, he is not entitled to file a patent on an invention, nor to inventorship status), then how can someone who is following, in Bell’s footsteps, a clever and comprehensive road map set out by the world’s ranking experts, be an independent inventor? The idea of inventorship as a very precise concept is difficult for scientific teams. Yet, in a patent, each inventor may be associated with a particular claim of an invention in which there is novelty. If the objective is to recognize discovery, then inventorship does not necessarily achieve it. On the other hand, if reward for taking the risk on the invention is the aim, then the measurement of return on the actual investment is a surer method of reward, since the lifetime of a patent’s exclusive use nature could be tailored to the achievement of whatever reward society thinks reasonable. For pharmaceuticals, 20 years may be too short, but it may be too long for many other subject areas. The present system appears to work well in the U.S.A. in encouraging investment in the products of research: a dollar of venture capital is seven times more powerful in stimulating patenting than a dollar of corporate R&D (research and development) [10]. An entire volume could be devoted to discussion of why this is so, but it appears, from our experience, that investors may seek a level of insurance against the knowledge asymmetry risk that is not required by corporations, and Gompers and Lerner [10] attribute the insurance requirement to those seeking the investment from the venture capitalist.

Another controversial aspect of patents is the disclosure element: there are few cases of monopolies being struck down for inadequate disclosure, and there are clearly too few strictures on those who seek and receive monopolies but who, in reality, do not make all the information available to the public, as is supposed to happen. There is no active public pursuit of the faintly bogus patents that are generally conceded to abound. Why is such abuse tolerated?

Confusion abounds

The real confusion about IP is not confined to academics. In struggling to confine new scientific discovery to the straightjacket of previous legal decisions and precedents in property law, lengthy and expensive lawsuits shuffling the problems up and down through the court systems burn millions of dollars, create great commercial uncertainty for all except the very wealthiest of corporations, and copper-fasten great monopolies. Can life itself be patented? The specialized breed of mice used for cancer research can and has been patented. Well, who then owns the cells in our bodies, cells that contain a signature of our individuality so that we can each be distinguished from millions of other very similar humans with whom we share 99.9% of the human genome?

A Mr Moore, who had an unusual cancer of the liver, discovered that his doctor had patented the products of his cell line. He lost the law case in California in which he tried to recover what he thought erroneously was his own property. This line of action is not confined to the U.S.A.; in Ireland, the Bioethics Committee [11] tells us that nobody should be allowed to make money by selling their body parts. It is clear that companies have managed to acquire body parts of deceased humans for decades through some Irish hospitals, and the record is silent on whether or not individuals received payment for this process.

An apparently strange inconsistency with simple logic will be evident to readers in the copyright case taken by Mrs Gormley in Ireland and finally adjudicated in 1998 [12,13]. She heard her own voice on a popular commercial recording sold by a multinational corporation, and traced it to a recording made long before in a state-run primary school, by a state-salaried teacher, in a school system to whose care the law had obliged her parents to commit her. The entire point of the record was the charm with which she and other children retold biblical stories in their own words and highly local accents. The name of the recording was chosen clearly to sell the recording by emphasising the individuality of the approach: "Give up yer aul sins". Yet she lost her case in several Irish courts, no doubt entirely properly in accordance with what was then the law, to the benefit of the multinational. The grounds were that the law of copyright as it stood in Ireland did not protect recordings as literary works (magnetic recording having only been discovered 50 years previously). It was made clear also that the law did not consider her work as sufficiently original literary work because she was a child, using the comparison of Charles Lamb's *Tales from Shakespeare* as the standard for what would be an original literary work. With the benefit of the hindsight that arises from the present proposal to amend the Irish Constitution to give statutory rights to children, we may query the viewpoint that, in a modern society, children's work is worthy of lesser protection. The issue of moral rights did not arise in the case. Moral rights, in this context, are the rights to be recognized as the author or inventor of a new creation.

Moral rights

In the early 1990s, on seeking advice from a TCD (Trinity College Dublin) law professor on the position of moral rights in Ireland, his nearby junior colleague, when asked to instruct me on the matter, informed me: "There are no moral rights in Irish Law". Unluckily for Mrs Gormley, the situation was only rectified in Ireland in the Copyright Act of 2000. This Act incorporates European thinking on software protection, which appears to be driven largely by U.S.A. influences. But in compliance with the wishes of industry, these new moral rights are assignable in Ireland, and few large companies will now disclose information about this intrinsic truth regarding invention and authorship in their products.

A hybrid system of software patents has emerged with some degree of furtiveness. How can this be, since software is copyright protected and copyright protects the form of expression, not the idea? Business processes are not protectable by patents (outside the U.S.A.). Algorithms are not

patent-protectable, and a computer program is essentially a compilation of algorithms. The rather immature approach which used to be adopted of simply changing variable names in software coding to show that the 'new' criterion was met in what were really copies of others' software, is specifically trapped by this Act. But the confusion between the two different systems of protection, patenting and copyright, reflects the absence of a clear, intellectually logical approach to incorporating new discoveries into the patent laws. Pretending that there is not a new situation and stretching old paradigms to cover new science and engineering may well bring down the entire system: hints of such failure are evident in the music industry and in education, where illicit copying is widespread and often encouraged.

Despair?

Do we despair in the university of ever achieving a worthwhile use of IP to compensate for the system's evident shortcomings? On the contrary, such examples as we have noted have driven us to pay close attention to the value that can be derived from the IP protection system.

The benefits of working closely with industry and business are not confined to earning royalties and other monies: in these direct activities, technology-transfer offices rarely cover their own costs. It is in indirect results that the universities benefit. An Irish example is provided by a summary of joint work to produce the patented nicotine patch, a smoking cessation aid arising from work between TCD scientists Professor John Corish and Professor Owen Corrigan, and Professor Joe Masterson and his team from the Elan Corporation in Ireland, initiated with the assistance of a grant from the state-owned IDA (Industrial Development Agency). This long interaction produced funding for many research students in chemistry and pharmacy. In addition to royalties, which were welcome and shared with the College inventors, the association provided funds with which Elan completed the building of a Biotechnology Institute at TCD. The main funding was provided by the state against a plan that promised that companies would use half of the building, as they did for its first 10 years of operation. A new pharmacy building was part-funded by the philanthropy of Don Panoz, the founder of Elan, who accessed consultancy from various TCD staff members. Many faculty members speak of the enhancement of their teaching range and intellectual interests consequent on such interactions.

The Elan-TCD case illustrates several of the features seen in statistical analysis of the earnings of U.S.A. universities from technology transfer [14]. The four strongly associated variables that correlate with financial success are: rewards for the professors (as in the case of Elan), local industry to take up the offer from the university (as in the case of Elan), support from the head of the university (who gravely inconvenienced himself to come to a critical College board meeting discussing the project) and the length of service of the person running the technology-transfer office (the same TCD person worked with Elan for 14 years of their association with TCD).

Criticism

Most university–industry projects do not produce such benefits, and a variety of criticisms are levelled at the intermediaries (technology-transfer offices) by both industry and by university researchers. A litany of complaints is available on the web [15]. Often, for a busy professor, one instance of non-performance, as the professor sees it, can damn the entire process. It is indeed true that many university discoveries lie idle and undeveloped, and a subjective view is the best that can be expected from this writer. The fundamental structural question in comparing a university with a business is that of money: when asked why the merger plan to unite UCL (University College London) with Imperial College in London had failed, one senior official answered that he had not known that universities could not access the financial resources to overcome the immediate costs of such a merger, whereas companies never have problems securing finance for mergers. In most cases in which a university is dealing with a business, the company spends one-third of its money at most on making the product; the rest is concerned with other aspects of business, such as marketing and sales etc. In a university, where the research effort uses, say, 50% of the core employees' time, and spends another €100 million in marginal research costs, the sum of money available to market and sell the product is probably less than 1% of the total. With such an allocation, the effects of marketing and sales efforts are predictably negligible. The sales that are effected are largely made through identification of customers by the primary-idea generators, whose ideas about the difference between cost and price are often unfortunately confused. Knowledge of the importance, as well as the value, of IP has grown rapidly over the past decade, and has probably reached the 10% penetration stage of the academic community. So 90% of the time, sales will be attempted where the principal advantage to the seller of a statutory monopoly may have been in part compromised.

Another major deterrent to the commercial exploitation of research is erected by those soliciting partnerships with industry without knowledge of their own university's policies for handling IP (usually available to all staff with two clicks on their internal website). Given the potential remission of income tax in Ireland, TCD researchers stand to earn approx. 50% more than the average university in Western Europe and the U.S.A. will allocate to researchers in a given deal. But the received wisdom on campus, reinforced by external consultancy advice, is that the TCD policy is aggressive (against its own staff). An intellectual stampede of this nature is hard to stop, especially when driven by academics running companies without the sanction of their employers, the university, and desirous of avoiding any claims from the university to earnings that might fairly be associated with their employment. The chief internal obstacles to appropriate earnings from inventions, even given an effectively supported and competently run technology-transfer office, are: the unwitting disclosure of material to third parties, the incorporation of third-party-owned IP, venue shopping to other homes and creating 'offshore' accounts (i.e. companies outside the universities' ambit). Most universities have no enforced mechanisms for effective sanction of such behaviour. It rarely leads to success, judging by the number of disgruntled researchers from countries where professors own, or used to own, their IP outright.

The distinguishing characteristics of great success are timing, luck and professional management of the stages of transfer of knowledge from laboratory to market. Meanwhile, in a typical small technology-transfer office, the university will pour its unfulfilled expectations on fifteen different fronts on to the workload, including duties ranging from organising vocational education, meeting and greeting the surplus of visiting dignitaries, establishing information networks and resolving internal conflicts on space. Focus is the first lesson the academy needs to learn in this regard.

Some good news

If I have dwelled on some malfunctioning of the university system in this regard, it is to try to balance the account, for it is in the regional development systems that I have encountered that the most severe obstacles were created, although there is now good news to report. Previous failures of local importance included insisting on creating one-to-one relationships with researchers, giving agencies control of contracts for use of the university's facilities, to dispose of the universities' staff time and laboratories and to sell the universities' research output. The management of IP was unknown and ignored, and the fertile ground for development from R&D was badly trampled through mishandling of IP. Much has now changed.

The positive aspects of state intervention in Ireland have been three-fold. First, Enterprise Ireland has introduced a scheme for financially supporting patent filings from university research. This has led to a tripling of patent applications from Irish universities. If this is an overenthusiastic response to the scheme, it certainly serves the purpose of training researchers in the methods and processes of this difficult area. The winnowing of the chaff from the wheat occurs early in the process, when it is clear that much that is patented is far too early for markets. But the next generation of young researchers who leave university to enrich the community will have the added skill of some knowledge of what to do with a discovery in order to extract value from it.

Secondly, Enterprise Ireland has created in Ireland a venture-capital industry where none existed before. This has the 'pull' effect that the executives of the funds regularly poll the colleges to seek research output which has the asset backing of some IP protection. Analysts, particularly U.S.A. promoters seeking to validate their dismissal of European practices as anti-productive and lacking in innovation and entrepreneurship, regularly dismiss such state interventions as futile, but state support to create local venture-capital industries appears to have worked well in Ireland and Israel.

Thirdly, the funding agencies now require the universities' staff to accept that, on receipt of funding for research, they undertake to implement their internal processes to protect discoveries that may have commercial potential. No university researcher is forced into patenting, or into commercialization against his will, but when academics choose to accept money for research under the main schemes, they must now also accept that the IP process may be applied to their work. To date this has caused minimal difficulty. One would wish that the universities themselves disposed of funds that could be used for entirely blue-skies work

at some level of funding, since, in my experience, that kind of work has yielded the greatest benefits by far. But this contention has never been accepted by public authorities, whose informants, generally in the manufacturing industry and sales domains, are usually not very knowledgeable about the creation of visionary companies. The need to support first-class research as a prerequisite for high-impact downstream developments is now enthusiastically promoted by Science Foundation Ireland.

Failures

But there are many negative aspects of state intervention: in Ireland there have been three great failures worthy of international note to avoid re-occurrence. First, attempts to centralize the management of IP in the 1990s caused hilarious attempts to override the wishes of researchers. Secondly, there have been a number of attempts to brush aside the issue of IP and create what was being termed ‘an IP-free zone’. Presumably, this concept was queried by anxious multinationals that prefer to have research carried out by people who have some inkling of the real value of discoveries than by those swept up in the euphoria of marketing the knowledge economy without understanding what it means. Those who have had to engage in contracts with multinationals will know how sobering it is to face the statement from industry, after 6 months of arrangements about personnel exchange, grants and buildings between colleges, state agencies and multinationals, that “the treatment of IP will be the most important part of this contract”. However, people will eventually learn that professors cannot be coerced into research on unfavourable terms, as was evidenced by the failure of MLE (Media Lab Europe), a venture based on MIT (Massachusetts Institute of Technology) Medialabs, with the expectation that IP generated in Irish universities could be given without change to U.S.A.-based corporate sponsors by MLE. Balance in all university–industry interactions is important for success.

Thirdly, there has been the wearisome process of establishing state-wide protocols for managing IP from publicly funded research, originally designed to give IP freely to companies, a concept which soon fell foul of the rules governing state aids. These protocols eventually settled down into sensible guides: paradoxically, they were breached almost immediately by other state agencies, if only to underline the historical practice of state monopoly-management of enterprises.

Progress?

In discussion with a colleague from a nearby jurisdiction, the subject of this colloquium caused him much distress: “Do the universities not know how little progress has been made in the area of commercialization? Surely they realize how untouched by commerce their lives and practices really are, and how ineffective we in tech transfer have been?”

What could be done to improve the record with regards to commercialization while saving the core values of the university? The ProTon network

recently addressed the European Commission on matters of detail in relation to IP [7]. Many of the trends relate to converting the rest of the world more closely to the American system. Much of the discussion relates to the hopelessness of changing such a deeply embedded system as the world-wide IP community practices, and the European reluctance to change to one common patent among the EU (European Union) members, rather than the present practice of issuing individual patents in each sovereign nation.

The need for an overhaul

I have described some personal reactions to apparent defects in the theoretical underpinning and practical application of IP management to discoveries. The entire subject seems to be riddled with intellectual inconsistency, with a confused approach to new science, with practical decisions that seem remote from equity and with local inefficiencies. Overall, the system now suits few members of the discovery community, the investment community or, indeed, the manufacturing and service industries protected ultimately by the system. Those few members who find it suitable are undoubtedly very powerful. But none of the other parties need despair of the possibility of repairing or ameliorating the system: if an overhaul seems improbable, at least some aspects of the IP system should be systematically addressed.

The entire concept of IP protection of invention and utility needs an overhaul: with the patenting of animals, software, medical treatments and business processes, it is almost surprising that breathing has not been patented. The protection that should be afforded to the investor should be limited in time and in scale. This may mean the lengthening of patents in biotechnology, and the shortening of the time period down from the 70 years that now attaches to the rights of the heirs of authors. The recognition of the scientific achievement of 'first-to-discover', and the authors' and designers' achievements of creativity, should be enshrined in all their works. It should never be possible to pretend that one person created what another actually did. The integrity of people, their bodies and their achievements should be seen as a whole, and the law should effectively guarantee individuals' rights to recognition for their achievements.

The resolution of disputes should not be governed entirely by the possession of wealth; scientific disputes about patents and discovery should be adjudicated by specialists and not by general and expensive courts. All unworked IP should be available for public licence after a set term of years, on fixed terms that reward the inventors and the investors in any jurisdiction. All universities should instruct researchers to some common minimum standard in the management of IP to the extent that discoveries and discoverers are not lost. At least in this matter of education, universities and business could find a common cause for action.

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