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Commercialisation of Knowledge in Universities: The Case of the Creative Industries

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ABSTRACT *During the last two decades, the convergence of a number of social and economic factors has increased the interest of universities, industry and government in the commercialisation of universities' research output. Not without scepticism from some institutions and individuals, governments and universities around the world are taking steps towards identifying marketable research products, strengthening links with industry, and creating institutional frameworks needed to sustain and increase research output and speed the technology transfer process. These actions vary in degree and scope: from standardising and enforcing conventional intellectual property protection mechanisms, to creating support mechanisms for spin-off companies and setting up venture capital funds to support their growth.*

To date, universities' commercial experience has been mostly in the area of science and technology and thinking about commercialisation is framed in these terms. However, as digital innovations move through the services, media and entertainment sector, innovations and commercialisation opportunities of quite a different nature present themselves. Thus, there are considerable challenges for creative disciplines within tertiary institutions seeking to respond to the commercialisation imperative. This paper examines claims from the emerging creative industries and analyses universities' potential support of the commercialisation of creative innovation.

Keywords: intellectual property, commercialisation, spin-offs, equity.

Introduction

During the last 20 years, universities have acquired a definitive role as agents of economic development. This shift in orientation can be attributed mainly to the convergence of four social and economic factors. First, nations' structural reforms and increased operational capabilities are now a 'given', and innovation has emerged as the key variable of competitiveness.[1] Second, governments have become more aware of, and focused on, solving fiscal deficits which has generated a tighter funding environment and the need for increased links with industry. Third, competition and rivalry across all industries has prompted the need for

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innovative technology at reduced costs; and fourth, military funding has not been a consistent funding source since the end of the Cold War.[2] In the US, the country that has led the insertion of universities into the economy, the Bayh–Dole amendment, implemented in 1980, gave small businesses and universities ownership of federally sponsored research.[3] As a consequence, government maintains a depository and administrator of the intellectual property (IP) generated in universities through the investment of federal funds. Institutions then choose the most appropriate production, financing and technology transfer mechanisms. Following the implementation of the amendment, in the period from 1980 to 1998, the yearly number of patents granted to universities grew from 300 to 2,000 and 1,990 companies developed from university campuses.[4] Though this increase in universities' commercial activity has not generated commercial gain for them,[5] it has allowed the institutions to maintain research output, helped to reduce increases in education costs and generated employment. It is estimated that 200,000 jobs have been generated in the US by the manufacturing of products originated in universities' licenses.[6]

One of the most widely used mechanisms for the commercialisation of university output is university spin-off companies (USOs). In USOs, all contributions made towards the development of the product take the form of participations in the venture (rather than a license contract), and any remuneration for contributions is dependent on the yield of that participation (dividends or capital gains). The involvement of universities in the formation of spin-offs has been a consistent trend over the last two decades. Not only has the growth rate in spin-offs not been vulnerable to economic cycles, but the failure rates of these companies are especially low when compared to conventional start-up companies being formed outside the university walls (25% vs. 50% on average).[7] According to Burton Clark,[8] universities that have been successful in the process of creating spin-off companies show some common features: having a strong steering core, maintaining a diverse funding base, possessing a stimulating academic heart and an integrated entrepreneurial culture. Other conditions that have been observed in successful entrepreneurial initiatives include crafting clear policy in relation to IP and shifting economic dynamics in the regions where the universities are located. Among the objectives pursued with the formation of spin-off companies are:

- *Generating appropriate structures for attracting capital*: USOs constitute an independent vehicle in which benefits and costs can be clearly accounted for and distributed. In addition, investors require capital mobility and the possibility of realising their investments by selling their participations in a vehicle. While universities can provide resources for products to be conceptualised, commercialisation is a capital-intensive activity that requires economic commitments which may be beyond their means.
- *Risk management*: as well as sharing risks and capital expenditures with partners, the risk profile of projects is reduced via the participation of experts in distribution, manufacturing, managing and promotion. The fact that spin-off initiatives come from a wide range of sources (students, staff, or faculty) helps universities diversify their commercialisation exposure using a portfolio management approach. The speed at which projects can be undertaken, given the number and variety of potential entrepreneurs (all staff and students), accelerates the build-up of critical mass required before a commercialisation portfolio can yield its first 'big hit'. For corporations and project partners,

teaming up with universities is a form of risk reduction by venturing into early stage technologies.

- *Job creation*: more than large corporations, it is small entrepreneurial companies that are responsible for job creation in the economy. In the creative industries, where SME is the predominant business form, the impact on employment of a growing number of university spin-off companies should be especially relevant. It has been observed that the average employment in USOs is six people.[9] Successful USOs constitute sponsorship opportunities for research students and a source of graduate employment.
- *Maintaining and attracting intellectual capital*: the economic potential generated by USOs could prevent brain-drain migration out of universities' areas of influence to the corporate world or overseas. Staff and students attracted by the economic upsides of USOs will remain in the university or its region, especially if the region is consolidating as a development focus. It is usual that USOs hire from within universities to perform research, which also provides funding to hire high profile researchers. The equity upside contributed by the ownership of valuable staff can provide the means for securing their permanence in these institutions.
- *Commercial validation of a concept*: the will of experienced industry and financial partners to join a project constitutes a validation of the commercial potential of a concept. Furthermore, the price at which participations in the companies are bought by investors constitutes a measurement of the economic value of the underlying assets.

Australian universities have been active in incorporating and funding investment vehicles for IP commercialisation.[10] Also, a number of venture capital funds and commercialising institutions targeting universities have been formed.[11]

Some Concerns in Relation to Commercialisation

Notwithstanding these developments, commercial applications of university research still face scepticism. Most typically, commercially oriented academic work has often been perceived as conflicting with or contrary to collegiate principles and the operation of a robust public knowledge domain. Some of the commonly articulated issues in relation to the effects of research commercialisation are:

- *Excessive focus on commercial research of institutions*: some authors note a shift from basic to commercial research.[12] Although commercial research has increased its share of global research investment, it is not clear if the absolute amount of basic research has been reduced. One reason for weaker investment in basic research could be the increased support by American corporations for development research, as a means of recovering market share lost by their companies during the 1980s.
- *The process of patenting requires non-disclosure before patents are secured*:[13] although research results can be published as soon as the IP is protected, some institutions do not agree to keep the results of research secret.[14]
- *Privatisation of publicly funded research*: the use of publicly funded research by private institutions has been widely questioned. This argument disregards the need for production and distribution capabilities for effective technology transfer to society and the need for financing sources in an increasingly tight funding environment.[15]

Other concerns in relation to commercialisation in universities are conflicts of interest, weak bargaining positions against institutions that are simultaneously industry partners and sponsors, and conflicts surrounding time commitments for staff involved in commercialisation activities.[16]

Our analysis so far is based on university experience deriving from the science and technological disciplines. The so-called new economy ushers in a new era of innovation that implicates other disciplines in universities in the rush for commercialisation. In particular here, we want to consider the creative industries as a sector at the forefront of new developments that raise many issues in relation to commercialisation of knowledge in universities.

Creative Industries Commercialisation: Challenges and Features

The creative industries are part of what could be called the 'knowledge consumption services' sector (business, education, leisure and entertainment, media and communications) which represents 25% of exemplary economies, whilst the new science sector (agricultural biotech, fibre, construction materials, energy and pharmaceuticals) for example, accounts for only about 15% of these economies.[17] Several analysts point to the crucial role they play in the new economy, with growth rates better than twice those of advanced economies as a whole.[18]

The term 'creative industries' was first articulated in 1997 as a way of categorising sectors of the British economy in which creative intangible inputs add significant economic and social value. The term encompassed advertising, architecture, the art and antiques market, crafts, design, designer fashion, film and video, interactive leisure software, music, the performing arts, publishing, software and computer games, television and radio. It is now widely used in Europe, East Asia, and Australasia.[19] It has even been taken up increasingly in the US, typically resistant to such European and dominion trends,[20] where its significance as an indicator of wealth creation has been championed by one of the most powerful brokers of the US entertainment industries, Motion Picture Association boss Jack Valenti.[21]

We argue that the internationalisation of the concept of creative industries is predicated on its capacity to connect key contemporary policy drivers in high-tech information and communications technologies (ICT) based research and development (*production* in the new economy) with the 'experience' economy, cultural identity, and social empowerment (*consumption* in the new economy). (At the same time, robust academic debate exists in relation to the putative economism and narrow economically focused views of creativity in the field.)[22]

Recent Federal Government reports into Australia's economic competitiveness in the global knowledge based economy point to the increasing significance of cross-sectoral applications of creativity. A 2003 NOIE report into the research and innovation system for digital content industries argues for promoting an export orientation amongst content creators, suggesting 'the overall objective is to underpin a virtuous cycle of feedback loops between the end user habitat and the innovation engines of R&D within digital content firms, and to re-position digital content producers as an investment class'.[23] This paper also responds to the report's demand to establish an *innovation frontier* 'for those industries in which digital content is becoming an important input and enabler, particularly education and other service sector industries'.[24]

Indeed, cutting-edge policy and industry research debates have moved towards a re-defining of attributes and outputs of creative industries. There is an emerging debate about the creative industries as an R&D sector,[25] and how particular creative sectors might benefit from innovation policy programmes. A significant outcome from this is Australia's first cooperative research centre focused on R&D in creative content and applications, the Australian Centre for Interaction Design, with the Queensland University of Technology's Creative Industries faculty as lead site, beginning in 2003.

While a high degree of unanimity exists as to the broad scope of the creative industries, overly inclusive definitions—such as those including the generation of scientific patents, designs or trademarks[26]—are now less tenable. We are therefore witnessing a sharper focus on particular sub-sectors of creative industries in different locations and jurisdictions. In this internationalising landscape: New Zealand concentrates on screen production, music, design, digital content, and publishing; Hong Kong focuses on advertising, architecture, design, publishing, IT services, as well as conventional and digital entertainment; Singapore on adding culture and creativity in education to its ICT pre-eminence; and Korea is focusing on broadband media applications, film and associated major infrastructure.[27]

In Australia, national policy—and to a significant extent state and local policies—have begun to concentrate on creative digital industries (CDIs). Concurrently there is also interest in mapping creative industries' inputs into, or enablers of, the wider service industries. For instance, design is seen as an enabler of communicative and branding strategies of finance or education, or as providing essential inputs in tele-health, modelled on the *ICT-as-enabler* paradigm. There is also priority focus on applied policy interventions, necessarily preceded by 'mapping'. By this we mean testing internal dynamics and informal–formal economy or 'relational assets',[28] as well as examining the distinctiveness of the creative industries that differentiate them from conventional commodities.[29]

So far, although some universities have supported the commercialisation of digital content related products and applications, the territory is largely unexplored. A systematic approach to creative products' commercialisation in universities will be pioneering, and should address a number of important issues. These include: the lack of business skills (and sometimes entrepreneurial drive) of creative producers; the fact that universities' experiences in commercialisation have been chiefly focused in science and technology; the focus of IP regimes in industries where assets are tangible and knowledge is explicit; the fact that existing commercial creative content has turned media dependent and is being 'pushed' on the basis of the control that corporations have over mainstream distribution channels; and the difficulties experienced by creative entrepreneurs of growing their companies in an environment of a few big players.

Nonetheless, in a context in which consumers resist being commodified and where technology brings alternatives for product distribution and consumer choice, strong cultural, social and economic incentives exist for such an effort. This process of slowly modifying deep-seated industry structures will require strong support and commitment from the public sector and creative industries institutions, before investors can observe a track record that makes them comfortable with new creative entrepreneurs in the value chain.

Prior to defining commercial schemes for universities' commercial creative production, a clear understanding of the dynamics and economic fundamentals of SME creative production is necessary. This understanding should shed light on the

intrinsic differences between creative production and other goods and services, especially scientific ones, where universities' experience has been most extensive.[30] This analysis should prove important in defining policies and institutional arrangements for creative enterprise support. Three factors help outline the distinctiveness of creative goods: commercial risk; the applicable intellectual property rights (IPR); and some micro economic issues.

Commercial Risk

Creative production is not only uncertain but highly volatile. Even though some industries like cinema have developed mechanisms to mitigate commercial risk by test screenings and consequently adjusting the product before release,[31] there is no exact method for forecasting demand. Caves notes that this unpredictability results from the fact that entertainment products don't respond to a pre-existing need.[32] Rather, they are 'experience goods'. Demand is not only uncertain but can turn highly volatile. Among the main components of consumer personal expenditure, recreation is the most discretionary and therefore highly dependent on changes in personal income.[33] However, increases in personal income may also increase the cost of opportunity for time spent at work and therefore likely decrease entertainment consumption, whereas income reductions will reduce entertainment consumption in a direct form. Demand for content may even be counter-cyclical with economic behaviour. It has been observed that demand for cinema tickets can remain steady or increase during economic recessions and decrease when evidence of the ending of hard times is visible. This uncertainty has a reflection on business models and the employment market of creative professions. In the case of scientific production on the other hand, the fact that products are often 'needs based' not only clears the demand uncertainty but helps identify and achieve commitments from distribution and financing interests.

Applicable Intellectual Property Rights (IPR)

IPR play a crucial role in the form in which creative production is commercially organised. The different types of commercial exchanges and copyright related royalty streams in industries such as music, require not only strong distribution channels but the existence of agents and agreements for the measure and collection of performance rights, artist royalties and synchronisation fees. Although some of these revenue concepts are contract based, others (i.e. synchronisation fees) are defined by law, making expected returns vulnerable to changes in copyright law.[34] In the case of scientific products, creators enter into individual agreements between discrete parties. In the case of scientific patents, economic value exists at an early stage as a result of the monopoly created.[35] However with copyright and royalty based businesses, a significant time period may elapse between initial development and the first release, before generating an income stream of value.[36]

The case of digital media is an evolving one and should be carefully considered not only because of its increasing application in creative production, but also as an enabler for the creative industries.[37] Some expect that the enabling capacity of digital media will release a disproportionate amount of value captive in the downstream end of the value chain, by means of creation of alternative forms of

distribution. Consequently, compensation for creative producers could become more equitable and stable. Nevertheless it is understood that distribution channels owe their power not only to their existing logistic infrastructure, but mainly to the concentration of investment among a reduced number of products (the 'distribution bottleneck'), which is certainly also possible in the digital domain. As a role for promotion, capital will always exist to channel consumers in their selection of content. However the digital domain may provide incentives and mechanisms for extending awareness beyond that of select products. The question is open on how electronic media would be a marketing tool that levels the playing field for all production outlets.

In the US it is now possible to obtain patent protection for the software expression of business models,[38] a practice that is likely to be emulated in other jurisdictions.[39] This is an example of how the digital domain can help strengthen the IPR of creative and other professions. Through having the status of patents, some media communications and web-design entities would enhance their value. In addition, the exclusivity of patents facilitates the construction of brands, another valuable IP form.

Some Micro Economic Issues

Several micro economic factors related to production in creative industries require special attention when considering commercialisation alternatives.

- *End customer vs. institutional nature of clients*: in contrast to scientific research based products, content is sold to the end consumer. Retail sales require the creation of product awareness and brand recognition, which requires important marketing resources and skills. This type of expenditure, which can account for a significant share of a company's budget, is not represented by any tangible asset. If the company fails, these expenses do not have a rescue value (sunk costs).
- *Evaluation and decision making*: while decision variables in patent production are mainly objective and supported by factual data (e.g., budgets execution, milestone completion), decision making in creative products depends on appreciations that may take time to assess (market forecasts vs. execution). One of the most common dilemmas capital investors face in relation to early stage companies is the appropriate length of time to provide support before recognising a loss.
- *Concentration of production tasks*: in creative production, the creation of the content is closely related to individuals and 'names' that become visible and constitute themselves as brands.[40] Scientific production may be the result of tasks that can be disaggregated among a pool of individuals (under an institutional name) or outsourced, reducing the amount of production risk.
- *Shared economic rationality*: science products are evaluated more on the basis of identified needs and economic rationality, and are more subject to negotiation among parties who are presumed knowledgeable in their field.
- *Securing distribution*: in the case of collaborations with industry and scientific R&D institutions, initial distribution arrangements are guaranteed for completed projects. Although this may be the case for some major film and music productions, it is not the case for independent artists, who have to 'shop' their product to retail stores or distributors.

Bearing in mind that realising the economic potential of creative production requires market validation, it is important to make sure that distribution channels are available for new creative products, especially in the context of major distributors that are not willing to take products that do not have massive commercial potential. An intensive focus on distribution channel creation as a means of enhancing the commercial potential of intellectual property in the creative industries is supported by the fact that new media technologies (like the Internet) provide efficient mechanisms for targeting increasingly fragmented markets that fall below the radars of major media outlets. From a cultural perspective, the creation of alternative distribution channels may bring to the surface the demand for 'niche' cultural expressions that have been overshadowed by the mass approach of conventional outlets. Besides, as electronic literacy increases, promotion costs (one of the major entry barriers to any distribution initiative) are likely to decrease with greater application of the Internet.[41]

All these micro economic factors suggest that spin-off companies may have a role to play in commercialisation of the creative industries as much as they have in the sciences and technology. In Australia at the present time, no *exclusive* creative industries USO schemes have been identified by the authors.[42] However, the experience of Twente University in relation to commercialising the creative disciplines is illustrative. Twente University[43] is located between the cities of Enschede and Engelo in The Netherlands. The university was founded in 1961 in the middle of a strong economic downturn in the region's output, generated by the slowdown in the textile industry that resulted in the loss of approximately 50,000 jobs.[44] The institution had gone through several transformations, before adopting its current 'entrepreneurial and adaptive' research model. In the 1970s the university diversified its set of programmes to social sciences, opening faculties of management, public administration, computer science and education science and technology. During the 1980s the transformation towards the current entrepreneurial model started. This model has helped in providing entrepreneurs with the resources required for new company developments. Since the end of the 1980s, as a consequence of the decrease in its engineering enrolment, the university has decided to develop programmes that combine social and technical sciences.

As part of the entrepreneurial approach that came with the 1980s, the university started the Temporary Entrepreneurial Posts (TOP) programme. This programme guarantees selected entrepreneurs a paid research position within the university, while they mature a concept with commercial potential and the company is formed. While in the programme, the individual has access to expertise, facilities, housing, a flexible loan, mentoring and the use of the university's network and logo. Reports by an external consultant show more than 300 enterprises emerging from the university in the last 18 years with only 23% having ceased their operations.[45] To date, the programme is said to have generated more than 2,000 jobs—a remarkable achievement for a university that graduates 1,500 students annually. In parallel with the TOP programme, the university has created the TOS programme (Temporary Support of Spin-offs), which consists of matching entrepreneurs with ideas and projects in established companies that otherwise would have not been pursued. The model has been so successful that Twente is now leading UNISPIN, a project aimed at helping other universities in Europe to establish similar initiatives.

The key components that support this entrepreneurial model are:

- *Business and Technology Centre Twente Ltd*: a private company operating since 1983, it is owned by the university, the Regional Development Corporation and private companies. It provides 4,500 square metres of flexible office and production space. The average rate of occupancy exceeds 85% and provides entrepreneurs with resources, telecommunication services, mailboxes, management consulting and technology marketing.
- *Enschede Business and Science Park*: an initiative of the BSP foundation, an entity created by the Chamber of Commerce, the city of Twente and the university (the owner of the land). The science park accommodates the business incubator, a set of knowledge intensive and professional services companies and research institutions.
- *Venture Capital*: Innofonds Twente was founded in 1996 by the Regional Development Agency, the university and Hogeschool Enschede. Its purpose is to provide stable returns and long term capital availability for USOs. It invests up to $A500,000 per company, and was expected to reach a total capitalisation of approximately $A20 million at the end of 1999. An average of seven projects is funded annually.

Conclusion

Commercialisation of universities' intellectual property is not a passing phase but a trend with both challenges and benefits. By both securing patents and giving support to the formation of USOs, universities have transferred an important number of technologies and products to society. This process has helped capture the value of publicly funded research and created tax generating wealth and employment. Until now, faculties in the creative industries have focused on production and performance, and have not yet participated in shaping the business processes that surround creativity. This situation has not only removed valuable cultural expressions from public reach, it has also allowed mainstream companies to significantly control the value chain in the media, arts and entertainment sectors. On the basis of a more diverse marketplace for creative production, compensation, and stability for creative professionals, creative industries tertiary institutions should take decisive and committed steps towards positioning their graduates in the marketplace. This will also have the effect of liberating the arts from an over-reliance on public subsidy and audiences will gain alternatives to the selection of 'preferred' cultural products. The question of how to systematically support and nurture fledgling creative industries companies is an unexplored one and the challenges it poses are important. Not only do the business models for creative enterprises need to be defined, but long established business practices and industry structures must be challenged. This process should include innovative uses of technology that redefine the flow of economic value through the production, distribution and retailing stages. If it is true that results are unpredictable in the creative industries, it is also true that creative entrepreneurs could make use of resource based facilities that can be used discretionarily in defining the approaches of new companies to their markets and business models. Entrepreneurial linkages within universities combined with commercialisation research in creative industries faculties could be an approach to further embed successful and marketable research outcomes which address IP

issues, augment distribution paths for CI products and deliver enhanced equity for independent producers.

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4. Universities also granted 5,396 licenses in the period from 1991 to 1995, with four universities classified among the 300 largest generators of patents in 2000: Nelsen, *op. cit.*
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32. R. Caves, *Contracts Between Arts and Commerce*, Harvard University Press, Cambridge, MA, 2000, p. 5.
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36. In the case of music production, not only is it important that the artist possesses market recognition and some track record, but the level of royalty is typically negotiated to increase as the sales volume increases. As record contracts typically consider 'recoupment' of all production and promotion investments before the artist starts perceiving any sort of income (the artist pays for expenses), significant time and more than one production may be required before any compensation is received by the artist.
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38. Among others, Amazon.com and Priceline have patented some key features of their business models like the 'one click shopping' and the 'reverse auction'.

39. Howkins, *op. cit.*, p. 42.
40. Caves, *op. cit.*, 2000, p. 6.
41. Early Internet companies did not only have the task of creating a brand but bringing people to use the technology, i.e. 'selling Internet'. With increased computer literacy new companies on the Internet will face lesser customer acquisition costs.
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