

The Commercialisation of University Research Workshop

Summary of Abstracts

**Birkbeck Centre for Innovation
Management
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High-Tech Cluster Development: Is Silicon Valley a Global Model or Unique Anomaly?

Professor Henry Etzkowitz, Stanford University, Human Sciences and Technologies Advanced Research Institute (H-STAR), Centre for Entrepreneurship Research, Edinburgh University Business School and Department of Management, Birkbeck, University of London

Abstract:

A boundary spanning regional innovation model of permeability among university-industry-government is abstracted from Boston, Silicon Valley and Research Triangle and used to assess Newcastle Science City. Early history may provide a better guide for aspiring regions than abstracting elements from the contemporary Silicon Valley ecosystem with its multiple interactive technology and business paradigms. Inducing permeability in academic boundaries is a first step to creating an entrepreneurial university, the motive force of the most successful regional innovation clusters. An entrepreneurial university is the key element of a knowledge-based region's infrastructure, superseding tunnels, bridges and roadways in importance. After a high-tech cluster is achieved, the generative source of its firms is often forgotten, their origins obscured by highly visible artifacts and symbols, like science parks or branding. The increasing dependence of Silicon Valley on external sources of human capital and technological innovation is a potential Achilles Heel, if competitive regions achieve "stickiness" and retain their assets. Paradoxically, Silicon Valley is both unique and replicable.

Regional Development: The Role of the University in Exploiting its Research

Dr Claire M. Leitch, Queen's University Management School

Professor Richard T. Harrison, Queen's University Management School

Abstract:

A recent central theme in economic, industrial and technology policy discussions in advanced industrial economies has been the link between wealth creation and competitiveness in a knowledge-driven global economy in addition to the exploitation of scientific and technological developments in scientific laboratories and universities.

While universities have long been regarded as sources of knowledge and research what marks current activity as being significant is that the relationship of universities to industry has become increasingly more strategic, formalized and commercialized. Furthermore it has been argued that, in the late twentieth century universities appear to be arriving at a common entrepreneurial format, and universities are undergoing a 'second revolution', involving the incorporation of economic and social development as part of their mission statement. Thus, while the first academic revolution made research an academic function in addition to teaching, economic development has now been integrated as an additional function to the academic job. Even though the link between university expansion and economic growth has long been established,

this has tended to be premised on the need to develop human capital and did not result from the exploitation of research. However, in the last two decades or so there has been a progressive shift in the perceived role of the university from a conservator of knowledge to an originator and exploiter of knowledge.

Most of the collaboration that has occurred between universities and industries has been premised on the belief that a stronger relationship will lead to a variety of benefits for both. From the academic perspective entrepreneurial activities are undertaken with the objective of improving regional or national economic performance as well as contributing positively to the university's financial situation as well as that of its faculty. In addition to the increased and accelerated support for technology transfer such relationships should provide increased support for academic research. From an industrial perspective the benefits of such collaborative activity potentially include the transfer from universities of knowledge, technology, know-how and people, in both a training and employment capacity.

Given that the experiment of university-industry collaboration has been under way for nearly 25 years, it is appropriate to consider the experience of universities relative to the actual benefits and outcomes derived. In this presentation the choice of exploitation methods, the process of commercializing technology as well as the role of the university in regional development will be considered. It will draw on the experiences of one university based in a peripheral, non-technology intensive regional economy where a focus on regional development as well as the commercialization of university-based research appears to have been pursued.

How to Evaluate the Impact of Academic Spin-Offs on the Regional Context

Professor Donato Iacobucci, Università Politecnica delle Marche

Alessandra Micozzi, Università Politecnica delle Marche

Abstract:

The triple helix concept emphasizes the role of university and its relations with firms and institutions at regional level. However, the impact of technology transfer activities depends on how universities organize them and on the characteristics of the regional context. The paper analyzes the three main ways of commercializing research – R&D collaborations, patenting and spin-offs – and discusses their beneficiaries and their impact at regional level. Spin-off creation is the most complex way of commercializing academic research, but with the highest potential impact on the regional context.

The paper discusses how to measure the impact of spin-offs at regional level and analyze empirical data about Italy. The Italian experience shows that the quantitative impact of spin-offs on local economies is rather low; however, there are qualitative direct and indirect effects that must be taken into consideration in the short and in the longer term.

Knowledge Commercialisation Mechanisms: Views Of and Usage By EU Research University Academics

Professor Edward Bergman, Vienna University of Economics and Business

Abstract:

This presentation considers commercialisation as one of the most contested mission elements facing universities. Based on recent survey data, comparisons of U.S., EU and Australian attitudes toward selected mechanisms are noted. Models of commercialisation actions, income and future intentions are reviewed. The principal focus is the usage of several commercialisation mechanisms (CMs) by the characteristics of EU academic users, their universities and their regions. Conclusions and tentative implications are mentioned.

University Commercial Outreach in a Metropolitan Environment: The Case of London

Professor Peter Wood, Department of Geography, UCL

Dr. David Chapman, Department of Management Science & Innovation, UCL

Abstract:

UK studies of university commercial outreach tend to conclude that the London universities perform poorly compared with those in other parts of the country. One reason for this may be the scale and variety of HEI activities in the city, and the difficulties of measuring various forms of outreach in a complex metropolitan economy. This examines paper various types of outreach in London HEIs, as measured by the annual Higher Education, Business and Community Interaction survey, since 2003.

Integration and Differentiation in Collaborative and Competitive Relations among, between, and within Universities, Industry, and Government

Professor Loet Leydesdorff, Amsterdam School of Communication Research (ASCoR), University of Amsterdam

Abstract:

Both self-organization and organization are important for the further development of the sciences: the two dynamics condition and enable each other. Commercial and public considerations can interact and “interpenetrate” in historical organization; different codes of communication are then “recombined.” However, self-organization in the symbolically generalized codes of communication can be expected to operate at the global level. The Triple Helix model allows for both a neo-institutional appreciation in terms of historical networks of university-industry-government relations and a neo-evolutionary interpretation in terms of three functions: (i) novelty production, (i) wealth generation, and (iii) political control. Using this model, one can appreciate both subdynamics. The mutual information in three dimensions

enables us to measure the trade-off between organization and self-organization as a possible synergy. The question of optimization between commercial and public interests in the different sciences can thus be made empirical.

New Triple Helix Environments for Creating Innovations: Observations from Case Studies

Professor Martin Meyer, Department of Business and Management, School of Business, Management and Economics, University of Sussex, Brighton (UK), ECOOM, KU Leuven (Belgium)

Abstract:

We have witnessed several significant shifts in thinking and in the organisation of innovation related activities. One of the recent changes is the shift from pure technology development towards customer and user oriented solutions. Instead of focusing on technology development per se, businesses are increasingly developing and delivering product-service packages to solve problems that users have, or to bring improvements to their daily operations, typically combining different types of knowledge which often comes from a range of disciplines. Another significant development is rise of the open innovation paradigm. During the golden age of internal corporate R&D laboratories in the 1960's and 70's only around three per cent of business related research was taken outside of the laboratories. At present the situation is very different. Businesses are extensively integrating knowledge from a wide range of external sources including individual users, user groups, large crowds, other businesses as well as external research performers, such as universities and research institutes. Drawing on a study of user-driven competence centres that reviewed business-led research networks of excellence across a wide range of countries, this contribution explores what one could call Triple Helix innovation environments. These new organisations are charged with bringing about radical innovations and driving industrial renewal in their respective sectors. In Stoke's terms, these innovation environments are positioned in 'Pasteur's quadrant' of strategic, or needs-driven, basic research and have developed new ways of organising research and innovation directed activities. In contrast to previous efforts, such as traditional competence centres, they are not necessarily located at an academic host institution but their 'coordination function' tends to be incorporated as a company - with Triple-Helix stakeholders acting as shareholders at the heart of boundary crossing research. In this presentation we explore a number of key characteristics and offer a comparison with more established user driven research centres. Drawing on the case studies presented, this contribution will propose a taxonomy of emergent research environments in the context of open and user driven innovation. These research and innovation environments are hybrid structures that are not captured by existing frameworks. One interesting implication of above observations is that the corporate strand may arguably become a more active player in generating exchange processes. The Government strand – at least in some of the countries featured here – has also taken on a very active role in bringing about new organisational set-ups for conducting user-driven research. In some of the cases, the company as a legal entity is becoming even the preferable form for conducting research. Universities continue

to play an important role but their impact as organisers of innovation seems to become more subtle and indirect.

In or Out of the IP System? What Can We Learn from Oxford University Spin-off Companies?

Ning Baines, Birkbeck, University of London

Dr Pierre Nadeau, Birkbeck University of London

Abstract:

The discussion of academic entrepreneurship often concentrates on faculty efforts to commercialize the new inventions that they have appropriated within the intellectual property (IP) system set up and organised by university administrators e.g. Technology Transfer Office. There has also been an assumption that academic entrepreneurial activities are reflected through the disclosure of patents via TTO. In the US, with the Patent and Trademark Act of 1980 (The Bayh-Dole Act) has formalised university ownership of IP. Likewise, in the UK, since 1985, each institution has been able to set their own rules on ownership of IP. However, the studies in the U.S. have shown that a substantial amount of academic entrepreneurship happens outside of the formal IP system. There is a lack of this kind of study in the UK and in European countries; this type of research can provide faculties, universities and policy makers with more accurate picture on academic entrepreneurial activities and parameter than the patents disclosure via formal IP channel.

We investigate and analyse whether Oxford academics involved in spin-off companies disclose or exploit patents inside or outside the formal university IP system (ISIS Innovation). Our findings appear to be consistent with previous studies, which showed that a significant percentage of academics do not engage in the entrepreneurial activities through formal IP channels.

Shaping the Formation of University-Industry Research Collaborations: What Type of Proximity Does Really Matter?

Dr. Pablo D'Este, INGENIO (CSIC-UPV), Universidad Politécnic de Valencia

Dr. Frederick Guy, Birkbeck, University of London

Dr. Simona Iammarino, London School of Economics and Political Science (LSE), and SPRU, University of Sussex

Abstract:

Research collaborations between universities and industry (U-I) are considered to be one important channel of potential localised knowledge spillovers. These collaborations favour both intended and unintended flows of knowledge and facilitate learning processes between partners from different organisations. Despite the copious literature on localised knowledge spillovers, still little is known about the factors driving the formation of U-I research collaborations and, in particular, about the role that geographical proximity plays in the establishment of such relationships. Using collaborative research grants between universities and business firms awarded by the

UK Engineering and Physical Sciences Research Council (EPSRC), in this paper we disentangle some of the conditions under which different kinds of proximity contribute to the formation of U-I research collaborations.

We examine the likelihood of research partnership formation by adopting a case-control approach. We pair each focal relationship (i.e. each instance of actual research collaboration) with a critical number of university-business pairs that could have happened but did not. Some of our results are congruent with earlier research on localised knowledge spillovers: geographical proximity has a strong positive effect on the formation of research partnerships between universities and firms. However, we find that other forms of proximity mitigate the disadvantages of geographical distance in shaping the formation of university-industry partnerships. Specifically, the spatial clustering of firms reduces the importance of firm-university proximity; this effect is particularly strong when the importance of firm-firm proximity within a cluster is weighted according to the estimated technological complementarity of the two firms' industries. Similarly, organisational proximity has a negative impact on the marginal effect of geographical proximity on the probability of forming a research partnership.

Changes to University IPR Regulations in Europe and the Impact on Academic Patenting

Dr. Federica Rossi, Birkbeck, University of London

Abstract:

We review the changes in university IPR regulations that have taken place in Europe in the last decade and discuss their effects on the patenting activities of universities and on knowledge transfer processes.

Understanding the effects of changes in IPR regulations on academic patenting is a complex issue: despite the general trend towards institutional ownership, university IPR regulations in Europe remain extremely differentiated, and it is difficult to disentangle the quantitative and qualitative effects of changes in IPR ownership regulations on academic patenting activities from the effects of concurrent transformations in the institutional, cultural and organizational landscape surrounding academic knowledge transfer.

The analysis of patterns of ownership of academic patents shows that there has been a general increase in university patenting since 1990, accompanied by a switch in academic patents ownership in favour of university ownership, while preserving the European specificity of high company ownership of academic invented patents. It is also possible to identify different patterns at the national level. The direction of the overall effect on the amount of knowledge transfer that takes place between university and industry is ambiguous.

Connected Innovation: an International Comparative Study that Identifies Mixed Modes of Innovation

Dr. Marion Frenz, Birkbeck, University of London

Dr. Ray Lambert, the UK Department of Business, Innovation and Skills

Abstract:

This paper offers a new angle on innovation modalities by adopting a recently emerging approach towards identifying innovation typologies via exploratory data analysis techniques with the aim to tease out some underlying latent variables that represent coherent innovation strategies for groups of firms. Mixed modes of innovation include aspects how business innovation links with, and is informed by, developments in the wider knowledge base, including the role of universities.

The modes of innovation are developed by exploring micro-level innovation survey data across 18 countries. The contributions of the paper lie in (a) the identification of five core innovation modes that are found in almost all countries; and (b) examining – via regression analysis – the role of different modes in firm performance.

Mode 1, entitled IP/technology innovating mode, contains at its core IPRs, and in many countries this is complemented by in-house R&D and new-to-market products. The second mode, Mode 2 – marketing based innovating – includes forms of product innovation, leaning towards new-to-firm imitating, with marketing expenditures for the introduction of innovations. Marketing based innovating is in its core also a strategy that leans towards sourcing information from other businesses. Mode 3, process modernizing, typically links process innovations with equipment spending. Process modernizing on average is driven by external developments feeding into the innovation strategy. In many countries training of employees is linked to this mode. Mode 4 is wider innovating and shows strong combinations of types of management and business strategy changes, including new sales and distribution methods.

Mode 5, networked innovating, generally involves external knowledge sourcing in the form of bought-in R&D or licences and formal collaboration, while leaning towards accessing information from the knowledge base – universities and research organizations.

The coherence and relevance of the mixed modes is tested by using them as explanatory factors in equations explaining economic performance. In most countries one or more innovation modes are positively associated with labour productivity. However, there is no consistent cross-country pattern as to which modes show significant associations with productivity. Even if common innovation patterns have been identified, there is no ‘single’ mode or form of innovation across countries that underlies the overall impact of innovation and there appear to be major national differences in patterns of competitive and comparative advantage (both with respect to levels of productivity and growth in turnover).

Phenomena, such as the various facets of globalization, are arguable shifting relevance away from national systems of innovation and national policies towards an international framework. One implication would be a convergence towards greater

similarity of innovation modes within an industry across countries, compared with patterns across countries themselves.

The core modes are used to explore a variety of propositions about the driving forces of innovation to enable more informed judgements on the desirability and likely success of alternative policies. In connection with concepts of openness we confirm that “openness as an innovative strategy is not a panacea nor a simple choice, for the firm or the policy maker” (Acha 2008:4), but that different forms of openness are highly context bound – embedded in national and sectoral environments of firms. The continued pertinence of national, as opposed to globalised, innovation systems emerges strongly, shown by the heterogeneity of country level patterns of mode use and their productivity impacts, but also by significant national level variations in innovation strategies in business sectors.

The public knowledge base – a key factor in national innovation systems and a focus of policies in many countries – plays an important role in several modes, but this role varies between countries, indicating that the public knowledge base is a part of specific national innovation systems and features as a complementary asset in a range of strategic orientations. The policy implications point towards instruments that optimize the benefits of the natural affinities between public knowledge and innovators under specific modes rather than instruments to force broad-spectrum outreach.

The Twists and Turns of a University Spin-Out

Dr Renos Savva, Birkbeck, University Of London

Abstract:

Domainex is a biotechnology company based on Cambridge Science Park, that had its origins in research conducted at UCL, and Birkbeck from the late 1990s. Looking back on the decade since approaching the UCL technology transfer office with an idea that was considered worth protecting with a patent, what can be learned with hindsight? The talk will review the most valuable, and unexpected, experiences on the road to forming a Spin-Out venture that is now a successful SME in its own right.