Innovation and academic practice: Challenges and opportunities through engagement with business
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Abstract
The demand for knowledge exchange between academia and business is growing. Research funders are increasingly requiring engagement with business. This paper investigates how academics can engage in the innovation process. It examines key barriers and enabling factors for effective collaboration between business and academia. Lessons are drawn from case studies on innovation in the context of health and wellbeing in the context of the European Centre for Environment and Human Health in Cornwall.

Key words: innovation; academic practice; knowledge exchange; health.

Introduction

The demands on academics to engage with business in forging the ‘knowledge economy’ are increasing. In this paper, we set out to identify the key challenges faced by academics in meeting targets to assist the innovation process. This builds on a case study of the European Centre for Environment and Human Health. At the European Centre for Environment and Human Health (part of the University of Exeter Medical School), the demands are heightened by the need to meet clearly defined targets for business engagement arising from the European Convergence funding programme.

The paper is structured as follows. The background to the need for academics to engage with business in general in the UK is examined, and the specific challenges and mechanisms being applied in the European Centre context are presented. An overview of the main routes for linkage between academia and business follows, before a discussion on how the academic research in the European Centre can be seen in the context of ‘innovation’. Potential barriers or enabling factors to effective engagement are then evaluated. Finally, the paper ends with a discussion of the key lessons and challenges facing the academic in this context.

Background

The importance of the linkage between academia and business is gaining increasing attention. The focus of the Research Excellence Framework (REF) on the impact of research, coupled with increasing focus from the Research Councils on this (e.g. RCUK undated), mean that it is important that the modern academic take this into account in research where possible.

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The European Centre for Environment and Human Health has significant targets for collaboration with business. This in part arises because of the nature of the funding for the Centre, which is based around Convergence funding from the European Regional Development Fund (ERDF) and European Social Fund (ESF) to drive growth in the knowledge economy in marginal European regions. Targets for engagement are linked to different intensity levels – in Phase 2 of the Centre’s funding (January 2013 to December 2014) there are the following objectives:

- 100 ‘business assists’ – largely based around Knowledge Exchange Officers engaging with businesses directly, and through outreach events such as conferences and workshops, as well as attending existing business network events in the county;
- 44 in depth collaborations – which would involve e.g. collaboration in a PhD studentship, working on preliminary research together through a ‘researcher in residence’ scheme;
- 22 collaborations which lead to significant impact on the companies involved – e.g. in terms of intellectual property (IP) and jobs created/safeguarded.

Associated with these are targets for employment benefits to Cornwall. To generate these will require significant engagement with small and medium sized enterprises (SMEs) which are often micro-small in the Cornwall region. These targets present part of the context to this paper.

Huggins et al. (2008) suggest that there may be difficulty in attributing regional improvements in competitiveness with developments in university-business engagement. Measurement of outcomes will be difficult in terms of business engagement. The complex environment means there are barriers to proving the marginal gain in terms of employment or international competitiveness of academic engagement with business. This may be particularly true for lower levels of business engagement, where anecdotal evidence may be the only ‘proof’ available.

The Lambert Review (Lambert 2003) investigated the state of business-university collaboration in the UK. Key lessons included the need for clarity over the ownership of IP arising from collaborations, with potential risks from the setting of a too high price on IP. Lambert also highlighted the role of regional development agencies in building bridges between business and universities – it is important to note that there have been significant changes in governance structures and the closure of RDAs since Lambert, and that universities have had to adjust to the changing support landscape. Lambert suggests that proximity is important, particularly for SMEs. The development of a new research Centre such as that in Truro offers particular opportunities to SMEs to engage with research.

The importance of collaboration between the business sector and universities was underlined in the recent Wilson Review (Wilson 2012). This wide ranging review highlights a number of key needs for improving business and university cooperation, including:

- Improvements in the ‘supply chain’ from universities to business, notably through better understanding of the needs and capabilities for both partners;
- A better understanding of the ‘landscape of collaboration’ – with no one university being equally effective across all domains, effective collaboration may require better cross-referral to other universities;
The key role of networking in an efficient innovation ecosystem is noted – and the need for existing mechanisms to be evaluated constantly and updated in the light of media innovations in particular.

The potential role for universities in Local Enterprise Partnerships (LEPs), with potential benefits from improved business connectivity.

The Science/Business Innovation Board (2012) draw a number of lessons from successful industry-university collaborations around the world. These show the importance of policy in terms of providing a stable environment for long-term strategic partnerships, giving universities sufficient autonomy and giving incentives to collaboration.

**Linkage between academics and business**

A central focus of the research at the European Centre for Environment and Human Health is the health and wellbeing benefits of engagement in activities in the natural environment, particularly coastal space. This is in addition to the Centre’s hard science analysis of the more traditional risks to health, such as pharmaceutical and chemical pollution.

A traditional model of the linkage between academics and business is given by a linear transfer of information from researchers to business. Such ‘knowledge transfer’ has given way in recent years to moves towards ‘knowledge exchange’ – which recognises that industry also holds knowledge in various forms and can usefully input to academic research in terms of priority setting, data and (potentially) funding.

Applying the concept of knowledge exchange on the topic of health and wellbeing involves a number of complex interactions between different agents in the process. Figure 1 presents a diagrammatic demonstration of these interactions.

Academic knowledge on the health and wellbeing benefits of engagement with the natural environment and the benefits of improved workplaces feeds through a ‘knowledge exchange process’ – involving a mixture of dissemination through the academic literature, direct consultancy with business and government and, crucially, informal networks between academics, business and policy makers to ensure research is informed by such groups. Government policy may be affected, which may have a significant influence on the decisions taken by business – examples may include command-and-control policy (e.g. regulation on ‘healthy workplaces’) or use of economic instruments (e.g. preferential taxation on certain product lines).

The decision making process is central to the effective integration of health and wellbeing – be it in terms of environmental management systems (EMS) or green accounting, or more formal decision making tools such as cost-benefit analysis (CBA) or multicriteria decision analysis (MCDA). In this paper, we focus mainly on the role of the linkage through innovation in business, rather than the more indirect links through government policy.
Industry can be an important source of data and funding, and is increasingly seen as being important in assisting the development of priority research areas. This is reflected in moves such as the funding of specific programmes to facilitate knowledge exchange, and specific requirements for business engagement in responsive mode funding calls such as calls under the European Commission’s Framework Programme 7.

Figure 1. Knowledge exchange between academia and business in the context of Health and Wellbeing (HWB).

Defining innovation and potential academic engagement

Tidd and Bessant (2009) identify four types of innovation. Innovation can be based around the ‘paradigm’, ‘product’, ‘process’ or ‘position’. Building on these concepts, we can see how innovation can enable business to capture revenue, or reduce costs, as a result of health and wellbeing benefits of the natural and working environment. Tidd and Bessant also distinguish ‘incremental’ (do what we do but better) and ‘radical’ (do something different) innovation. Academics can have a role in either form.

Different models of the ‘firm’ will affect how the firm interacts with academia and innovation – whether a firm profit maximises profit, market share, has ethical goals or other objectives will have impacts on the innovation process.
In terms of product innovation – clearly new products or services may emerge in terms of recreational services or ‘green care’ as described by Pretty et al. (2011). Environmental economics research may contribute in terms of the use of methods to estimate the ‘willingness to pay’ for goods that as yet are not marketed or to test the values attributable to changes in existing goods or services. Discrete choice experiments emerged from the marketing literature as a method of placing monetary values on non-marketed goods. To apply this method in the business context would require some reframing of existing activity towards marketed goods – and an example of this is given in Box 1.

**Box 1: Product innovation and Environmental Economics – Case study**

Recently PhD studentships have required significant business engagement in the research to enable more applied research outcomes, which are mutually beneficial in terms of novel research and business growth. Building on an existing collaboration with a colleague in the Business School, a joint interest was identified in the area of disability recreation and a proposal designed that would meet both academic objectives of rigour and business needs. This was arrived at by first designing a concept note around the studentship and engaging in consultation with the businesses by phone and email – given the limited time frame it was not possible to meet face-to-face which would have been preferable. The Centre Knowledge Exchange Officers recommended two particular companies from their previous contacts, reducing the search costs to the academic. This underlines to me the importance of academics working closely with the Knowledge Exchange staff. The project encompasses estimation of the health benefits of partaking in disability recreation and an analysis using discrete choice experiments of potential products/packages that could be offered to disabled tourists. This method would involve the use of questionnaires and ‘choice cards’ to elicit preferences for different products/packages, as shown in Figure 2 below. This project has clear potential benefits for the two business partners in giving detailed analysis of potential markets and also in marketing if the health benefits are shown to be significant – increasing the marketability to social services and others who may need evidence of the ‘Social Return on Investment’ of spending on such activities for clients.

<table>
<thead>
<tr>
<th>Package A</th>
<th>Package B</th>
<th>Status quo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abselling</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>White water rafting</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Carers’ facilities</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Rock climbing</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Price</td>
<td>£20 a day</td>
<td>£15 a day</td>
</tr>
<tr>
<td>Choice (please tick)</td>
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*Figure 2.* Example of a choice card relating to a disability recreation product.

Another example of the impact of academic engagement on project innovation can be through the facilitation of business-to-business linkages. Through one of the Centre’s Special Interest Groups, which aim to bring together academics and researchers, businesses and policy makers, two businesses have come together to develop a joint, complimentary product. The ‘Children’s Health & Play’ Special Interest Group has been run by the Centre for two years and has a membership of
academics, public health practitioners, and businesses – including manufacturers of children’s play equipment and play service providers. It is jointly chaired by a local business, Taylor Made Play, who design and manufacture innovative play equipment for both indoor and outdoor markets. Through this group, Centre Knowledge Exchange Officers have introduced Taylor Made Play to another local play equipment manufacturer, Design for Sport. The two businesses have discovered complimentary synergies in their designs and are now piloting a joint play concept with the Shangri La Hotel Group in China, who are keen to develop facilities for collaborative play.

In terms of process there may be benefits to business in capturing the benefits of healthy workplaces and responsible business practice – which may include exercise in the workplace and the natural environment outside of working hours, active travel support, positive food choices, employer investment in environmentally sustainable practices, and embracing the equalities and diversity agenda. A key hypothesis is that if such interventions are set up to be led and championed by employees then the employees will experience a greater sense of ownership and control, and the Centre is exploring this. Studies on the costs of ill health to employers show a significant impact of chronic disease and associated absenteeism – Collins et al. (2005) estimated that for one company, Dow Chemicals, the costs of chronic illness amounted to 10.7% of the labour bill in the United States. A key research strand at the European Centre focuses on the healthy workplace and responsible business concept, and here process innovation may be promoted. An example is given in Box2.

**Box2: Healthy Workplaces and Responsible Business Practice: Process innovation**

Staff at the European Centre are working with various businesses and public sector organisations of all sizes, to develop evidence-based programmes and investigate whether engaging with the natural environment promotes health and wellbeing. Crucially, it is also developing understanding of the impact on workers’ wellbeing of being employed by a ‘responsible business’. Whilst staff are working on specific studies with large organisations such as the NHS and Cornwall Council, they are also working closely with smaller SME companies in Cornwall. One useful vehicle for engaging with Cornish businesses across this theme has been collaboration with the existing ‘Healthy Workplace programme’ for Cornwall; this has provided access to a number of businesses locally, engaged in different levels of the programme. In addition to this, the Centre is working with SME businesses in Cornwall to understand what the barriers and enablers are to engaging in responsible and sustainable business practice. This is being specifically addressed through investigation into how technology and different media could support businesses in these areas. The Centre plans to work with over 200 Cornish businesses by developing a prototype website and evaluating how this changes behaviour.

Positional benefits may be derived from the repositioning of an existing product into a new market space. In the case of the health and wellbeing benefits of exercise in the natural environment, it may be possible for a company to develop marketing based around the concept of health – e.g. around health tourism or health promotion. Examples of this are given by spa resort hotels and by surf schools that are starting to target products towards customers requiring health and wellbeing benefits – e.g. children with educational needs. The Centre has one PhD student who is examining the possibility of developing methods to identify potential markets for goods and services relating to
the health and wellbeing benefits of the natural environment. This also considers the use of Social Returns on Investment (SRoI) which does have strong links with economics to test the validity of the market identified in areas that are based around social funding. We have obtained some additional funding to examine this issue (Box 3).

Paradigm innovation represents ‘changes in the underlying mental models which frame what the organisation does’ (Tidd and Bessant 2009, 21). Examples of this include IBM’s change from being a manufacturer of machines to consultancy and services, or the Cirque du Soleil’s redefinition of the circus (ibid.). This kind of step change involves a radical shift – and it is hard to see how the work of the Centre may impact on the development of such innovation, except possibly through knowledge spillovers.

**Box 3: Case study - Global Boarders**

The European Centre was recently successful in attracting a small grant from ECOMINDS towards the evaluation of a surf school for children undergoing transition to secondary school, in collaboration with Global Boarders.

This project will involve building on past work by others in the European Centre, to conduct a Social Return on Investment analysis. This will require a literature review on appropriate monetary values and estimates of the quantification of physical and social impacts to use in the analysis, supplemented by interviews with ‘experts’: e.g. those working with young offenders to assess potential impacts of improved behaviour on probability of criminality. Uncertainties will be identified in this analysis, enabling sensitivity analysis to be conducted.

This will involve close working between the European Centre for Environment and Human Health and Global Boarders staff, involving an iterative process in identifying the particular costs and benefits of the surf school concept and the development of a report to document the potential benefits of such a scheme, drawing on lessons from past evaluations where possible of similar interventions (e.g. the previous surfing-based intervention with early teens and other school-based ideas such as forest schools).

Key to the success in getting the funding was the past relationship, with several students already engaged in research on Global Boarders’ activities. There is an existing academic engagement, in that Dr Mat White from the European Centre has already conducted a fairly rigorous study of another intervention. These relationship aspects are important in the development of trust between the academic and the business.

It is also useful to note the other motivators for the business to engage with the research. In this case, part of the time of Global Boarders staff could be allowed for in the analysis and also the scheme allowed for the part-funding of a surf school for children in transition to secondary school. They also see the strategic nature of such a study in presenting the benefits of their programme to potential clients.
From an academic perspective, there is a reasonable chance of publishing from this work given the relative lack of previous studies on similar interventions. This means that there are mutual benefits for engagement with the business – a key factor underpinning successful collaboration.

**Barriers to success and enabling factors**

The Wilson Review (Wilson 2012) highlights some of the key causes for potential business-university collaborations not moving beyond initial discussions. These include institutional factors, issues of transaction costs, financial constraints and mismatched expectations. As noted by Wilson, ‘informed businesses recognise the objectives of universities in collaboration are different from those of the company; successful collaboration requires a duality of interest’ (2012, 29).

In the initial stages of the development of business-academic links at the European Centre, some of these have arisen and there is also the need to develop appropriate first links with businesses, some of which have no previous exposure to the demands placed on academics. The needs above are more institutional, but for the academic there are additional questions of the potential to publish from the results, the need for appropriate reward for consultancy and the subject matter being close to the interest of the researcher, and enabling novel research rather than evaluation. One of the issues in fostering the relationships between business and academics is the setting of appropriate incentives for engagement in what may be a speculative exercise. This is difficult to address, because the measurable outputs of publications, research grants and postgraduate completions are given greater weight and the time frame over which business engagement may lead to productive output may be a long one.

For businesses, academic engagement also carries risks and uncertain rewards, which may make SME engagement with academics more difficult due to financial barriers. The European Centre has developed a mechanism to incentivise business engagement, through an innovative researcher in residence programme which provides funds to cover the costs to businesses of engaging with researchers (Box 4).

**Box 4: In Residence Scheme**

In order to encourage the first steps of relationship-building between academics and business representatives, the European Centre has set up the In Residence scheme. This is to help justify small and medium sized businesses spending time with researchers at initial discussion stages and funds businesses to spend time with a researcher for up to 12 days over a 3 month period. Businesses can apply directly through an Expression of Interest, or a researcher can put a request in to the Knowledge Exchange staff to help identify an appropriate business or group of organisations to develop a study or give stakeholder input. The scheme has been up and running since January 2013 and currently has 6 In Residencies going ahead. These vary from sharing data and expertise, to designing pilot studies together. The scheme also includes a ‘Pilot Pot’ for follow-on funding, which the researcher and business can jointly apply for once an In Residence has taken place. The desired outcome is to develop relationships, and ideally move towards a large grant application to fund
mutually beneficial research. The scheme is in its infancy and further work will be needed to gauge its effectiveness.

The need not to be perceived as being unresponsive is a difficult one to confront. The demand from business, particularly from community interest companies, for evaluation has been particularly notable. Evaluation is of little academic interest: the results are seldom publishable and the benefits would accrue solely to the company in question. This has led to some difficulty for the Knowledge Exchange Officers and for academics alike, and to consideration of the potential for developing consultancy services to meet these needs or for appropriate cross referral. The difficulty is in capturing appropriate levels of financial reward to compensate for the opportunity costs, given the nature of the demand. There are few consultancy services that would meet the need in Cornwall; but there may be potential for the Centre to provide training to build capacity outside the University setting in this area.

Lack of capacity and academic relevance of the research needs of business are also significant barriers. The Centre has also found that it may receive interest from a university-savvy knowledge based business, but unfortunately it may not fit directly any of the research foci of the staff. Another issue has been the sheer capacity of staff in the Centre to engage, with the competing demands of Russell Group and REF for academic impact versus business needs. All staff in the European Centre have business engagement built in to the equivalent of ‘workloads’ and have minimal teaching loads as a result. Despite this there is still a limited resource of staff hours for business engagement. In this case, options for a consortium approach are being explored at the Centre, in particular with the Special Interest Groups, to enable a model of one researcher to many businesses. There is also the potential to cross-refer to other departments, and other universities if these would fit better in their research remit – an example of which is shown in Box 5.

Box 5: Case Study: Request for evaluation services
An academic at the European Centre received a request from a community interest company to meet to discuss the potential to evaluate a project around bereavement counselling. The issue was outside the direct remit of research in the European Centre for Environment and Human Health – but the CIC had managed to secure a significant sum to evaluate their new programme. The issue of bereavement is a difficult one to explore without adequate experience – notably the ethical issues of questioning a bereaved person during the process would be complex. As such, the academic in question referred the CIC to a specialist at the Centre for Death and Society at the University of Bath. The Centre for Death and Society was interested and followed up with the CIC. There is clearly the need for academics to be more aware of other potential ‘special interest’ groups that may conduct evaluations in academic centres – and not to simply say ‘no’ to a request for evaluation. Similarly, due to the Centre not having a specific physiology focus at present, a number of activity-based businesses have been referred to the Sport and Health Sciences department at Exeter, and where necessary to departments at Loughborough and other external university links.
Link and Rees (1990) suggest that due to diseconomies of scale in the innovation process in large firms, there is the potential for an advantage for smaller firms in engaging in collaboration with university based research. Their research focussed on certain industry groups in the United States – notably computing equipment, machine tools and aircraft and components. In the context of the European Centre, this may seem to indicate potential to achieve greater gains from collaboration; however, both the dated nature of the study (drawing on 1986/7 data) and the sectors covered require caution to be applied. First, it is likely that universities have developed larger structures to deal with the innovation process which may inhibit the uptake of knowledge exchange in the context of SMEs. Second, the sectoral coverage differs dramatically from that in the Cornish context.

Unrealistic expectations on both sides may lead to difficulties in the development of the university-business relationship. To facilitate this, early and clear communication is important. The area of business-research collaboration is often a new concept for many researchers and businesses, and the role of the Knowledge Exchange professionals is crucial. It is key for the Knowledge Exchange staff to both understand the individual research focus of academic staff, and to support those staff in all aspects of engagement, from initial introductions to managing intellectual property issues. Equally, knowledge exchange staff need to enable businesses to engage with the Centre and appreciate the potential benefits through outreach activities. As such, the Centre has found it important to ‘normalise’ business interactions through regular events and workshops, bringing academic staff and businesses together in informal settings. This is vital as it enables a gradual culture shift for both businesses and academics, and makes business-academic collaboration more familiar territory for all involved.

The determinants of the extent to which a firm can assimilate and exploit knowledge have been the subject of some research. This ‘absorptive capacity’ has been found to be strongest in firms with existing research capabilities and academic contacts (Thursby and Thursby 2004). In evaluating potential collaboration, it may be useful to initially prioritise contacts with such firms which may facilitate the meeting of targets for successful collaboration in terms of job creation. Certainly, it has been the experience within the European Centre that companies with existing collaborations with academics, or whose directors are educated to PhD level, are more amenable to collaboration and appreciate the potential benefits of engagement. Where there is a mutual understanding of drivers, required outputs and language, collaboration has been more realistic and discussions have developed. The Centre is also finding that businesses which hold skills and expertise that can support and complement research methodologies are a natural fit, no matter what the research theme is. For example, businesses in the digital and creative economies and other knowledge intensive clusters often hold expertise in crucial areas for the Centre’s research, from large data management to oyster purification technologies.

In the Cornish context, SMEs are particularly important. Hoffman et al. (1998) investigate the state of knowledge over SMEs and innovation, based on a review of the literature. They find a substantial body of literature suggesting that ‘many SMEs, particularly those in high-technology sectors, had diverse and extensive linkages with a variety of external sources of knowledge’ (1998, 47). However, the extent to which these linkages lead to positive outcomes is questionable. The role of university links are particularly questioned – with some studies suggesting that there may be significant
differences between long-term research interests of universities and the needs of SMEs in facing short-term, market issues (e.g. Tang et al. 1995).

A comparison of university to business technology transfer in the UK and USA is provided by Decter et al. (2007). They find a number of differences between the two countries in terms of the motivations of universities in the technology transfer process, consistency of policies across the sector and accessibility of university technology to business. This includes cultural factors such as the ‘publish not patent’ tendency in the UK and perceptions that UK industry is seen to be less interested in university technology. Factors such as this pose issues for a Centre with a focus on short term success in a number of areas – particularly when there is the need to publish to meet the requirements of the REF alongside the need to generate job benefits for Cornwall.

Conclusions

The needs of increased engagement with business, based on the needs for impact and from funders, will have a potentially significant impact on my academic practice at the European Centre for Environment and Human Health. There is the potential for academic research to develop into areas with more business relevance, notably the evaluation of potential products or services based around health and wellbeing. However, there is the need to balance the potentially conflicting needs of business, in terms of the short term needs for data on how to improve the business offer, against academic rigour and the potential to publish.

There are a number of existing linkages with business at different levels, from special interest groups developing bid-ready consortia, to the In Residence Scheme and development of pilots through to PhD studentships funded by the European Social Fund and other funding bodies. These may provide good scope for developing deeper relationships with the managers of these companies and exploring further opportunities for collaboration.

Reflecting on past experience in case studies shows the importance of liaising closely with the Knowledge Exchange Officers for early links to potential business collaborators – to open discussions before funding opportunities emerge. Additionally, the continuing demand for evaluation services may provide potential for a future ‘spin-out’ or for capacity building for local consultancy firms in Cornwall.

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