Title: Universities and Economic Development Activities – a UK Regional Comparison

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Introduction

In the UK, a number of universities engage in economic development or regeneration activities and this can, in some cases, form the majority of their knowledge transfer (KT) work. Economic development activities have been funded in the UK largely by the European Union (EU) through the European Regional Development Fund (ERDF) and UK Regional Development Agencies (RDAs) since the late 1990s. However, the amount of funding available is dependent on the level of economic deprivation in sub-regional areas. In the North West Region of England the economy has been described as underperforming. The North West Development Agency's Regional Economic Strategy states that:

"Gross Value Added (GVA or output) per head is 12% lower than the England average, resulting in an output gap of £13 billion. £3 billion of this is due to fewer people working per head of population and £10 billion is due to lower productivity (GVA per employee)." (NWDA RES, 2006:3).

The difference in levels of economic development funding has led to disparate experiences in different regions of the UK and in the context of this paper, very different responses from universities. An unusual feature of university economic development work is that the links between industry, government and the university are via a funding model that sees government at regional or European level providing funding directly to the university. This funding requires the university to meet targets associated with support of small to medium sized enterprises (SMEs). Within de minimis regulations[1], this support is often free of charge for the SMEs involved.

This study compares two regions of the UK, the North West and the South East of England; which attract very different levels of economic development funding and examines the effects of this difference.

State of the Art about the Topic

A recent review of research on the effectiveness of technology transfer concludes that **"**… much of it has been descriptive and approached from the perspective of inventorying the phenomenon." (Phan and Siegel, 2006; 44)

The UK academic literature relating to direct knowledge transfer (KT) from universities is relatively sparse and often utilizes descriptive methodologies and/or analysis of survey results. Previous work by the authors examined influences on universities including the Research Assessment Exercise (RAE) which reinforced a preference for pure, rather than applied, research (Decter, 2009) and the range and levels of UK university KT activities. (Decter et al 2010).

The UK KT literature tends to examine entrepreneurship, particularly spin-out company formation, amongst academics. For example Franklin et al. examine the role of surrogate (or external) entrepreneurs in university spin-out companies (Franklin et al., 2001). Lockett and Wright explore "…the extent to which the capabilities of technology transfer offices are important influences on the generation of university spin-outs within the context of universities' resources and environments." (Lockett and Wright, 2005:1044) Government reports look for trends and classifications of university types which are unrelated, and possibly irrelevant, to university knowledge transfer behaviour.

There is little evidence of published research which examines KT at individual universities and effects on regional regeneration. Benneworth and Charles do examine university spin-off

[1] "The De minimis Regulation covers small amounts of aid within a predetermined threshold … period which do not count as State aid in the sense of Article 87(1) and are therefore exempt from the notification requirements of the competition rules." http://wales.gov.uk/topics/businessandeconomy/stateaid/sarules/deminimis/?lang=en

companies and their effects on the economic development of regions comparing Newcastle in the UK with Twente in the Netherlands. This work focuses on university spin-offs rather than indigenous companies, however, and recognizes these companies may not remain within the region (Benneworth and Charles, 2005).

There also appears to be little use of theory in relation to the choices by individual universities in terms of KT work. Phan and Siegel suggest that “the use of institutional theory and evolutionary economics perspectives to explain the persistence of differences in effectiveness across regions may be a fruitful direction in which to take the research related to regional development and university technology transfer.” (Phan and Siegel, 2006; 44).

An extensive literature search has shown no evidence of the use of an evolutionary theory approach to UK knowledge transfer from universities (other than that of the authors). No previous work has been found which relates the history of industry links and government intervention in UK universities to current day knowledge transfer activities. Neither have the influences on individual UK universities engaging in regional economic development activities been elucidated. In this study evolutionary theory is used as a framework for analysis of UK university regional regeneration activities.

Evolutionary theory and the development of university knowledge transfer

Evolutionary theory in economics analyzes the rationale for and outcomes of the actions of firms. Here the tenets of evolutionary theory are used to explore UK universities and their engagement in regeneration activities. Evolutionary theory is useful as it allows for a discussion of how an organisation comes to behave in a particular way.

The development of routines in organisations; the concept of search, akin to mutation in Darwin’s evolution; and finally arising from these aspects the ideas of path dependence and path creation are the key elements of evolutionary theory utilized in this study (Nelson and Winter, 1982; Nooteboom, 1997; Nelson, 2006). The development of routines can be useful to organisations. Hodgson states that …“Routines in the firm have a relatively durable quality through time. They may help to retain skills and knowledge, and to some extent they have the capacity to replicate through imitation, personal mobility, takeovers, and so on.” (Hodgson, 1994, p. 416) However routines can also prevent organisations from changing. “Survival requires a balance of, on one hand, routine, habit, conservatism, continuity, and on the other hand, adaptability, innovation, shift." (Nooteboom, 1997, pp. 63-64).

The influence of the RAE, referred to previously, may have unintentionally produced a path dependent response. Although set up to allow for selective research funding, it appears to have a wider effect on universities. Antonelli states that “The trajectory of a path-dependent process however cannot be fully anticipated on the basis of the original events.” (Antonelli, 1997)

Hodgson discusses selection of maximizing behaviors and the likelihood that the objectives of firms differ in this respect. “With a multiplicity of adaptive peaks the path followed and thus the peak obtained is path-dependent: a result of history.” (Hodgson, 1994, p. 422). The "... twin propositions from evolutionary theory of persistence and differences in firms' activities." are examined in Helfat’s study. Persistence is related to ideas of path dependence (Helfat, 1994, p. 1721).

In the context of university KT in the UK there has over the last decade been a multitude of funding opportunities and a wide range of resulting KT patterns developed at different universities (Decter et al, 2010). This is perhaps akin to the early stages of new growth in regions described by Kenney and von Burg:

"Both economists dealing with innovations and industrial geographers studying regional industrial growth find that often there is an initial period of openness with a number of contenders prior to the selection of a dominant design or dominant location. It is at such moments that the small events can result in the long-term differences." (Kenney and von Burg, 2001:130)

In UK University KT terms it may be that regional regeneration activities are one of a range of KT contenders currently being explored by some universities. Whether they become dominant activities in some regions in the future remains to be seen.

Also of interest is the way in which KT activities have developed at universities. Garud and Karnøe "... offer a contrasting perspective that we term path creation. In our view, entrepreneurs meaningfully navigate a flow of events even as they constitute them." (Garud and Karnøe, 2001:2).

In this perspective the decision to engage in regeneration activities, modeled later in this paper as quite different to normal university routines, is taken deliberately in order to create a new direction for the university.

In universities these concepts can be applied to the continuation on or deviation from a specific path involving particular forms of Knowledge Transfer, in this analysis, regional regeneration activities.

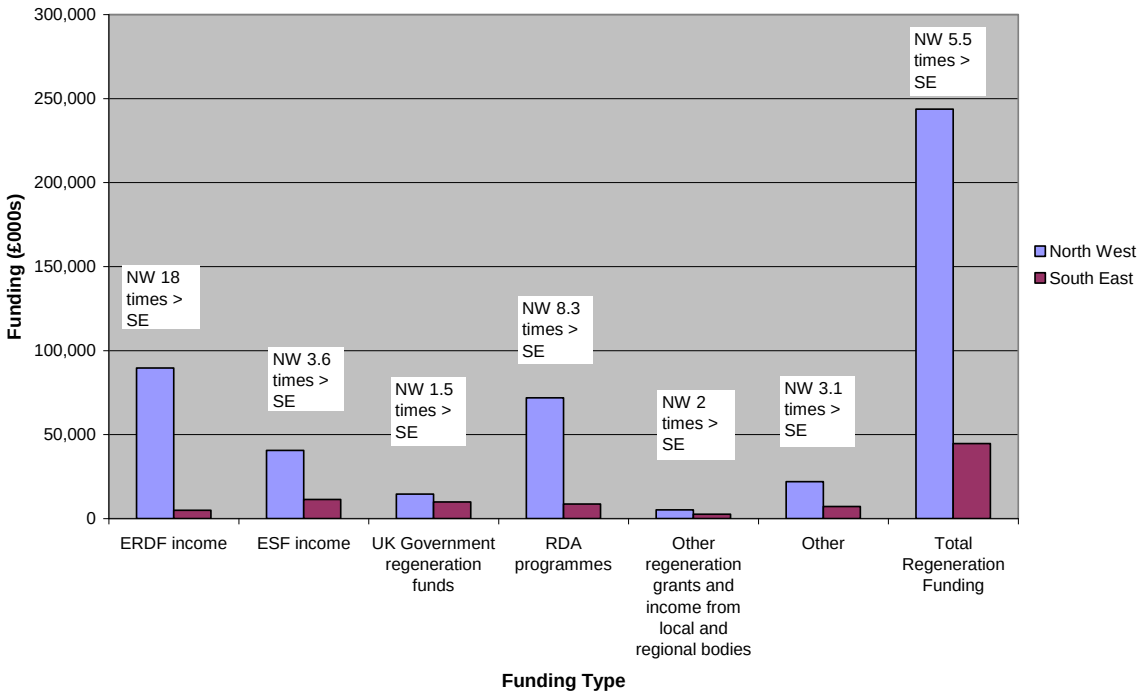
Research Focus

The research considers factors which influence UK universities to engage with economic development activities. It would be simple to assume that universities become involved in regeneration as a response to available funding. Universities in two regions of the UK with very different levels of funding are examined in order to test this hypothesis.

In order to do this the relative levels of such activities must be established for universities in the North West and South East regions of England. Figure 1 shows the aggregates of various types of regeneration funding for the six academic years 2002-3 to 2007-8. In all cases the level of funding is higher in the North West region than in the South East although there is substantial variation depending on the funding body. Taken as total regeneration funding though, the proportion is approximately 5.5 to one. Although the inclination to engage in regeneration activities might be for reasons beyond those solely to do with funding it is likely that the level of funding will affect the ability to undertake such activities.

Although external funding is important to maintain university engagement in economic development, other factors influence the decision to embark on regional regeneration projects.

Figure 1 Regeneration Funding Aggregate for Academic Years 2002-3 to 2007-8



Data Source: HEBCI Surveys (HEFCE, 2006; HEFCE, 2007; HEFCE, 2008; HEFCE, 2009)

Methodology

Quantitative data from the UK government Higher Education Business and Community Interaction (HEBCI) Survey has been used to track economic development activity from universities in the two UK regions. Figures 1, 5 and 6 illustrate this approach. To develop Figure 1, HEBCI data relating to regeneration funding was aggregated from surveys for the years 2002-3 through 2007-8. (HEFCE, 2006; HEFCE, 2007; HEFCE, 2008; HEFCE, 2009) Figures 5 and 6 show the total numbers of SME contracts in the local Regional Development Agency (RDA) area. These figures are the sum of Consultancy, Contract Research and Facilities and Equipment Contracts for the 6 academic years 2003-4 to 2008-9. This second set of data covers a period one year later than the first due to the changes in availability of data in the HEBCI surveys for 2002-3 and 2008-9. HEBCI data has also been used to construct Figures 7-13 which illustrate the KT funding received by universities identified for further study. These are discussed in detail in later sections.

This analysis of the levels of regeneration activity provides a basis for selection of universities for study. From this initial analysis a pool of 12 universities, 5 in the North West and 7 in the South East have been indentified as potentially engaging in regeneration activities (see Table 2). It is not possible using the available data to ascertain whether a contract with an SME in the region has been undertaken as part of a government funded regeneration programme. For example such contracts may be undertaken with well funded small businesses that pay the university directly for services. In this case the contract is more likely to be part of a business support programme. These differences are discussed later in this paper.

To determine the likely provenance of SME contracts, analysis of qualitative data was undertaken. Strategy documents prepared in the form of answers to a set of questions by each university in

compliance with the fourth round of the UK government Higher Education Innovation Fund (HEIF) were used in two ways (HEFCE, 2008a). First a large number of strategy documents were analysed to develop models and definitions of different types of KT activities undertaken by UK universities. Second, individual strategies were analysed to determine whether regeneration activities are undertaken with a view to regional regeneration or whether SME contracts are undertaken due to other motivations.

For the latter analysis, HEIF 4 strategies were analysed using Wmatrix, a data-driven software tool for linguistic analysis through corpus comparison. The Wmatrix results have been used to help support interpretation of HEIF 4 strategies and allow the researcher to check the context of significant words to ensure that interpretations are correctly assigned [2] (Rayson, 2003). Initially "key word cloud" diagrams for each of the strategy documents were examined to seek evidence of regeneration/economic development "buzz" words[3]. Then the context of these words in the main body of the text was checked to ensure correct interpretation.

Using this method The Universities of Brighton, Buckinghamshire, Portsmouth and Southampton appear to have the strongest regeneration focus in the South East. In the North West region all five of the universities listed in Table 1 have some focus on regeneration, but using the method described above this focus is strongest at UCLAN and the Universities of Lancaster and Salford. Further discussion will focus on these seven universities, highlighted in Table 2. HEIF 4 strategies for these universities are examined in more detail to provide perspectives on their approaches to KT activity. Also other relevant data acquired from university websites and the Higher Education Statistics Agency (HESA) is discussed.

A case study of one regeneration programme, developed at Lancaster University using research findings, has been included to provide further insight into regeneration activities. Leading Enterprise and Development (LEAD) aims to contribute to raising regional productivity, competitiveness and skills by addressing issues of leadership within the context of the SME sector generally and in particular in the owner-manager's business.

Findings

Definitions and Models of UK KT Activity

Regeneration activity in the UK has been described as being typically characterised by engagement with Regional SMEs (Decter et al, 2010). HEIF 4 strategies have been used to determine the full range of KT activities undertaken in English universities. A spreadsheet of university KT activities was developed through analysis of 39 of the 133 HEIF strategies published. The KT activities discussed in the strategy documents were listed in the spreadsheet for each of the universities. Most of these activities were common to more than one university and they appeared to fall into three broad categories, as perceived by these researchers. These categories have been defined as technology transfer, business support and regeneration.

Table 1 shows a summary of this extended categorization including funding, features and a list of the types of activities that would fall into each category. The following paragraphs and Table 1 essentially provide a definition of each of the three categories; technology transfer, business support and regeneration.

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[2] Answers not included to question 9 - preset table outlining financial breakdown or question 12 - assessment of risks (see HEFCE, 2008a for questions).

[3] Buzz words – regeneration and/or economic development, regional, Regional Development Agencies (NWDA; SEEDA), SMEs,

Table 1 UK KT categories – An extended categorisation/definition

Classification	Technology Transfer	Business Support	Regeneration/Economic Development
Main Funding Bodies	HEFCE, VC funds (some gov't), Income earned	Industrial funding, some research council funds	European Union funding, RDA funding
Features of funding/ activity	Licensing and spin-out activity, some funds support start-up companies	Mainly funded by industry or though Research Council schemes for training or collaborative research	Generally targets SMEs, EU funding has strict targets with respect to e.g. job safeguarding/creation and company turnover
Items elucidated from HEIF 4 strategy documents	• Spin-outs/ Incubation • HEIF 4 budget for Spin-outs/ incubation • HEIF 4 budget -patents • Invention disclosures/ Opportunity ID • Patents • Licensing • Income from IP/ Commercialisation • IP/ Commercialisation mentioned • Proof of concept funds (as a %of total HEIF4) • Incentive policy for academics to engage • Academic staff as Enterprise Champions • Academic staff training in enterprise • Spin-ins	• Strategic Relationships with Large Companies • Support for academic staff to engage in KT activities • National / International focus • Collaborative/Contract Research • Consultancy/ Commercial Services • Master and doctoral level programmes for industry • Non-credit bearing courses /CPD • CASE studentships • Academic staff training in KT • Secondments to/from Industry • KTP • Enterprise clubs/ Support to start-ups (from outside HEI) • UK KT Networks • Student placements	• Regeneration (income/ involvement) • SME income • SMEs assisted • Sales increases • Jobs created/ safeguarded • Graduate retention/ employment/ employability employer engagement • Community/ social engagement • Public sector • Regional Focus • Growth in KT income • Companies Created or attracted to region • Student/ Graduate start-ups • Student enterprise

Source: HEIF 4 Strategies from http://www.ikt.org.uk/ accessed April 2009; The European Regional Development Fund – An Introductory Guide, Office of the Deputy Prime Minister, 2001

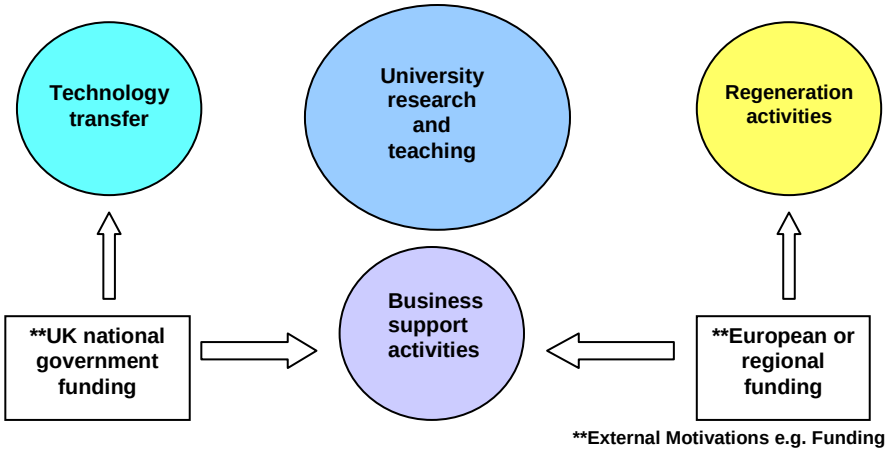
Business support is closest to "normal" academic pursuits as it involves research funded wholly or partially by industry or teaching to industry participants. The normal routines of universities are research and teaching, so business support activities are an extension of these and therefore relatively easily undertaken by many universities. In evolutionary theory terms this is a path dependent approach to university KT.

Technology transfer involves a move away from normal routines towards a more commercial outlook, either through the university's own motivations or encouraged by funding streams. From an evolutionary theory perspective, UK universities that have been involved in technology transfer, prior to the advent of KT funding in the late 1990s, have unusual "routines". They have followed a different path; perhaps due to these universities retaining routines established in their early history, which involved a strong connection to industry; or due to a deliberate departure i.e. path creation.

Regeneration/economic development activities can indicate the influence of European and regional development agency funding. These activities are quite clearly a long way from the normal routines of UK universities and indicate elements of deliberate path creation (see Table 1 for examples). In the main, activities involve working with small companies in the local region, a major departure from expected routines of research and teaching.

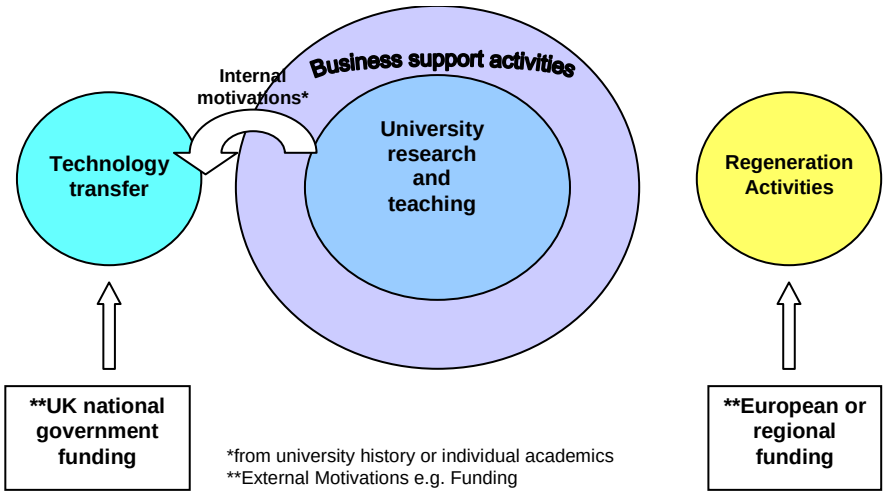
Figures 2-4 illustrate the relationships between KT categories at UK universities with different KT landscapes. Figure 2 illustrates a scenario in which the university focuses solely on pure research and teaching and KT activities may exist but are not embedded in the university. This represents what might be expected of a university fully conforming to established university routines in the UK, that is a strong emphasis on research and teaching with KT activities undertaken solely due to external funding and government pressure

Figure 2 Knowledge Transfer Activity – Low Level of University Engagement



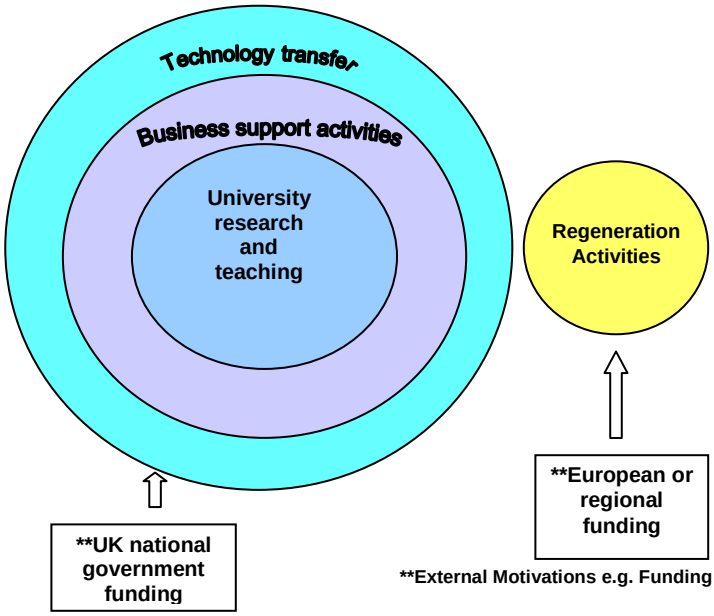
In Figure 3, Business support activities are depicted as embedded as routine and there is some intrinsic motivation to undertake technology transfer, but regeneration activities are undertaken as one-off projects and do not form part of “business as usual”. In this case one might theorise that the university undertakes business support naturally as a result of its history, either due to a lack of research funding from government sources, or due to continuing long term links with industry. A long, uninterrupted history of industry links would allow for the university to adopt a stance in which the pursuit of pure research and maintaining what have always been considered appropriate associations with industry can co-exist. A reduction in research funding from government, such as that experienced by some universities after the first RAE, may lead to a university turning to industry to maintain levels of research activity. Some intrinsic motivation to carry out technology transfer might also be expected to emerge from existing connections with industry.

Figure 3 Knowledge Transfer Activity – Business Support Embedded



In the third scenario (Figure 4) both Business Support and Technology Transfer are normal parts of university business. In these universities norms of behaviour include not only research for and teaching to industry; but also an acceptance of a “legitimacy” in licensing technologies and spinning-out companies. This culture might arise due to early successes in these areas leading to enhanced university funding, rejection of the prevailing culture in UK universities or the belief that such activities might co-exist, or even enhance pure research.

Figure 4 Knowledge Transfer Activity - Business Support and Technology Transfer Embedded



One might speculate on a situation in which regeneration activities become embedded as routine in universities. However if the variation in levels of regeneration activity correlate with levels of external funding this model is unlikely to be appropriate. Data examined in the following section may shed some light on this area.

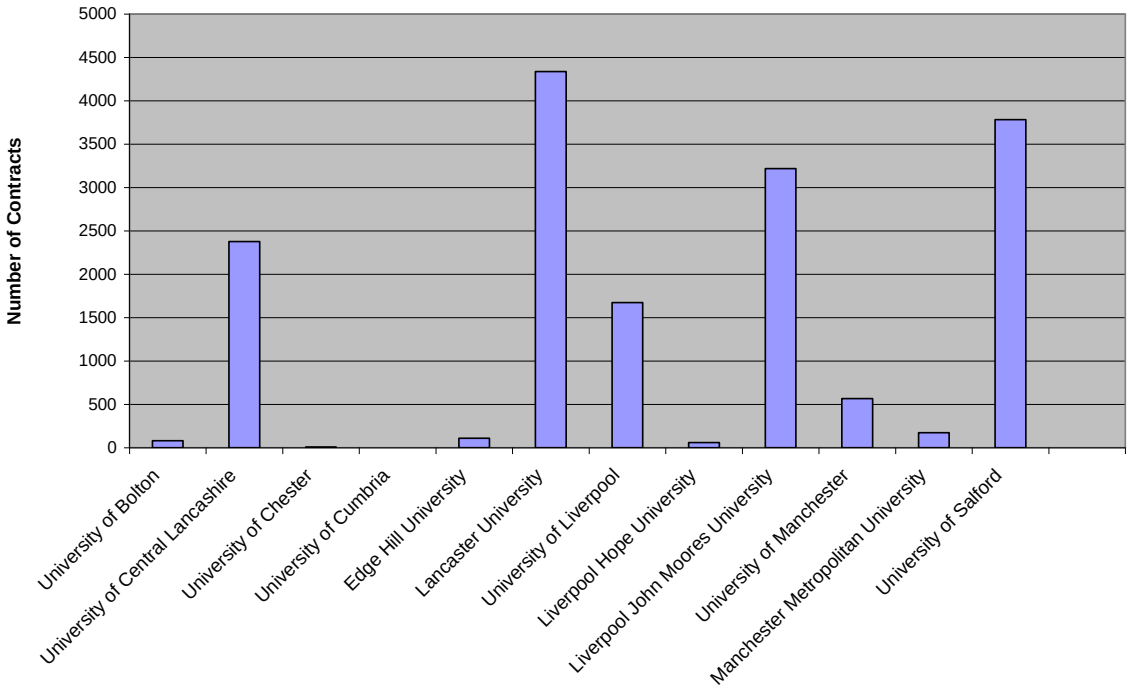
There has been some speculation in the literature as to which types of universities might embrace different types of KT activities (Shattock, 2009; Holi et al., 2007). This will be examined taking into account age, size and types of university as well the effects of regional location and funding.

SME Engagement

Figures 5 and 6 show the total aggregated number of contracts with SMEs within the area of the Regional Development Agency (RDA) for the North West and South East.

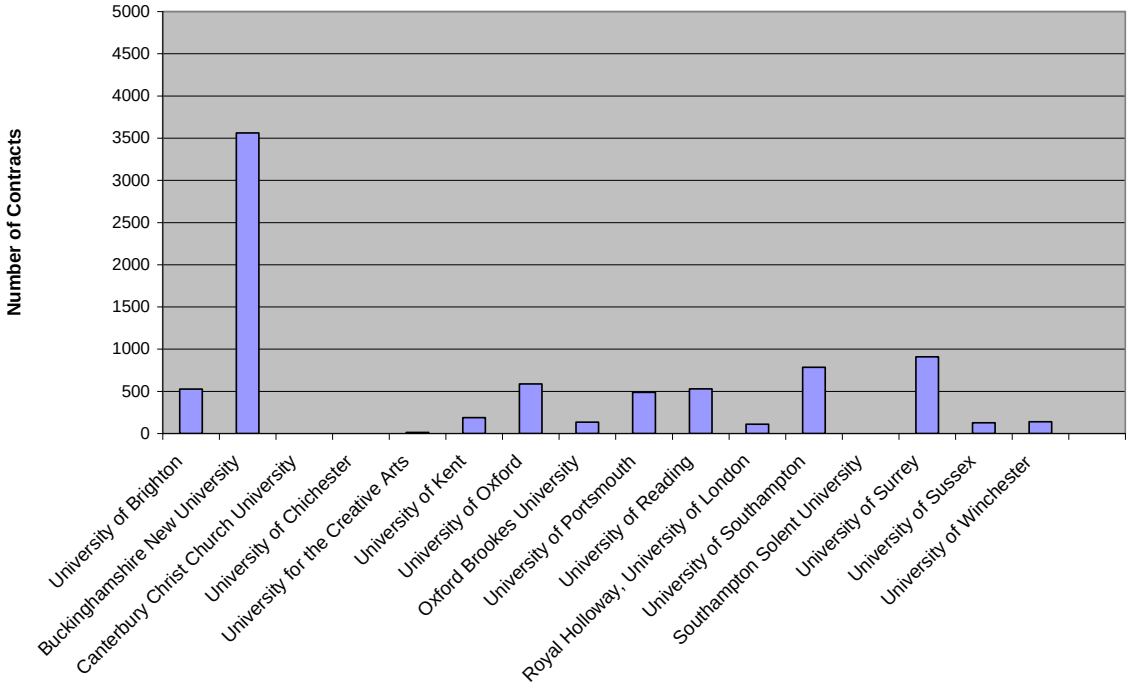
With the exception of Buckinghamshire New University there is a much lower level of engagement with regional SMEs in the South East compared to the North West. However if we apply the ratio of regeneration funding - North West: South East - to the level of SME contracts, then some of the South East universities might also be considered to be engaged.

Figure 5 Total Number of Contracts with SMES in NW RDA Area 2003-4 to 2008-9



Data Source: HEBCI Surveys (HEFCE, 2006; HEFCE, 2007; HEFCE, 2008; HEFCE, 2009; HEFCE, 2010)

Figure 6 Total Number of Contracts with SMES in SE RDA Area 2003-4 to 2008-9



Data Source: HEBCI Surveys (HEFCE, 2006; HEFCE, 2007; HEFCE, 2008; HEFCE, 2009; HEFCE, 2010)

In the North West region the Universities of Central Lancashire, Lancaster, Liverpool, Liverpool John Moores and Salford are strongly engaged with SMEs in the region in the period 2003-4 to 2008-9. Taking a value of 1500 contracts as an arbitrary cut off point (250 contracts per year) we can divide this value by 5.5, the ratio of total regeneration funding in the two regions. Then a cut off value of approx. 270 contracts in the South East region can be justified to account for the lower levels of regeneration funding in the South East. Using this reasoning the Universities of Brighton, Buckinghamshire, Oxford, Portsmouth, Reading, Southampton and Surrey may be of interest. A selection of universities in the two groups described will be examined (Table 2).

Table 2 North West and South East Universities potentially engaged in Regeneration

North West Universities	South East Universities
University of Central Lancashire (UCLAN)	***University of Brighton***
Lancaster University	***Buckinghamshire New University***
University of Liverpool	University of Oxford
Liverpool John Moores University	***University of Portsmouth***
University of Salford	University of Reading
	University of Southampton
	University of Surrey

Using the method described in the Methodology section in which regeneration “buzz” words were explored in HEIF strategies, the Universities of Brighton, Buckinghamshire, Portsmouth and Southampton were identified as having the strongest regeneration focus in the South East. In the North West this focus is strongest at UCLAN and the Universities of Lancaster and Salford.

Table 3 outlines various indicators relating to these seven universities. As these universities represent a very diverse group in respect of their university type; research quality or quantity, based on RAE performance and PhDs produced; or size, based on income, it seems unlikely that these factors influence regeneration engagement. It is not possible to correlate regeneration activities with these, more customary, university classification methods.

The availability of regeneration funding does relate to some extent to the level of activity as already discussed. Perhaps also of interest is the date of opening of the KT office at some of these universities, which coincides with the earliest calls for funding bids in the late 1990s.

Table 3 Variables relating to selected universities

University	Total income (£ million) 2007-8[1]	Year KT/TT office open[2]	No. of PhDs[3]	RAE ranking (2008)[4]	University type[1]	ERDF funding available in region[5] (£ million)
University of Central Lancashire	169	1999	40	96	1992 –Former Polytechnic	1,076
Lancaster University	163	2000	215	20	New – 1960s	1,076
University of Salford	177	1999	85	61	Former CAT*	1,076
University of Brighton	146	1996	45	59	1992 –Former Polytechnic	23
Buckinghamshire New University	55	2001	5	119	Former University College	23
University of Portsmouth	143	1997	65	68	1992 –Former Polytechnic	23
University of Southampton	373	1992	390	14	Younger civic university	23

Sources: see footnote[4]

Funding History and KT Strategy

The timing of regeneration funding in relation to other KT funding received may have a bearing on regeneration engagement. Figures 7-13 show rough chronological funding patterns for the seven universities being examined (HEFCE, 2006; HEFCE, 2007; HEFCE, 2008; HEFCE, 2009; HEFCE, 2010). For the North West Universities identified as engaging in regeneration; UCLAN, Lancaster and Salford, it is clear that much of the KT funding received has been regeneration funding; that the amounts have been very large; and that this started early in their KT funding history. This may be due either to decisions taken as to the direction of the university KT programme or more directly due to the influence of receiving funding. These three universities all state that their current KT offices opened in 1999 or 2000 when applications for such funding began. All three of these universities make strong statements about regeneration in their HEIF 4 strategies:

"Our KT activity will therefore make a significant contribution to the region's economic and social development." (HEIF 4 UCLAN, 2008)

"Support the Regional Economic Strategy in order to maximise both our programme opportunities and funding to achieve them. Therefore the KPIs in Table 1 all match to RES priorities." (HEIF 4 Lancaster, 2008)

"The main focus of our delivery will be local and regional, supporting RDA and Sub-regional strategies, but with global reach." (HEIF 4 Salford, 2008)

It is possible that these early regeneration funding successes have helped to shape the views at these three universities towards regeneration activities as routine. This inclination is perhaps

[4] 1. Individual University websites for Annual Reports and background information 2. HEFCE (2008) Higher Education – Business and Community Interaction Survey 2006-07 July 2008/22 and HEFCE (2007) Higher Education –Business and Community Interaction Survey 2004-5 and 2005-6 July 2007/17 3. HESA statistics Table R1 Share of research output per share of research input, weighted by cost centre 2006/07 http://www.hesa.ac.uk/ accessed June 2009
4. THES interpretation
http://www.timeshighereducation.co.uk/Journals/THE/THE/18_December_2008/attachments/RAE_2008_THE_RESULTS.pdf accessed Dec. 2008 5. ERDF (amount available 2000-2006 Objective 1 and 2) The European Regional Development Fund – An Introductory Guide, Office of the Deputy Prime Minister, 2001

surprising given the vulnerability of these activities due to the reliance on government funding. Alternatively funding applications may have followed a conscious decision on the part of universities towards regional engagement indicating path creation.

Figure 7 KT Funding Pattern for University of Central Lancashire
KT Office established 1999, regeneration funding labelled

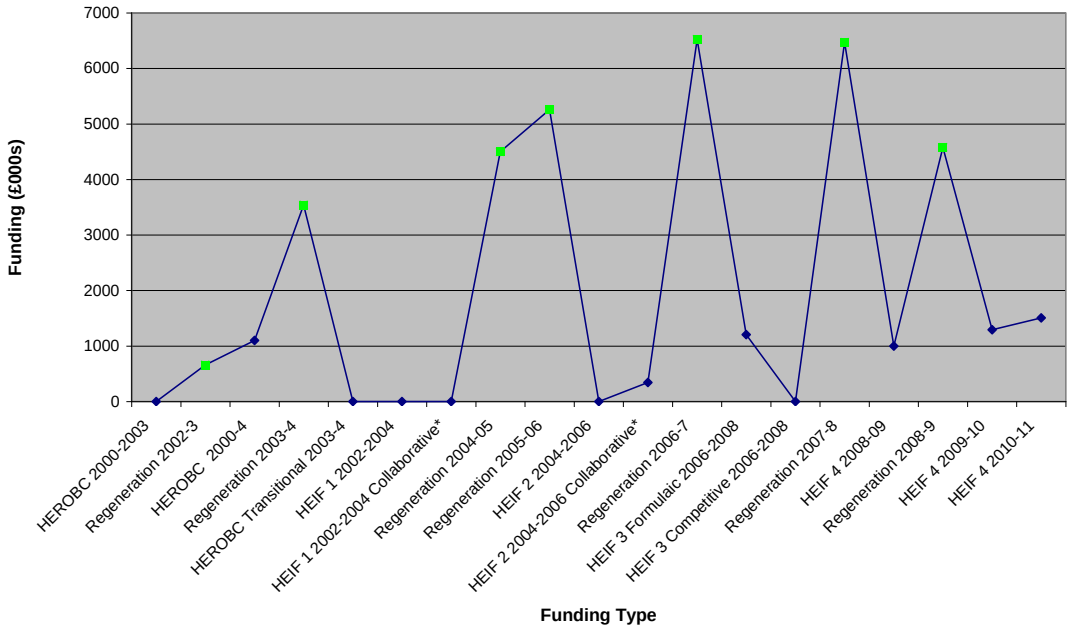


Figure 8 KT Funding Pattern for Lancaster University
KT Office established 2000, regeneration funding labelled

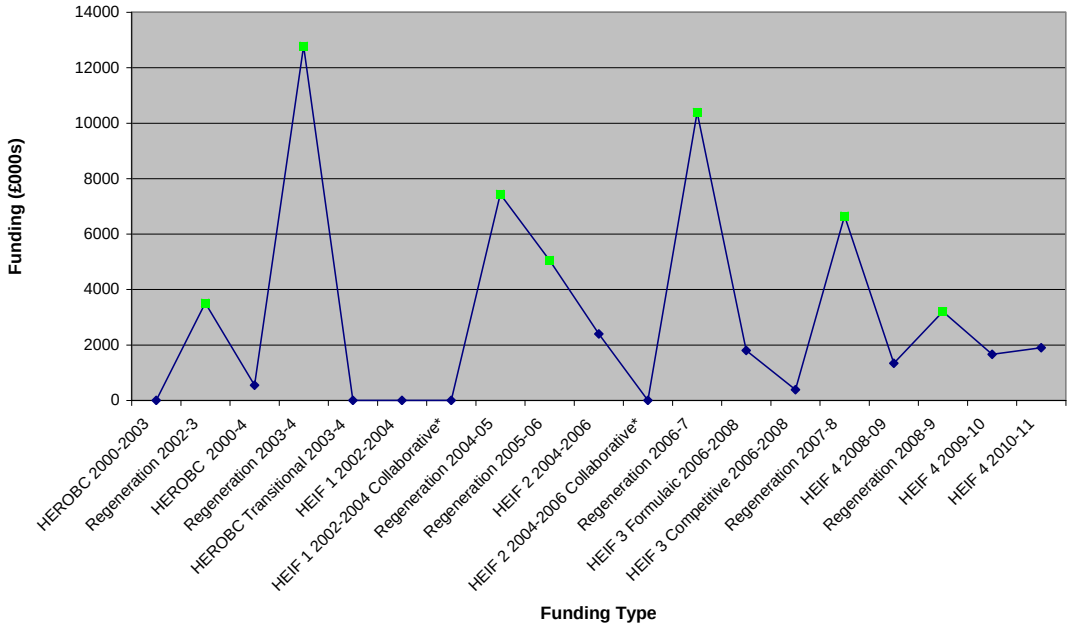
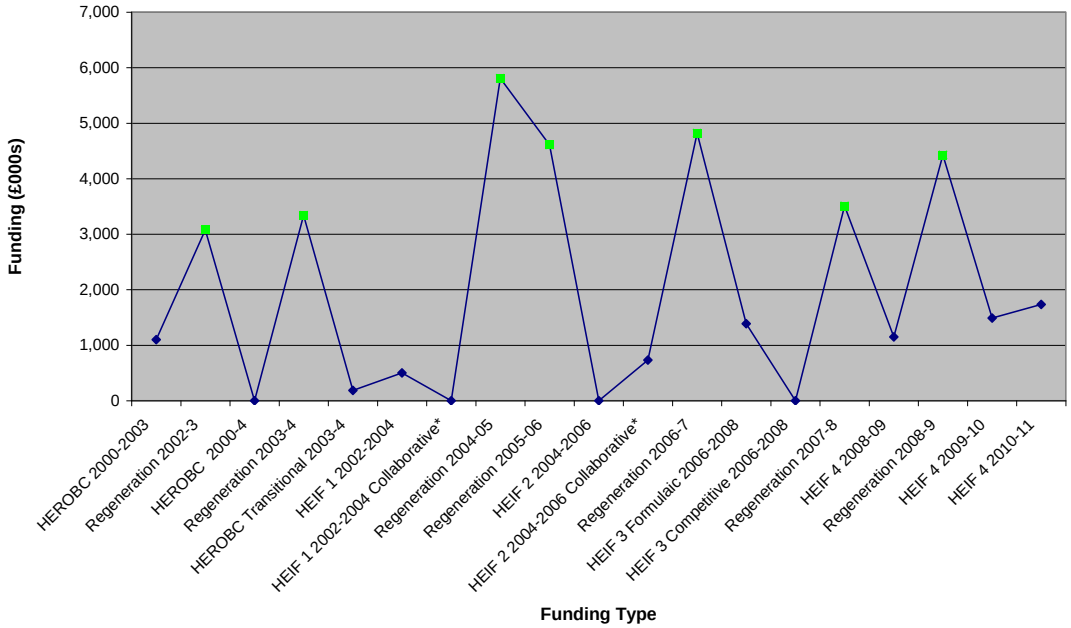


Figure 9 KT Funding Pattern for University of Salford
KT Office established 1999, regeneration funding labelled ■



In contrast, regeneration funding patterns at universities in the South East of England are more variable. Overall, as previously noted, funding levels are much lower. The University of Brighton received significant regeneration funding in 2003-4 prior to any large amounts of less targeted KT funding. Their HEIF 4 strategy states:

To meet this goal we must become a force in our regional economy which requires this activity to be prominent in our portfolio - unequivocally part of its 'core business' with Research and Teaching." (HEIF 4 Brighton, 2008)

This highlights not only the engagement of University of Brighton with the regeneration agenda but also the intention to adopt such work as equal to the more usual university activities of research and teaching. This statement presents a clear picture of path creation with the University of Brighton purposefully setting out a new direction for their future. "Such a process of mindful deviation lies at the heart of path creation." (Garud and Karnøe, 2001:6)

Buckinghamshire New University presents a much less clear picture. High levels of SME contracts are reported, but KT funding, both for regeneration activities and more generally has been relatively sparse. Strategy statements in the HEIF 4 plan both related to regional activity, but also to business indicating that the involvement with SMEs is possibly through a "Business Support" model.

"In short the knowledge transfer strategy will enable the university to fulfil its mission to become business facing, focusing mainly but not exclusively on the public and private business communities in Buckinghamshire and surrounding areas." (HEIF 4 Buckinghamshire New, 2008)

The word "regeneration" does not appear in the HEIF 4 strategy for Buckinghamshire New University and "economic development" appears only once, which supports the view that these activities with SMEs relate more to business support than regeneration.

Figure 10 KT Funding Pattern for University of Brighton
KT Office established 1996, regeneration funding labelled

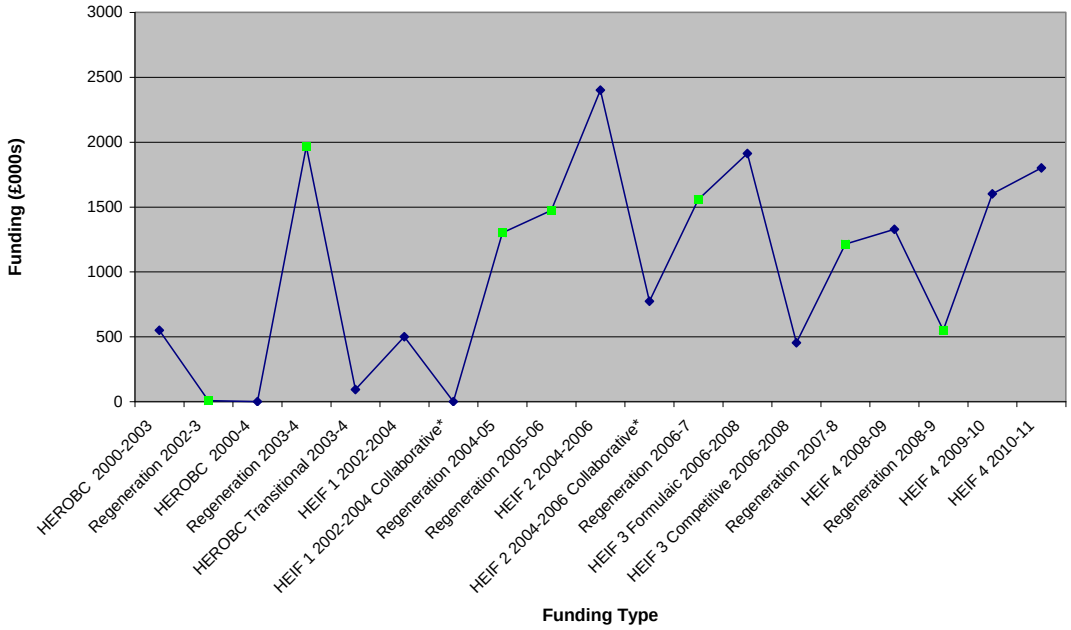


Figure 11 KT Funding Pattern for Buckinghamshire New University
KT Office established 2001, regeneration funding labelled

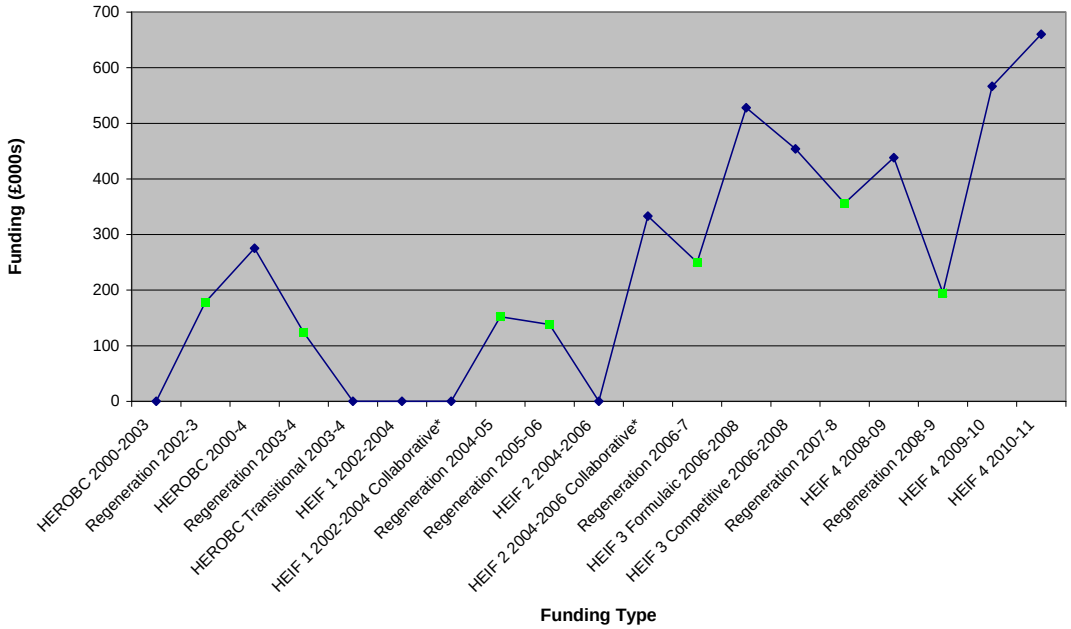


Figure 12 KT Funding Pattern for University of Portsmouth
KT Office established 1997, regeneration funding labelled

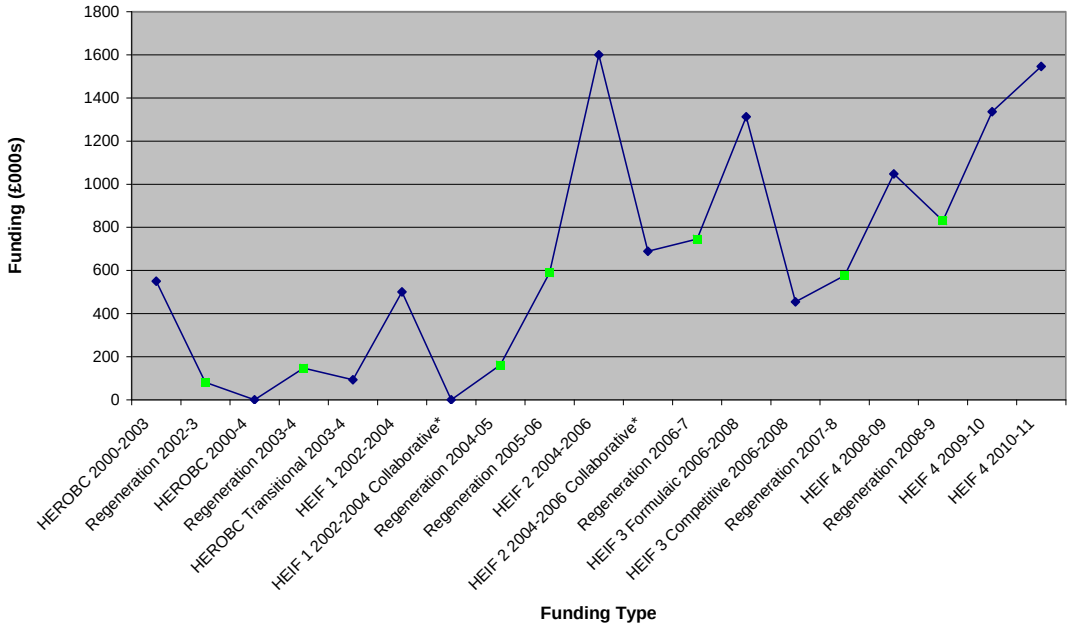
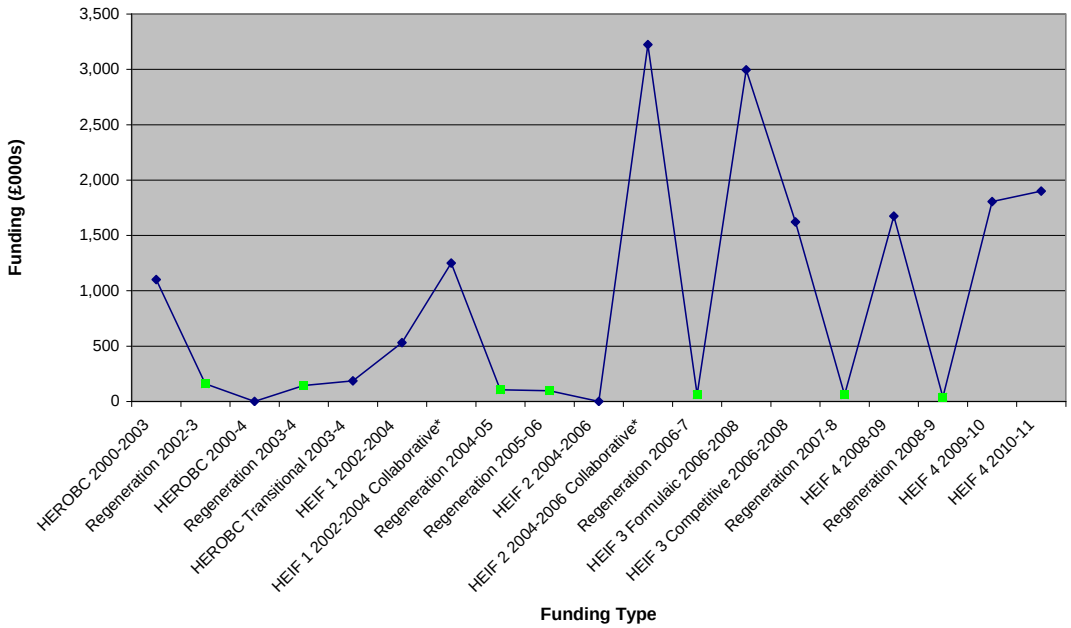


Figure 13 KT Funding Pattern for University of Southampton
KT Office established 1992, regeneration funding labelled



Although in receipt of little regeneration funding the University of Portsmouth makes strong statements about regeneration in its HEIF 4 strategy document. For example, included as one of the four headline aims of the University of Portsmouth's Strategic Plan 2007 – 2012 is:

"To contribute to sustainable economic, social, cultural and community regeneration and development." (HEIF 4 Portsmouth, 2008)

In addition, both of the "Flagship projects" outlined in the HEIF 4 strategy document relate to the economic development of the region. The University of Portsmouth website includes a large section on "Economic Impact" of the university on its region which opens with the words:

"The University of Portsmouth has a long tradition of helping UK business succeed and in the process enabling those businesses to create new jobs, wealth and prosperity for all."

It later also states:

"The University is committed to the renaissance of Portsmouth and the wider region and has worked … to support enterprise led regeneration." (University of Portsmouth, 2010)

The university presents itself as engaged with regeneration and its region.

The University of Southampton has received little regeneration funding and has a reputation for technology transfer activities. Strategy statements reinforce this, but also describe strong relationships with SMEs. This is expressed in terms of SME income; however, implying a stronger focus on paid business support activities than on government sponsored regeneration.

"The University of Southampton has built a strong reputation for enterprise using internal funding supplemented by HEIF, SEC, UCF and HEROBC funding. It is one of the world leading Universities for spin outs alongside Stanford and Cambridge (Library House 2007) and is the top UK University for SME Income (HEBCIS 2004-2007)." (HEIF 4 Southampton, 2008)

The KT office at University of Southampton opened in 1992, long before regeneration funding commenced, which helps to explain the enterprise focus.

In summary, it is clear that for universities in the North West of England, in receipt of large amounts of regeneration funding, the regeneration agenda has been adopted as a large part of the KT focus. Interestingly not all universities in the North West have engaged in regeneration activities however, as evidenced by levels of SME contracts.

In the South East the picture is much less clear, however some universities have adopted a regional regeneration focus, evidenced by their SME engagement and strategy statements, in some cases despite receiving very little regeneration funding.

Case Study – An Example of a University Regeneration Programme - LEAD

The Institute for Entrepreneurship and Enterprise Development (IEED) is a department within Lancaster University's Management School based in the North West of UK. From the early 1990s the then Entrepreneurship Unit was engaged in teaching entrepreneurship. Its establishment as an Institute in 2003 was built on the philosophy of intertwined research, teaching and outreach. This also reflected government policy with its growing emphasis on knowledge exchange. Within the North West region SMEs represent 98% of all businesses, with micro-SMEs constituting 89% of this figure (Small Business Service, 2006). The knowledge transfer work within IEED has focussed on this sector, connecting with over 1,000 SMEs since 2001 whilst also developing strong collaborations with Government bodies such as the Regional Development Agency and Business

Link[5]. Cox and Taylor (2006) argue that very little is known about the local and regional economic impact of third mission activity, although there is recognition that higher education can have a critical role as a key driver of productivity growth. A study of the work of IEED identified that for every £1 spent on the IEED's KT resource, £10 was created in the region's economy (A D Little, 2003). This evaluation of the regeneration impact of the activity may be considered one of the 'small events' referred to by Kenney and von Burg, 2001 since it had a significant influence on the future KT strategy of both the RDA and the university. This work has facilitated an in-depth understanding of the needs of this sector and what interventions can provide meaningful support. This learning highlighted that working with the owner-manager (or a decision maker) on their personal development and the strategy of the business had a demonstrable impact on the business's bottom line.

The success of IEED's outreach work and the Government's identification of leadership development led to the North West Development Agency-funded creation of a two-year research and development project focusing on developing the leadership capacity of small businesses. This new path creation, a programme Leading Enterprise and Development, LEAD, was entirely dependent on the availability of the external funding.

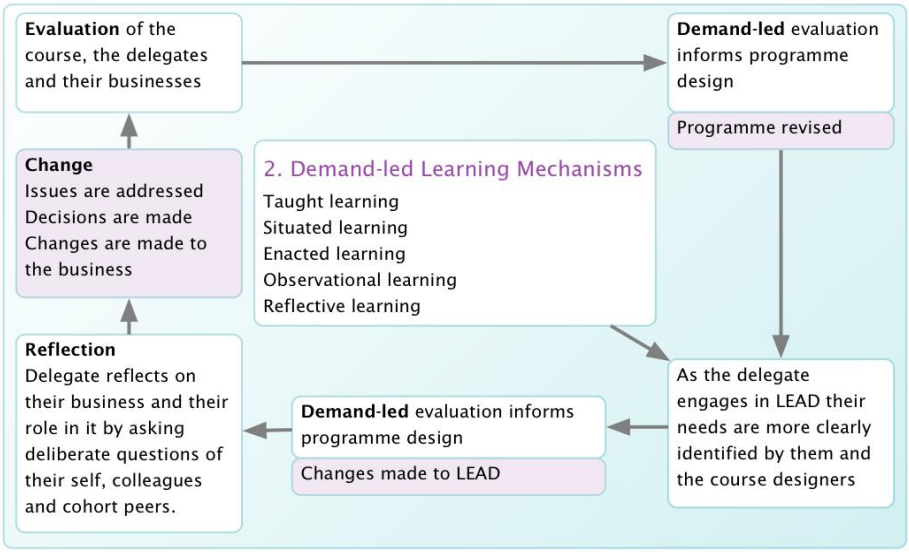
LEAD was piloted from 2004 to 2006 to engage nearly 70 owner- managers from micro SMEs which employ fewer than 20 people, to provide learning opportunities for them to develop their leadership capabilities. The programme ran as four cohorts with between 16 and 19 delegates per cohort. The pilot programme was delivered in dialogue with the SME owner managers to ensure that it met their dynamic needs as leaders of small businesses. This economic sector is under-represented in training programmes with most, if not all, other training programmes being designed for and marketed to managers within larger companies. Training that is available to SME owner-managers tends to consist of elements and methods drawn from corporate training tools demonstrating the dominant routines of universities and their path dependence. Because no courses existed before LEAD that were fundamentally focussed on assisting SMEs, the course designers were required to make assumptions about what methods of learning would suit the LEAD participants best and how these could be best delivered by IEED.

LEAD was designed to be flexible and responsive to the needs of the participants (Smith and Peters, 2006). The sequential nature of the cohort start dates and the ongoing demand-led evaluation enabled formative changes to be made to the programme. In developing the learning mechanisms, the LEAD team recognised the isolated position and lack of training opportunities available to SME owner-managers and developed the programme with a strong emphasis on reflective learning practices. These methods would encourage the participants to think more closely about issues and ask themselves questions which could help them resolve problems at work. With nobody to ask for help or advice, being able to solve one's own problems could prove vital for a small business owner

In evolutionary terms this process of demand led design demonstrates both a break with university routines of supply side design and a case of path creation. The format of the delivery and the emphasis laid by funding bodies on the economic impact suggest that although business support is involved, economic regeneration is the relevant category for this activity in our model. The staff involved act as the entrepreneurs referred to above (Garude and Karnoe, 2001) as they "meaningfully navigate a flow of events even as they constitute them"

[5] The knowledge transfer work has been supported predominantly through funding from the European Regional Development Fund (ERDF), the Higher Education Innovation Fund (HEIF) and through the North West Regional Development Agency.

Figure 14 Developing a demand-led programme



LEAD has proven to have real economic benefits to the individual company and an independent evaluation demonstrated that on average companies increase their turnover by £200k (Wren and Jones, 2006). This further evaluation of impact has led to a £10m roll out of LEAD across 13 Higher Education, Further Education and private training providers across the North West. It is also being considered by other RDA's having already been adopted in parts of Wales. The programme has in effect become the dominant design referred to by Kenney and von Burg (2001).

Contributions and Implications

This study presents techniques for comparison of university engagement in regional regeneration activities. The research makes a contribution through the use of evolutionary theory to examine this behaviour, in contrast to more usual university KT practice.

In the UK there has been huge government investment both in university research and, since the late 1990s, in KT activities. Understanding the influences that affect university relationships within their regions can help to ensure that this investment is beneficial to the UK economy. Also understanding the KT behaviour of universities allows for more effective policy making in this area.

High levels of regeneration activities from UK universities seem to be directly influenced by funding aimed at regeneration. However, it is not clear whether this focus originated with the receipt of funding or whether university policy, to actively engage with regeneration of their region, motivated the decision to utilise such funding. Some universities in receipt of very little regeneration funding still engage with their region and make a point of presenting themselves as doing so. As such regeneration activities would be considered to be unusual in comparison with the normal routines of research and teaching, it is interesting to note this departure and to speculate on the future of these activities.

The case study of the LEAD programme demonstrates evolutionary theory as a useful tool for exploring specific KT activities of a university.

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References

Antonelli, C. (1997) The economics of path-dependence in industrial organization, *International Journal of Industrial Organization,* 15, pp. 643-675

Arthur D Little. (2003), "Expansion of the Lancaster university management school and the Lancaster Leadership Centre: An Appraisal of the Impacts", *Report to North West Development Agency*. Cambridge, A D Little.

Benneworth, P. and Charles, D. (2005) University Spin-off Policies and Economic Development in Less Successful Regions: Learning from Two Decades of Policy Practice, European Planning Studies Vol. 13, No. 4, 537-557

Decter, M.H. (2009) Comparative review of UK-USA industry-university relationships, *Education + Training*, 51, 8/9, pp. 624-634

Decter, M., Rose, M. and Cave, F. (2010) The shaping of knowledge transfer from UK universities: an exploration of influences and motivations, The XXI ISPIM Conference - The Dynamics of Innovation, Bilbao, Spain, 6-9 June 2010

Franklin, S.J., Wright, M. and Lockett, A. (2001) Academic and Surrogate Entrepreneurs in University Spin-out Companies, Journal of Technology Transfer; Jan 2001; 26, 1-2; ABI/INFORM Global, pg. 127

Garud, R. and Karnøe, P. "Path Creation as a Process of Mindful Deviation" In *Path Dependence and Creation*, eds. Raghu Garud and Peter Karnøe, Mahwah, New Jersey: Lawrence Erlbaum Associates, 2001

HEFCE (2006) "Higher Education –Business and Community Interaction Survey 2003-4" July 2006/25, available on the HEFCE website http://www.hefce.ac.uk/pubs/hefce/2006/06_25/ Accessed July 2009- February 2010

HEFCE (2007) "Higher Education –Business and Community Interaction Survey 2004-5 and 2005-6" July 2007/17 available on the HEFCE website http://www.hefce.ac.uk/pubs/hefce/2007/07_17/ Accessed April 2008- February 2010

HEFCE (2008) "Higher Education –Business and Community Interaction Survey 2006-07" July 2008/22 available on the HEFCE website http://www.hefce.ac.uk/pubs/hefce/2008/08_22/Accessed July 2009- February 2010

HEFCE (2008a) Higher Education Innovation Fund round 4 Invitation and guidance for institutional strategies January 2008/02 available on the HEFCE website http://www.hefce.ac.uk/pubs/hefce/2008/08_02/ Accessed July 2009- February 2010

HEFCE (2009) “Higher Education –Business and Community Interaction Survey 2007-08” July 2009/23, available on the HEFCE website http://www.hefce.ac.uk/pubs/hefce/2009/09_23/ Accessed July 2009- February 2010
HEFCE (2010) “Higher Education – Business and Community Interaction Survey 2008-09” June 2010/14, http://www.hefce.ac.uk/pubs/hefce/2010/10_14/, data available from http://www.hesa.ac.uk/

Helfat, Constance E. (1994) Evolutionary trajectories in petroleum firm R&D, *Management Science, 40,* 12, pp. 1720-1747

Hodgson, G. M. (1998) The Approach of Institutional Economics, Journal of Economic Literature, Vol. XXXVI, pp. 166-192

Holi, M., Franklin, R., Hugo, E. and Lapinski, J. (2007) An Analysis of the UK University Technology and Knowledge Transfer Activities, Library House, November 2007, www.libraryhouse.net

Kenney, M. and von Burg, U. “Paths and Regions: The Creation and Growth of Silicon Valley”, In *Path Dependence and Creation,* eds. R. Garud and P. Karnøe, Mahwah, New Jersey: Lawrence Erlbaum Associates, 2001.

Lockett, A. and Wright, M. (2005) Resources, capabilities, risk capital and the creation of university spin-out companies, Research Policy 34 (2005) 1043–1057

Nelson, R. (2006) Evolutionary social science and universal Darwinism, *Journal of Evolutionary Economics*, 16, pp. 491–510

Nelson, R. and Winter, S. *An Evolutionary Theory of Economic Change*, Cambridge Massachusetts and London England, The Belknap Press of Harvard University Press, 1982.

Nooteboom, B. “Path Dependence and Knowledge: Implications for the Theory of the Firm”, In *Evolutionary Economics and Path Dependence*, eds. L. Magnusson and J. Ottosson, Cheltenham, Glos., UK: Edward Elgar, 1997.

Northwest Regional Development Agency (2006) Northwest Regional Economic Strategy, Available at http://www.nwda.co.uk/publications/strategy/regional-economic-strategy-200.aspx, Accessed August 2010

Office of the Deputy Prime Minister **“**The European Regional Development Fund – An Introductory Guide”, 2001, Published by the Office of the Deputy Prime Minister. Reprinted Sept 2005 (05RDG03345) Copies available from Email: richard.watkins@odpm.gsi.gov.uk

Phan, P.H. and Siegel, D.S. (2006) The Effectiveness of University Technology Transfer: Lessons Learned from Quantitative and Qualitative Research in the U.S. and the U.K., *Rensselaer* Working Papers in Economics, Department of Economics, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY, http://www.rpi.edu/dept/economics/www/workingpapers/

Rayson, P. (2003). Matrix: A statistical method and software tool for linguistic analysis through corpus comparison. *Ph.D. thesis*, Lancaster University

Shattock M. (2009) Research, technology and knowledge transfer In Shattock M. (Ed.) Entrepreneurialism in Universities and the Knowledge Economy - Diversification and Organizational

Change in European Higher Education, Chapter 3, pp.33-48, Society for Research in Higher Education and Open University Press, Maidenhead

Smith, L. & Peters, S. (2006). *Leading by Design: The Case of LEAD Full paper for Symposium: Entrepreneurial Leadership Learning*. British Academy Management: Belfast.

Wren, C. and Jones, J. (2006) Ex-post Evaluation of the LEAD programme. University of Newcastle upon Tyne, July 2006.

Websites

Individual University websites for background information and Annual Reports

University of Brighton, http://www.brighton.ac.uk/, Accessed August 2010

Buckinghamshire New University, http://bucks.ac.uk/, Accessed August 2010

University of Central Lancashire website, http://www.uclan.ac.uk/, Accessed August 2010

University of Lancaster, http://www.lancs.ac.uk/, Accessed August 2010

University of Portsmouth, http://www.port.ac.uk/, Accessed August 2010

University of Salford, http://www.salford.ac.uk/, Accessed August 2010

University of Southampton, http://www.soton.ac.uk/, Accessed August 2010

University of Brighton Annual Report http://www.brighton.ac.uk/annualreport/index.php?PageId=404 accessed Jan-Feb. 2010

Buckinghamshire New University Annual Report http://bucks.ac.uk/about/structure/directorates/finance.aspx Accessed August 2010

University of Central Lancashire Annual Report http://www.uclan.ac.uk/information/services/finance/accounting/2008/expenditure_account.php accessed Jan-Feb. 2010

Lancaster University Annual Report http://www.lancs.ac.uk/press/annualreport.htm accessed Jan-Feb. 2010

University of Portsmouth, Annual Report, http://www.port.ac.uk/aboutus/corporatepublications/ , Accessed August 2010

University of Salford Annual Report http://www.corporate.salford.ac.uk/annual-report/ accessed November-December 2007 and September-October 2009

University of Southampton Annual Report, http://www.soton.ac.uk/about/publications/index.html, Accessed August 2010

HEIF 4 Strategies http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy University of Brighton http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy UCLAN http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy University of Lancaster http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy University of Salford http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy Buckinghamshire New University http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy University of Portsmouth http://www.ikt.org.uk/ accessed April 2009

HEIF 4 Strategy University of Southampton http://www.ikt.org.uk/ accessed April 2009

Higher Education Statistics Agency (HESA) statistics, "Table R1 - Share of research output per share of research input, weighted by cost centre 2006/07" from http://www.hesa.ac.uk/ Accessed June 2009

Research Assessment Exercise THES interpretation http://www.timeshighereducation.co.uk/Journals/THE/THE/18_December_2008/attachments/RAE_2008_THE_RESULTS.pdf, Accessed Dec. 2008

Small Business Service, http://www.sbs.gov.uk/, Accessed January 2006

The De Minimis Regulation http://wales.gov.uk/topics/businessandeconomy/stateaid/sarules/deminimis/?lang=en

THES, "Times Higher Education Table of Excellence", http://www.timeshighereducation.co.uk/Journals/THE/THE/18_December_2008/attachments/RAE_2008_THE_RESULTS.pdf , Accessed Dec. 2008

University of Portsmouth website, http://www.port.ac.uk/aboutus/economicimpact/ Accessed August 2010