ESRC Research Project on *Knowledge Transfer in HE in Scotland*

Working Paper 2

KNOWLEDGE TRANSFER IN THE CONTEXT OF SCOTTISH HIGHER EDUCATION – THE POLICY AGENDA

Robert Jones
Centre for Educational Sociology, University of Edinburgh

A revised version of this paper has been submitted to *Discourse: Studies in the Culture and Politics of Education*.

For over a decade now, Scotland has witnessed an ongoing debate regarding the production, purpose and dissemination of knowledge created by its universities. This has been fuelled by concerns relating to both the performance and responsiveness of the higher education sector, and also of the Scottish company base. An important publication in the early stages of this debate was the *Commercialisation Enquiry*, produced by the Royal Society of Edinburgh and Scottish Enterprise (the enquiry began in 1994, and was issued in 1996). The report was prompted by fears that Scotland's economic competitiveness was being weakened by an inability to capitalise upon new technology and scientific breakthroughs. Many of the themes in this publication remained constant in the intervening years, and it is possible to identify, in subsequent policy literature, clear anxieties amongst policy makers linking to what are perceived to be the urgent demands of the knowledge economy in the context of increasing global pressures.

The following analyses focus on the ways in which knowledge transfer policies propose to reform the types of research and dissemination undertaken by universities. Through an examination of key policy texts in this field, the primary aim will be to locate areas of tension, and to pinpoint issues that are recurrently problematic. Following Ozga (2000), a range of questions will be posed to the policy texts. Amongst those set out by Ozga, the following are arguably of most relevance for the field under investigation:

- *What story is being presented? What images are present?*
- *What ideas and categories are present, and how - if at all - are these new? What is absent from the account?*
- *What is the logic/discursive construction of the argument?*

- *What do the texts imply about the relationship between e.g. state and civil society?*

Given the nature of the knowledge transfer context in Scotland, these questions can also be supplemented with several others. For example, the Scottish policy climate is somewhat unique – certainly in the UK. It has a devolved system of government with its own parliament, created in 1999 following the passage of the Scotland Act of 1998. The Scottish Executive (also established in 1999) constitutes the government in this arrangement, and its cabinet currently consists of 11 ministers from the parliament. Below these tiers is a range of agencies and organisations, with more or less specific remits and who may, in the course of policy development and implementation, seek to exercise varying degrees of influence and 'steerage'. These primarily include Scottish Enterprise (created in 1990 following the Enterprise and New Towns [Scotland] Act of that year), the main economic development agency in Scotland, and the Scottish Higher Education Funding Council (established in 1992). To these can be added the universities themselves who can - depending on levels of prestige and status - assert their own interests and positions. Supplementary questions may thus include the following:

- *What body, agency or organisation has issued the policy text?*
- *What are the primary roles and functions of this body?*
- *How do these roles relate to those of neighbouring agents?*

In posing these questions to the policy texts on knowledge transfer, it will also be instructive to pay due attention to the chronological aspect of the policy field, which will help to plot its evolution. As will be seen, certain issues and tensions endure throughout its course – though they arise in slightly different forms from time to time.

WHAT STORY IS BEING PRESENTED?

Returning to the first question, the task is to identify any narrative threads deployed by the policy texts, and to assess their purpose and rhetorical weight. Such threads can be seen first and foremost in relation to the perceived imperatives for knowledge transfer. The sense is one of urgency, and such threads sometimes describe an external threat menacing the Scottish economy. In its less dramatic forms, however, the imperatives narrative tends to employ the language of needs, demands and necessities. The Scottish economy is cast as one of many competitors in the global arena, and one that must strive to take full advantage of its knowledge, i.e. the scientific and technological products it creates. Thus, in 1999, the Scottish office spoke of '…the pressing need to maximise the transfer of knowledge from the science and engineering base into the market place,' (Scottish Office, 1999, section 1.3). The global context is characterised as one in which investment and products are flowing continuously: 'Since capital is mobile, technology spreads quickly and goods can be made in low cost countries and shipped to developed countries

such as our own. Scotland therefore needs to exploit capabilities which are hard to imitate,' (ibid).

The ferocity of this internationally competitive setting is occasionally viewed as something of an overt threat, giving the imperatives narrative a quite febrile flavour – as with this statement from the Executive:

> *It is clear that those countries which are most able to make connections between their academic research base and their industrial sectors are also best placed to capitalize successfully on discovery and innovation, to generate an entrepreneurial culture, and to raise their standards of living. Scotland cannot afford to be left behind in this increasingly fierce competition, and we must find ways to perform even better.* (Scottish Executive, 2003, p.42)

The threats in this global dimension may also arise in relation to the staffing of higher education institutions. The reader is told that Scotland must retain its researchers, and that it needs to address the eventuality of scientists leaving the country for more lucrative positions elsewhere. The Executive therefore talks of a 'key challenge' being to '…compete successfully for the best people in an increasingly competitive world,' (ibid. p41). This anxiety can be felt in other parts of Scotland's political administration too. For instance, in September 2003, the Scottish Parliament's Enterprise and Lifelong Learning Committee accepted evidence from Scottish Enterprise to address the staffing issue. The submission contains the following comment:

> *It is certainly the case that should all or most English HEIs be funded at a level per student significantly above that for Scottish HEIs, then Scottish HEIs would be at a competitive disadvantage. This in turn would mean doing less well in the competition for staff, students and research funding leading to an inevitable decline in performance relative to the rest of the UK and globally.*

This particular concern – regarding funding per student – emerged as a consequence of the UK government's 2003 white paper *The Future of Higher Education,* which proposed granting English universities (by 2006) the right to charge students up to £3000 to study on degree programmes. This policy obviously has the potential to create an additional source of revenue for HEIs south of the boarder. The fear in Scotland was that this new revenue stream would increase the research capacities of the English sector, in turn creating superior rates of remuneration – which might lure 'excellent' researchers away from Scotland. The issue also became a main focus in phase three of the Executive's HE review (published in 2004).

Regardless of how it is unpacked, the imperatives theme is arguably the most explicit narrative within the knowledge transfer policy agenda. That it constitutes a narrative should be evident from its linear structure, and – without wishing to stretch the point too far – its characterisations. Its linearity arises primarily from the policy texts' invocation of a historical dimension, which is mobilised to portray Scotland as a country struggling to establish its position in a changing and continually modernising world – it is a country that *must* move on from its past, when

manufacturing and manual labour were the order of the day. Secondly, with respect to characterisation, Scotland often seems cast as a threatened figure, labouring alongside stronger, faster and more successful opponents on one side, and on the other, rapidly evolving new economies who could usurp its position. The rhetorical function of this narrative strand should be apparent now. The knowledge economy is seen to exert new pressures on both the research base and commerce, and these can only be addressed through the introduction of reforms in Scotland.

WHAT IDEAS AND CATEGORIES ARE PRESENT - AND ARE THEY NEW?

In a broad historical sense, there is nothing new in the knowledge transfer agenda. A concern within government relating to the extent to which productive relations existed between the science base and industry can be traced back at least as far as the early decades of the twentieth century. During the first world war, such concerns led to the creation of the Department of Scientific and Industrial Research in 1918, originally organised by Sir Henry Frank Heath. More recently, it is perhaps possible to detect within the knowledge transfer agenda a continuation of the ’80s Thatcherite project of rendering the public sector more responsive to external exigencies, e.g. market forces – albeit in the more high-gloss formulations of New Labour.

But with such broad brush strokes, the details and complexity of this field of policy remain obscured. To clarify matters it is helpful to start by considering the goals that the policies hope to realise, and to break these down into discrete categories. As has been seen, at one level the main goal of the knowledge transfer agenda is to create the new knowledge economy – and / or meet its needs. And there, perhaps, is a key. To what extent do the policy texts assume the knowledge economy already exists? Is it seen to already been achieved by - or in - Scotland, and thus needs to be sustained? Or do the texts regard it as a goal, an ideal state towards which the relevant actors and organisations must proceed? Perhaps it is viewed primarily as a mode of progress, a policy goal articulating with particular sets of reforms and change.

Arguably the key knowledge transfer policy documents are not always clear on these fundamental questions. Nevertheless, if they are posed to the texts they can help to identify the categories around which they are organised. More specifically, if policy goals can be identified, it should then be possible to pinpoint the steps and means by which they will be reached, as well as those issues that are perceived to be obstacles and problems to progress.

Taking this line of reasoning to the texts, the following categories can be discerned. Firstly is that of ‘relevant knowledge.’ Notions of relevance are used by the policy texts to designate forms of knowledge that are held to be most appropriate for the knowledge economy. Its status as an analytical category will be established below, where it will be shown to contain – and open out onto – a set of issues that run through many of the most prominent policy texts linked to knowledge transfer. As will be seen, ‘relevance’ is often counterpoised by the term ‘excellence,’

and these generally exist in a rather uneasy relationship. It should also be noted here that, to a certain extent, the relationship between notions of relevance and excellence parallel those of applied and basic research.

A second category is that of 'knowledge markets.' Although this term is not used within the policy texts, it serves as a useful category heading to indicate some of the key ways in which knowledge transfer agenda has developed. That is to say, the process of transfer tends to be viewed as one in which universities will engage by freeing up their research findings, discoveries, inventions and technological breakthroughs to meet the requirements of the knowledge economy. Succinctly, central aspects of knowledge transfer policies are premised on notions of demand and supply. Moreover, it will become apparent that policy texts are often reliant upon such ideas to address what are seen to be the problems facing the creation of a successful knowledge economy.

Thirdly is the category of 'collaboration.' As in so many policy texts of the past decade, this term is used to set forth the ways in which public sector bodies, intermediate agencies, and private sector concerns will operate to avoid duplication of efforts and other inefficient or counter-productive practices that may arise from the introduction of market forces into the context of provision and service delivery. The term seems to be designed to avoid conveying a sense of centralised planning, whilst still retaining some residual notion of co-ordination – and is therefore useful for those policies addressing the often chaotic spaces created by the state's retreat from 'big' government. In the context of knowledge transfer policy, the category of collaboration is a heading beneath which the tensions of competition and governance are addressed. More specifically, its contents try to spell out the ways in which universities will engage with external agents (invariably those in the private sector), and also how they will create links between each other – sometimes to redress the excesses of competition brought about by policies such as the Research Assessment Exercise.

Obviously, the above 3 categories of relevant knowledge, knowledge markets and collaboration do not exhaust the list of categories that could be identified within the policy texts relating to knowledge transfer. However, they do provide a way into the content of the documents. And, whilst it is the case that the categories could perhaps be given different names, this should not detract from the fact that each one does head its own more or less discrete set of issues and policy contents, which when combined, constitute the most salient elements of the knowledge transfer discourse.

Category #1 – Relevant knowledge

Culturally, there is certainly little that is new about the current debates questioning the purpose and value of academic research – think here of Charles-Augustin Sainte-Beuve's remarks regarding Alfred de Vigny, and in the twentieth century, elements Hesse's last novel, *The Glass*

Bead Game. However, with respect to the knowledge transfer agenda, it can be argued that the current concern amongst policy makers is, if not unprecedented, at a new and high level. As indicated above, when exploring the relevant policy texts' contents relating specifically to knowledge, it is instructive to gauge the extent to which classification and orderings are present. In a consultation document published by SHEFC in 2000, research (and by implication knowledge) is viewed from four angles, with respect to excellence; in terms of depth; regarding its breadth; and in relation to commercialization and application. Having signaled its commitment to each of the first three aspects, the Council goes on to make the following statement:

> *It should be assumed that the Council's funding methods will seek to promote a greater emphasis on the application and commercialisation of research and on knowledge transfer. A strong capacity in basic research is a prerequisite for its application. However, the Council takes the view that universities and colleges must continue to be involved in creating the links with the users of research, including businesses and industry, charities, Government and the general public, which will lead to its practical application and the development of a knowledge-based society and economy. Such interaction also encourages a broader input to the establishment of the research agenda.*

Given the purported limitations and potential weaknesses of the present funding system (which the Council addresses under the heading 'Funding Pressures'), this constitutes a somewhat uneasy ordering. In a hypothetical context where the funding quantum can expand to accommodate new emphases, whilst also maintaining existing ones, a policy of sustaining basic research (that is excellent, wide and deep, etc.) and promoting commercialisation is achievable. However, in light of 'funding pressures,' according more weight to either one becomes problematic. This is arguably the central dilemma of the knowledge transfer agenda in Scottish higher education. In an attempt to address the tensions here, the Council broaches the possibility that funds can be focused '…on areas of the research base that are both relevant and excellent by international standards, within a broad research capability,' (p12). As the document proceeds to note, this implies identifying and prioritising research that achieves international renown, whilst also possessing sufficient relevance to create economic development. However, given the consultative nature of this document, this is forwarded as a possibility and discussion point, primarily.

The potentially uneasy relationship between basic research (which may also be thought of as research driven primarily by researchers' curiosity), and relevant research in the above SHEFC text has certain parallels with that of research breadth and - conversely - notions of focus, specialisation and applicability, set out in a document published by the Executive in the following year. In *A Science Strategy for Scotland* it is stated that '…while appropriate breadth is important, no country can afford to provide public funds for unlimited science activity, no matter

how good,'(Scottish Executive, 2001, p16). The Executive maintains that the aims and objectives of scientific research need to be clarified:

> *Public money is already targeted on the most important parts of the science base. This money pays for the skilled people, the resources and the physical infrastructure to work on areas of current or future importance. It also pays for specific projects relevant to our policy priorities. These priorities need to be continuously reviewed. We need to be clear about what we want the science base to do for us, and how broad, how strong, and how specialised it should be. (ibid)*

As with the SHEFC text, concerns relate to the funding quantum (linked evocatively here to the public sphere), and in turn to a dilemma between sustaining breadth, and the possibility of expanding specialised research. An imperatives theme can also be detected in this section of the text, where the Executive addresses other sources of funding:

> *The maintenance of an internationally strong science base depends on support for good quality, effective scientific research activity in the Higher Education sector and in other publicly funded bodies. This* ***needs*** *to be supplemented by privately funded research and development (R&D), including commercial R&D. (ibid, p17 – additional emphasis)*

This statement can also be thought to build on the idea forwarded by SHEFC, i.e. to focus finite resources on areas that may be regarded as both excellent and relevant. If relevant research can bring about economic development, then the Executive's call for contributions from the private sector can be regarded as appropriate. Nevertheless, given the private sector's tradition of intransigence in this capacity, the viability of this solution remains in doubt. The Executive's commitment to '…continue to provide funding to support curiosity driven research…to maintain appropriate breadth,' (ibid, p20) - whilst promoting the expansion of relevant research – is therefore problematic.

Perhaps not surprisingly, the issue was amongst those addressed in the following year by a specially convened 'joint task group,' consisting of Scottish Enterprise and the Scottish Higher Education Funding Council. In its report (*Research and Knowledge Transfer in Scotland*) there is both a sense of optimism and pessimism. On the one hand, a research culture tailored to meet the needs of the knowledge economy creating a symbiotic relationship between the spheres of knowledge production and consumption, supply and demand, etc.:

> *There is a positive feedback between an excellent knowledge base which interacts with innovative companies that feed on investment capital to stimulate growth, creating a virtuous cycle of further demand for skills and knowledge which in turn stimulate further economic activity.* (SHEFC and Scottish Enterprise, 2002, p2)

On the other hand is a quite different eventuality, arising from the potential threat posed to basic research, with its much valued breadth, excellence and depth, by a new and potentially, distractive focus on commercialisation:

> *A major shift from basic to applied or developmental research can only be a short term option. In the longer term, the decline of basic research will lead to the collapse of strategic and applied research and of the innovative capacity required in an effective knowledge economy.* (ibid, p5)

The stakes are seen to be high, then. In the absence of a correctly struck balance, far from achieving a virtuous cycle of growth, all aspects of the research base could be tipped into a downward spiral of decline. But there are other important factors to be considered here, which are of a separate – or at least, separable – order from those contained in the category of knowledge relevance. These factors link squarely to the notion of *transfer* and the ways in which the policy texts address the relationship between the production and consumption of knowledge.

Category #2 – Knowledge markets

To varying degrees, notions of production and consumption – and demand and supply – can be identified in all the main policy texts relating to knowledge transfer. Processes of transference tend to be conceived in quite linear terms, with e.g. the producer of knowledge at one end (invariably an HEI or university department), and a recipient commercial organisation at the other. Early on in the debate, the Royal Society of Edinburgh spoke of the '…"science push" of the research base,' and the '…"demand pull" of societal needs,' (Royal Society of Edinburgh, 1996, p16). It would also not be too much of an overstatement to say that the policy thinking around knowledge transfer has developed around notions of technological innovation. This may help to explain why linear models frequently seem so present in the texts. Indeed, the general idea of the knowledge economy is prone to technological determinism, and it should therefore not be too surprising that the subsequent policy developments have incorporated much of this emphasis. At any rate, a major concern in knowledge transfer policy relates to gauging, encouraging and assessing the extent to which there exists a healthy supply of relevant knowledge, and a corresponding demand for it.

An early commentary on this issue is contained in the Royal Society of Edinburgh's Commercialisation Enquiry, which reports that the marketing of ideas by universities can result in their use by business, allowing companies to become more prosperous, which has a subsequent positive effects for HE: 'With more support from the local economy, the university is better placed to compete internationally for both students and research income.' Anticipating the 'virtuous cycle' envisaged by SHEFC and Scottish Enterprise in their joint-publication from 2002, this situation is seen to create a mutually beneficial relationship for the two parties:

> *The university sector becomes an integral part of the economy's capacity for innovation. Within this framework, the future well-being of the university sector and the Scottish Economy are interdependent.* (Royal Society of Edinburgh and Scottish Enterprise, 1996, p9)

However, it is also noted that for such a process to emerge '…there must be a reasonable match between outputs from the university sector and the structure and requirements of the Scottish economy,' (ibid). As the knowledge transfer policy debate has evolved, the ways in which a 'reasonable match' between the two spheres will be achieved can be seen to have varied. At times it has identified problems on the demand side of the relationship. Thus in 1999, the Executive relayed a conclusion drawn by the knowledge economy taskforce:

> *The key issue which the taskforce believed has not been receiving full attention concerns the ability of the Scottish company base to absorb the fruits of scientific discovery. They considered that the potential here has neither been fully explored nor exploited.* (Scottish Executive, 1999, section 1.8)

The Executive proceeds to emphasise this point by directing Scottish Enterprise's efforts to this end, and, interestingly, implies that hitherto this agency has been overly concerned with addressing the supply side of the knowledge transfer process, i.e. with the place and efforts of the HE sector. Section 1.9 thus calls for '…rebalancing the efforts of Scottish Enterprise much more towards the company base as the users of new technology and less towards the HEIs and research institutes as the producers of science and technology.'

The practical measures proposed by the Executive called for HEIs to work with 'clusters' (themed areas of economic activity and development identified by Scottish Enterprise), whilst noting that this approach may not receive the full endorsement of institutions:

> *From the economic development perspective the key need is to link the work of SE's cluster teams to the potential technology emerging from HEIs and research institutes... From the higher education perspective… this might seem overly restrictive but the number of clusters is set to grow and those already identified match particular Scottish research strengths in life sciences, electrical engineering and food/nutrition. Moreover, the clusters teams will have a detailed knowledge of market opportunity and capacity in their sectors which, when matched with HEI research, will help point the way to those projects with a higher probability of success.* (Scottish Executive, ibid, section 1.23)

This focus on clusters is probably influenced, either directly or indirectly, by the work of Michael Porter (e.g. Porter, 1990). The thinking here is that economic development can be highly dependent upon the extent to which businesses in a specifiable sector can thrive through the creation of links, links which may often be of an informal nature. Despite the advent of digital communication and the compression of space and time, geographical concentration is still seen to be a crucial factor. The example that is usually cited in discussions around clusters is, of course, that of Silicon Valley, south of San Francisco. However, in a consultation paper from 2000, SHEFC make a somewhat circumspect statement regarding the role of clusters and the idea that research and dissemination by HEIs should be tailored to them:

> *There are some arguments in favour of focusing funding on areas of high quality research that might underpin proposals for economic development in Scotland, such as the proposals by Scottish Enterprise for clusters, where such strategies have long-term horizons…However, the Council considers that it would be unwise to use the cluster areas as the main, or only, means of defining research that has potential relevance.* (SHEFC, 2000, p24)

Bracketing the issue of knowledge types (raised by the reference to relevance), the above seems to suggest a degree of tension between the roles of Scottish Enterprise and SHEFC, and perhaps – in turn – between the SHEFC's position and the policies of the Executive. SHEFC appears anxious to remain at some distance from the process of kick-starting the private sector's ability to soak up knowledge, at least via clusters. Nor would this tension become completely resolved by the creation of a 'joint-task group' consisting of the two parties created in 2002, culminating in the report *Research and Knowledge Transfer in Scotland.* As was seen in the discussion of relevant knowledge, this report advances a number of potential problems regarding the ways in which a re-jigged focus on the types and quantity of knowledge produced by Scottish universities could undermine the excellence and breadth of research. With respect to the closely linked issues of how to address the question of the supply and demand of knowledge, and where the causal factors of weakness may lie here, the report offers some quite forthright comments. Firstly it echoes views from e.g. the Executive that there is a lack of capacity on the demand side, i.e. within the Scottish company base. Secondly, HEIs are cited as a key means of addressing this:

> *'…universities will need to commit themselves to proactive knowledge transfer in support of economic development as a part of their core mission. The public policy objective for such a compact is clear: in the absence of strong business pull on the knowledge base, the objective is to enable the universities to push strongly by active involvement in the process of creating a larger knowledge-based industrial sector.'* (SHEFC and Scottish Enterprise, 2002, p10)

There is, however, at least one potential obstacle in the path to enabling universities to 'push' out the knowledge required by a highly innovative Scottish knowledge economy. Or, rather, there may be a problem relating to *where* universities push their knowledge. Here it will be helpful to make a distinction between outcome and outreach activity. The distinction was proposed by Dr. Kevin Cullen of Glasgow University in a submission to the Scottish Parliament's Enterprise and Lifelong Learning Committee in February 2003, and is instructive when addressing the ways in which markets for knowledge can operate. Crudely, if a university undertakes outcome activity it will strive to create financial returns to the institution – an example may be seen in the case of licensing deals, where the rights to market a new idea, prototype product or technological breakthrough (a piece of 'intellectual property') etc., could be sold to a commercial organization, although the HEI may also retain a stake in such an arrangement. Conversely, outreach activity designates activity that is far less concerned with generating profit for the institution; the goal is

to bring about economic development – usually in a local or regional context. In one sense, the distinction is between that of exogenous and endogenous spheres.

On examining these two types of engagement more closely, it becomes evident that the nature of knowledge markets presents a problem for policy makers. Firstly, monies created by licensing arrangements are particularly attractive to universities because the institution retains a considerable degree of autonomy in relation to how, where and when it is spent, unlike other sources of funding which may be earmarked for specific purposes. This point was noted back in 1996 by the Royal Society of Edinburgh Commercialisation Enquiry:

> *Income from licensing is significant to the universities. It is unallocated money which can be used in any way the university chooses. For example, it could be used to 'seed' new areas of research or create new facilities. Licensing deals can also lead to contract research income being generated in parallel, with the licensee as sponsor.* (RSE and SE, 1996, p14)

Thus any 'steerage' that policy bodies may seek to introduce regarding such activity is likely to be experienced with a degree of reluctance by those institutions for which outcome work is a valuable source of income. There is a circular aspect to the problems here too, for as has already been seen, the Scottish Executive's science strategy acknowledges that to sustain the growth in excellent research by universities, contributions from commercial sources must grow (Scottish Executive, 2001, p17). For some HEIs this could well already have been the goal of those activities that could be filed under the 'outcomes' heading. To maximize commercial funding, universities may well pursue lucrative licensing opportunities outwith the Scottish context. From the view point of those seeking to enhance the position of the national economy, this could be seen to grant further advantage to foreign competitors. The difficulty is that in trying to maximize their outcome revenues, HEIs will be tempted to look beyond the Scottish context, and towards more developed economies that are able to capitalise on their innovative research. This may also then impinge upon their capacity to undertake outreach work, designed to bring about endogenous economic development. In short, the most propitious way to achieve the goal of attracting commercial funding may create tensions with the goal of national economic development. Yet, while a focus on outcome activity could compound the weaknesses of the internal economy, there is the converse danger that a stress upon outreach work will lead to the neglect of highly innovative research, and the ability of institutions to become less reliant upon public funding.

At this juncture, it may be asked if this is merely a restatement of the dilemma identified in the case of 'relevant' versus 'excellent' research. This is not the case, however. The distinction between excellence and relevance and that of outcome and outreach activity is quite separate. Where the former is used to categorise what knowledge is produced by universities, the latter is intended to signify where (and why) this knowledge is transferred. On one level, it must surely be assumed that the knowledge transferred in either an outreach or outcome capacity will be

relevant (the extent to which it can also be deemed ‘excellent’ by current criteria such as those used in the RAE is immaterial).

Summarily, the category of knowledge markets is an element of the knowledge transfer policy discourse forged around notions of supply and demand, and the view that the HE sector must meet the needs of the knowledge economy, or where such needs cannot be identified, perhaps to help create them. One of the more recurrent problems with the model links to how the market is to be defined – should it be built primarily around a national purview, or a more global one? As will be seen, this tension is still present in the following category, headed ‘collaboration.’

Category #3 - Collaboration

Despite the frequency with which the term collaboration is used in many contemporary policy texts, it remains somewhat opaque. For one thing, it seems to stand in an uneasy relationship with the idea of competition - a policy goal that was, of course, very much at the forefront of reforms to the public sector in the 1980s and beyond. To a large extent, collaboration acts as something of a political caveat or qualifier, a term that seeks to blunt the sharp edge of meanings encompassed by competition, and wholly unfettered, random and frenetic activities created by marketisation. Notions of collaboration often appear to serve a similar purpose in the texts relating to knowledge transfer. It has already been noted that Scottish Enterprise’s clusters strategy is reliant upon some degree of co-operation between business and corporations, and also between them and relevant public sector bodies. It is, in short, the Silicon Glen phenomenon. The task is to therefore assess more specifically how the term functions in the relevant policy texts and to examine how it relates to the forms of research and dissemination that are seen to be required by the knowledge economy.

Back in the early part of the knowledge transfer debate in Scotland, the Royal Society of Edinburgh asserted the importance of ‘proximity’ in the context of economic development created from largely knowledge-based activity. The Society was influenced by an OECD report which it said had ‘…demonstrated that proximity to sources of knowledge is a source of competitive advantage because of the tacit nature of much know-how,’ (Royal Society of Edinburgh, 1996, p12). In some ways, this is ironic, given that other aspects of the rhetoric surrounding the knowledge economy tend to stress the ways in which time and space have been subject to considerable compression, courtesy of the rapid speed at which communication now takes place. Perhaps the point here relates more to quality of communication, rather than its quantity and rate, i.e. the extent to which informal exchanges of ideas occur, and the ways in which some sort of localized, shared communities of research and development emerge. In any case, the Society concluded that ‘…a lack of networking in Scotland is perhaps one of the most important issues to be identified by the commercialization enquiry,’ (ibid p27).

There is, however, another element to the advocated policy of collaboration. This relates more to the higher education sector and to institutional practices, rather than the 'external' context of collaboration between e.g. commercial organizations and universities. For the Royal Society of Edinburgh, part of the problem was seen to lie with the Research Assessment Exercise (the means by which universities compete to receive funding for research). They held that this allocation method resulted in a situation which was inimical to the development of research processes appropriate to knowledge transfer: 'It has not in the past encouraged a culture of interdisciplinary cooperation, which is becoming an increasingly significant factor in industrially relevant research,' (Royal Society of Edinburgh, 1996, p24). The antagonistic relationships put in place by this approach to funding were also seen to create problems for the structure of the sector more generally, in that institutions with a history of undertaking applied forms of research might become encouraged to join the struggle for 'excellence:'

> *The new universities are likely to find it difficult to obtain funding under this new system. They appear to have two broad options: either to accept that the principal route to increased research income will be industry-funded work rather than public sources, or to seek to achieve the RAE ratings necessary for public funding, possibly at the expense of their existing relationships with industry.* (ibid)

A further factor informing the perceived need to create collaborative practices relates to the resource-intensive nature of the science research base. The expense of innovative scientific apparatus means that it is not always possible for each institution to purchase its own equipment. This point was made in the Garrick report of 1997 (a part of the National Committee of Inquiry into Higher Education focusing on Scottish higher education):

> *We believe that greater collaboration in research is needed across the sector generally, as multidisciplinary research becomes increasingly important, and as the demands for, and the costs of, leading edge technologies and facilities escalate.* (NCIHE, 1997, section 4.107)

SHEFC endorsed this view in its consultation paper, *Research and the Knowledge Age* (2000), where it was noted that 'The increased costs of research…will require greater collaboration…as expensive resources for research…are concentrated in particular sites,' (SHEFC 2000, p29). Endeavouring to spell out in more detail how collaborative processes between HEIs and commercial concerns might develop, the joint task group of 2002 (consisting of SHEFC and Scottish Enterprise) proposed the creation of 'halfway houses.' Part of the intention of these proposed hybrid organizations is not for them to create discrete 'spin-out' companies, '…but to be an incubation route that facilitates spin-out and start up activity,' (SHEFC and Scottish Enterprise, 2002, p11). However, the potential difficulty with such intermediate bodies is that, as the task group notes, they may evolve into competitors, pursuing the same funding sources and markets as HEIs. Clearly then, there is the possibility that such a proposal could have the opposite outcome to the original policy goal. Rather than encouraging and sustaining cross-

sector collaboration, the halfway house could break away from the host-institution and come to occupy a wholly independent - and perhaps ultimately opposed – position.